

# Regional Association II (Asia)

Fifteenth session

Doha

13–19 December 2012

Abridged final report with resolutions



**World  
Meteorological  
Organization**

Weather · Climate · Water

WMO-No. 1106



# Regional Association II (Asia)

Fifteenth session

Doha

13–19 December 2012

Abridged final report with resolutions



**World  
Meteorological  
Organization**  
Weather • Climate • Water

WMO-No. 1106

WMO-No. 1106

© World Meteorological Organization, 2012

The right of publication in print, electronic and any other form and in any language is reserved by WMO. Short extracts from WMO publications may be reproduced without authorization, provided that the complete source is clearly indicated. Editorial correspondence and requests to publish, reproduce or translate this publication in part or in whole should be addressed to:

Chair, Publications Board  
World Meteorological Organization (WMO)  
7 bis, avenue de la Paix  
P.O. Box 2300  
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0) 22 730 84 03  
Fax: +41 (0) 22 730 80 40  
E-mail: [publications@wmo.int](mailto:publications@wmo.int)

ISBN 978-92-63-11106-7

#### NOTE

The designations employed in WMO publications and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of WMO concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or products does not imply that they are endorsed or recommended by WMO in preference to others of a similar nature which are not mentioned or advertised.

This report contains the text as adopted by Plenary and has been issued without formal editing. Acronyms used in this report may be found in METEOTERM, the WMO terminology database, at: [http://www.wmo.int/pages/prog/lsp/meteoterm\\_wmo\\_en.html](http://www.wmo.int/pages/prog/lsp/meteoterm_wmo_en.html). Acronyms may also be found at: [http://www.wmo.int/pages/themes/acronyms/index\\_en.html](http://www.wmo.int/pages/themes/acronyms/index_en.html).

# CONTENTS

Page

## GENERAL SUMMARY OF THE WORK OF THE SESSION

<b>1.</b>	<b>OPENING OF THE SESSION</b> (RA II-15/Doc. 1 and 2) .....	<b>1</b>
<b>2.</b>	<b>ORGANIZATION OF THE SESSION</b> (RA II-15/Doc. 1 and 2).....	<b>2</b>
2.1	Consideration of the report on credentials .....	2
2.2	Adoption of the agenda (RA II-15/Doc. 2.2(1)).....	2
2.3	Establishment of committees .....	2
2.4	Other organizational matters.....	3
<b>3.</b>	<b>REPORT BY THE PRESIDENT OF THE ASSOCIATION</b> (RA II-15/Doc. 3) .....	<b>3</b>
<b>4.</b>	<b>PROGRAMME ACTIVITIES – REGIONAL ASPECTS</b> .....	<b>5</b>
4.1	Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate, water and related environmental predictions, information, warnings and services in response to users’ needs, and to enable their use in decision-making by relevant societal sectors (RA II-15/Doc. 4.1) .....	5
4.2	Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements (RA II-15/Doc. 4.2) .....	12
4.3	Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies (RA II-15/Doc. 4.3) ..	16
4.4	Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO (RA II-15/Doc. 4.4(1), RA II-15/Doc. 4.4(2); RA II-15/Doc. 4.4(2) ADD. 1).....	23
4.5	Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development (RA II-15/Doc. 4.5) .....	32
4.6	Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates (RA II-15/Doc. 4.6).....	36
4.7	New and strengthened partnerships and cooperation activities to improve NMHSs’ performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategic issues (RA II-15/Doc. 4.7) .....	39
<b>5.</b>	<b>STRENGTHENING GOOD GOVERNANCE</b> .....	<b>40</b>
5.1	An effective and efficient Organization (RA II-15/Doc. 5.1(1); RA II-15/Doc. 5.1(2); RA II-15/Doc. 5.1(13); RA II-15/Doc. 5.1(4)) .....	40
<b>6.</b>	<b>GLOBAL FRAMEWORK FOR CLIMATE SERVICES AND FOLLOW-UP TO Cg-Ext.(2012)</b> (RA II-15/Doc. 6); .....	<b>50</b>
<b>7.</b>	<b>EMERGING ISSUES AND SPECIFIC CHALLENGES</b> (RA II-15/Doc. 7) .....	<b>53</b>
<b>8.</b>	<b>WMO REGIONAL OFFICE FOR ASIA AND THE SOUTH-WEST PACIFIC INCLUDING WMO OFFICE FOR WEST ASIA</b> (RA II-15/Doc. 8) .....	<b>57</b>
<b>9.</b>	<b>SCIENTIFIC LECTURES AND DISCUSSIONS</b> (RA II-15/Doc. 9) .....	<b>61</b>

<b>10.</b>	<b>REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS</b> (RA II-15/Doc. 10) .....	<b>61</b>
<b>11.</b>	<b>ELECTION OF OFFICERS</b> (RA II-15/Doc. 11) .....	<b>62</b>
<b>12.</b>	<b>DATE AND PLACE OF THE SIXTEENTH SESSION</b> (RA II-15/Doc.12 and 13) .....	<b>62</b>
<b>13.</b>	<b>CLOSURE OF THE SESSION</b> (RA II-15/Doc.12 and 13).....	<b>62</b>

## RESOLUTIONS ADOPTED BY THE SESSION

<i>Final No.</i>	<i>Session No.</i>		
1	4.1/1	The implementation of the WMO Strategy for Service Delivery in Regional Association II (Asia) .....	64
2	4.3/1	Implementation and operation of Regional Climate Centres.....	65
3	4.4/1	Regional WMO Integrated Global Observing System Implementation Plan .....	67
4	4.4/2	Regional Basic Synoptic Network and Regional Basic Climatological Network in Region II .....	99
5	4.4.2/1	WMO Information System .....	123
6	4.4.2/2	Amendments to the <i>Manual on the Global Telecommunication System</i> , (WMO-No. 386), Volume II.....	126
7	5.1/1	Regional Association II Management Group.....	132
8	5.1/2	Regional Association II Working Group on Weather Services .....	134
9	5.1/3	Regional Association II Working Group on Climate Services .....	138
10	5.1/4	Regional Association II Working Group on Hydrological Services.....	141
11	5.1/5	Regional Association II Working Group on WMO Integrated Global Observing System and WMO Information System.....	143
12	5.1/6	Regional Association II Implementation Coordination Team on Service Delivery .....	147
13	5.1/7	Regional Association II Implementation Coordination Team on Disaster Risk Reduction.....	149
14	5.1/8	Pilot Project to Develop Support for National Meteorological and Hydrological Services in Numerical Weather Prediction .....	152
15	5.1/9	Pilot Project on Information Sharing on Climate Services.....	154
16	5.1/10	Pilot Project to Develop Support for National Meteorological and Hydrological Services in the Collection and Application of Aircraft Meteorological Data Relay Data .....	155
17	5.1/11	Pilot Project to Sustain and Enhance the Capacity of National Meteorological and Hydrological Services in the Provision of Official Weather Forecasts for the Medium Range .....	156
18	5.1/12	Pilot Project to Enhance the Seamless Provision of Regional Severe Weather Warnings and Advisories .....	158
19	5.1/10	Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association II (Asia) (2012–2015).....	160
20	10/1	Review of previous resolutions and recommendations of the Association.....	161

## ANNEXES

I	Regional Training Centres in Region II (paragraph 4.6.11 of the general summary).....	166
II	Membership of subsidiary bodies of Regional Association II (Asia) (paragraph 5.1.15 of the general summary).....	167
III	List of experts to whom certificates were awarded (paragraph 5.1.23 of the general summary).....	169
IV	Strategy Part of the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015 (paragraph 5.1.50 of the general summary) .....	171
V	Designation and mandatory functions of Regional Specialized Meteorological Centres with activity specialization in atmospheric sandstorm and duststorm forecasts (paragraph 7.2.1 of the general summary) .....	173
	APPENDIX. List of participants.....	174





# GENERAL SUMMARY OF THE WORK OF THE SESSION

## 1. OPENING OF THE SESSION (agenda item 1)

1.1 At the kind invitation of the Government of the State of Qatar, the fifteenth session of Regional Association II (Asia) was held in Doha, State of Qatar, from 13 to 19 December 2012. The session was declared open by Prof. Victor E. Chub, president of the Association, at 10.00 a.m. on Thursday, 13 December 2012 at Courtyard by Marriott Doha City Center Hotel.

1.2 Prof. Chub expressed his appreciation to the Government of the State of Qatar for hosting the session in Doha and the excellent arrangements made. The president noted that this session was attended by the representatives of the Region for the common goal to facilitate the development and modernization of the National Meteorological and Hydrological Services (NMHSs) with support of WMO. He recalled that NMHSs had great influence on the sustainable development of their countries through the provision of weather, climate and water services to users. The president stressed that decisions and outcomes of this session including the regional aspects of WMO strategic planning would serve as a basis for the further modernization and capacity development of NMHSs during the intersessional period.

1.3 Mr Ahmed Abdulla Mohammed, Permanent Representative of Qatar with WMO and Director of the Qatar Meteorological Department extended a warm welcome to all participants. He hoped that through the discussions on important issues related to meteorology and hydrology in the Region, the session would have clear perspectives for the improvement and enhancement of NMHSs. Noting that the oceans provide a vital source of food, energy, water and mineral resources and they are an essential component of the Earth's climate system, Mr Mohammed was pleased to inform the session that the establishment of a dedicated Gulf Marine Center focusing mainly on marine weather forecasting was being proposed with the support of the Government, neighbouring countries and WMO. He thanked the Chairman of the Qatar Civil Aviation Authority for his unlimited support to the meteorological projects.

1.4 Mr Mohammed noted that effective climate services would facilitate climate-smart decisions with more information that would reduce the impact of climate-related disasters, improve food security and health, and enhance water resources management and improve the environment. In this respect, he expressed his appreciation to the Secretary-General of WMO for his actions to increase the political profile and relevant contribution of WMO and NMHSs to international initiatives to respond to the global challenges directly connected or influenced by climate variability and climate change, especially regarding the implementation of the Global Framework for Climate Services (GFCS).

1.5 Mr Michel Jarraud, Secretary-General of WMO, in his address, expressed the deep appreciation of WMO to the Government of the State of Qatar for hosting the session as further evidence of Qatar's strong commitment to WMO's Programmes and activities. He extended a warm welcome to all participants. He thanked Prof. Victor E. Chub, president of the Association, and Dr Qamar-uz-Zaman Chaudhry, vice-president of RA II, for their leadership and the successful implementation of the programmes and activities of the Association during the intersessional period. He expressed WMO's appreciation to all the chairs, coordinators and theme leaders of working groups and pilot projects, for their key services.

1.6 He noted that WMO featured prominently in the work of the eighteenth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP-18) and underlined the relevance of GFCS to address the adverse impacts of climate change through systematic observations, data and information sharing, and enhanced adaptation capacity.

1.7 In looking to the future, the Secretary-General identified some issues in the Region that the Association should consider when planning its future work programme, including the further improvement of NMHSs' capabilities for service delivery, at national and regional levels; enhanced

efforts to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements, and to strengthen the role of NMHSs in disaster risk reduction in coordination with relevant partners and international and regional organizations; additional efforts to enhance capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings.

1.8 He wished all the delegates an enjoyable stay in Doha and a very successful and productive session.

1.9 H.E. Mr Abdul Aziz Al-Nueimi, Chairman of the Qatar Civil Aviation Authority extended a warm welcome to all participants. He expressed his sincere appreciation to H.E. Sheikh Hamad Bin Jassim Bin Jabr Al-Thani, Prime Minister and Minister of Foreign Affairs for his kind patronage of this session. H.E. Mr Al-Nueimi, on behalf of H.E. Sheikh Jabr Al-Thani, conveyed his wishes for the successful and fruitful discussions at this session. He also expressed his appreciation to His Highness Amir of Qatar and His Highness Heir Apparent for their unlimited support for the upgrading projects of the Qatar Meteorological Department in response to the growing role of the Qatar Meteorological Department in enhancing the economic and social development. He mentioned that organization of COP-18 and this session in Doha showed the commitments and obligations of Qatar for the improvement of meteorological and climate services, locally, regionally and globally. He hoped that the session would provide a unique opportunity for delegates to review the progress and planning for the future strategies of the Region, and how to provide the resources to support advancing the contribution of NMHSs to the safety and well-being of the people throughout the world and conservation of the natural environment. He assured that the Government of Qatar would be willing to organize this type of global gathering of international importance. Finally, he wished all delegates fruitful discussions at this session and pleasant stay in Doha.

## **2. ORGANIZATION OF THE SESSION (agenda item 2)**

### **2.1 Consideration of the report on credentials (agenda item 2.1)**

2.1.1 The representative of the Secretary-General presented reports on credentials taking into account the documents received prior to and during the session. The Association accepted the report and declared that it would not be necessary to establish a Credential Committee.

2.1.2 The session was attended by 90 participants from 30 Members of Regional Association II (Asia), 10 observers from 5 Members from outside the Region and 1 from a regional organization. The list of participants is given in the [appendix to the present report](#).

### **2.2 Adoption of the agenda (agenda item 2.2)**

The proposed annotated agenda for the session was unanimously adopted, as contained in RA II-15/Doc. 2.2(1).

### **2.3 Establishment of committees (agenda item 2.3)**

2.3.1 It was agreed that the work of the session be carried out in plenary sessions to deal with the various agenda items. General Plenary was to be chaired by the president and the vice-president; Plenary A co-chaired by Mr Ahmed A. Mohammed (Qatar) and Mr C.M. Shun (Hong Kong, China), Plenary B co-chaired by Mr Mohammad Karam Ali (Kuwait) and Ms A. Habib (Bangladesh).

2.3.2 The following committees were established for the duration of the session:

### *Nomination Committee*

2.3.3 A Nomination Committee was established composed of the principal delegates of Afghanistan, China and Thailand.

### *Coordination Committee*

2.3.4 A Coordination Committee was established, comprising of the president and the vice-president of the Association, the representative of the Secretary-General, the co-chairs of Plenaries A and B and secretaries of the General Plenary, Plenary A and Plenary B.

## **2.4 Other organizational matters (agenda item 2.4)**

2.4.1 The Association established its working hours for the duration of the session. The Association agreed that no minutes of the General Plenary sessions would be produced unless a Member specifically requested that it should be done for a particular item.

2.4.2 The Association designated the principal delegate from the Republic of Korea as rapporteur on Agenda item 10 – Review of previous resolutions and recommendations of the Association and of relevant Executive Council resolutions.

2.4.3 The Association agreed to waive the Regulation 110 during the duration of the session.

## **3. REPORT BY THE PRESIDENT OF THE ASSOCIATION (agenda item 3)**

3.1 The Association noted with appreciation the report of the president of RA II which provided an overall review and assessment of the major activities of the Association since its fourteenth session and expressed satisfaction at the effective manner in which the activities of the Association were being undertaken. The president also highlighted the issues that the Association would have to address, such as the implementation of the RA II Strategic Operating Plan for the Enhancement of NMHSs in RA II (Asia) 2012–2015; the future working mechanism of the Association; and other priority activities, including the implementation in the Region of the high priority activities decided by the Sixteenth Congress (2011) in the areas of: the Global Framework for Climate Services (GFCS); implementation of the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS); Aeronautical Meteorology; Capacity Development; and Disaster Risk Reduction (DRR).

3.2 The Association commended its president, Prof. Victor E. Chub (Uzbekistan), for the dedication, enthusiasm and initiative with which he had conducted the affairs of the Association, thus contributing to the further development of weather, climate and water services in the Region. The Association also commended the vice-president, Dr Qamar-uz-Zaman Chaudhry (Pakistan), for his valuable contribution to the work of the Association and support to the president. It also expressed its appreciation to the chairs, coordinators and theme leaders of working groups as well as coordinators and members of coordinating groups of pilot projects, who had effectively collaborated in carrying out the activities of the Association.

3.3 The Association extended its appreciation to Members who hosted various regional events during the intersessional period and encouraged them to continue to provide the necessary support to the activities of the Association.

3.4 The Association reaffirmed the importance of the setting up of multi-hazard early warning systems within its Members, in light of the disastrous earthquake and tsunamis on 11 March 2011 and subsequent nuclear power plant incidents in Japan and the severe floods in Pakistan in July/August 2010, and requested the Secretary-General to continue assistance to Members in this regard.

3.5 The Association recognized with satisfaction the following achievements in the Region:

- (a) Successful implementation of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services in RA II (Asia) (2009–2011) and the development of the RA II Strategic Operating Plan for 2012–2015;
- (b) Implementation of the new working mechanism of the Association for effective implementation of the RA II Strategic Plan by establishing the Management Group and four working groups with sub-groups and themes;
- (c) Successful implementation of five Pilot Projects: on Provision of City-Specific Numerical Weather Prediction Products to Developing Countries via the Internet; on Support for the Developing Countries in the Aeronautical Meteorology Programme, to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations; to Develop Support for NMHSs in Numerical Weather Prediction; and to Develop Support for NMHSs in Satellite Data, Products and Training. The project on Provision of City-Specific Numerical Weather Prediction Products to Developing Countries via the Internet became operational in July 2011;
- (d) Progress in the establishment and enhancement of the Regional Climate Centres (RCCs) in RA II with the two designated RCCs in Beijing and Tokyo and four candidate RCCs in India, Islamic Republic of Iran, Russian Federation and Saudi Arabia; and conducting Regional and Subregional Climate Outlook Forums (RCOFs), to support the work of the GFCS;
- (e) Substantial improvement in upgrading GTS links and progress on WIS implementation through operational services of GISCs Beijing and Tokyo and trial operations at four conditionally-designated GISCs in Seoul, New Delhi, Tehran and Jeddah, as well as the development of a WIS Implementation Plan for RA II by the Coordinator of the Sub-Group on WIS and two dedicated (Local Secondment) experts from China and Republic of Korea;
- (f) Development of a Regional WIGOS Implementation Plan for RA II through the establishment of the Task Team;
- (g) Development and initiation of two Severe Weather Forecasting Demonstration Projects (SWFDP) for Southeast Asia and the Bay of Bengal region;
- (h) Implementation of the initiative of the Asian node of the WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS);
- (i) Further enhancement of partnerships with UN and regional organizations/bodies, including UNDP, UNISDR, UNEP, ASEAN, UNESCAP, UNESCWA, the League of Arab States (LAS), CASPCOM, the Mekong River Commission, and a new partnership with the Cooperation Council for the Arab States of the Gulf (GCC).

3.6 The Association noted that specific challenges to RA II relate to further development of RA II RCC network activities to contribute to the GFCS at national and regional levels and implementation of regional WIGOS and WIS Implementation Plans and regional WHYCOS projects including Aral-HYCOS, as well as quality management, cost recovery, sand and dust storms, thunderstorms and associated extreme weather events. In this respect, the Association requested the Secretary-General and Members to give high priority to these subjects in order to be able to address future challenges of the Region.

3.7 The Association was pleased note that the Regional Office for Asia and the South-West Pacific, located in Geneva, and the WMO Office for West Asia, located in Bahrain, have played an important role in various regional activities including the support for the president.

#### **4. PROGRAMME ACTIVITIES – REGIONAL ASPECTS (agenda item 4)**

##### **4.1 Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate, water and related environmental predictions, information, warnings and services in response to users' needs, and to enable their use in decision-making by relevant societal sectors (agenda item 4.1)**

###### **Public Weather Services (PWS)**

4.1.1 The Association commended the work carried out for the implementation of the Public Weather Services (PWS) Programme in Regional Association II (RA II, Asia) during the intersessional period. It emphasized that services provided to the public through Members' PWS Programmes and activities represented the most visible part of the work of National Meteorological and Hydrological Services (NMHSs), and as such, made a significant contribution to their credibility. The PWS Programme contributed to Members' service delivery efforts by concentrating on user-focus, quality management and developing capabilities in NMHSs for the continual improvement of quality in the delivery of weather, and related environmental services to user communities, and, in particular, to the public. The Association requested that the PWS Programme continue to support the implementation of Members' PWS activities at the national level, particularly in the developing and Least Developed Countries (LDCs) of the Region.

###### ***The WMO Strategy for Service Delivery***

4.1.2 The Association recalled that the Sixteenth World Meteorological Congress (Cg-XVI, Geneva, May 2011) had adopted "The WMO Strategy for Service Delivery" ([http://www.wmo.int/pages/prog/amp/pwsp/documents/WMO\\_Strategy\\_for\\_Service\\_Delivery.pdf](http://www.wmo.int/pages/prog/amp/pwsp/documents/WMO_Strategy_for_Service_Delivery.pdf)) as a WMO-wide Strategy, applicable to all activities and programmes having a role in service delivery. The PWS Programme had been tasked by the Executive Council Working Group on Service Delivery (ECWG-SD) to lead the coordination of the development of the Strategy. It noted that Congress had highlighted the close synergy between the Strategy and the Global Framework for Climate Services (GFCS), and that the GFCS Implementation Plan (IP) had stressed the need for the User Interface Platform (UIP) of the GFCS to be closely aligned with the Strategy. Congress had also requested the Secretary-General to arrange for the development of an Implementation Plan (IP) for the Strategy to guide Members' efforts at the national level.

4.1.3 The Association noted that the IP for "The WMO Strategy for Service Delivery" which was under development, clearly reflected the fundamental role of Service Delivery in most of the WMO Programmes and initiatives, in particular the GFCS, Quality Management System (QMS), the WMO Information System (WIS), WMO Integrated Global Observing System (WIGOS), Disaster Risk Reduction (DRR), and Capacity Development. The draft IP had been circulated to all the presidents of Regional Associations (RAs) and Technical Commissions (TCs), WMO Programmes and experts from NMHSs for review and comments. The review process had produced a substantial amount of feedback which was being incorporated into the draft IP, in preparation of its submission to the sixty-fifth session of the Executive Council (EC-65, May 2013) for approval. The presidents of RAs, including the president of RA II, had indicated the need for a strong role by the RAs in the implementation of the Strategy. The Association also noted that the fifteenth session of the Commission for Basic Systems (CBS-15, Jakarta, Indonesia, September 2012) had endorsed the draft IP. The Association similarly endorsed the draft IP and requested its Members that following the approval by EC, they take the necessary measures for mainstreaming "The WMO Strategy for Service Delivery" and its IP into the priorities of the Association.

4.1.4 In consideration of the importance of the Strategy and its IP to the Region, the Association adopted [Resolution 1 \(RA II-15\) – Implementation of the WMO Strategy for Service Delivery in Regional Association II \(Asia\)](#).

### ***Multi-Hazard, Multi-Scale Early Warning Systems***

4.1.5 The Association noted that many countries are affected by multiple hazards and it is not cost-effective to operate single hazard warning centres. In this regard, Oman advised the Association that it had decided to establish a state-of-the-art, national multi-hazard early warning centre with the assistance of UNESCO-IOC for the issuance of tsunami-related services in conjunction with meteorological services, including hazards such as sandstorm or duststorms, flash floods, tropical cyclones and the like. The Association emphasized that multi-hazard, multi-scale early warning systems needed to be embedded within an operational end-to-end service delivery framework, to be applied for preparing and delivering warnings through PWS Programmes and channels of NMHSs. The Association recognized that some Members were already pursuing a multi-hazard approach as described above, and encouraged all Members to consider such an integrated approach in the future. In this regard, the Association requested the PWS Programme to assist NMHSs build their capabilities to prepare and deliver multi-hazard warnings by facilitating the relevant multi-hazard training for forecasters.

4.1.6 The Association welcomed the preparation by the CBS-led PWS Expert Team on Meeting User Needs and Reducing the Impacts of Hydrometeorological Hazards (ET/DPM) of guidance materials on multi-hazard impact-based information and warning services for hydrometeorological hazards as a contribution to disaster reduction and mitigation for NMHSs, and was informed that the guidance materials will be distributed to all Members once published. The Association noted that the guidance materials would contain examples and best practices of impact-based forecast and warning services, while taking into account the challenges of impact-based forecast services as well as national circumstances, as regards the responsibilities of NMHSs and existing task sharing in national risk management. The Association considered the draft of the guidance materials and provided inputs. It encouraged Members to make use of the material in the development of their own impact-based warnings.

### ***The PWS Component of the Severe Weather Forecasting Demonstration Project (SWFDP)***

4.1.7 The Association emphasized the value of the two Severe Weather Forecasting Demonstration Projects (SWFDP) which are at an early stage of development in the South-East Asian region and the Bay of Bengal. It noted that as in all SWFDP, these projects are implemented through the two components of forecasting (through the Data Processing and Forecasting System (DPFS) Programme) and service delivery (through the PWS Programme). The role of the PWS component is to strengthen skills and capabilities of NMHSs to deliver high-quality warning and forecast services to users through: (1) improved coordination with main partners such as the Disaster Management and Civil Protection Authorities (DMCPAs) and the media; (2) improved communication skills of staff; (3) design of warning systems for the dissemination of alerts and warnings through multiple communication channels; and (4) the evaluation of the quality of services. The Association urged Members participating in the SWFDP in the Region, to make optimum use of the training events and guidance materials of the PWS component of the Project in order to realize its full potential.

4.1.8 The Association expressed satisfaction that the PWS component of the SWFDP was addressing several priority areas of the Region, notably: training on evaluation of service quality and getting feedback from the public and other users through surveys; and the enhancement of communication with stakeholders and regional organizations through developing Standard Operating Procedures (SOPs) and Memorandums of Understanding (MOUs).

4.1.9 The Association stated the need for the development of a regional website for real-time weather information, forecasts and warnings as a priority for action by the PWS Programme. The Association pointed out the successful METEOALARM website, which had been developed by NMHSs in RA VI (Europe), and which currently serves the needs of that Region very well. It recommended that lessons learnt in setting up and operating METEOALARM could be used to develop a similar website in RA II. In this regard, the Association expressed the need for the PWS Programme to examine the possibility of initiating an integrated warnings website as a pilot project under SWFDP.

4.1.10 The Association noted a pilot project proposed under Agenda Item 5 to promote the use of a common data format for severe weather warnings and advisories, taking advantage of the development of such common data format as Common Alerting Protocol (CAP), so as to enhance user-friendliness in presenting severe weather warnings and advisories in an integrated and seamless manner on common platforms such as the WMO Severe Weather Information Centre (SWIC) (ref. paragraph 5.1.21). This pilot project is expected to pave the way for the development of the above-mentioned integrated warnings website pilot project under SWFDP.

### ***Socio-Economic Benefits (SEBs) of Weather, Climate and Water Services***

4.1.11 The Association recognized the need for Members to develop capabilities to demonstrate socio-economic benefits (SEBs) of weather, climate and water services, as an essential element for: (1) monitoring and enhancing user satisfaction; (2) justification of the use of public funding for weather service production; (3) pricing of services; (4) appraising investment options; (5) determining Cost-Benefit Analysis (CBA)-based investment; and (6) facilitating Research and Development (R&D) prioritization within NMHSs. The Association strongly supported the work of the PWS Programme in assisting Members with the assessment and demonstration of the socio-economic benefits of the services provided by NMHSs, and re-iterated the urgent need for developing methodologies for this purpose. It supported the collaboration of WMO with the World Bank to compile and publish an authoritative joint WMO-World Bank document on methodologies for assessment of such SEB. It noted that the sixty-fourth session of the WMO Executive Council (EC-64, Geneva, June–July 2012) had similarly requested the production of such a document and the implementation of pilot projects on SEB of meteorological and hydrological services, as well as the collection and analysis of the outcomes and lessons learnt. The Association encouraged the development of an authoritative assessment report on meteorological service benefits, at an appropriate stage.

4.1.12 The Association expressed satisfaction that the PWS Socio-Economic Benefits website ([www.wmo.int/socioec](http://www.wmo.int/socioec)), which had recently been revamped, continued to be a valuable resource for decision-support tools and case studies and that it served as a valuable web-based SEB guidance platform that met the priority needs of the Region. The Association encouraged Members to make full use of the website.

### ***International Exchange of Public Forecasts and Warnings***

#### *The World Weather Information Services (WWIS)*

4.1.13 The Association noted the significant accomplishments that had been made to further strengthen the recognition of NMHSs as official authoritative sources of warnings and public weather forecasts and to improve access, by the public and other users, to official information sources. The Association agreed that, with over 15 million page visits per month, the World Weather Information Services (WWIS) website (<http://worldweather.wmo.int>) had evolved from a PWS Programme project to a mainstream activity of Members that communicated official forecasts for over 1,664 cities. It noted that WWIS had upgraded graphics for easier use, and that it was hosted in ten languages (Arabic, Chinese, English, French, German, Italian, Polish, Portuguese, Russian and Spanish). The Association commended all the Web hosts and especially Hong Kong, China, for coordinating and leading the activity. The Association also appreciated the contribution from Members to the WWIS initiative, particularly India and China for providing more city forecasts to WWIS as well as Afghanistan, Iraq and Kuwait for participating in the WWIS activities during the past intersessional period. The Association urged RA II Members to continue to contribute to the WWIS. It urged RA II Members to continue to contribute to the WWIS.

4.1.14 The Association encouraged all Members to support the WWIS and agreed to implement the recommendation of Cg-XVI for Members to enhance their participation in the WWIS activity by providing:

- (a) More cities for which they issue forecasts and climate information;

- (b) Longer forecast duration;
- (c) More forecast elements, e.g., relative humidity and wind;
- (d) Higher temporal resolution in the forecast.

4.1.15 The Association noted a pilot project proposed under Agenda Item 5 to enhance the capacity of NMHSs in providing medium-range city weather forecasts based on reliable and validated NWP products (ref. paragraph 5.1.21), which is expected to contribute to the WWIS activities.

4.1.16 The Association was pleased to note that the PWS Programme had recently produced the *Guidelines on Participation of National Meteorological and Hydrological Services in the WMO World Weather Information Service* (WMO-No. 1096, PWS-25) to assist NMHSs enhance their participation in WWIS. The Guidelines are freely available in Arabic, English, French, Russian and Spanish on the Web ([http://www.wmo.int/pages/prog/amp/pwsp/publicationsguidelines\\_en.htm](http://www.wmo.int/pages/prog/amp/pwsp/publicationsguidelines_en.htm)).

4.1.17 The Association welcomed the development of the mobile version of WWIS and agreed that it would bring easier access by the public and the media to the authoritative weather information issued by NMHSs, which would further increase the visibility of Members. It requested the Secretary-General to continue enhancing the usefulness and reach of WWIS. It further welcomed the decision of Cg-XVI in approving access to WWIS data by various organizations to develop media products.

4.1.18 The Association received an update from Hong Kong, China on the future plan for the mobile version of WWIS, namely, MyWorldWeather. Following the launch of the English version of MyWorldWeather on the iPhone platform in October 2011, the Spanish and Polish versions on the iPhone platform as well as the English, Spanish and Polish versions on the Android platform will be rolled out in late December 2012 to January 2013. The Chinese and Portuguese versions on both iPhone and Android versions are planned to be launched in March 2013. When available, the Korean, German and other language versions will be launched thereafter.

#### *The Severe Weather Information Centre (SWIC)*

4.1.19 The Association expressed satisfaction with the improvements on the Severe Weather Information Service (SWIC) website which is based on advisories issued by Regional Specialized Meteorological Centres (RSMCs), Tropical Cyclone Warning Centres (TCWCs), and official warnings issued by NMHSs. It appreciated the addition of “observed fog” information to the website (<http://severe.worldweather.wmo.int>).

4.1.20 The Association expressed appreciation with the PWS Programme initiative of launching the international online “Register of Alerting Authorities” (<http://www-db.wmo.int/alerting/edit.asp>) as an important step towards achieving a “Single Official Voice” for the dissemination of weather warnings. It requested its Members who had not yet done so, to nominate editors of the Register for their respective countries as requested by the Secretary-General.

#### *The Common Alerting Protocol (CAP)*

4.1.21 The Association emphasized the importance of the Common Alerting Protocol (CAP) as an international standard format for emergency alerting and public warning, designed for “all-hazards” and “all media”. The Association welcomed the CAP Implementation Jump-Start Offer initiative of the PWS, in which Members can request CAP experts to provide free advice and assistance at strategic, operational and technical levels in their CAP implementation programmes ([http://www.wmo.int/pages/prog/amp/pwsp/CAPJumpStart\\_en.html](http://www.wmo.int/pages/prog/amp/pwsp/CAPJumpStart_en.html)). The Association urged Members to take up the CAP Jump-Start Offer, as it would speed up implementation of the CAP standard for their benefit.



### ***Network of PWS National Focal Points***

4.1.22 The Association noted the value of the network of PWS National Focal Points in supporting the implementation of PWS among Members, and requested all Members who had not already done so to nominate national PWS Focal Points and to equip them with adequate skills and resources to carry out PWS tasks as indicated in their Terms of Reference (ToRs) (<http://www.wmo.int/pages/prog/amp/pwsp/documents/FocalPointsToRs.pdf>).

### ***Capacity Development through the PWS Programme***

#### ***Training***

4.1.23 The Association agreed that there was a need for specific competencies within NMHSs, and the associated education and training requirements for the service delivery tasks in PWS. The Association was pleased that these competency requirements were being developed through the CBS in close liaison with the Executive Council Panel of Experts on Education and Training for eventual approval by CBS. In noting that seven training workshops had been conducted for NMHSs from the Region by the PWS Programme during the intersessional period, a number of which had been in collaboration with the Tropical Cyclone Programme (TCP) and the Global Data-Processing and Forecasting System (GDPFS), the Association requested that continued attention be given to training activities in PWS. The Association expressed appreciation to those Members who had hosted these training events, and for those who had availed their experts as trainers and urged more developed countries to continue to provide assistance in training of staff from less developed NMHSs. Furthermore, the Association emphasized the call by Cg-XVI that training in service delivery was a crucial element in ensuring the successful implementation of “The WMO Strategy for Service Delivery” and requested that training in this area be enhanced especially in developing countries and LDCs.

#### ***Publications***

4.1.24 The Association acknowledged the production of eight guidelines by the PWS Programme during the intersessional period. It noted that the guidelines addressed key aspects for the implementation of the PWS programmes and activities in NMHSs. The Association expressed its appreciation to various PWS experts who had contributed to the production of those publications. The Association further requested Members to make full use of these materials which are freely available on the Web ([http://www.wmo.int/pages/prog/amp/pwsp/publications\\_en.htm](http://www.wmo.int/pages/prog/amp/pwsp/publications_en.htm)).

#### ***Public Education and Outreach***

4.1.25 The Association stressed that the Region had recognized the development and implementation of a public education and outreach programme as a priority and had requested that the PWS Programme should facilitate exchange and training on the relevant know-how. The Association noted that public education was indispensable to improved service delivery as it enabled the public to better understand and apply NMHSs services, and was also vital in helping manage public expectations of services they received from NMHSs. The Association requested that the PWS Programme continue to support this important aspect of the work of NMHSs.

4.1.26 The Association encouraged Members to find a way of including services to the renewable energy sector, particularly relating to the location and operation of wind turbines and solar panels for energy generation, within its service delivery activities.

### ***Agricultural Meteorology (AgM)***

#### ***Agrometeorological Services***

4.1.27 The Association noted that the “International Conference on the Challenges and Opportunities in Agrometeorology” had been held in New Delhi, India, in February 2009. The Association supported the following recommendations of the Conference: (1) NMHSs should be

pro-active in getting involved with existing agricultural fora, such as farmer field days in order to further improve user interactions; (2) develop methodologies for the application of data from meteorological satellites to obtain parameters characterizing the agricultural crop development during the vegetation period across different geographical zones; and (3) apply daily meteorological data in agrometeorological models developed to forecast the yield of certain agricultural crops at the local and national levels. The Association further noted that pest and disease models are important in the agricultural sector and that many require meteorological data as a key input.

4.1.28 The Association noted that the “Workshop on Operational Agrometeorological Services in South Asian Association for Regional Cooperation (SAARC) and other RA II Countries” was held in Pune, India, in April 2012. The Association agreed that several of the workshop recommendations could be used by the new Sub-group on Agrometeorology.

#### ***Sub-Group on Agrometeorology (WGCAA-AgM)***

4.1.29 The Association noted that the meeting of the RA II Sub-Group on Agrometeorology (WGCAA-AGM), under the Working Group on Climate Services, Adaptation and Agrometeorology (WGCAA), was held in Pune, India, in April 2012. The Association also noted that the WGCAA-AGM was unable to formally meet due to logistical reasons.

4.1.30 The Association agreed that the application of meteorology to agriculture continues to be of high importance to the Region. Hence the continued activities on agricultural meteorology should take the following developmental needs in the Region into account: sharing of weather forecast products among countries; capacity-building and training in forecasting and agrometeorology; exploring the establishment of Agromet Advisory Services in various countries; monitoring and forecasting soil moisture conditions and their use in assessing crop water requirements; and monitoring and preparedness strategies for drought and the extent of their implementation in the Region.

#### ***World Agricultural Meteorological Information Service (WAMIS)***

4.1.31 The Association noted that the World AgroMeteorological Information Service (WAMIS-<http://www.wamis.org>) has products from over 50 countries and provides tools and resources to help countries improve their bulletins and services. Considering the benefits of WAMIS to Members, the Association urged Members to participate and disseminate their products to the global community. The Association appreciated that an “Expert Meeting on Potential Information Technologies and Tools for Future WAMIS Applications” was held in Seoul, Republic of Korea, in April 2010. The Association recognized the importance of developing new technologies such as agrometeorological forecasts and applications based on Numerical Weather Prediction (NWP) output and Geographical Information System (GIS) technologies and welcomed Members to assist the Secretariat in developing pilot projects on these concepts.

#### ***Marine Meteorology and Ocean Affairs (MMO)***

##### ***Marine Meteorology and Oceanography (MMO)***

4.1.32 The Association noted the summary report of the fourth session of Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM-4, Yeosu, Republic of Korea, 23–31 May 2012), including the resolutions and recommendations that were approved by the Executive Council through Resolution 2 (EC-64) – Report of the fourth session of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology. The Association congratulated the Government of the Republic of Korea, including the Korea Meteorological Administration (KMA), for successfully hosting the session, and welcomed the newly elected JCOMM co-presidents, Dr Nadia Pinardi (Italy) and Mr Johan Stander (South Africa).

4.1.33 Appreciating the substantial achievements of JCOMM during the past intersessional period in the areas of ocean observation, data management and marine/ocean product preparation

and service delivery, the Association noted in particular the following outcomes presented at JCOMM-4:

- (a) The coordination, facilitation and standardization of marine and ocean product preparation and service delivery (including services for maritime safety and DRR) were a major part of the work of JCOMM. Major achievements in this area included: (1) ensuring maritime weather and sea ice safety services, including the operational service in five new Arctic Ocean Metareas by July 2011; (2) stimulating operational ocean forecasting capability through collaboration with the Global Ocean Data Assimilation Experiment (GODAE) Ocean View (GOV) and through the ongoing development of the Guide to Operational Ocean Forecasting; and (3) enhancing JCOMM efforts for marine hazard risk reduction for coastal communities, by implementing the Commission for Hydrology (CHy) Coastal Inundation Forecasting Projects (CIFDP);
- (b) The successful completion of the JCOMM Pilot Project for WIGOS and JCOMM's collaboration with the IOC International Oceanographic Data and Information Exchange (IODE) had underpinned the network of Regional Marine Instrument Centres (at present in China and the United States of America, and a proposed new establishment in Morocco);
- (c) The ocean observing system, being coordinated through JCOMM, reached 62 per cent of the requirements specified in the Global Climate Observing System Implementation Plan (GCOS-138, revised in 2010). New initiatives would be required by WMO Members/IOC Member States to continue its growth. In this regard, concerns were expressed that the current global economic slow down may make this a very challenging task;
- (d) JCOMM has actively promoted cross-cutting activities with a number of WMO Commissions and Programmes such as CHy and DRR (CIFDP implementation), WIGOS and WIS (completed JCOMM pilot project for WIGOS), Quality Management Framework (QMF, planning for marine competency requirements), CAgM (Joint Task Team on Climate and Oceanic Fisheries) and CCI (Joint CCI-CLIVAR-JCOMM Expert Team on Climate Change Detection and Indices);
- (e) JCOMM Capacity Development had been undertaken in accordance with a set of JCOMM Capacity Development Principles. Further efforts would be made to develop and improve technical guidance and training material, as well as to enhance liaison and collaboration with the wider WMO-IOC Capacity Development programmes.

4.1.34 The Association noted the future priority challenges of JCOMM in response to the priorities of WMO and IOC, as follows, and encouraged its Members to actively conduct related national activities in view of implementing the approved work plan of JCOMM:

- (a) Underpinning the development of operational ocean forecasting services, through the development of a WMO guide and the enhancement of JCOMM coordination/support for maritime safety services and marine environmental emergency response;
- (b) Supporting disaster risk reduction in coastal zones and improving safety-related marine meteorological services;
- (c) Promoting standards and best practices in ocean observations and data management, and assisting the further development of the Ocean Data Portal (ODP);
- (d) Long-term maintenance of the Global Ocean Observing System (GOOS) and its continued growth in accordance with GCOS identified requirements and WIGOS implementation, encouraging the diversification of Members/Member States contribution;

- (e) The implementation of QMS in National Services, within the WMO QMF;
- (f) Contribution to the marine/ocean aspects of the GFCS;
- (g) Enhanced Capacity Development of NMHSs in marine meteorology and oceanography through streamlined training and development of related guidelines such as marine competency requirements.

4.1.35 The Association noted the progress in the first national Sub-project of the Coastal Inundation Forecasting Demonstration Project (CIFDP: <http://www.jcomm.info/CIFDP>) in Bangladesh, CIFDP-B, followed by several Sub-projects in other Regions including Dominican Republic and Fiji. It particularly welcomed the CIFDP progress in building collaborative arrangements for CIFDP-B implementation with the WMO/ESCAP Panel on Tropical Cyclones and the regional SWFDP. The Association also noted the benefit of the Project, which would directly improve the work of NMHSs at the national and local level in providing forecasting and warning services in coastal zones as well as in enhancing NMHSs' role in national disaster management, and encouraged the Members with concerns on coastal inundation to consider developing national Sub-projects in the established framework of CIFDP.

## **Atmospheric Environment (AER)**

### ***The GURME and Megacity Trust Fund***

4.1.36 The Association agreed that increased attention needs to be placed on urban services as, currently, half the world's population is living in urban areas and this ratio is expected to increase continually. The Association further supported the provision for studies and projects involving megacities and large urban complexes that are providing the basis for improved weather, climate and environmental services to Members. Megacities are often located along coasts or near major rivers and deltas and face many challenges due to their geographical locations as well as high economic, population and building density. Megacities need climate, weather and environmental services in order to be resilient in withstanding environmental hazards. Climate information and services are also needed for planning and long-term infrastructure building, while weather and environmental information and services respond to the needs of the population in handling severe and high-impact events. The activities undertaken recently within the GAW Urban Research Meteorology and Environment (GURME) projects in New Delhi and Shanghai have demonstrated the capabilities and importance of the NMHSs in broadening their activities in addressing urban problems.

4.1.37 The Association requested Members to support the newly established GURME and Megacity Trust Fund.

## **4.2 Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements (agenda item 4.2)**

### ***WMO Disaster Risk Reduction Work Plan (2012–2015)***

*A comprehensive model for development and delivery of products and services for DRR decision-making*

4.2.1 The Association stressed that protection of lives, property and livelihoods are at the core of the priorities of the WMO Members and the National Meteorological and Hydrological Services (NMHSs). Furthermore, the implementation of the Hyogo Framework for Action (HFA) by national Governments is leading to changes in national DRR policies, legal and institutional frameworks, with implications on the role, responsibilities and new working arrangements for the NMHSs. These changes provide opportunities such as increased recognition of the NMHSs by their Governments and stakeholders, which could result in strengthened partnerships and increased resources. However, NMHSs face increasing demand and liabilities related to the

provision of products and services to larger and more diverse groups of DRR stakeholders (e.g., Government authorities, public and private sectors, NGOs, general public and media, etc.) who have direct responsibilities for DRR decision-making. To meet these new challenges, the Association recalled the decisions of:

- (a) The Sixteenth World Meteorological Congress (Cg-XVI) that identified DRR as one of the five priorities of WMO and requested the presidents of the technical commissions (TCs) to leverage the activities of their respective TCs with the regional associations (RAs) to support the work plan of the DRR Programme during the intersessional period 2012–2015;
- (b) The sixty-fourth session of the Executive Council (EC) that approved the Two-Tier DRR Programme Work Plan (2012–2015) with Resolution 8 (EC-64) that can be found at: [ftp://ftp.wmo.int/Documents/PublicWeb/mainweb/meetings/cbodies/governance/executive\\_council\\_reports/english/pdf/64\\_session\\_1092\\_part1\\_en.pdf](ftp://ftp.wmo.int/Documents/PublicWeb/mainweb/meetings/cbodies/governance/executive_council_reports/english/pdf/64_session_1092_part1_en.pdf);
- (c) The 2012 Meeting of the Presidents of Technical Commissions:
  - (i) To contribute to the development of standards, guidelines, and training materials in the thematic areas of DRR;
  - (ii) To ensure that DRR national and regional projects contain proposals on how TCs could contribute to the implementation of these projects with in a coordinated manner.

#### *DRR thematic guidelines, standards and related training modules*

4.2.2 The Association noted that under the cross-cutting Framework of the DRR Programme, a number of DRR User-Interface Expert Advisory Groups (EAGs) have been established to work in close collaboration with the WMO constituent bodies (TCs and RAs), to develop user requirements, technical regulations, standards, guidelines and training modules for DRR thematic, based on documentation and synthesis of good practices, for the development and provision of meteorological, hydrological and climate services to support: (i) Hazard/Risk Analysis; (ii) Multi-Hazard Early Warning Systems (MHEWS); (iii) sectoral risk management; and (iv) disaster risk financing. In this regard, the Association acknowledged the experiences of RA II as one of the most natural hazard prone Regions and that a number of NMHSs in the Region were among the good practices for provision of such services to the user-community, and could thus support the development of DRR knowledge products and training materials.

4.2.3 The Association highlighted a number of DRR-related good practices currently being implemented within the Region:

- Free exchange of radar data between different agencies within a country, and between adjacent countries;
- Use of a single radar supplier within a country to reduce the technical problems associated with the exchange of radar data;
- Exchange of software used for typhoon tracking and prediction.

#### *Coordinated DRR and adaptation regional capacity development projects*

4.2.4 The Association recalled that one of the three DRR regional projects, approved by Cg-XVI and EC-64 was located in Southeast Asia. This project involves Lao People's Democratic Republic, Cambodia, Thailand, Viet Nam, Indonesia and the Philippines. The Association noted that this project provided the possibility to demonstrate the benefits of integrated planning and coordination. The project proposal and related implementation plan have ensured reflection of the specific contributions of the Association's Management Group (MG) and related Working Groups

(WGs) in supporting the assessments, development of the requirements, prioritization of capacity development needs and execution of the project. The Association was informed that the proposal had been submitted to donors; however as yet there has been no confirmed offer for funding.

#### *Emergency Response Activities (ERA)*

4.2.5 The Association recalled that a number of major hazardous events with significant impacts needing ERA have occurred in RA II since its previous session, including volcanic eruptions in Indonesia, and the Tsunami and subsequent Fukushima-Daiichi NPP accident in Japan along with smaller events such as pollution from oil fires, chemical spills and the like. The Association noted the significant operational impact of the Fukushima-Daiichi event on the workloads of the RSMCs with activity specialization for the provision of atmospheric transport modelling for environmental emergency response (EER) and/or backtracking, and therefore expressed its sincere thanks to the RSMCs in RA II (Tokyo, Beijing and Obninsk) for the excellent work and response provided throughout this event. A special note of appreciation was expressed to the staff at the Japan Meteorological Agency (JMA) and RSMC Tokyo, who in the face of tragedy and adversity arising from the Fukushima Daiichi NPP accident, continued to respond to with diligence throughout the event.

4.2.6 The Association noted the active participation of WMO within the UN system, following the Fukushima Daiichi NPP accident, to review and assess the emergency preparedness and response system, including in the development of meteorological analyses suitable for atmospheric transport, dispersion, and deposition modelling, to contribute to the post-accident study undertaken by the UN Scientific Committee on Effects of Atomic Radiation's (UNSCEAR) on the levels and effects of radiation released from the accident.

4.2.7 In the context of nuclear accidents, in following up to the Fukushima-Daiichi accident, the Association noted that a number of lessons had been learnt and reported on not only by RSMCs, RTHs, and related international organizations, but also by NMHSs in the affected region, inter alia, the increasing need to provide meteorological information for general public interest as well as special user applications. While noting that the EER arrangements, as stated in the *Manual on the GDPFS* (WMO-No. 485, Part II, Appendix II-7) and further documented in the WMO Technical Note No. 778 (documentation on RSMC support for EER targeted for meteorologists at NMHSs), define standards in the provision of international products and services by RSMCs for nuclear environmental emergency response standardized products, the Association noted that there are a number of products available on the Internet from other sources, which could be misleading for the Manual/Note. Therefore, the Association requested: (a) its Members who host RSMCs to consider the provision of appropriate training courses in the use and interpretation of their guidance and products; and (b) the Secretary-General and the Commission for Basic Systems (CBS) to promote the use of ERA-related products by NMHSs and assist them in the uptake, including in the interpretation and application, of such products for their national purposes.

4.2.8 To the extent that the three RSMCs providing EER services (Beijing, Obninsk and Tokyo) do develop training courses for the users of their products, the Association encouraged them to coordinate this activity to prevent duplication of work and to ensure consistency of the training.

#### *Integrated Flood Management*

4.2.9 The Association recognized the substantial achievements made through the Associated Programme on Flood Management (APFM) in the form of providing flood management policy guidance, technical tools and capacity-building. Noting that the APFM is being undertaken in partnership with the Global Water Partnership (GWP), the Association welcomed the assistance provided to Members through the HelpDesk of the APFM on integrated flood management. The HelpDesk provides technical assistance and disseminates information and guidance material.

4.2.10 The Association appreciated specific activities in the Region namely regional training courses in integrated flood management held in Nepal (October 2010), in Viet Nam (April 2011),

and assistance provided to the governments of Pakistan (January 2011), Thailand (February 2012) and Lao People's Democratic Republic (April 2012) in the development of national strategies for flood management.

4.2.11 The Association thanked the Governments of Japan, Switzerland and Germany for their substantial support contributing to the success of the programme and noted with interest pledges made by the United States of America to provide further funding for APFM activities. The Association recommended further promotion of the APFM to increase its field effectiveness and to attract extrabudgetary resources for its activities (ref.: [www.apfm.info](http://www.apfm.info)).

#### *Integrated Drought Management*

4.2.12 The Association supported the effort of the WMO Secretariat to establish an Integrated Drought Management Programme (IDMP) with the Global Water Partnership (GWP). The Association expressed interest in the work of IDMP and especially in developing potential IDMP projects in the Region.

4.2.13 The Association also supported the organization of the High-Level Meeting on National Drought Policies that will be held in Geneva, Switzerland from 11 to 15 March 2013. The Association urged its Members to participate in this meeting and in the IDMP.

#### *Tropical Cyclone and Storm Surge Forecasting Technical Assistance Projects*

4.2.14 The Association noted that the TCP/JCOMM Storm Surge Watch Scheme (SSWS) showed steady development in the regions exposed to storm surges. It took particular note of the graphical presentation of the regional storm surge advisories, which was implemented by RSMC Tokyo for the Typhoon Committee Members in 2011, and the collaboration between the RSMC New Delhi and the Indian Institute of Technology (IIT) Delhi for development of the graphical advisory in accordance with the decision of the Panel on Tropical Cyclones at its thirty-ninth session in March 2012. Recognizing that many Members of the Region still require an upgrade of their technologies in storm surge warning services to meet their national demands, the Association requested the WMO Secretariat to continue to direct its efforts to the capacity development activities for the Members, including the training of storm surge experts at IIT Delhi.

4.2.15 The Association recognized that improvement of the tropical cyclone forecasting, including intensity forecasting in particular, was still a serious challenge to the tropical cyclone warning services. To address this longstanding issue, the Association reaffirmed the significance of the interaction between operational forecasters and researchers for sharing awareness of the priorities in the technical development and for effective application of its results to the forecasting. In this respect, the Association endorsed the cooperative activities of TCP and WWRP in the Region through the Northwest Pacific Tropical Cyclone Ensemble Forecast Project (TCEFP) and the Typhoon Landfall Forecast Demonstration Project (TLFDP). The Association also supported the recommendation of the TLFDP Workshop and Training Course on Tropical Cyclone Forecast (Shanghai, China, June 2012) to extend the project period of TLFDP for three years until the end of 2015.

4.2.16 The Association noted that arrangements have almost been completed by the TCP and Hong Kong, China for re-establishment of the WMO Tropical Cyclone Forecaster website at the Hong Kong Observatory. The website is aimed to assist forecasters in their operational forecasting of tropical cyclones. It will function as a portal to various websites offering data/products of tropical cyclone analyses and forecasts and will provide research outcomes and training materials, thus serving as a comprehensive source of information for operational forecasters. Noting that the Global Guide to Tropical Cyclone Forecasting will also be updated as a web-based reference soon, the Association recommended that the two schemes be effectively linked for the forecasters' convenience.

4.2.17 The Association welcomed the decisions of the UNESCAP/WMO Typhoon Committee and the WMO/UNESCAP Panel on Tropical Cyclones to promote application of Common Alert

Protocol (CAP) to tropical cyclone warning services. In this regard, the Association emphasized the outcomes of the seventh Integrated Workshop of the Typhoon Committee held in Nanjing, China in November 2012, which discussed the utility of CAP with participation of the media and DRR experts. With a view to facilitating the implementation of CAP in the Region, the Association requested the WMO Secretariat and the Typhoon Committee to make arrangement for the outcomes of the workshop to be widely shared by RA II Members.

*Coordination, leveraging and alignment of the technical assistance projects within the cross-cutting framework of the DRR Programme*

4.2.18 The Association stressed that a number of technical assistance projects, namely, the Severe Weather Forecasting Demonstration Project (SWFDP), Flash Flood Guidance (FFG) systems and Coastal Inundation Forecasting Demonstration Project (CIFDP), Integrated Drought Management, WMO Flood Management, the WMO Emergency Response Activities as well as further development of the Global Data-Processing and Forecasting System (GDPFS), the WMO Integrated Global Observing Systems (WIGOS) and WMO Information System (WIS)) are critical in supporting disaster risk reduction in the Region and should be closely aligned within a comprehensive, coordinated and user-driven approach of the DRR Work Plan to ensure that meteorological, hydrological and climate services are developed based on user-requirements and linked to the institutional frameworks for DRR and climate adaptation nationally and regionally.

### **4.3 Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies (agenda item 4.3)**

#### ***Global Data-processing and Forecasting System (GDPFS), including the Severe Weather Forecasting Demonstration Project (SWFDP)***

4.3.1 The Association recalled that the GDPFS, including Emergency Response Activities (ERA), is a critical component of the end-to-end Basic Systems. The Association therefore encouraged its Members running global and regional models, including Regional Specialized Meteorological Centres (RSMCs), to make their products available on the WMO Information System (WIS) for the benefit of all countries in RA II. In addition, the Association requested: (a) its Members who host RSMCs to consider the provision of appropriate training courses in the use and interpretation of their Numerical Weather Prediction (NWP) products, including in the integration of the Ensemble Prediction System (EPS) into core operational forecasting; and (b) the Secretary-General and the Commission for Basic Systems (CBS) to assist NMHSs in the uptake, including in the interpretation and application, of such products for their national purposes.

4.3.2 The Association noted with appreciation that steps have been made for the development of an SWFDP project for the Southeast Asia region, and more recently for the Bay of Bengal region, focusing on heavy rain and strong winds. The Association acknowledged the importance of the continued project-critical support from advanced global centres that provide NWP/EPS and satellite-based products, and the equally project-critical roles played by the regional centres. The Association commended all these centres for their enthusiastic participation in SWFDP regional projects in RA II so far, and encouraged all participating centres to complete their developmental activities in order to commence their demonstrations as early as possible in 2013. Discussions are ongoing between the WMO Secretariat and the Viet Nam Institute of Meteorology, Hydrology and Environment concerning the hosting of the East Asia SWFDP.

4.3.3 The Association noted that WMO, with the support of the Mekong River Commission (MRC), has been implementing the HYCOS project and the Flash Flood Guidance System (FFGS) in Southeast Asia. At the same time, the Association noted that the SWFDP NWP's quantitative precipitation forecasts (QPF) could benefit from improved estimates of actual rainfall amounts by including satellite-based estimates into precipitation analyses, and by using such analyses in operational forecast verification activities. In this context, and noting the RA II pilot project on developing support for National Meteorological and Hydrological Services in satellite data,



products and training, the Association recommended synergy between the frameworks of the SWFDP, the FFGS, and the WMO Space Programme to optimize existing structures in the Region. In a broader context, the Association requested the Secretary-General to further explore opportunities with the MRC to enhance the capabilities of NMHSs, and recommended a dialogue between CBS (GDPFS/SWFDP and SAT) and CHy (FFGS) on synergy between the three activities.

4.3.4 The Association was pleased to note the significant progress that has been made with the comprehensive revision of the *Manual on the GDPFS* (WMO-No. 485), following the adoption by Cg-XVI of the revised Manual's outline. Noting that the new Manual (which would most likely be in force by 2015) introduces a number of changes to the current procedures, the Association requested: (a) the Secretary-General to keep Members informed of these developments; and (b) its Members hosting WMCs and RSMCs to follow these developments and take the appropriate actions in due course.

4.3.5 The Association noted with appreciation that ECMWF has developed the Lead Centre for Deterministic NWP Verification (LC-DNV) website (<http://apps.ecmwf.int/wmolcdnv/>, username/password protected), and commended its Members that contribute to this verification activity, and urged its Members to make best use of the results of verification of upper-air and surface fields for both operational forecasting and management purposes. In this context, the Association urged those Members that have not as yet requested to ECMWF a WMO account, to do so following the procedures stated on the ECMWF website at [http://www.ecmwf.int/about/wmo\\_nmhs\\_access/index.html](http://www.ecmwf.int/about/wmo_nmhs_access/index.html). In addition, the Association thanked JMA for maintaining the Lead Centre for EPS Verification website (<http://epsv.kishou.go.jp/EPsv/>, no longer password protected), which has recently added the new CRPS score as per the procedures stated in the *Manual on the GDPFS* (WMO-No. 485), and its Members that contribute to this verification activity. It encouraged its Members to visit it and make best use of its EPS verification results.

4.3.6 Recalling the operational nature of the Global Producing Centres (GPCs) for Long-Range Forecasts and that Cg-XVI envisioned that some GPCs could play an important role in providing global climate predictions from sub-seasonal to longer time-scales, within the context of the GFCS, the Association requested its Members who host GPCs and RCCs to continue and reinforce their collaboration. In addition, recalling the request by Cg-XVI to the LC-LRFMME to extend its role to include the exchange of extended-range predictions, and that GPCs were invited to provide data from their monthly forecast systems for display and generation of multi-model extended range products along the same lines as for seasonal range products, the Association noted that CBS-15 recommended a phased approach, starting by a pilot exchange with GPCs supplying forecasts on a voluntary basis and the LC-LRFMME generating and displaying a range of products along the same lines as for seasonal range products. The Association encouraged its Members hosting GPCs to follow the guidelines as appropriate.

### **Climate Issues**

4.3.7 The Association recalled that Cg-XVI, in the light of its decision on the GFCS and to optimally support the implementation and operation of its various components, decided to restructure the World Climate Programme (WCP), consisting henceforth of the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP) and a new World Climate Services Programme (WCSP). The Association further recalled that Cg-XVI decided to conclude the Climate Information and Prediction Services (CLIPS) project in 2015, and consolidate and transition the ongoing CLIPS activities into the initial implementation activities of the GFCS in the coming years. The Association agreed that a well-coordinated implementation of the WCP and its components in RA II will enhance the Region's contribution to the GFCS. The Association urged Members to closely align their operational climate service capabilities with the emerging requirements of the GFCS.

4.3.8 The Association expressed the need for assistance in the development of frameworks for climate services at the national level and was pleased to learn that WMO had prepared draft guidelines on frameworks for climate services at the national level and a step-by-step guidebook to

conduct national workshops for climate services. A number of Members offered examples of the application of national processes that could be shared within the Association.

#### *Climate System Monitoring*

4.3.9 The Association noted that it is critically important for the Members in the Region to further increase their NMHSs capacity to operate high quality timely climate monitoring and watch systems which are essential for producing timely information on the onset, intensity, geographical extent, duration, evolution and cessation of extreme climate events such as heavy rains, heat waves, cold waves, drought spells, etc. which can lead to disastrous impacts on health, agriculture, water and public services. The Association emphasized that this information should be developed as an integral part of Members' efforts in Climate Risk Management and Disaster Risk Reduction.

4.3.10 The Association was pleased to note that China hosted the first workshop on Climate Monitoring and the implementation of Climate Watch Systems (CWS) in November 2009. The workshop produced useful recommendations on the way forward for CWS implementation. However, there are still pending steps to accomplish for achieving widely implemented operational CWS in the Region. It requested the Management Group to keep under review the progress made in the implementation of CWS and provide guidance on how to accelerate the implementation process as a matter of priority for NMHSs in responding to the increasing concern posed by extreme climate events.

4.3.11 The Association noted with appreciation the work of the CCI Open Panel on Climate Monitoring and Assessment CCI Task Team on the Definition of Extreme Weather and Climate Events (TT-DEWCE), aiming at providing guidance to the Members for harmonizing, to the extent possible, the use of definitions and terminology and proposing methodologies and tools for monitoring on a quasi-real time operational basis the extreme climate events. The Association noted with satisfaction that both the co-chairs of TT-DEWCE are from the Region (China and India). It urged the Members in the Region to take this opportunity to further support the work of CCI for improving CSM in the Region and globally.

4.3.12 The Association noted with satisfaction the sustained cooperation among Members in providing input and expert review to the WMO annual statement on the status of the global climate, which has been regularly published since its initiation in 1993. In this regard the Association welcomed the work being taken by the CCI-Open Panel on Climate Monitoring and Assessment Task Team on National Climate Monitoring Products (TT-NCMP) to provide guidance on the calculation and provision of new national climate monitoring products.

4.3.13 The Association was pleased to note that WMO worked with NMHSs to produce a decadal climate report covering the period 2001–2010 with an emphasis made on extreme weather and climate events which occurred in the world and their impacts. The report constitutes a source of useful climate information on the decadal time-scale which is crucial for assessing the changing conditions of the climate system.

4.3.14 The Association noted with appreciation the progress made by the Joint CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI). The achievement included the publication of a useful WMO guideline document on the analysis of extremes in a changing climate in support of informed decisions for adaptation (WCDMP-No. 72 – WMO/TD-No. 1500). The Association further appreciated the support provided by Members in the organization of ETCCDI workshops in several regions, one having been held in Viet Nam in 2008 which covered South-East Asia.

4.3.15 The Association expressed its appreciation to China for offering to host and co-sponsor in early 2013 a training workshop on climate data including data rescue and management. A training component on using ETCCDI software and methodology for analysing climate extremes and indices will be also included as a demonstration element on applying climate data analysis tools for producing useful climate information which can be used in supporting climate assessment and analysis of climate extremes in the countries.

### *Climate Services Information System*

4.3.16 The Association recalled that the Congress, through Resolution 17 (Cg-XVI), had decided to establish the Climate Services Information System (CSIS), with a leading role in its implementation for CCI in close collaboration with CBS. The Association noted that WMO has already put in place or identified several entities to specifically support NMHS climate operations, including the highly specialized centres designated by WMO based on standards and criteria, namely the Global Producing Centres for Long-range Forecasts (GPCs) and Regional Climate Centres (RCCs), as well as mechanisms such as the Regional Climate Outlook Forums (RCOFs).

4.3.17 The Association noted with satisfaction that the Region is at the forefront in the implementation of RCCs, and complimented the Beijing Climate Centre (BCC), China and Tokyo Climate Centre (TCC), Japan, for achieving formal designation as WMO RCCs in June 2009, and the North Eurasian Climate Centre (NEACC) for successfully completing its demonstration phase and getting recommended by CCI and CBS for its formal designation. The Association urged India, Saudi Arabia and the Islamic Republic of Iran, who had expressed their intent to establish RCCs earlier, to expedite the commencement of their demonstration phases, and welcomed the proposal from Kazakhstan to establish an RCC for Central Asia with a focus on agriculture and water management. It requested the president of RA II to promote a fully-fledged establishment of RCCs in the Region, and enhanced uptake of RCC products by NMHSs. The Association urged all the RCCs, including those in the demonstration phase, to work towards standardization and a 'common look and feel' in their products and services, under the joint guidance of CCI and CBS. The Association recognized the important role of RCCs in implementing the CSIS in RA II, and adopted [Resolution 2 \(RA II-15\) – Implementation and operation of Regional Climate Centres](#). The Association noted that RCCs will play an important role in the capacity development for GFCS. It thanked RCCs for their implementation of training activities so far, and encouraged them to continue and enhance such training activities.

4.3.18 The Association expressed deep appreciation to China, India and the Russian Federation for their support and leadership in establishment and sustaining of RCOFs in RA II, namely the Forum on Regional Climate Monitoring, Assessment and Prediction for RA II (FOCR-II), South Asian Climate Outlook Forum (SASCOF) and North Eurasian Climate Outlook Forum (NEACOF), and noted their growing benefits in fostering networking amongst climate experts, and in development of consensus-based forecasts for the Region as well as the concerned subregions. Establishment of a new sub-RCOF, the East Asia winter Climate Outlook Forum (EASCOF), has been agreed by CMA, JMA, NAMHEM-Mongolia, and KMA for the region where the East Asian winter monsoon dominates. The Association agreed that the RA II RCOF efforts need to be expanded and enhanced through establishment of RCOFs in more subregions, and urged the relevant coordinating agencies to promote an increase in the participation of user sectors as well as subregional inter-governmental entities in RCOFs providing a much broader ownership of the process. The Association urged Members and donor agencies to seek low-cost options and user support to ensure their sustainability, and requested the RA II Working Group on Climate Services (WGCS) to guide the technical development and capacity-building activities of RCOFs in RA II.

4.3.19 The Association noted the need for the establishment of RCCs and RCOFs in certain subregions having common climatic characteristics extending into neighbouring RAs (such as Southeast Asia extending into RA V, polar regions encompassing many other RAs, etc.), and requested the president of RA II to engage with the presidents of the concerned RAs in facilitating the implementation of such RCCs and RCOFs.

4.3.20 The Association noted that a trial phase of the Global Seasonal Climate Update (GSCU) has commenced under the guidance of CCI and that the aim of such updates would be to assist the NMHSs as well as RCCs and RCOFs in the interpretation, characterization and assessments of the reliability of seasonal predictions.

4.3.21 The Association agreed that the climate watch systems developed and promoted by WMO would need to be further strengthened and integrated into the implementation of the CSIS in RA II.

4.3.22 The Association noted that CCI, CBS, the Commission for Atmospheric Sciences (CAS) and WCRP have been making significant contributions in operational aspects of climate prediction and projection, albeit with different perspectives. The Association recognized the need to improve coordination of these efforts on the regional and national scales, to ensure consistency and complementarity in the establishment of operational capabilities at all levels in the CSIS, and to better jointly support CSIS improvements and respond to feedback on CSIS products and services. The Council therefore requested RA II WGCS to pursue closer links with all the above entities on aspects relevant to RA II.

#### *Climate Information for Adaptation and Risk Management*

4.3.23 The Association urged its Members (both climate and sectoral communities) to support and to take part in user engagement through regional and national Climate Outlook Forums, through user or sector-driven climate forums (e.g., hydrological-, agricultural- or health-focused forums), through interdisciplinary workshops and training, and through field activities including roving seminars, a notable success in climate services for agriculture sector.

4.3.24 The Association noted the needs of key socio-economic sectors globally, including across Asia, for reliable, relevant, actionable climate information for Climate Risk Management (CRM) and for adaptation, and the need to improve the practical application of CRM at local levels, in order to reduce climate impacts, build resilience to climate variability and change and contribute to poverty reduction and development. The Association appreciated the recent publication on this topic under the auspices of CCI and urged its Members to access this publication, to peruse the real-life case studies and lessons learnt, and to apply the recommendations for improving decisions in managing the opportunities and hazards of the climate. The Association further urged development of case studies demonstrating good practices in CRM, and that these be shared with the CCI to help improve CRM in all regions and sectors.

#### ***Drought Initiatives***

4.3.25 The Association supported the effort of the WMO Secretariat to establish an Integrated Drought Management Programme (IDMP) with the Global Water Partnership (GWP). The Association supported the organization of the High-Level Meeting on National Drought Policies (HMNDP) that will be held in Geneva, Switzerland from 11 to 15 March 2013. The Association urged Members to participate in this meeting.

#### ***Water Issues***

##### *General*

4.3.26 The Association noted that fourteenth session of the Commission for Hydrology (CHy) had been held in Geneva from 6 to 14 November 2012 and was updated by the Secretariat on the decisions of CHy-14. The Association recalled the value of strong cooperation with CHy and appreciated that Regional Hydrological Advisers (RHAs) had been invited to the meeting of the CHy Advisory Working Group (AWG) immediately preceding the CHy session to provide inputs on regional priorities to the CHy planning process.

##### *Strategy for the Enhancement of National Hydrological Services*

4.3.27 The Association, while appreciating progress made by some Members at national level, voiced concern on the overall low level of implementation of the Strategy and Action Plan for the Enhancement of Cooperation between National Meteorological and Hydrological Services for Improved Flood Forecasting in many Member countries. To improve this situation, the Association requested its Working Group in charge of hydrological services (WGHS) to develop a specific action plan towards the implementation of the strategy. The Association further requested the WGHS to integrate all relevant activities contained in the RA II Operating Plan into this action plan to achieve maximum effectiveness.

### *WMO Flood Forecasting Initiative*

4.3.28 The Association encouraged Members to further develop national and regional projects that would contribute to the achievement of the objectives of the WMO Flood Forecasting Initiative (Resolution 15 (Cg-XVI)).

4.3.29 The Association expressed its satisfaction with the development of a Flash Flood Guidance System project in the Mekong River basin and welcomed the planned inclusion of Myanmar in the system.

4.3.30 The Association further welcomed the results of a planning meeting held in November 2012 in Kathmandu, Nepal, to establish a Flash Flood Guidance System (FFGS) in South Asia including Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. The Association thanked the Government of the United States of America, which through the United States Agency for International Development (USAID)/Office of Foreign Disaster Assistance (OFDA), provided the core funding for the implementation of this project.

4.3.31 The Association noted with appreciation that a Regional Workshop and Training on Flood Forecasting and Warning was held in October 2011 in Nanjing, China. The Association thanked the Government of China and Hohai University for hosting the workshop and expressed the expectation that such workshops would be held on a regular basis for the benefit of Members of the Association.

4.3.32 The Association saw merit in establishing closer links between the Severe Weather Forecasting Demonstration Project (SWFDP) and the FFGS with the intent to establish a predictive capability for flash floods. Further, aiming to improve the flood forecasting systems including flash flood guidance and prediction systems, the Association recommended exploring the suitability of global precipitation products and information for various geographical regions and the benefits derived from the use of terrestrial and satellite-based observations to improve forecasting accuracy of flash floods and riverine floods.

### *Associated Programme on Flood Management (APFM)*

4.3.33 The Association recognized the substantial achievements made through the Associated Programme on Flood Management in the form of providing flood management policy guidance, technical tools and capacity-building. Noting that the APFM is being undertaken in partnership with the Global Water Partnership, the Association recommended the further strengthening of the HelpDesk for Integrated Flood Management as the backbone of the initiative. The HelpDesk provides technical assistance and disseminates information and guidance material ([www.apfm.info](http://www.apfm.info)). The Association appreciated the wide scope of the target audience, reaching beyond NMHSs while fully integrating these in activities of the APFM. It appreciated the substantial support so far provided by the Governments of Japan, Switzerland, Italy and Germany to the success of the Programme. The Association also thanked USAID for pledging additional funds in support of the APFM.

4.3.34 The Association noted with appreciation the series of workshops held in the Region in support of integrated flood management concept and practices, through the provision of training for trainers and the continued organization of national workshops for the development of national flood management strategies. This includes regional training workshops held in Nepal in October 2010, in Viet Nam (April 2011), and assistance provided to the governments of Pakistan (January 2011), Thailand (February 2012) and Lao People's Democratic Republic (April 2012) in the development of national strategies for flood management.

### *Water Resources Assessment and climate issues*

4.3.35 The Association noted the publication of the Technical Material for Water Resources Assessment and called for a wide distribution of these materials among Members.

4.3.36 The Association was pleased to note that a key result of a regional workshop on “Development of Water Resources Assessment (WRA) Methodologies and Establishment of an Information System” held in Seoul, Republic of Korea in October 2012 was the call to develop dynamic methodologies for WRA, allowing timely monitoring of changes of water resources availability as a result of climate variability and human-induced changes of the water balance and to establish an RA II wide WRA Information System which will provide the information base to generate information needed for decision-making. The Association also recognized the benefits of establishing an expert team on WRA in RA-II and in close liaison with CHy. This is also seen as a contribution to the Global Framework for Climate Services (GFCS).

4.3.37 Recognizing the role of glaciers and snowfields in mountainous areas, the storage of freshwater in lakes and reservoirs in the Region and interactions between surface and groundwater bodies that are increasingly important for water resources assessment and management, the Association reiterated the need of obtaining specific data and information especially in the context of climate change. Consequently, the Association emphasized the need for investigating the possibility to link with other international programmes with the aim to develop a regional information system for the exchange of knowledge, data and information to improve water resources assessments.

#### *Capacity-building (hydrology)*

4.3.38 The Association noted with appreciation that in the last intersessional period the number of WMO fellowships assigned to hydrology had increased and in particular appreciated that fellowships for BSc and MSc programmes in Hohai University, Nanjing, and in the Russian State Hydrometeorological University (RSHU), were offered as part of the cooperation with China and the Russian Federation.

4.3.39 The Association recalled that the World Hydrological Cycle Observing System (WHYCOS) consists of a number of different HYCOS components (projects), each of which is independently implemented and responsive to local needs. The establishment of hydrological information systems and capacity-building is at the core of each of the HYCOS projects. The Association highly appreciated the financial support provided by the Agence Française pour le Développement (AFD) in the implementation of the Mekong-HYCOS project that ended in September 2012. It noted with satisfaction the current implementation of the HKH-HYCOS project and thanked the government of Finland for providing the funding for this project. The Association noted that the objective of both projects is the operation of a transboundary flood information system, complementary to national flood forecasting systems.

#### *Exchange of hydrological data*

4.3.40 While noting some improvements in the exchange of hydrological data in particular with respect to dedicated projects including WHYCOS, the Association expressed its concern that the overall level of exchange of hydrological data falls sharply behind a growing need for the free and open access to these data, in particular for improved water management, adaptation to climate change and variability as well as scientific programmes at regional and global scales.

4.3.41 The Association reaffirmed the importance of data rescue, which is fundamental for trend analysis and understanding the effects of climate change. It urged Members to support the activity of Hydrological Data Rescue, including experimental data, through the mobilization of extrabudgetary resources including the VCP.

4.3.42 The Association stressed the need for exchange of hydrological data, in particular on the monitoring of water bodies, in transboundary situations and urged members to apply Resolution 25 (Cg-VIII) – Exchange of hydrological data and products in this regard.

### *WMO Quality Management Framework for Hydrology*

4.3.43 The Association noted its appreciation for the publication of several documents under the WMO QMF-Hydrology in the last intersessional period, namely: the *Manual on Estimation of Probable Maximum Precipitation (PMP)* (WMO-No. 1045), the *Manual on Stream Gauging* (WMO-No. 1044), the *Manual on Flood Forecasting and Warning* (WMO-No. 1072), the *Guidelines for the Assessment of Uncertainty of Hydrometric Measurements* (WMO-No. 1097), the *Technical Report on Climate and Meteorological Information Requirements for Water Management* (WMO-No. 1094), the *Technical Report on Water Quality Monitoring* (In Progress), the *Technical Report on Technical Material for Water Resources Assessment* (WMO-No. 1095). All these publications are available online at [http://www.wmo.int/pages/prog/hwrp/index\\_en.php](http://www.wmo.int/pages/prog/hwrp/index_en.php).

### *Cooperative activities*

4.3.44 The Association welcomed the important role that WMO is playing in UN-Water, as it considered that it is enhancing the awareness of partner organizations and Governments of the contributions that WMO in general, and NHSs in particular, can provide to the solution of water issues.

4.3.45 Realizing the need for seeking strategic alliances to achieve the objectives of the flood forecasting initiative, carry out activities related to hydrology and water resources in the RA II Operating Plan and in view of enhancing the development of NHSs in the Region, the Association emphasized the importance of strengthening linkages in particular with UN ESCAP, regional organizations including river basin organizations such as the Mekong River Association, and including centres such as the International Centre for Water Hazard and Risk Management (ICHARM), and the International Centre for Integrated Mountain Development (ICIMOD) as well as other regional and professional national, regional and global organizations, as appropriate.

## **4.4 Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO (agenda item 4.4)**

### ***WMO Integrated Global Observing System (WIGOS)***

#### ***The WIGOS Framework Implementation***

4.4.1 The Association considered the WIGOS implementation actions to be undertaken by its Members and subsidiary bodies. In this consideration, the Association took into account decisions of Cg-XVI, EC-64 and CBS-15 on the WIGOS implementation.

4.4.2 The Association recalled Resolution 50 (Cg-XVI) – Implementation of the WMO Integrated Global Observing Systems, by which the regional associations were requested: (1) to develop their regional WIGOS implementation plans; (2) to coordinate WIGOS implementation activities with the WMO Information System in their operating plans and work programmes; and (3) to promote capacity-building and outreach activities to assist Members in the implementation of WIGOS. The Association agreed that WIGOS would provide a framework for improved collaboration and coordination between NMHSs and relevant national, subregional/regional and international organizations.

4.4.3 The Association expressed its gratitude to the Republic of Korea and the Russian Federation in implementing their [WIGOS Demonstration Projects](#) providing a number of lessons learned, experiences and perspectives received on the potential benefits, value and impact of the WIGOS implementation process at the national and regional levels. In this regard, the Association encouraged its Members to share relevant experiences and cooperate with one another in implementing WIGOS, including assistance to Members with specific WIGOS implementation needs.

4.4.4 The Association emphasized that strong support and close collaboration among Members were needed to advance scientific knowledge and technical infrastructure to meet the regional WIGOS requirements. Therefore, it will be desirable to strengthen cooperation and partnership through Region-wide organizations or subregional groupings overseeing the WIGOS observing components. It specifically referred to enhanced cooperation among meteorological, hydrological, marine/oceanographic and environmental institutions/services where they are separated at the national level.

4.4.5 The Association recalled Resolution 10 (EC-64) – WIGOS Framework Implementation Plan (WIP) developed by ICG-WIGOS and expressed its concern that the timely completion of WIGOS implementation in the Region would directly depend on the available resources (expertise and funds). The Association further underlined that WIGOS implementation at national and regional levels would require initial investment, specifically for improvement of coordination and technological infrastructure. This investment should be a significant component of WIGOS implementation plans of individual NMHSs. In this regard, the Association urged Members to provide resources to support the implementation of WIGOS in the Region.

4.4.6 The Association agreed that the recently established WIGOS Project Office is critical to the success of WIGOS implementation and should be fully resourced. It therefore urged its Members to continue to provide resources, through the WIGOS Trust Fund and seconded experts or Junior Professional Officers, to help support the implementation of WIGOS.

4.4.7 The Association noted that CBS-15 considered the new “Implementation Plan for the Evolution of Global Observing Systems” (EGOS-IP). In this regard, the Association thanked the Members of the Region for their contributions, reporting on progress and plans in their countries related to actions in the original EGOS-IP.

4.4.8 The Association further requested its Members to: (a) nominate national focal points tasked to monitor the implementation of the EGOS-IP nationally, report on implementation issues, and provide feedback to the CBS through the Secretariat; and (b) address the actions listed in the EGOS-IP in collaboration with partner organizations and agents identified in the EGOS-IP. It also encouraged Members to mobilize additional resources to drive these activities forward. It further requested the relevant RA II subsidiary bodies to address the EGOS-IP in their work programmes, and promote its effective implementation.

4.4.9 The Association noted with great appreciation that, in response to the request from the Sixteenth Congress, the development of a Regional WIGOS Implementation Plan for RA II (R-WIP-II) was initiated at the meeting of the Working Group on WMO Integrated Observing System and WMO Information System (WG-IOS/WIS) held in November/December 2011 in Seoul, Republic of Korea. The RA II Management Group at its fourth session (Doha, Qatar, February/March 2012) endorsed the proposal by the WG-IOS/WIS for the establishment of the Task Team on R-WIP (TT/R-WIP) and requested the TT/R-WIP to streamline the proposed projects within the draft R-WIP-II. Through a meeting of TT/R-WIP held in September 2012 in Jakarta, Indonesia during CBS-15, the Task Team further developed the draft R-WIP-II. The Association expressed its appreciation to WG-IOS/WIS, especially TT/R-WIP for the development of R-WIP-II, which includes seven draft RA II WIGOS Implementation Projects

4.4.10 The Association accordingly adopted [Resolution 3 \(RA II-15\) – Regional WMO Integrated Global Observing System Implementation Plan](#) and its annex. The Association agreed that the implementation of R-WIP-II be supported by all the Members of the Region, and be guided, supervised and monitored by the Management Group of RA II, with periodic reports from appropriate subsidiary bodies in charge of WIGOS. The Association further agreed that R-WIP-II be further revised to accommodate new projects which would be submitted by Members and authorized the president to approve the revised R-WIP-II during the intersessional period in consultation with the Management Group.

4.4.11 The Association noted that some Members, including China, Republic of Korea and the Russian Federation, had already conducted projects to implement the WIGOS for the design of an



integrated national observing system. The Association invited these Members to share with the other RA II Members their experiences and lessons learned from a national integration process to support the implementation of WIGOS.

4.4.12 The Association noted with appreciation the willingness of the Russian Federation to include a national tsunami monitoring system as a new regional WIGOS project. The Association agreed that the regional WIGOS projects should be expandable to include more subregional and national projects.

#### ***Regional Basic Synoptic Network (RBSN) and Regional Basic Climatological Network (RBCN)***

4.4.13 The Association noted that owing to Members' efforts, the RBSN and RBCN have demonstrated sustainable performance. It also appreciated the work done by the Lead Centre for monitoring the data quality of land surface observations in Tokyo (JMA) to improve monitoring procedures and for the presentation and distribution of monitoring results on the availability and quality of land surface-based observational data.

4.4.14 By adopting [Resolution 4 \(RA II-15\) – Regional Basic Synoptic Network and Regional Basic Climatological Network in Region II](#), the Association approved the new list of RBSN and RBCN stations as given in Annexes 1 and 2 to this resolution

#### ***GCOS Reference Upper-Air Network (GRUAN)***

4.4.15 The Association noted that implementation of the GCOS Reference Upper-Air Network (GRUAN) has progressed steadily over the past years, with 15 highest-quality upper-air sounding sites currently contributing globally (of which two are located in RA II, in Xilinhote (China) and Tateno (Japan)). The fourth GRUAN Implementation-Coordination Meeting was hosted by JMA in March 2012. GRUAN data have been flowing since summer 2011 through NOAA's National Climatic Data Centre (NCDC) to data users. The Association noted that specific details of, and information on, GRUAN from the forthcoming GRUAN Reference Manual and Guide are planned to be included in the WIGOS regulatory material.

#### ***Marine and Oceanographic Observations***

4.4.16 The Association requested its Members to contribute to the [JCOMM Observations Programme Area Implementation Goals](#) and thereby increase the deployment of ocean observing platforms (buoys, floats, ships, sea level stations, Tsunameters) in data sparse areas. It noted the establishment of a WMO-IOC Regional Marine Instrumentation Centre (RMIC) in Tianjin, China per Resolution 9 (Cg-XVI) and IOC Resolution XXVI-9, and invited its Members to take advantage of the infrastructure in order to enhance traceability of ocean observations produced by the Region.

#### ***Cryospheric Observations and Global Cryosphere Watch (GCW)***

4.4.17 The Association expressed its strong interest in the ongoing development of the Global Cryosphere Watch (GCW) as reported to EC-64, the recent availability of the GCW Implementation Plan and the engagement of experts from RA II in GCW activities. It strongly urged Members to consider expansion or implementation of measurements of solid precipitation and snow and ice parameters which would enhance monitoring of cryospheric changes nationally and regionally, and to consider establishment of GCW reference sites as part of GCW's CryoNet initiative. It further stressed that the measurement and exchange of cryospheric data at synoptic and climate stations, where appropriate, but particularly in mountain and high land regions, would be especially useful to meet the operational, research and service needs of weather, climate, hydrology and environmental science nationally, regionally and globally. The Association urged interested Members to nominate national focal points for GCW activities and to review and provide the EC Panel on Polar Observations, Research and Services (EC-PORS) with information on how GCW could help them.

***Aircraft Observations***

4.4.18 The Association noted that the Global AMDAR Programme is the core of the aircraft-based observing system and now comprises 33 airlines, over 2800 aircraft, and provides around 300,000 observations per day on the GTS supplemented by around 15,000 additional aircraft-based observations from ICAO sources. It recognized that the AMDAR Programme in Region II is well advanced with long-term operational programmes for China; Hong Kong, China; Japan; and Republic of Korea. Between these programmes, the Region contributes around 25,000 AMDAR observations on the GTS per day from 7 airlines and around 270 aircraft. While this is a significant contribution to the global aircraft-based observations programme, there is still large potential for AMDAR programme growth and improved coverage over the Region and even greater potential through the addition of water vapour sensing as a component of the AMDAR observing system platform.

4.4.19 In line with the actions of the CBS Implementation Plan for Evolution of the GOS, the Association encouraged its Members to work with the CBS Expert Team on Aircraft-based Observations (ET-ABO) and determine strategies for ensuring wider and optimized implementation of AMDAR programmes towards an improved and more efficient upper-air observing system throughout the Region.

***Surface-based remote sensing observations***

4.4.20 The Association noted that, lead by the Turkish State Meteorological Service (TSMS), CBS has overseen the development and operational implementation of the WMO Weather Radar Database (WRD) (<http://wwr.dmi.gov.tr/Default.aspx?l=en>), which will be an important contributor to the WIGOS Information Resource and the WMO Information System as a source of radar metadata. The Association encouraged its Members to nominate WMO radar metadata focal points to ensure their weather radars are included and timely updated in the WRD.

4.4.21 Planning has commenced for a Workshop in early 2013 on the Regional and Global Exchange of Weather Radar Data. It is expected that the outcomes from this workshop would provide clear guidance to enable Members to meet the requirements for the international exchange of Doppler radial winds and reflectivity data, which was a clear recommendation from the fourth WMO Workshop on the impact of various observing systems on Numerical Weather Predictions. The Association agreed to support the representative of the Region to the Workshop and contribute to future activities associated with the international and regional exchange of weather radar data.

***Atmospheric Chemical Composition and UV Measurements***

4.4.22 The Association welcomed the establishment of the GAW global station Nepal Climate Observatory – Pyramid (5079 m asl) in Nepal and GAW regional station Tiksi (71.58°N) in the Russian Federation. The Association appreciated the uninterrupted operation of the global GAW station Minamitorishima in Japan after a severe earthquake and following a tsunami in March 2011. The Association recognized that further efforts are needed in filling the observational gaps in Eurasia and in the extension of the observational programme at existing stations. It reminded members to submit data in a timely fashion to the appropriate data centers. The Association requested its Members to update now and to continue updating regularly their station information on the GAW Station Information System (GAWStIS) at <http://gaw.empa.ch/gawstis/>.

***Terrestrial observations – Water cycle***

4.4.23 The Association noted with appreciation the successful implementation of the MEKONG-HYCOS project, involving Cambodia, Lao People's Democratic Republic, Thailand and Viet Nam. Implemented through the Mekong River Commission, the objective of the project had been to establish a hydrological information system in support of regional flood forecasting of the

lower Mekong basin, complementary to flood forecasting services of Members. In this regard, the Association thanked the Government of France for funding the project.

4.4.24 The Association welcomed the substantive progress made in the implementation of the Hindu Kush Himalaya-HYCOS (HKH-HYCOS) project that aims to establish a regional flood information system. Bangladesh, Bhutan, Nepal and Pakistan cooperate actively in the project while China and India are prepared to provide meteorological forecasts and prediction products. The project is implemented in cooperation with the International Centre for Integrated Mountain Development (ICIMOD) as a well-established intergovernmental regional organization. The Association thanked the government of Finland for funding the project.

4.4.25 The Association noted with concern that in over more than eight years the establishment of an ARAL-HYCOS project that had been promoted by the NMHSs of five Central Asian states had still not been successful in securing funding for this important project aiming to improve water management in the Aral Sea basin including the Amur Darya and Syr-Darya river basins. The Association encouraged Members, and requested the Secretary-General, to continue efforts to secure extrabudgetary funds to support the project.

### ***Space-based Observations***

4.4.26 The Association welcomed the substantial progress accomplished by Members' agencies participating in the Coordination Group for Meteorological Satellites (CGMS) in adopting a new baseline for their contribution to the space-based GOS. It agreed that this was an important step towards fully implementing the space-based component of the Vision for the GOS in 2025. CBS-15 decided to reflect this new baseline in the WMO regulatory material and adopted amendments to the Manual on the GOS.

4.4.27 The Association encouraged continuation of the RA II Pilot Project to Develop Support for NMHSs in Satellite Data, Products and Training, coordinated by JMA and KMA. This Pilot Project is to be evolved into a RA II WIGOS Project from 2013, as it is important for improving the dialogue between satellite providers and users in the Region. In this respect, the Association stressed the importance of identifying and regularly documenting Region-oriented requirements for satellite data access and exchange, following the guidance provided by the "Procedure for Documenting Regional Requirements for Satellite Data Access and Exchange." The Pilot Project conducted a questionnaire survey in 2012 to develop an initial set of such requirements.

4.4.28 The Association expressed its deep appreciation to CMA, JMA and KMA for hosting the first (2010), second (2011) and the third (2012) Asia/Oceania Meteorological Satellites Users' Conferences, respectively. The third Asia/Oceania Meteorological Satellites Users' Conference, preceded by a 3-day WMO-KMA RA II Pilot Project VLab Satellite Training Event attended by participants from 13 Members of the Region, brought together more than 160 scientists, users and satellite operators representatives and has become the prime forum for the satellite meteorology community in the Region. The Association strongly encouraged continuation of the Conference on an annual basis.

4.4.29 The Association looked forward to the planned introduction of several next generation geostationary satellite systems by RA II satellite operators in the 2013–2017 timeframe: INSAT-3D, FY-4A, Himawari-8/9 and GEO-KOMPSAT-2A. Emphasizing that optimal utilization of the new operational satellite systems should be assured and the risk of disruption for operational users be mitigated, the Association recognized the need for appropriate and timely preparation of satellite data users to these new systems, in line with the CBS-15 "Guideline for Ensuring User Readiness for New Generation Satellites" ([http://www.wmo.int/pages/prog/sat/documents/SAT-GEN\\_CBS-15-GuidelineUserReadiness.pdf](http://www.wmo.int/pages/prog/sat/documents/SAT-GEN_CBS-15-GuidelineUserReadiness.pdf)). The preparation should involve user training, guidance to upgrade processing software and hardware, information and tools.

### **Observing System Experiments (OSEs)**

4.4.30 The Association noted the list of topics for NWP impact studies (Observing Systems Experiments and Observing Systems Simulation Experiments) relevant to the evolution of global observing systems proposed by CBS-15, and requested its Members to consider undertaking such studies from a regional perspective, and report feedback through the CBS Rapporteur on Scientific Evaluation of Impact Studies (R-SEIS).

### **Instrument Standards and Best Practices**

4.4.31 The Association recalled that Cg-XVI stressed that Regional Instrument Centres (RICs) and Regional Marine Instrument Centres (RMICs) should provide effective support to Members in ensuring the traceability of their standards and reaffirmed the need to regularly assess their capabilities making use of the evaluation scheme that was developed to this effect. The Association noted that Regional Radiation Centres should provide support to Members for the traceability of radiation measurements. The Association requested its Members hosting RICs, RMICs and RRCs to reconfirm their on-going willingness to provide these facilities and their compliance with the relevant Terms of Reference of these centres at the latest by December 2013 as they play a crucial role in ensuring traceability of measurement to the International System of Units (SI), and capacity-building which is fundamental for the development of WIGOS.

4.4.32 The Association noted that the Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations (PP-QM), in collaboration with WMO, had held a Workshop on Quality Management in Surface, Climate and Upper-air Observations in RA II (Asia) in Japan in July 2010. The workshop had confirmed the importance of full utilization of RICs and the promotion of capacity-building for enhancement of data quality and availability in Region II. All materials from the workshop are available on the JMA website at [http://www.jma.go.jp/jma/en/Activities/qmws\\_2010/qmws\\_2010.html](http://www.jma.go.jp/jma/en/Activities/qmws_2010/qmws_2010.html).

4.4.33 The Association noted that PP-QM had conducted two questionnaire surveys to assess the current implementation status of relevant observations and quality management in July 2010, and to gather necessary information on the calibration capabilities of RA II Members and their need for RIC services in December 2011. The result is summarized in WMO IMOP/IOM Report No. 111 on the WMO website at <http://www.wmo.int/pages/prog/www/IMOP/publications-IOM-series.html>.

4.4.34 The Association welcomed that RIC-Tsukuba, in collaboration with WMO and RIC-Beijing, will hold a Training Workshop on Calibration and Maintenance of Meteorological Instruments in RA II (Asia) in Japan from 19 to 22 February 2013. The Association noted that the workshop will be a RIC-Tsukuba follow-up activity to the outcomes of the JMA/WMO Workshop in July 2010 and to the results of two questionnaire surveys in July 2010 and in December 2011, as part of the RIC's contribution to the implementation of WIGOS in Region II.

4.4.35 The Association noted the support expressed by Congress and the Executive Council to the further development of the siting classification for observing stations on land that had been published in the *Guide to Instruments and Methods of Observations* (WMO-No. 8), as a common WMO-ISO standard. The Association recognized that its Members needed guidance material on the use and implementation of the siting classification to implement their observing stations. The Association noted that CIMO/ET on standardization had drafted questions and answers related to the use and implementation of the siting classification as a working document. The Association urged its Members to implement that classification and to share experience and to represent their interests in the further development of the classification as a common WMO-ISO standard.

4.4.36 The Association noted that the eighth WMO Intercomparison of High Quality Radiosonde Systems held in China in July 2010 has produced a large data set on the performance of new operational radiosonde designs, backed up by measurements from Scientific Sounding Instrumentation. This allows recommendations as to the radiosonde designs that are potentially

suitable for the GRUAN network operations and those which are suitable for routine operations, together with recommendations to improve systems without excessive development expenditure.

4.4.37 The Association recognized the need for a new Dobson calibration exercise in RA II, in view of the fact that the previous exercise took place in Tokyo in 2006.

#### ***Radio Frequency Coordination***

4.4.38 The Association recalled Resolution 11 (EC-64) on radio frequencies for meteorological and related environmental activities. It noted that several RA II Members had contributed significantly to the WMO success at the International Telecommunication Union (ITU) World Radio Communication Conference 2012 (WRC-12) in protection spectrum employed by WMO systems and applications. However, there remains increasing pressure to share or reallocate frequencies used for meteorological purposes that could impact on Members' operations, in particular their observing systems. The Association supported the EC-64 request for all Members to participate actively in national, regional and international activities on radio frequency regulatory issues in order to defend radio frequency bands used for meteorological and environmental activities.

4.4.39 The Association further noted that RA II incorporates parts of several ITU regional organizations, in particular, the Regional Commonwealth in the field of Communications (RCC), the Asia-Pacific Telecommunity (APT) and the League of Arab States (LAS). It emphasized that it is essential that these groups be represented in WMO radio frequency coordination, and that meteorological requirements/interests are appropriately represented in the relevant ITU regional organizations.

#### ***Coordination of Observations for Climate***

4.4.40 The Association noted with appreciation the consideration given by the CCI Management Group for supporting the WIGOS implementation and addressing the need in providing guidance on improving national climate networks and furthering the establishment of national reference climate networks. The Association urged its Management Group to keep this issue as a matter of high priority in the Regional WIGOS Implementation Plan.

4.4.41 The Association took note of the update of the 2006 GCOS report on *Systematic Observation Requirements for Satellite-based Products for Climate*, providing supplemental details to the satellite-based component of the 2010 update of the *Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC*. The report recognizes in particular the importance of building data records and deriving products from the measurements made by satellites. It is intended primarily to assist those Members and their multi-national agencies that provide Earth observation from space in their response to the requirements of the Implementation Plan.

4.4.42 The Association noted that GCOS provides the international framework through which the various global observing systems and programmes operate under the auspices of WMO, IOC/UNESCO, UNEP and ICSU. The successful implementation of GCOS activities also depends on effective coordination at the national level of the contributions of Member countries to the WMO Integrated Global Observing Systems (WIGOS), the IOC-led and co-sponsored Global Ocean Observing System (GOOS), the FAO-led and co-sponsored Global Terrestrial Observing System (GTOS), and the many other in situ and space-based observing systems providing climate-related observation data.

#### ***Global Information System Centres (GISCs)***

4.4.43 The Association was pleased with the progress of WIS Implementation in the Region noting that GISCs Beijing and Tokyo have been operational since January 2012. It noted that GISC Seoul had also been successfully audited by CBS and that it will become operational in early 2013. GISCs Jeddah, Moscow, New Delhi and Tehran are preparing for their audits with an aim to beginning operations in 2013. Seven GISCs are expected to be directly supporting RA II by the

end of 2013. The Association expressed its appreciation to GISCs Beijing and Tokyo for providing WMO Interim Metadata Management Services (WIMMS, [GISC Beijing WIMMS](#) and [GISC Tokyo WIMMS](#)) to support those WIS centres that do not yet have access to an operational GISC. It further noted that GISC Seoul will be able to provide WIMMS starting from early 2013. The Association noted the important role of GISCs in ensuring effective exchange of information between Members, and encouraged Members to work with GISCs on network and data management issues and to participate in the WIS Application Pilot Project in Regions II and V (former WIS VPN Pilot Project) focusing on pragmatic applications providing benefits from GISC services via internet.

### ***National Centres (NCs) and Data Collection or Production Centres (DCPCs)***

4.4.44 Recalling [Resolution 51 \(Cg-XVI\)](#) – Designation of WIS Centres and Recommendation 4.3.1/1 (CBS-15) – Amendments to Appendix B Table B.3 “National Centres” in the Manual on the WMO Information System (WMO-No. 1060)”, the Association noted that the Region has 28 DCPCs and 36 NCs. Seventeen DCPCs have been endorsed by CBS for operations, five are under review and six have still to be submitted to CBS for endorsement. The Association, noting the request from the Sixteenth World Meteorological Congress (Cg-XVI) to initiate the coordination and consultations as a tentative solution so that each National Centre should be linked to a principal GISC and to a secondary GISC, reviewed the list of NCs provided by CBS. The Association adopted [Resolution 5 \(RA II-15\) – WMO Information System](#).

### ***RA II WIS Implementation Plan***

4.4.45 The Association recalled that Cg-XVI stated that WIS has moved from a development stage into an operational stage and that WIS activities in 2012–2015 should be: (1) complete WIS implementation across all WMO Centres; (2) capacity-building to ensure support of all WMO Members; (3) leverage WIS advantages for all WMO Programmes; and (4) take advantage of WIS in all WMO Data Management. The Association noted that capacity-building has been given an effective start through the contributions of China, Japan and the Republic of Korea by running international workshops on WIS, and through the successful incorporation of WIS into telecommunication-related training workshops undertaken by Regional Training Centres in the Islamic Republic of Iran and Turkey. The Association noted that a training workshop on the BUFR and WIS matters was held (26–30 November 2012, Moscow) for Russian speaking countries. It emphasized that all Regional Training Centres should consider ways to incorporate WIS, to improve current training programmes, improve the trainers’ understanding of WIS, and to ensure that the principles of WIS data management are taken up in other WMO Programme activities. The Association noted the initiatives of CBS for developing training strategies and encouraged Members to monitor this activity and to take advantage of CBS guidance and initiatives on capacity-building.

4.4.46 The Association noted with satisfaction that Kazakhstan carried out significant modernization of the National Meteorological Service and in this regard, it planned to expand the participation in the WIS program during the next intersessional period. In particular, it expected to upgrade the WIS national centre up to DCPC status as one of the elements of the North Eurasian Climate Centre. In parallel, the meteorological communication links with neighbouring countries and other WIS centres will be upgraded.

4.4.47 The Association reviewed the draft RA II Regional WIS Implementation Plan and expressed its appreciation to China, Japan and the Republic of Korea for their contributions to development of the plan. It agreed that fully implementing WIS in the Region was an essential step toward the efficient implementation of WIGOS, GFCS and other priority areas. The Association noted the effectiveness of having a virtual WIS Implementation Project Office, utilizing local secondments in Beijing and Seoul. It encouraged other centres, especially GISCs, to provide similar resources towards completing the implementation of WIS in all centres in the Region. The Association noted the draft plan and agreed that the virtual WIS Implementation Project Office should continue to refine the plan and assist the RA II Management Group to guide Members through the implementation process. It agreed that the aim was to have WIS implemented in all

RA II Members' centres by the Seventeenth World Meteorological Congress in 2015 and that it was important to regularly review the progress of WIS implementation, with a major review in mid-2014 with an aim to accelerating WIS implementation for those centres which are not likely to meet the 2015 target.

#### ***WIS discovery metadata***

4.4.48 The Association noted that CBS-15 recommended an updated version of the WMO Core Profile of the ISO 19115 metadata standard that is used to represent WIS discovery metadata. This update introduces features that are needed to manage WIS. It also noted that CBS-15 recommended a standard way of managing changes to the metadata standard that clearly identifies those changes that will need software changes and subjects these to tighter change controls than for changes that have lower impact. Centres that create information that is exchanged through the WIS should work with their GISC to ensure that there are appropriate WIS discovery metadata records associated with the information.

#### ***Quantitative monitoring of the World Weather Watch***

4.4.49 The Association noted that the analysis of the Annual Global Monitoring results for October 2011 shows that availability of SYNOP, TEMP and CLIMAT reports continues to be sustained at the higher level achieved since 2005. The proportion of CLIMAT reports received is lower than the proportion of SYNOP reports. The Association urged Members to ensure that CLIMAT reports are created and distributed correctly.

#### ***Data Rescue and Climate data sets***

4.4.50 The Association urged Members to further accelerate, as a matter of high priority, the recovery and digitization of old climate records which remain critical for climate change assessment and the development of climate services in the context of climate change adaptation and the GFCS. The Association further agreed that the ongoing WMO plans for accelerating climate data recovery and digitization efforts worldwide in view of developing high-quality climate data sets is a practical approach to link together Data Rescue on one side and regional climate assessment and adaptation efforts on the other side. These regional initiatives should set up the regional pillars for establishing a worldwide International Data Rescue initiative which was recommended by CCI-XV.

4.4.51 The Association agreed on the need for Members to collaborate actively for developing a regional collaborative data rescue and data set initiative. The objectives of this initiative can be similar to the existing ones in other Regions, i.e. MEDARE and ECA&D. It welcomed the plan for the organization, in early 2013, of a training workshop on Data Rescue and Data Management for RA II Members, which will be hosted in China and co-sponsored by the China Meteorological Administration and WMO. It appreciated that the event will include other applications such as Climate Data Management System and the calculation of climate indices.

#### ***Climate Data Management Systems (CDMSs)***

4.4.52 The Association was pleased to note that the Region collaborated actively in the WMO survey on the status of climate data management and related systems worldwide. It noted that a total number of 12 NMHS in the Region responded to the WMO survey. The response reflected the gaps and needs for modernizing the CDMS worldwide and in the Region.

4.4.53 The Association noted with appreciation the work being finalized by the CCI Open Panel on Climate Data Management Expert Team on Climate Data Management Systems (ET-CDMS) on the provision of an updated guidance on the specifications for modern Climate Data Management Systems (CDMSs).

4.4.54 The Association was pleased to note that the Qatar Meteorological Department would hold a WIS Workshop from 26 to 30 January 2013 in Doha and invited RA II Members to participate in the Workshop.

#### ***Manual on GTS, Vol. II – RA II***

4.4.55 The Association noted the activities of the Sub-group on WMO Information System (WIS) and its contribution through the Commission for Basic Systems to ensure the maintenance of the Global Telecommunications System main and regional networks. It noted that the latest version of Volume II – Regional Aspects – Region II (Asia) of the *Manual on the GTS* (WMO-No. 386) was issued in 1991 and that it had been updated only twice (1992 and 1998). It further noted that no amendment has been issued in the following 14 years with much of the relevant information having been maintained on the WMO web pages. The Association adopted [Resolution 6 \(RA II-15\) – Amendments to the Manual on the Global Telecommunication System \(WMO-No. 386\), Volume II](#).

#### **4.5 Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development (agenda item 4.5)**

##### ***World Climate Research Programme (WCRP)***

4.5.1 The Association acknowledged the research successes and advancements facilitated through the WCRP projects and working groups in improving the quality of seasonal forecasts through the use of multi-model ensembles, developing state-of-the-science data assimilation systems, and better understanding of key processes that are likely to contribute to improved seasonal forecasts, such as the Madden-Julian Oscillation, ENSO and Asian Monsoons.

4.5.2 The Association noted with satisfaction the successful outcome of the WCRP Open Science Conference (OSC) “Climate Research in Service to Society”, that was convened in October 2011 in Denver, Colorado, United States, to consult with the international communities of scientists and climate information users on research priorities for WCRP in the ensuing decade. The major scientific priorities identified by the participants include: (1) provision of skilful future climate information at regional scales; (2) regional sea-level rise; (3) cryosphere in a changing climate; (4) cloud and climate sensitivity; (5) changes in water availability; and (6) prediction and attribution of extreme events.

4.5.3 The Association welcomed WCRP’s efforts to engage early career scientists in its activities, with particular emphasis on scientists from least developed and developing countries, to facilitate growth of the diverse future workforce needed to meet the increasingly complex scientific challenges in the future. It noted with satisfaction that over the past four years WCRP support had enabled 145 scientists, of whom 30 were early career scientists or students, to participate in WCRP activities.

4.5.4 The Association was pleased to note that the study of the Asian monsoon systems continues to be an important focus of the WCRP projects. It noted WCRP support for several important research campaigns in the Region, including the Asian Monsoon Years (AMY 2007–2012), GEWEX/CEOP, DYNAMO (Dynamics of the Madden-Julian Oscillation) and YOTC (Year of Tropical Convection). Other research activities being coordinated by WCRP include observational and numerical process studies, prediction and predictability experiments, and coordinated model evaluation, for instance under the Coordinated Regional Climate Downscaling Experiment (CORDEX). The Association encouraged its Members in the Region to participate in the CORDEX Asia activities. The Association welcomed WCRP interaction with the Forum on Regional Climate Monitoring, Assessment, and Prediction for Asia (FOCRAll), noting that these efforts were designed to provide science-based climate information for decision makers, especially in line with priorities of the Global Framework for Climate Services (GFCS). An International Workshop on CORDEX-East Asia was held in Seogwipo, Republic of Korea, 22–23 September 2011.



4.5.5 The Association further noted the progress in implementation of the multi-national and multi-institutional NPOCE (the Northwestern Pacific Ocean Circulation and Climate Experiment), which is hosted by China. NPOCE is designed to observe, simulate, and understand the dynamics of the NWP (Northwestern Pacific) ocean circulation and its role in low-frequency modulations of regional and global climate.

4.5.6 The Association welcomed the outcomes of the Conference on Opportunities and Challenges of Monsoon Prediction in a Changing Climate (OCHAMP-2012) held at the Indian Institute for Tropical Meteorology (IITM) in February 2012, noting that better account of the role of aerosols, monsoon season long-term trends, convection, clouds and precipitation, and orography may result in developing considerably improved prediction of various attributes of monsoons with the aid of coupled models.

4.5.7 The Association noted with appreciation the strategic priorities for the WCRP related to Expected Result 5:

- (a) Advance understanding, research and modelling to improve global and regional climate prediction and projection skill for seasonal, decadal, and longer time scales;
- (b) Facilitate major advances in understanding the basic physics underlying climate prediction and predictability through major projects each focussing primarily on the interfaces in the climate system and through cross-cutting activities that can contribute directly to socio-economic benefits to the WMO Members;
- (c) Enhance collaboration with CCI to work towards improvement of climate products and services, especially in the area of climate prediction on seasonal and decadal scales, and also on climate change projections and downscaling;
- (d) Identify important research needs, and assisting Members in operationalization of research advances in climate prediction;
- (e) Contribute to capacity-building, training and development of new products/services.

#### ***World Weather Research Programme (WWRP)***

##### ***Research in the improved prediction of high-impact weather on time scales of hours to sub-seasons***

4.5.8 The Association acknowledged the research successes and advancements in the WWRP including THE Observing system Research and Predictability EXperiment (THORPEX), in meeting Members' needs, including the successful transition of research into operations through WWRP Forecasting Demonstration Projects (FDPs) (e.g., Beijing 2008), the closer collaboration with the Severe Weather Forecasting Demonstration Projects (SWFDPs) in the Commission for Basic Systems (CBS), the new sub-seasonal to seasonal prediction project with the World Climate Research Programme (WCRP), the new polar prediction project with strong linkage to WCRP, the collaboration between WWRP and the Integrated Research on Disaster Risk (IRDR), as well as the model research development by the Working Group on Numerical Experiment (WGNE).

4.5.9 The Association noted the progress achieved by the Northwest Pacific Tropical Cyclone Ensemble Forecast Project (NWP-TCEFP) and the Typhoon Landfall Forecast Demonstration Project (TLFDP). Four new WWRP Research and Development Projects (RDPs) focusing on high impact weather events were endorsed at the WWRP JSC in April 2012, including the Southern China Heavy Monsoon Rainfall Experiment.

4.5.10 The Association noted that THORPEX will conclude at the end of 2014 and the Programme has demonstrated significant benefits to the global meteorological science community. In this regard, more Members and national and international funding agencies were urged to commit support to the THORPEX Trust Fund and to provide financial or in-kind support, for

national and regional THORPEX research initiatives. The Association appreciated the contributions of the Republic of Korea and other Members of the Region to the THORPEX Trust Fund.

4.5.11 The Association also welcomed the activities of the five THORPEX Regional Committees, including Asian Regional Committee (ARC), and was pleased that each Regional Committee had developed broad research and implementation plans, especially the THORPEX Pacific Asian Regional Campaign (T-PARC) for tropical cyclones over the Pacific in 2008, led by the ARC.

4.5.12 The Association recognized that the successful establishment of the THORPEX Interactive Grand Global Ensemble (TIGGE) database was a major achievement and acknowledged the significant contributions of the ten data providers, three of which are in RA II: the China Meteorological Administration (CMA); the Korea Meteorological Administration (KMA); and the Japan Meteorological Agency (JMA), and three archive centres including CMA.

4.5.13 The Association acknowledged the financial contributions to the THORPEX Trust Fund by Canada, China, France, Germany, Japan, Republic of Korea, Norway, the United Kingdom and the United States.

4.5.14 The Association noted the forecast guidance products from the TIGGE archive may provide new insights for the development and execution of the SWFDPs. Using the global ensemble forecasts in the TIGGE archive, better quantitative forecast guidance on tropical cyclone tracks and probability of high-impact weather occurrence can be obtained for the SWFDP for South East Asia and also be applicable for the SWFDP for the Bay of Bengal. The probabilistic forecasts based on the TIGGE database may add additional information for forecasters and thus for decision makers.

4.5.15 The Association noted with appreciation the decision of EC-64 (Resolutions 16 and 17) approving the establishments of two new projects on sub-seasonal to seasonal prediction (S2S) and polar prediction (PPP), as a legacy of THORPEX. The S2S, as a joint project with WCRP, is aiming to improve predictions and their applications on time scales at the interface between weather and climate research, in support of, inter alia, the GFCS. The Association recommended that planned activities should be implemented as a priority in full cooperation with existing structures (CBS, CCI, CAgM, etc.) that will ensure optimal translation of research results into operational services. The PPP is a legacy of the ten projects of the THORPEX cluster in the International Polar Year. It is important to coordinate effectively between several initiatives (EC-PORS, GIPPS) and therefore an integrated PPP should be developed between WWRP and WCRP. The Association also noted that there would be the third project as a legacy of THORPEX focussing on high-impact weather prediction in addition to S2S and PPP. A cluster of these three projects will represent the post-THORPEX activities in the WWRP. To address the needs of Members, including those in RA II, an implementation plan for this third project will be developed during 2013. The Association encouraged its Members to participate in the activities of THORPEX and the three post-THORPEX projects.

4.5.16 The Association noted that a WWRP/THORPEX Open Science Conference on Earth System Modelling will be held in Montreal, Canada, in August 2014. The Association recognized that this initiative on weather time-scale is aimed at accelerating advances in Earth-system prediction, aligned to and building on the three new projects recently initiated by WWRP/THORPEX and WCRP on sub-seasonal to seasonal prediction, polar prediction and high-impact weather prediction research.

#### ***Global Atmosphere Watch (GAW) Programme***

4.5.17 The Association recalled that the Addendum for the Period 2012–2015 to the GAW Strategic Plan: 2008–2015 (GAW Report No. 197 available at [http://www.wmo.int/pages/prog/arep/gaw/documents/FINAL\\_GAW\\_197.pdf](http://www.wmo.int/pages/prog/arep/gaw/documents/FINAL_GAW_197.pdf)), approved by Cg-XVI, contains the tasks to be undertaken in the GAW Programme in the mentioned years and requested its Members and contributing partner organizations and institutes to act upon these tasks.

4.5.18 The Association noted the recognition of, for example, the Total Carbon Column Observing Network (TCCON) as a Contributing GAW network, and that such agreements are an excellent way of expanding the GAW Programme. The Association requested that such agreements be made with appropriate networks in the Region. For example, the Acid Deposition Monitoring Network in East Asia (EANET) provided an essential contribution to the GAW Global Assessment of Precipitation Chemistry and Deposition, which is currently under preparation.

4.5.19 The Association recommended that RA II Members, through the GAW Programme, work closer with other international agencies to utilize funding mechanisms related to agriculture and food security in order to extend observations of atmospheric composition in agricultural land. This will enable Members to evaluate food security risks due to atmospheric pollution and the potential for agriculture to regulate greenhouse gas emissions.

4.5.20 Considering the needs for the GFCS, the Association recognized the important contribution from the GAW Programme through the coordination of the observations of long-lived greenhouse gases and as well as short-lived climate forcers such as ozone and particulate matter. The Association noted with satisfaction the efforts by KMA in organizing regional workshops on greenhouse gases. The Association encouraged its Members to maintain and expand existing atmospheric composition measurements and consider establishing additional stations in coordination with the GAW Programme.

4.5.21 The Association expressed its appreciation to Japan for hosting a number of GAW Central Facilities including the World Data Centre for Greenhouse Gases (WDCGG), World Calibration Centre (WCC) for Methane in Asia and the South-West Pacific, Regional Dobson Calibration Centre (RDCC) for Asia and the Quality Assurance/Science Activity Centre (QA/SAC) for Asia and the South-West Pacific. WDCGG plays a key role in the preparation of the WMO Greenhouse Gas Bulletin, which is an authoritative WMO publication on the state of the key greenhouse gases in the atmosphere. The Association noted with satisfaction that a new GAW World Calibration Centre for SF<sub>6</sub> has been established in KMA. The Association requested Members with appropriate proven capabilities to consider hosting such GAW central facilities that are currently missing, for example regional facilities for aerosols, precipitation chemistry and UV radiation. The Association encouraged Members to make contributions to the GAW World Calibration Centre newsletter.

4.5.22 The GAW Aerosol Lidar Observation Network (GALION) was established to provide the vertical component of the aerosol distribution through advanced laser remote sensing in a network of ground-based stations of lidar systems. The Association expressed its satisfaction to the engagement of AD-Net, part of GALION, for volcanic ash, forest fire, sand, dust and air quality monitoring. The Association also noted that the survey of ceilometer stations has been made, including stations in Asia. Ceilometers, usually used at the airports for observing the cloud base height, could potentially complement lidar observations.

4.5.23 The Association noted that the collaboration between WMO and the Joint Group of Experts on the Scientific Aspects of Marine Environment Protection (GESAMP) has resulted in a successful global assessment of the atmospheric input of chemicals to the ocean and corresponding impacts on ocean productivity and climate, in which Asian aerosol sources, especially emerging ones from China and India are considered. There was a substantial contribution to this assessment study by scientific experts from India, China, Japan, and Thailand. The Association was informed that the next phase of collaboration with GESAMP will address the input of nitrogen to the global ocean.

4.5.24 The Association further noted that over half the world's population now resides in urban areas and that this portion is expected to rise to 70% by 2050, with the urban population growing to about 6.3 billion from the current 3.5 billion. Almost all of this growth is expected to take place in developing countries. The Association recognized that many of the megacities in the world (currently 23 in total and expected to reach 37 by 2025) are located in Region II. These and other large urban complexes face numerous potential meteorological and related environmental threats. The Association recognized that urban areas need a new way of dealing with meteorological and

environmental challenges and agreed with Cg-XVI that WMO GAW Urban Research Meteorology and Environment (GURME) is well placed to address these issues. The Association was pleased to note the excellent progress made in the GURME Pilot Projects undertaken in Shanghai, first for development of appropriate services for the EXPO 2010 and followed up by the project on Urban Meteorological Observation Design; the project in China on NRT Data Application to Air Quality Forecasts; and in India the System of Air Quality Forecasting & Research (SAFAR-CWG-2010).

4.5.25 The Association welcomed the recent publication of the WMO/IGAC report “Impacts of Megacities on Air Pollution and Climate”, available at [http://www.wmo.int/pages/prog/arep/gaw/documents/GAW\\_205\\_DRAFT\\_13\\_SEPT.pdf](http://www.wmo.int/pages/prog/arep/gaw/documents/GAW_205_DRAFT_13_SEPT.pdf). The report focuses on providing an initial assessment of what information is available on air pollution in megacities across Africa, Asia, South America, North America, and Europe. Noting that 1.3 million people die annually due to outdoor urban air pollution (WHO), the Association agreed with the report that more study is needed on how the geography, meteorology, emissions, atmospheric chemistry, and climate of megacities interact with one another and affect human health.

4.5.26 The Association requested its Members to support the recently established GURME and Megacities Trust Fund and to consider the secondment of an officer or a Junior Professional Officer to the GAW Programme to support these activities.

#### **4.6 Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates (agenda item 4.6)**

##### ***Capacity Development Strategy***

4.6.1 The Association recalled the discussions in Cg-XVI on the need for a cohesive and coordinated approach to capacity development to maximize the outcome of capacity development activities. It further noted the importance of regional and subregional efforts to support the capacity development of NMHSs given the large number of existing and planned regional centres and the regional emphasis of development partners. In this regard, the Association welcomed the WMO Capacity Development Strategy (CDS) that had been approved at EC-64 and acknowledged the key role that the Association would have to play in implementing the CDS.

4.6.2 While the Association noted with satisfaction the progress of capacity development activities in the Region, it also recognized the needs to further strengthen and harmonize such activities to address existing gaps in human, institutional, infrastructural and procedural capacities for many RA II Members. In order to utilize limited resources effectively and efficiently the Association urged its Members to consider the strategic approaches to capacity development corresponding to the six Strategic Objectives of the CDS.

4.6.3 The Association was informed of the ongoing effort of the EC Working Group on Capacity Development (EC-WG/CD) to develop and finalize the Capacity Development Strategy Implementation Plan (CDSIP) for 2012–2015. In order for the RA II regional perspective of the capacity development activities to be fully integrated in CDSIP, the Association appreciated that the RA II president served as a member of the EC-WG/CD during the preparation of the CDS and requested that the president continue to provide RA II inputs to CDSIP during the process of its development and implementation.

4.6.4 The Association also agreed to reinforce the work of the Management Group in coordinating and harmonizing capacity development activities in line with the CDS.

4.6.5 The Association reviewed two tools being developed as part of the CDS; the proto-type on-line Country Profile Data Base (<http://www.wmo.int/cpdb>) and the on-line Guide for the Role and Operations of Meteorological Services (<http://www.wmo.int/eguides>. User name: 123wmo Password: wmo123). Following a demonstration of these tools the Association discussed how the tools can be used to build the NMHSs in RA II, offered suggestions and expressed their support for the deployment of the pre-operational capability of these tools in 2013.

## ***Human Capacity Development, including education and training***

### *Introduction*

4.6.6 The Association noted its appreciation to all Members of RA II, particularly China, Japan, India and the Republic of Korea, for the education and training, and fellowship opportunities that they have provided to WMO Members from within and outside the Region. The training courses addressed activities in each of the high priority areas for this and the previous financial period. The Association noted that most of the activities were provided using face-to-face training but that some use was also made of distance and online learning. The fellowship opportunities also go a long way in bolstering support to Members in the Region and beyond at the level of human resources development and succession management.

4.6.7 Given the increasing demand for, and at best slow increase in budget, education and training activities, the Association encouraged its Members and its Regional Training Centres to actively investigate increased use of distance learning courses to assist Members in addressing their training needs. In making this recommendation, the Association recalled that the Sixteenth Congress had called for increased use of distance and online learning and requested the WMO Education and Training Programme to support Members in its introduction and use. The Association acknowledged that the course participants would require time to be set aside from their normal duties to undertake the training. The Association also acknowledged that it could require the providers of the training to allocate more staff time to develop and deliver materials, as well as provide support for participants, than the traditional methods, especially in the initial offerings. The Association noted that the Republic of Korea had been delivering various education and training programmes with a special focus on professional development courses such as ICT, satellite data analysis, radar data analysis and climate prediction and acknowledged its plan to establish an RTC in the Korea Meteorological Administration (KMA) with a special emphasis on professional development courses. The Association further noted that this was in accordance with the recommendation from Sixteenth Congress that called for increased use of distance and online learning and that the Republic of Korea might wish to submit its proposal to the president of RA II, possibly in 2015 following the lifting of the freeze on new RTCs associated with the review on the Role and Future Operations of RTCs conducted by the EC Panel of Experts on Education and Training.

### *RA II Education and Training Needs*

4.6.8 The Association acknowledged the key role education and training would have to play if it was to meet the goals outlined in its 2012 to 2015 operational plan. It thus requested the president and the RA II Management Group to undertake a training needs analysis based on the priorities in the operational plan to determine whether the Members and Regional Training Centres would be able to successfully address these needs. The Association noted that it may be necessary for an adjustment of the operational plan if it was not possible to meet the identified training needs. Noting the imminent deadlines for competencies and qualifications for aeronautical meteorological personnel, the Association recommended that the Management Group make the determination of the regional needs and ability to address the aeronautical issue a priority.

4.6.9 The Association recalled that the Region was well represented on the WMO Executive Council Panel of Experts on Education and Training and that these Panel members should act as an interface between the Panel and the Management Group to ensure smooth coordination and communication between the Panel and the Region. The Association recommended that the Management Group nominate a member to be responsible for the ongoing assessment of the regional education and training needs against the operational plans and the ability of the regional training institutes to deliver that training. The focal point should also liaise with the EC Panel of Experts on ETR members. The Association also urged its Members to continue to cooperate with and avail to WMO, any bilateral and multilateral opportunities that are available for fellowships in appropriate national institutions. The Association also urged fellowships recipient countries to support delivery of fellowships to their nominees by way of meeting some of the costs associated

with the awards. The Association also urged its Members to ensure that employment opportunities are guaranteed for nominated fellows.

### *Regional Training Centres*

4.6.10 The Association recalled the discussions in EC-64 regarding inactive and dormant training centres and that the EC Panel of Experts on Education and Training were to carry out a review on the current and future roles and opportunities for WMO Regional Training Centres.

4.6.11 At the present time the Region has six Regional Training Centres located in China, India, Islamic Republic of Iran, Iraq, Qatar and Uzbekistan (see [Annex I to the present report](#)). With the exception of Iraq (due to the security situation) and Qatar (as it only commenced in 2011) each of the Regional Training Centres has been through at least one review by the EC Panel and their role as a Regional Training Centre renewed with recommendations for improvement, particularly in communicating the available training opportunities to the Regional Association and Members.

4.6.12 It is clear from the activity reports of the RA II RTCs that the RTC in China is particularly active in long-term and short-term training within the Region and for other Regions. The other Regional Training Centres are much less active with some reporting zero foreign students for a number of years. Recalling that the Association itself nominated these institutions as Regional Training Centres and that even inactive Regional Training Centres still require support from the Education and Training Office in the WMO Secretariat (for staff to attend training workshops, reviews to be undertaken, resources provided), the Association requested the Management Group to critically consider the number and location of Regional Training Centres as part of its review and update of its operational plan and provide Members feedback within the next two years. The discussion should focus on the willingness and ability of the institutes to carry out their role as a Regional Training Centre, not on their role as a national training centre. The key guide should be on the quantity and quality of training provided to the Region thus it includes consideration of the costs and likelihood of foreign students participating in courses. The Association requested the president, on behalf of the Association, to provide input into the review being undertaken by the EC Panel of Experts on Education and Training on the “Current and Future Roles and Operations of Regional Training Centres”.

### ***Resource Mobilization, Development Cooperation and Partnerships; as well as Infrastructure and Operational Facilities Development***

4.6.13 The Association expressed its appreciation to the Voluntary Cooperation Programme (VCP) and its donors within and outside the Region for their valuable assistance in supporting RA II Members through the WMO VCP. The Association noted that almost every developing and LDC country in the Region received support during the period 2008–2012. It welcomed the 88 individual support actions initiated through the WMO VCP representing some 20 million USD in real terms. It encouraged its Members to continue to contribute to and participate more actively in the Programme to address the requirements of NMHSs in the Region.

4.6.14 The Association noted its appreciation to all Members of RA II, particularly China, Japan, India, Republic of Korea, Russian Federation, and to non-RA II Members including Finland, France, Germany, Italy, the United Kingdom of Great Britain and Northern Ireland and the United States, for the financial and in-kind support that they have provided to WMO Members within and from outside the Region on a bi-lateral basis representing some tens of millions of USD in financial terms as evidenced by the reports of the Informal Planning Meeting (IPM) on the VCP. The development assistance addressed activities in each of the high priority areas for this and the previous financial period. The Association noted that most of the activities were provided under expertise and technology transfer and training.

4.6.15 The Association, acknowledging that the VCP cannot address all these needs, requested its Members and the Secretary-General to mobilize resources through development of bilateral and multilateral partnerships. It noted with satisfaction the WMO engagement with major

partners in the Region including the World Bank, UNDP, Multi-lateral Development Banks and ODA Agencies such as USAID-OFDA.

4.6.16 The Association requested the Secretary-General to further enhance the WMO resource mobilization efforts to support NMHSs of developing countries, particularly LDCs in the Region.

### ***Special focus on LDCs in RA II***

4.6.17 The Association recalled the discussions in Cg-XVI on the importance of the WMO Programme for the LDCs and the high priority to be continually attached to it. It welcomed Congress' decision to continue and enhance the WMO Programme for the LDCs to address the obstacles and constraints limiting NMHSs in LDCs to provide relevant weather, water and climate information and services and to strengthen their capabilities to meet the demands and requirements of the priority areas for action in the Istanbul Programme of Action (IPoA) for the LDCs for the decade 2011–2020 as appropriate. It further noted that all the WMO's scientific and technical programmes gave higher priority to LDCs including those which are SIDS in their assistance and capacity-building activities.

4.6.18 The Association recognized that, under the WMO Programme for the LDCs, assistance would continue to be provided for the preparation and implementation of development plans of NMHSs of LDCs and SIDS based on the priority needs of countries. In this regard, the Association urged its Members and partners to increase their support in enhancing the capacities of NMHSs in the respective countries.

4.6.19 Noting the successful organization of the regional workshop on climate services at the national level for the LDCs in Asia, held in Bangkok, Thailand, in October 2012, the Association requested that the outcomes of the workshop contribute to enhancing the NMHSs' ability to address adequately issues relevant to priority areas for action in the IPoA for the LDCs, particularly productive capacity sectors of agriculture, food security, disaster risk reduction, water resources management and climate change and environmental sustainability.

4.6.20 The Association expressed its support to the organization of a workshop on coordination and partnership for enhancing the benefits of weather-, climate- and water-related services in the development of LDCs in Asia-Pacific, planned to be held in early 2013 to address the needs and requirements related to the implementation of the IPoA at national and regional levels.

### **4.7 New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategic issues (agenda item 4.7)**

#### ***Cooperation between WMO and the regional bodies of the United Nations system and regional organizations***

4.7.1 The Association noted with satisfaction that the cooperation between WMO and the regional bodies of the United Nations system had been strengthened through active support and participation in relevant events, including regular sessions of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), the United Nations Economic and Social Commission for West Asia (ESCWA), the UNESCAP/WMO Typhoon Committee and the WMO/UNESCAP Panel on Tropical Cyclones in the fields of meteorology, hydrology and disaster risk reduction. Noting the continued cooperation of UNESCAP and WMO in supporting the Typhoon Committee and the Panel on Tropical Cyclones, the Association invited the Secretary-General and UNESCAP to continue their support to the activities of the two intergovernmental bodies.

4.7.2 The Association further noted with satisfaction that the Regional Office for Asia and the South-West Pacific and the WMO Office for West Asia had participated in the various activities of

the regional organizations including the Association of South-East Asian Nations (ASEAN) Sub-Committee on Meteorology and Geophysics (SCMG), the Economic Cooperation Organization (ECO) Regional Centre for Natural Disaster Risk Management, the Permanent Meteorological Committee of the League of Arab States (LAS), and the Cooperation Council for the Arab States of the Gulf (Gulf Cooperation Council: GCC), SAARC Meteorological Research Center, and the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES). The Association encouraged the Offices to continue and strengthen the partnership with such regional organizations and requested the Secretary-General and Members to provide support for the Offices to ensure expanding strategic partnerships to other potential partners in the Region. The Association further encouraged Members in the Region to actively participate in and become involved in programme and activities of regional organizations related to weather, climate, water and natural disaster risk reduction.

### ***Communication and Public Affairs***

4.7.3 The Association recalled that the Sixteenth Congress (2011) by its Resolution 27 (Cg-XVI) on the WMO Information and Public Affairs Programme sought to advance “the aim of consolidating the WMO Web presence, including in social media, mobile telephone technology and other new media to reach out to people worldwide, in particular to youth, and paying special attention to the needs of developing countries”. Congress invited its Members to continue to contribute actively to this aim and more generally to regional cooperation on communications and public affairs.

4.7.4 The Association recognized that the WMO Secretariat is committed to making significant improvements to the WMO website over the coming year. As the WMO website should represent and promote the entire WMO community, and not only the Secretariat, the Association stressed that it is important that as many Members as possible are engaged in strengthening WMO’s presence on the Internet. The Association therefore agreed to take the following measures:

- (a) Link NMHSs’ websites to the [wmo.int](http://wmo.int) website;
- (b) Provide visible WMO identity on the websites of WMO-affiliated centres and facilities, such as RSMCs, RTCs, RCCs, RICs and WIS centres;
- (c) Contribute to “News from Members”;
- (d) Designate and empower an IPA Focal Point;
- (e) Promote regional cooperation on communications and public affairs.

## **5. STRENGTHENING GOOD GOVERNANCE (agenda item 5)**

### **5.1 An effective and efficient Organization (agenda item 5.1)**

#### **Internal matters of the Association**

##### ***Internal matters of WMO***

5.1.1 The Association took advantage of the Secretary-General’s presence at the session to discuss internal matters of WMO of concern to Members of the Region, particularly on the outcomes of the Sixteenth World Meteorological Congress (Cg-XVI) and the Extraordinary Congress (Cg-Ext. (2012)) and on the Secretariat actions.

5.1.2 The Secretary-General highlighted regional efforts relating to WMO priorities in climate services, disaster risk reduction, WIGOS/WIS and capacity-building, noting the importance of



Member participation in the High-level Meeting on National Drought Policy (HMNDP) to be held in Geneva on 11–15 March 2013.

5.1.3 The Secretary-General noted the efforts to increase the focus of the Regional Office for Asia and the South-West Pacific on development cooperation and training activities. He noted the expanding role of the WMO Office in Bahrain in new cooperative efforts with subregional organizations and invited the Association to consider possible relocation of the Office to the Region as a means to further enhance its service to the Region and cost-effectiveness.

5.1.4 In that connection, the Association was informed by the Director of the Development and Regional Activities (DRA) Department that the DRA Department had made organizational adjustment to the Department to implement programme activities in a further effective and efficient manner towards Expected Results 6 (Enhanced capabilities of National Meteorological and Hydrological Services (NMHSs) in developing countries, particularly least developed countries, to fulfil their mandates). The DRA Department manages the development cooperation activities including the resource mobilization activities and the WMO Voluntary Cooperation Programme (VCP); the WMO Programme for the Least Developed Countries (LDCs); the Education and Training Programme; and the Regional Programme.

5.1.5 The Association was pleased to note the emphasis which the adjusted DRA structure provides for capacity-development and expressed appreciation for renewed efforts to organize the Secretariat in line with the approved WMO Strategic Plan and the Operating Plan 2012–2015.

5.1.6 The Association welcomed the further harmonized and coordinated approach for capacity development activities for Members including development of cooperation and regional activities and human resources development activities expected to be carried out by the Regional Offices and WMO Offices in the Region.

5.1.7 The Association expressed its appreciation to the Secretary-General and the Director of the DRA Department for the information provided as well as the opportunity to consider suggestions for further improvement.

### ***Report of the Management Group of RA II***

5.1.8 The Association noted with appreciation the reports of the first to sixth sessions of the RA II Management Group (MG). The Association complimented Prof. V.E. Chub, president and chair of the RA II MG, Dr Q. Chaudhry, vice-president and members of the Group for the activities carried out according to its terms of reference, in particular, for guiding the development of the Strategic Operating Plan for the Enhancement of NMHSs in Asia (20012–2015), for monitoring the work of RA II working groups and pilot projects, as well as the implementation of the WMO Programmes and activities in the Region. The MG also provided guidance for the future working mechanism of the Association and for the organization of the fifteenth session of RA II as well as the Technical Conference and the Regional Seminar in an efficient and cost-effective manner.

5.1.9 The Association, in recognizing the importance of coordinating its activities and the need for strengthening the roles and responsibilities of the MG including oversight of the activities of various Regional Centres, agreed to re-establish the Management Group. The RA II Management Group is expected to deal with the areas of WMO Expected Results 6, 7 and 8, including capacity-development and partnership as well as strategic planning issues, and to consider the optimal use of resources that might be allocated or could be made available in connection with the activities of the subsidiary bodies of RA II.

### ***Review of the subsidiary bodies of the Association***

5.1.10 The Association noted with appreciation the information provided by the chairs of Working Groups and coordinators of the Coordinating Groups of Pilot Projects on the activities of the RA II subsidiary bodies during the intersessional period. It expressed its satisfaction for the working groups' activities, but noted with concern that some working groups/sub-groups had not

been able to perform satisfactorily for various reasons. The Association encouraged its Members to provide the necessary support to the designated members of working groups and theme leaders to allow them to conduct their planned activities efficiently.

5.1.11 The Association noted with satisfaction the successful implementation of the three pilot projects established at XIV-RA II as well as the two pilot projects established at XIII-RA II. Through the pilot project to develop support for developing countries in the aeronautical meteorology programme, an Asian Aviation Weather Pilot Project website was established by China and became operational in November 2010. The pilot project on the provision of city-specific Numerical Weather Prediction (NWP) products to developing countries via the Internet was also declared operational in July 2011 after several years of operation to the satisfaction of participating Members. The Association further noted that the two observation-related pilot projects: to enhance the availability and quality management support for NMHSs in surface, climate and upper-air observations; and to develop support for NMHSs in satellite data, products and training, would continue to be implemented within the framework of the RA II Regional WIGOS Implementation Plan. The Coordinating Group of the pilot project to develop support for NMHSs in NWP agreed to pursue the second phase of the pilot project in the next few years with emphasis on post-processing of NWP products and data assimilation.

#### *Future working mechanism of the Association*

5.1.12 With regard to the future working mechanism of the Association, the Association considered that:

- (a) The Association should continue to play an important and active role in the implementation of WMO Programmes and activities in the Region in the fields of weather, climate and water;
- (b) The regional implementation of WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) is the highest priority activity of the Association;
- (c) The Association should continue to enhance linkage with existing Technical Commissions, thus a limited number of Expert Groups (EGs) should be established, under Working Groups (WGs), for: aeronautical meteorology; agricultural meteorology; climate services; hydrological services; and CBS-related observations, telecommunications, weather forecasting and public weather services;
- (d) Disaster risk reduction and service delivery are cross-cutting issues requiring the expertise of weather, climate and water professionals and also the expertise of social and economic specialists and sector-based experts. The Implementation Coordination Team approach would be more suitable for this purpose.

5.1.13 In view of the need to align the working mechanism of the Association to the Strategic Thrusts and Expected Results of the WMO Strategic Plan as well as Regional Key Outcomes of the RA II Strategic Operating Plan for 2012–2015, it was agreed to establish the following RA II subsidiary bodies:

- (a) Management Group (MG);
- (b) Working Group on Weather Services (WGWS), with an Expert Group on Aeronautical Meteorological Services Delivery (EG-AeM); an Expert Group on Operational Forecasting (EG-OF); and an Expert Group on Public Weather Services Delivery (EG-PWS);
- (c) Working Group on Climate Services (WGCS), with an Expert Group on Climate Services (EG-CS); and an Expert Group on Agrometeorology (EG-AgM);
- (d) Working Group on Hydrological Services (WGHS);

- (e) Working Group on WMO Integrated Global Observing System and WMO Information System (WG-WIGOS/WIS), with an Expert Group on WIGOS (EG-WIGOS) and an Expert Group on WIS (EG-WIS);
- (f) Implementation Coordination Team on Service Delivery (ICT-SD);
- (g) Implementation Coordination Team on Disaster Risk Reduction (ICT-DRR).

5.1.14 The Association requested the Management Group to review the activities of the RA II Working Groups annually and to take appropriate measures to ensure that continued progress be made by the Working Groups and their Expert Groups as well as Implementation Coordination Teams, including appropriate adjustments to the terms of reference, membership and the work structure. The Management Group may also establish mechanisms to ensure cross-cutting coordination among regional activities of subsidiary bodies. It further requested the Working Group chairs to submit an annual report to the Management Group summarizing Working Group (i.e., Expert Groups) activities, including inputs from relevant theme leaders and plans for future activities. The Association requested that each Management Group member takes responsibility for overseeing one of Working Groups or Implementation Coordination Teams.

5.1.15 The Association agreed that an Expert Group be composed of Co-Coordinators, Theme Leaders and expert volunteers. The Theme Leaders are expected to lead the activities in their respective theme areas in close coordination with the Members in the Region, monitoring the key performance indicators/targets concerned, and reporting progress of development and implementation to the Expert Group Co-Coordinators concerned. The membership of RA II subsidiary bodies, i.e., chairs of RA II working groups, co-coordinators of expert groups and chairs of implementation coordination teams, is given in [Annex II to the present report](#).

5.1.16 The Association further agreed that the Management Group should select chairs of working groups, if necessary; and select theme leaders and expert volunteers, in consultation with co-coordinators of Expert Groups, by the end of March 2013 nominated by Members no later than the end of February 2013, with due regard to the need for the involvement of experts who had not had an opportunity to serve the Region or other international forums.

5.1.17 The Association agreed on the terms of references of the newly established bodies. In that connection, the Association adopted [Resolution 7 \(RA II-15\) – Regional Association II Management Group](#), [Resolution 8 \(RA II-15\) – Regional Association II Working Group on Weather Services](#), [Resolution 9 \(RA II-15\) – Regional Association II Working Group on Climate Services](#), [Resolution 10 \(RA II-15\) – Regional Association II Working Group on Hydrological Services](#), and [Resolution 11 \(RA II-15\) – Regional Association II Working Group on WMO Integrated Global Observing System and WMO Information System](#), as well as [Resolution 12 – Regional Association II Implementation Coordination Team on Service Delivery](#) and [Resolution 13 – Regional Association II Implementation Coordination Team on Disaster Risk Reduction](#).

5.1.18 The Association recognized very successful implementation of the pilot project to develop support for NMHSs in NWP established by XIV-RA II. It agreed that the continuation of the Pilot Project would contribute to enhancing weather services delivery, disaster risk reduction and capacity development efforts of Members in RA II.

5.1.19 The Association was pleased to note that the Regional Climate Centre (RCC) Tokyo, as an RA II contribution to GFCS, was ready to lead a new pilot project related to the GFCS. Under this project, RCC Tokyo would establish a portal site collecting climate information provided by NMHSs as well as good practices for application of climate information to society. The Association recognized the importance of sharing good practices on the implementation of the GFCS through the web and welcomed the offer by Japan to develop and maintain such a portal site.

5.1.20 The Association was also pleased to note that Hong Kong, China proposed three new pilot projects to be undertaken during the intersessional period. The first pilot project is expected to develop support for NMHSs to enhance the collection and application of AMDAR data in RA II, with

the aim to promote further growth in AMDAR programmes in the Region, thus benefiting numerical weather prediction (NWP) and weather service delivery. The second pilot project will develop support to NMHSs, particularly those from the developing countries, in providing official weather forecasts for their cities and for longer forecast period in the medium range, taking advantages of reliable and validated NWP products. This project aims at addressing the increasing challenges posed to NMHSs of growing popularity of free and unofficial automatically-generated weather forecasts for extended period for many cities around the world, and is expected to bring further enhancements to WMO's World Weather Information Service (WWIS) and visibility of NMHSs in fulfilling the needs of the public and the media. The third pilot project will promote the use of a common data format for severe weather warnings and advisories, e.g., Tropical Cyclone Advisories, taking advantage of the development of such common data format as Common Alert Protocol (CAP), so as to enhance their user-friendliness and allowing their presentation in an integrated and seamless manner on common platforms such as WMO's Severe Weather Information Centre (SWIC), thus increasing the visibility of NMHSs as providers of official severe weather warnings and advisories in DRR. This project is also expected to bring benefits to the proposed development of an integrated warnings website as a pilot project under SWFDP.

5.1.21 The Association considered with interest the proposals to launch the five pilot projects:

- (a) Pilot Project to Develop Support for NMHSs in Numerical Weather Prediction;
- (b) Pilot Project on Information Sharing on Climate Services;
- (c) Pilot Project to Develop Support for National Meteorological and Hydrological Services in the Collection and Application of Aircraft Meteorological Data Relay (AMDAR) Data;
- (d) Pilot Project to Sustain and Enhance the Capacity of National Meteorological and Hydrological Services in the Provision of Official Weather Forecasts for the Medium Range;
- (e) Pilot Project to Enhance the Seamless Provision of Regional Severe Weather Warnings and Advisories;

and agreed on the terms of references of the proposed pilot projects. The Association adopted [Resolution 14 \(RA II-15\) – Pilot project to develop support for National Meteorological and Hydrological Services in numerical weather prediction](#), [Resolution 15 \(RA II-15\) – Pilot project on information sharing on climate services](#), [Resolution 16 \(RA II-15\) – Pilot project to develop support for National Meteorological and Hydrological Services in the collection and application of Aircraft Meteorological Data Relay data](#), [Resolution 17 \(RA II-15\) – Pilot project to sustain and enhance the capacity of National Meteorological and Hydrological Services in the provision of official weather forecasts for the medium range](#), and [Resolution 18 \(RA II-15\) – Pilot project to enhance the seamless provision of regional severe weather warnings and advisories](#).

#### *Volunteerism in the work of the Association*

5.1.22 The Association recalled that XIV-RA II decided that volunteerism in the work of the working groups, sub-groups and theme leaders should receive the required attention, and that XIV-RA II made recommendations on the nomination, performance monitoring and recognition in order to improve the work of the subsidiary bodies with volunteerism.

5.1.23 The Association agreed on the need for strengthening the nomination and performance monitoring processes and requested its Management Group to establish a mechanism to ensure strong commitment of experts and full support by the Permanent Representatives of Members with WMO. In view of the need to further encourage volunteerism among Members (not only NMHSs but also other institutions) and their staff, the Association requested the president to issue certificates in recognizing individuals who provided outstanding and valuable contributions to the work of the Association during the intersessional period. The Association urged Permanent Representatives of its Members to facilitate active participation and voluntary contribution of

experts to the activities of the Association. In this connection, certificates were awarded to the individuals listed in [Annex III to the present report](#).

### ***Representation of RA II in the Executive Council***

5.1.24 The Association affirmed that the representation of RA II in the Executive Council is one of the key challenges of RA II. It recalled that, in light of great diversity in geography, climate, ecosystems, religions, and political and economic systems, as well as a number of Members that can make significant contributions to EC activities within RA II, the president of RA II submitted a proposal to EC-LXII (2010) to increase the number of EC members from 37 to 38 to enable RA II to obtain an extra seat (increasing from six to seven) for consideration at Cg-XVI in accordance with the procedures described in the WMO Convention.

5.1.25 The Association also recalled that Cg-XVI, in considering the discussions at EC-LXII and the recommendations of the EC Working Group on Strategic and Operational Planning, approved the amendments proposed by the president of RA I to the General Regulations by introducing a regulation concerning the distribution of EC seats that reflected the gentlemen's agreement negotiated at Cg-XIV (2003) and Cg-XV (2007), which allowed the allocation of six EC seats to RA II out of the total of 37 seats.

5.1.26 It further noted that Cg-XVI acknowledged the proposal made by the presidents of Regional Associations II (Asia), IV (North America, Central America and the Caribbean) and V (South-West Pacific) to increase the number of EC members to enable these Regions to obtain an extra seat with respect to the distribution of seats adopted by Resolution 44 (Cg-XVI) for consideration at Cg-17 (2015), in accordance with the procedures described in the WMO Convention.

5.1.27 In that respect, the Association agreed to proceed with the proposal to increase the number of seats allocated to RA II from six to seven and requested the Management Group to prepare appropriate proposal to be submitted by its president to the Executive Council for further consideration on the enabling of increasing seats in the Council as requested by Sixteenth Congress.

### **WMO Strategic Planning – Regional Aspects**

#### ***WMO Strategic Plan and Operating Plan 2012–2015***

5.1.28 The Association noted the appreciation of Cg-XVI (Geneva, 16 May–3 June 2011) of the active involvement of regional associations, technical commissions and the Secretariat, including Secretariats of WMO joint programmes, in the development of the WMO Strategic Plan 2012–2015, which ensured that the document reflected the collective view of all WMO constituencies.

5.1.29 The Association also noted the decision of Cg-XVI that the SP 2012–2015 should determine collective and coordinated activities of regional associations, technical commissions and the Secretariat through well-defined programmes, projects and initiatives, as well as guide and motivate activities of Members and their National Meteorological and Hydrological Services (NMHSs).

5.1.30 The Association further noted the decision of EC-LXIII (Geneva, 6–8 June 2011) to re-establish the EC WG/SOP (Resolution 7 (EC-LXIII)) to carry out various activities including strategic planning, in particular to improve and align the Organization-wide strategic, operational and budget planning process according to the relevant decisions and requests of the Sixteenth Congress, especially with respect to:

- (a) Refinement of the key performance indicators;

- (b) Monitoring of progress made in the implementation of the WMO Strategic Plan and evaluation of programme performance within the framework of the WMO Strategic Plan and Operating Plan 2012–2015;
- (c) Development of the WMO-wide Operating Plan 2012–2015;
- (d) Development of the next WMO Strategic Plan and WMO Operating Plan 2016–2019.

5.1.31 In this regard, the Association was pleased to note that its Operating Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association II (Asia) 2012–2015 constitutes an integral part of the WMO-wide Operating Plan 2012–2015 and contributes to the WMO strategic planning process.

### ***WMO Strategic Plan and Operating Plan 2016–2019***

5.1.32 The Association noted that Sixteenth World Meteorological Congress (Cg-XVI, 2011) adopted Resolution 38 (Cg-XVI) – Preparation of the Strategic Plan for 2016–2019.

5.1.33 The Association also noted that the sixty-fourth session of the Executive Council (EC-64, 2012) decided to endorse the parameters for the development of the next Strategic and Operating Plans (*Abridged Final Report with Resolutions of the Sixty-fourth Session of the Executive Council* (WMO-No. 1042), paragraph 4.8.14 a–l).

5.1.34 The Association further noted that the Council agreed to proceed with the development of the next Strategic and Operating Plans based on the outlines of the SP and OP, and the proposed process and timelines (*Abridged Final Report with Resolutions of the Sixty-fourth Session of the Executive Council* (WMO-No. 1042), paragraph 4.8.15).

5.1.35 The Association noted that the strategic planning process should be driven by the needs and priorities set by the Members and that regional associations should facilitate translation of these priorities into the WMO plan. The Association discussed evolving societal and economic needs particularly relevant to its Members, bearing in mind the outcomes of the United Nations Conference on Sustainable Development (Rio de Janeiro, Brazil, 20–22 June 2012) and the ongoing process of defining the Sustainable Development Goals for post-2015. As its initial contribution to the WMO Strategic Plan for the period 2016–2019 the Association reiterated that the following areas should remain high strategic priorities for the Organization:

- (a) Implementation of the GFCS in the four priority areas: agriculture and food security, water, health and disaster risk reduction (including climate risk management) as well as capacity development with special emphasis on infrastructure and human resources for WIS and WIGOS, and on capacity-building in service delivery for those least developed in these areas;
- (b) Disaster Risk Reduction;
- (c) Capacity Development especially for basic services for aviation and agriculture in the countries with least developed capacity in these areas.

5.1.36 The Association expressed concern regarding the progress and pressing deadlines related to aviation services, which should be met within the current financial period. It further noted the emerging new ICAO concepts for aviation meteorological services, in particular, the Aviation System Block Upgrades (ASBUs) which will lead to new data-centric environment, system-wide information management, and Single Authoritative Source requirement of weather information, bringing significant challenges and opportunities to Members. These would require prioritized and focussed actions by WMO in the future.

5.1.37 The Association requested its Management Group to facilitate further Members' inputs to strategic planning on a continuous basis and to put in place a planning process that would

ensure that the regional contribution to the WMO Operating Plan is ready before Cg-17 in May 2015.

### ***Monitoring and Evaluation***

5.1.38 The Association noted that the Secretariat continued to develop and implement the WMO Monitoring and Evaluation System and that EC-64 (Geneva, 25 June–3 July 2012) encouraged constituent bodies to make use of the M&E System and Guide prepared by the Secretariat and provide feedback for further improvement.

5.1.39 The Association encouraged Members to respond to the surveys on impacts of achieved results on Members that provide information on areas where WMO has made significant achievements and those that needed more attention.

### **Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia)**

#### ***Implementation of the Strategic Plan for the Enhancement of NMHSs in RA II (Asia) (2009–2011)***

5.1.40 The Association recalled that the fourteenth session of RA II (Tashkent, December 2008) commended the unique approach of RA II that the Strategic Plan was developed on the basis of the survey results for the period 2005–2008 and adopted [the RA II Strategic Plan for the Enhancement of NMHSs in RA II \(2009–2011\)](#) composed of 201 deliverables mapped under the 11 Expected Results of the WMO Strategic Plan 2008–2011. XIV-RA II authorized the president to make the necessary adjustments to the Regional Strategic Plan in consultation with the RA II Management Group and working groups, and develop a related Action Plan in consultation with Members.

5.1.41 The Association noted that the Management Group established a Task Team on Strategic Planning to work on: identification of priorities among 201 deliverables given in the Strategic Plan 2009–2011; development of the Operating Plan (formerly called Action Plan) by proposing concrete action(s) for each corresponding priority deliverable; development of new survey questionnaires to monitor the implementation of the Strategic Plan; and finalization of the complete RA II Strategic Operating Plan for 2012–2015.

5.1.42 The Association was pleased to note that the Task Team developed a new questionnaire covering 12 topics and that the regional survey (2010–2011) on the basic capability of NMHSs in RA II was carried out during January to November 2011. In reviewing the analyses of the responses from 30 out of 35 Members, the Association expressed its satisfaction with the overall improvement of weather, climate and water services by Members of RA II, including service delivery capability, infrastructure for observation, telecommunication and forecast products; however it also noted differences among the Members in the Region.

5.1.43 The Association expressed concern about insufficient observational infrastructure and capacity to produce and provide reliable and timely forecast and warning services. It further noted that many LDCs cannot afford to have qualified maintenance technicians for observation instruments or the communication infrastructure for real-time delivery of observations.

5.1.44 The Association, taking note of the fact that many Members use and interpret NWP products from major centres in the forecasting process, agreed that capacity development for the interpretation and application of NWP products should be given priority, whilst the capacity to support NWP operation could be further developed within a longer-term framework. It encouraged its Members to provide further support for NMHSs in developing countries, in particular LDCs in the Region, to enable them to implement quality management systems and cost-recovery of services.

### ***Strategic Operating Plan for the Enhancement of NMHSs in RA II (Asia) for 2012–2015***

#### *RA II Operating Plan for 2012–2015*

5.1.45 The Association was pleased to note that the Operating Plan for the Enhancement of NMHSs in RA II (Asia) for 2012–2015 was developed by the Task Team on Strategic Planning, composed of experts from China; Hong Kong, China (Chair); Islamic Republic of Iran; Japan; Republic of Korea; and Uzbekistan, in consultation with Members and Working Group Chairs and with guidance of the Management Group. The RA II Operating Plan has taken into account the previous RA II Strategic Plan 2009–2011, the *WMO Strategic Plan 2012–2015* (WMO-No. 1069), WMO Operating Plan 2012–2015, Cg-XVI decisions, and evolving needs and deficiencies identified through the 2010–2011 regional survey.

5.1.46 The Association recognized that the RA II Operating Plan contains Regional Key Outcomes (RKO) and corresponding Key Performance Indicators associated with WMO's eight Expected Results, and under RKO, a total of 114 priority deliverables, associated activities, relevant Programmes and technical commissions, responsibility, implementation schedule, and baselines and targets defined from the 2010–2011 survey.

5.1.47 The Association expressed its appreciation to the Task Team on Strategic Planning for the commendable efforts in developing and finalizing the RA II Operating Plan 2012–2015. It noted that the president of RA II, on behalf of Members, approved the Operating Plan for the Enhancement of NMHSs in RA II (Asia) for 2012–2015, in mid-November 2012.

#### *Priority areas of RA II for 2012–2015*

5.1.48 In view of the WMO priority areas identified in the WMO Strategic Plan 2012–2015, i.e., Global Framework for Climate Services (GFCS); aviation meteorological services; capacity-building for the developing and least developed countries; implementation of the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS); and Disaster Risk Reduction (DRR), and considering the circumstances in the Region, the Association agreed on the following highest priority areas for RA II:

- Implementation of the WIGOS/WIS and the necessary improvement of the GTS;
- Sustainable capacity development including human resources development;
- Implementation of the GFCS in support of agriculture and food security; water; health; and disaster risk reduction, as well as energy and other sectors, through, but not limited to enhancement and operation of the RA II RCC network and RCOFs;
- Climate services to address the slow-onset impacts of climate variability and climate change;
- Establishment of a Region-wide multi-hazard early warning system for Disaster Risk Reduction;
- Implementation of aeronautical meteorological services enhancements in coordination with CAeM and upgrading of service delivery capability in other application areas including marine meteorological services;
- Implementation of WMO Flood Forecasting Initiative, water resources assessment and regional exchange of hydrological data and information;
- Reduction of risks and impacts of Region-specific hazards caused by climate change, sand and dust storms, thunderstorms and associated extreme weather events.

#### *RA II Strategic Operating Plan for 2012–2015*

5.1.49 The Association further noted that the Task Team, with the guidance of the Management Group, also developed the draft RA II Strategic Operating Plan 2012–2015, which is



composed of: (a) strategy part, including introduction describing the purpose and how to use; priority areas of RA II; and monitoring and evaluation mechanism; and (b) Operating Plan (table part).

5.1.50 The Association examined the draft strategy part of the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015, as given in [Annex IV to the present report](#), and agreed to adopt the Plan and [Resolution 19 \(RA II-15\) – Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association II \(Asia\) \(2012–2015\)](#) in view of the usefulness of using the Strategic Operating Plan as a guideline for NMHSs' planning their improvement.

5.1.51 The Association encouraged its Members, and in particular their NMHSs, to conduct proposed activities to implement the deliverables in collaboration with the relevant technical commissions and WMO Programmes to improve their own services and/or help other NMHSs in the Region. The Association requested the Secretary-General to provide assistance to Members in the implementation of the Strategic Operating Plan.

5.1.52 The Association, in view of the usefulness of the survey to monitor the implementation of the Strategic Operating Plan, invited its Members to continue to contribute to the periodical survey on the basic capability of NMHSs in RA II, to be carried out in 2013 and 2015. In this connection, the Association requested its Management Group to consider further improvement of the survey questionnaire to facilitate the objective assessment of the progress.

#### ***WMO Operating Plan for 2016–2019***

5.1.53 With regard to the preparation for the Operating Plan for 2016–2019, the Association noted the decisions of EC-64 to guide the preparation of the draft WMO Operating Plan 2016–2019, which include:

- (a) The Organization should have a single Operating Plan that includes the activities of regional associations and technical commissions;
- (b) The strategic planning process should be driven by the needs/priorities set by the Members (through regional associations);
- (c) Key Performance Indicators should be measurable where possible, and clear milestones and responsibilities (Members, Secretariat, task forces and/or technical commissions) should be defined;
- (d) The EC and its WG/SOP should focus on developing a “single” operating plan for the next financial period.

#### **Sixth Technical Conference on Management of Meteorological and Hydrological Services in Regional Association II (Asia)**

5.1.54 The Association expressed its appreciation to the Secretary-General for assisting Members in developing their NMHSs particularly by organizing regional events including technical conferences to enable them to exchange views on, and share experience in the management and operation of the Services. The Association noted with appreciation that the Fifth Technical Conference on Management of Meteorological and Hydrological Services in RA II had been held in Daegu, Republic of Korea, from 29 November to 3 December 2010 at the kind invitation of the Government of the Republic of Korea. It expressed satisfaction that the Conference was attended by 39 Directors or senior officials of NMHSs of 20 Members in Region II, two invited lecturers and nine invited experts. Many Directors and senior officials of NMHSs had presented lectures or case studies on six topics: (a) strategic planning and management of NMHSs including, social and economic benefits of weather, climate and water services, strategic partnership, and regional cooperation; (b) capacity development in NMHSs including human resources development;

(c) improving climate services including GFCS activities, and adaptation to climate variability and change; (d) improving service quality and service delivery, with new technologies in meteorology and hydrology including Quality Management, sand and dust storms, and SWFDP; (e) role of NMHSs in disaster risk reduction including emergency response; and (f) implementation of WIS/WIGOS.

5.1.55 Considering that constant improvement on management techniques and practices is needed for NMHSs to increase efficiency of their Services and to improve the ability to address challenges facing them under financial and other constraints, the Association agreed that the Sixth Technical Conference on Management of Meteorological and Hydrological Services in Regional Association II be held during the sixteenth financial period. Taking into account the importance of regional implementation of the Global Framework for Climate Services (GFCS), the Association agreed to include topics related to climate services, e.g., Best practices of the GFCS; and Enhancement of climate service delivery system through effective establishment of user interface platforms at regional and national levels.

5.1.56 The Association also noted with appreciation that the Fourth Regional Seminar on Strategic Capacity Development of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) had been held in Doha, Qatar, from 11 to 12 December 2012 at the kind invitation of the Government of State of Qatar. It expressed satisfaction with the level of participation of Members of the Association in the Seminar and that many senior officials of NMHSs had presented lectures or case studies on four topics: (a) Development and Implementation of Regional Strategic Operating Plan and Challenges of NMHSs in RA II; (b) Capacity Development and Strategic Partnerships (including Role and Operation of NMHSs); (c) Implementation of WIGOS/WIS; and (d) Improving Climate Services.

5.1.57 The Association also expressed its appreciation to the Secretary-General of WMO for planning to organize a Regional Seminar during the next financial period.

5.1.58 The Association encouraged its Members to propose more topics to the Secretariat and requested its Management Group to consider appropriate topics for the above-mentioned Technical Conference and Regional Seminar taking into full consideration the regional priority areas as given in the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015.

## **6. GLOBAL FRAMEWORK FOR CLIMATE SERVICES AND FOLLOW-UP TO Cg-EXT.(2012) (agenda item 6)**

### ***The vision of the Global Framework for Climate Services***

6.1 The Association recalled that the Sixteenth World Meteorological Congress (Geneva, 16 May to 3 June 2011) had endorsed the report of the high-level taskforce on the Global Framework for Climate Services (GFCS) and mandated WMO to facilitate, with the involvement of relevant stakeholders, including other United Nations bodies, the development of the draft Implementation Plan, the draft terms of reference and rules of procedure of the Intergovernmental Board of the GFCS and its substructures based on the draft Implementation Plan (Governance Mechanism) for the consideration of an Extraordinary Session of the World Meteorological Congress.

6.2 The Association noted with appreciation that the process for the development of the draft Implementation Plan and Governance Mechanism of the GFCS involved extensive consultations. More than 40 agencies and over 300 experts in the different pillars of the GFCS (User Interface Platform, Climate Service Information System, Observations and Monitoring, Research, Modelling and Prediction, and Capacity-building) and initial priority areas (agriculture and food security, water, health and disaster risk reduction) participated in the various consultation meetings. Their participation resulted in expressed commitment of institutions and experts to engage with the GFCS and the volunteering of experts to reviewing drafts of the Implementation

Plan. In the drafting process itself, more than 100 experts from 36 countries nominated by governments, UN and international agencies and regional organizations, contributed their time and expertise in the development of the draft Implementation Plan and Governance Mechanisms of the GFCS.

6.3 The Association further noted that the vision of the GFCS is to enable society to manage better the risks and opportunities arising from climate variability and change, especially for those who are most vulnerable to climate-related hazards. Effective climate services will facilitate climate-smart decisions that will reduce the impact of climate-related disasters, improve food security and health outcomes, and enhance water resource management, among other societal benefits. All countries will benefit, but in the initial stages priority shall go to building the capacity of developing countries vulnerable to the impacts of climate change and variability. The GFCS aims to bridge the gap between those that need to know the climate and those that have such knowledge, thus empowering, in particular, the vulnerable.

***Outcomes of the Extraordinary Session of the World Meteorological Congress (Cg-Ext.(2012))***

6.4 The Association noted the successful outcome of the Extraordinary Session of the World Meteorological Congress (Geneva, 29 to 31 October 2012), in particular:

- (a) The adoption of the draft Implementation Plan of the GFCS;
- (b) The establishment of the Intergovernmental Board on Climate Services as an additional body accountable to Congress under Article 8(h) of the Convention of the WMO;
- (c) The approval of the terms of reference and rules of procedure of the Intergovernmental Board;
- (d) The approval of the specific functions of the Secretariat support of the GFCS.

6.5 The Association also noted that the first meeting of Intergovernmental Board on Climate Services is planned to be held in Geneva in July 2013.

6.6 The Association noted that the Extraordinary Congress had urged Governments to, among others:

- (a) Continue to make their expertise and experts available during the implementation of the GFCS;
- (b) To make maximum use of existing national institutions and capabilities including NMHSs, regional and global capabilities to collect and exchange data products, to generate climate information products, and to provide science-based climate prediction and services to enhance decision making through implementation of a framework for climate services at national level;
- (c) To facilitate coordination and collaboration among various institutions, including intermediary institutions at the nexus between climate information providers and climate service users, within their countries, for the generation and use of climate services through appropriate legal and institutional arrangements;
- (d) To facilitate transfer and sharing of technology and know-how between developed and developing countries in relation to the production, availability, delivery and application of science-based climate prediction and services;
- (e) To provide adequate resources for strengthening weather, climate and water data networks, their operation and maintenance;

- (f) To support research in climate science, climate application science and interdisciplinary earth system science at national, regional and global levels to improve understanding of climate systems and their impacts and to promote the delivery of better climate services;
- (g) To work closely with the WMO Secretariat in communicating the development and progress of the implementation of the GFCS and in advocating its benefits.

6.7 The Association further noted that the Extraordinary Session of the World Meteorological Congress was preceded by a Dialogue for climate services users and providers from 26 to 27 October 2012. The Dialogue provided the status of capabilities in climate prediction, among others, and offered a platform for sharing of experiences and lessons on the production and application of climate services worldwide. A publication, "Climate Exchange" containing case studies on experiences from around the world on the development and application of climate services in various socio-economic sectors was launched at the Dialogue (the publication is available at: <http://www.wmo.int/pages/gfcs/tudor-rose/index.html>).

### ***Actions required from Members of the Association***

6.8 With the adoption of the draft Implementation Plan and Governance Mechanism, the GFCS moves to the implementation phase. As initial actions, the Association noted that its Members are invited to:

- (a) Designate representative(s) to serve as members(s) of the Intergovernmental Board and appoint a principal member, who will normally come from the NMHS, who shall be regarded as the main focal point of a Member for the matters relating to the Intergovernmental Board. The letter from the Secretary-General on this matter has been circulated to all Members;
- (b) Consider initiating frameworks for climate services at national level as the national mechanisms to bridge the gap between climate information being developed by scientists, service providers and knowledge hubs on the one hand, and the practical needs of users on the other, from the national to community levels;
- (c) Promote the Implementation Plan of the GFCS to relevant stakeholders at national level;
- (d) Convene user and pillar specific fora;
- (e) Make their expertise and experts available for the implementation of the GFCS;
- (f) Make maximum use of existing national institutions;
- (g) Facilitate coordination and collaboration among various institutions, including intermediary institutions at the nexus between climate information providers and climate services users;
- (h) Implement priority projects and activities as proposed in the Implementation Plan of the GFCS;
- (i) Emphasis should be made on the importance of provision of high quality services and managing user expectations.

6.9 The Association further noted that Resolution 4 (EC-64) had established an EC Task Team on WMO Policy for International Exchange of Climate Data and Products to support the Implementation of the GFCS and that this Task Team was in the early stages of consultation. The Association re-affirmed the benefits of addressing issues of exchange of climate data and accessibility to model prediction data as soon as possible. As the data requirements will extend

beyond the remit of NMHSs, it also noted the positive experience of some Members in establishing national data exchange mechanisms through consultation with all national stakeholders.

6.10 The Association appreciated the encouragement of the President of WMO to lead the identification and initiation of regional activities in support of the GFCS, in particular in the identification and characterization of existing regional climate services delivery mechanisms and their alignment with best practices, identification of regional partnerships with all potential stakeholders, providing advice and guidance with respect to access to climate and related data and model prediction data, and development of a process for framing the priorities of the regional needs for climate services.

6.11 The Association stressed the need to improve technology exchange and to concentrate on capacity development utilizing existing sub-structures of the WMO.

6.12 The Association agreed that its contribution to the GFCS should be considered further by a dedicated subsidiary body established under Agenda Item 5.

## **7. EMERGING ISSUES AND SPECIFIC CHALLENGES (agenda item 7)**

### **7.1 Quality Management for Aeronautical Meteorological Services**

7.1.1 The rapid growth of aviation across the entire Region makes Asia one of the most crucial Regions for the implementation of the priority areas of the Aeronautical Meteorology Programme, including the implementation and further development of Quality Management Systems (QMS), competency of personnel, SIGMET deficiencies, new services to Air Traffic Management (ATM) and the predictions and warnings of volcanic ash.

7.1.2 The Association recalled that aeronautical meteorology was a priority for the WMO for a number of reasons including that the safety of flight operations relies on access to timely and accurate services from NMHSs and because, for many NMHSs, the aviation sector is a crucial client on which their viability depended. The Association noted that the WMO's priorities will be reviewed and revised prior to Cg-17 in 2015 and considered that, while it was very early to settle these priorities now, Aeronautical Meteorological Services remain a priority issue in RA II and that the Management Group should keep this issue under consideration for input into the planning process closer to Cg-17.

7.1.3 The Association further recalled that EC-64 had requested Members to provide in-kind contributions at current, or wherever possible increased levels. The Association was reminded that there are many challenges for NMHSs in providing services to the aviation which are reflected in the five top level priorities of the Commission for Aeronautical Meteorology below:

- (a) Implementing and sustaining QMS noting that a number of Members may have missed the ICAO implementation deadline of 15 November 2012;
- (b) Undertaking competency assessment of Aeronautical Meteorological Personnel (AMP) noting the WMO deadline of 1 December 2013;
- (c) Improving the efficiency and effectiveness of SIGMET issuance;
- (d) Improving services to aviation in particular for high-density airspace and aerodromes;
- (e) Improving Members' ability to respond to volcanic ash and other large-scale, high-impact events, e.g., space weather, tropical cyclones and nuclear incidents.

### ***Support for the Twinning/Mentoring Framework in Quality Management Systems (QMS) Implementation***

7.1.4 The Association recognized that, following the expiry of the deadline on 15 November 2012, ICAO provisions concerning the quality management of meteorological services for international air navigation were now upgraded from a Recommended Practice to a Standard. The Association noted with concern that about one third of members in the Region had implemented a QMS, about one third had implementation activities underway, and about one third had yet to commence implementation in a meaningful way.

7.1.5 The Association was informed of an “in-principle” agreement between the relevant WMO and ICAO Secretariats that Members not complying with the Recommended Practice of obtaining certification in accordance with the ISO 9001 Standard, should, as a minimum, provide evidence for having achieved the following milestones:

- (a) Evidence of a contractual arrangement between the Meteorological Authority and Service Provider with clearly established responsibilities;
- (b) Availability of quality policy, quality manual and complete set of work instructions/ process descriptions at all workplaces, and familiarity of staff with these documents;
- (c) Documented evidence of user consultation and feedback (publications, questionnaires, records of user meetings, actions stemming from these);
- (d) Evidence of corrective and preventive action processes;
- (e) An internal audit plan, audit reports and documented follow-up decided by a Management Review meeting.

7.1.6 Noting that some Members lacked capacity for internal audits, the Association re-iterated that a ‘twinning’ or ‘mentoring’ framework was expected to help overcome this critical issue. The Association, noting Resolution 26 (Cg-XV), urged the relevant Task Team, once re-established, to actively work towards the establishment of twinning/mentoring arrangements as a part of the WMO’s QMS implementation activities, and to seek cooperation with similar task teams in neighbouring Regions.

### ***Competency of Aeronautical Meteorological Personnel (AMP)***

7.1.7 The Association, noting the deadline for implementation of AMP Competency Standards of 1 December 2013 as given in the new edition of the WMO Technical Regulations No. 49, Vol. 1, was informed of rapid progress in the implementation of the CAeM Competency Assessment Toolkit in most WMO Regions with the help of the relevant task and expert teams of the Commission for Aeronautical Meteorology. The Association warmly welcomed the holding of AMP competency assessment workshops hosted and facilitated by Members in the Region, and supported the cost-effective mapping of required competencies to web-based and other training material, with a view to addressing any competency deficits detected by the assessments. The Association appreciated the highly productive cooperation with the US COMET programme which has provided access to a range of modules including a newly developed module on QMS. These are available on the COMET website at <https://www.met.ed.ucar.edu/>. Moreover, the Association reaffirmed that the time is limited before the WMO/ICAO competency standard for aeronautical meteorological personnel comes into effect and additional voluntary inputs are required, including training events and the exchange of best practices. The Association recalled that since competency assessment of aeronautical meteorological personnel is a component of QMS, the competency standard should be consistently compliant with the whole QMS implementation process.

7.1.8 Recognizing the important role that Regional Training Centres (RTC) have in the successful implementation of the AMP competency standards, the Association urged the ETRP

and CAeM to coordinate with the RTC network and other training and education institutes on the further development of mechanisms, documented in line with QMS principles, to support the training, education and 'best practices' in the assessment of AMP. In this context, the Association warmly welcomed the establishment of the new regional training centre in Qatar, which already held a highly successful training course on aeronautical meteorology in cooperation with WMO and ICAO experts in April 2012. The Association also encouraged additional "train-the-trainer" activities as a way of accelerating the training efforts.

### ***SIGMET Advisory Trial***

7.1.9 The Association noted with appreciation that ICAO, in close collaboration with WMO and with the assistance of France, South Africa and China, had conducted a SIGMET advisory trial in RA I and RA II in mid-2011, in order to address long-standing SIGMET issuance deficiencies. The Association noted with concern the limited response by some Members to the trial issuance of ICAO SIGMET advisories (details of the trial can be found at: <http://www.icao.int/safety/meteorology/METWSG/Meeting%20MetaData/METWSG.4.SN.008.5.en.pdf>). In the case of severe resource deficiencies, the Association further encouraged those Members concerned to seek the temporary transfer of their SIGMET responsibilities through negotiations involving ICAO to a Member in a position to provide this service on their behalf until such time that the necessary capabilities have been re-established, and noted Resolution 6 (EC-64) – Alternate means of compliance with ICAO SIGMET Provisions.

7.1.10 The Association further noted the requirement by aviation users that SIGMET information be better harmonized across FIR boundaries, and encouraged the establishment of regional coordination mechanisms, making best use of the RA II Task Team structure to liaise between Meteorological Watch Offices to support this effort.

### ***Information relating to the status of SIGMET implementation by Members***

7.1.11 The Association, having been informed of significant information deficits concerning the implementation status of such priority items as QMS, Competency Assessments and SIGMET issuance, strongly requested its Members to provide the necessary status information to the Secretariat by timely replies to relevant questionnaires. The Association reminded its Members that only complete, up-to-date and accurate information on the implementation status can be used to prioritize Secretariat and other support to Members.

### ***Meteorological services for air traffic management and data-centric information exchange models***

7.1.12 The Association noted the work of the Expert and Task Teams jointly established by CAeM and CBS to drive and facilitate the migration of aeronautical meteorological information (such as METAR/SPECI, TAF and SIGMET) to an XML/GML digital form, formatted in accordance with a globally interoperable information exchange model. To this end, and recognizing regional air traffic management improvement programmes such as NextGen (United States), SESAR (European Union) and CARATS (Japan), the Association noted that ICAO, with the assistance of WMO, was addressing the future system-wide information management of aeronautical meteorological information that will support the future global air traffic management environment. The latest version of the ICAO Global Air Navigation Plan (GANP) encompassed a system of sequential Aviation System Block Upgrades (ASBU) that were designed to take full advantage of emerging new technologies in all areas of aviation to cope with the expected growth of traffic and the ensuing increased traffic density. Asia, with its rapid growth of the economy and consequential need for connectivity, was expected to be in the forefront of these developments. Aviation meteorology is seen as a fundamental enabling factor for the transition to new, trajectory-based air traffic management concepts, for which highly accurate, reliable and detailed meteorological information will be a pre-requisite to maintain and improve safety and economy in an increasingly dense air space. The Association further supported the development of new, tailored meteorological services for Air Traffic Management with emphasis on high-density air space and aerodromes by a newly established Project Team of ICAO in close cooperation with WMO,

whereby the CAeM Expert Team on Meteorological Service to ATM and Meteorological Information Exchange (ET-M&M) is providing the scientific and technical input. The Association urged the NMHSs to establish closer interactions with aviation authorities towards the implementation of block-based modules for aeronautical system modernization to meet the needs of aviation users in meteorological information, as well as towards financial resources allocation to support such activities.

### **Volcanic Ash**

7.1.13 The Association strongly supported the work of the WMO/IUGG Volcanic Ash Scientific Advisory Group. The Association was informed that since its establishment in March 2010, this group had played a significant role in advancing the scientific understanding of volcanic ash detection and forecasting in support of continued safe and efficient civil aviation operations. The Association was also informed of the recent conclusion of the ICAO International Volcanic Ash Task Force (IVATF). IVATF had involved many Members and resulted in a large number of recommendations to go forward to the International Airways Volcanic Watch Operations Group. The Association noted that the recommendations will have procedural, training, and resource implications for many Members and requested the president of CBS to cooperate with CAeM in providing all necessary support to the Volcanic Ash Advisory Centres, Meteorological Watch Offices and Volcano Observatories for this challenging task.

7.1.14 A joint letter by the Secretaries-General of both WMO and ICAO to all Members and Contracting States has strongly requested the countries to enhance and support the observation programmes that will allow to objectively determining the location, height and intensity of volcanic ash clouds. Only an integrated observing system with both ground and space-based observing systems could be expected to deliver the necessary resolution, completeness and reliability of Volcanic Ash (as a specific form of litho-aerosols).

### **Other emerging issues**

7.1.15 Aviation as a crucial sector of the transport industry is required to establish sound safety risk management procedures. In this respect, the establishment of a CAeM-CBS inter-commission task team on space weather is developing a concept of operations in close cooperation with ICAO on the potentially harmful effects of solar storms on communications and navigation systems and the health of passengers and crews. Similar efforts are underway to provide meteorological support to aviation in the event of the release of chemical and/or nuclear hazardous substances. This work is again undertaken as a multi-disciplinary effort with other UN partners such as WHO, IAEA, ICAO and other stakeholders and was prompted by the recent nuclear incident in Fukushima/Japan.

## **7.2 Sand and dust storms**

7.2.1 The Association noted that as a result of collaboration between CAS and CBS, CBS-15 recommended to incorporate the mandatory functions and criteria for the designation of a RSMC with activity specialization in Atmospheric Sand and Dust storm Forecasts (RSMC-ASDF) in the current version of the *Manual on the GDPFS* (WMO-No. 485). These mandatory functions and criteria, approved by the Executive Council at its sixty-fourth session, are contained in [Annex V to the present report](#). The Barcelona Supercomputing Centre (BSC) applied to act as an RSMC-ASDF for Northern Africa (north of Equator), Middle East and Europe. Noting that this centre complies with the mandatory functions, CBS-15 recommended its formal designation, and therefore proposed an amendment to the *Manual on the GDPFS*, as found in Annex 1 to Recommendation 13 (CBS-15) for consideration by EC-65.

7.2.2 The Association noted that the SDS-WAS Regional Steering Group (RSG) for Asia (Tsukuba, Japan, March 2012) discussed the major plans for the Asian SDS-WAS node to be considered in the near-term, including the development by China of the Asian SDS-WAS portal, data exchange and data policy, and model intercomparison.



7.2.3 The Association strongly encouraged China to realize its plans related to sand and dust storm-related services and recommended a demonstration of operational forecasting capabilities (as described in Annex V to the present report) during the upcoming season (in 2013), to serve Members of the eastern part of RA II in dust monitoring and forecasting and supported the formal nomination a centre to act as a RSMC-ASDF, for CBS consideration.

7.2.4 In the same context, the Association recognized the need for similar arrangements for the western part of RA II, and therefore requested the Western Asia countries to consider establishing a SDS-WAS node for the western part of RA II, which would include an assessment of the capabilities to produce and deliver atmospheric sand and dust storm forecasts, and a demonstration of possible operational arrangement(s) to serve Members of the western part of RA II. The Association agreed to also include these aspects in its work programme for the coming intersessional period.

7.2.5 The Association recognized that the SDS-WAS, as a research project, has the following objectives:

- (a) Improving scientific understanding of the atmospheric dust process and impacts;
- (b) Contributing to improvement of dust forecasting and observation technology through coordinated research;
- (c) Collaborating with WMO constituent bodies (e.g., CBS, RAs) on transferring research on dust forecasting to operations;
- (d) Building capacity of relevant countries to be trained to utilize dust-related observation and forecasting products for meeting societal needs.

7.2.6 The Association welcomed the progress made by WWRP, GAW and operational partners in WMO in implementing the SDS-WAS. It noted with appreciation that China, the United States and Spain are hosting SDS-WAS regional research centres for Asia, Pan America, and Northern Africa, Middle East and Europe, respectively.

7.2.7 The Association welcomed the interest of Members in the West Asian region in utilizing the SDS-WAS to address their national and regional needs. It noted that several meetings and workshops sponsored by WMO were held in the Region to consider the issue of dust process and impacts in the Region, including: Seminar on sand and dust storms in the Arab Region, Bahrain, January 2011; Training workshop on dust storms, Islamic Republic of Iran, October 2011; and Regional conference on dust and dust storms, Kuwait, November 2012.

7.2.8 The Association was advised that for the last two years Oman has been working with WMO and EUMESAT on the further development of a Centre of Excellence and supported the proposal that the mandate of this Centre for training satellite meteorology in the Region be extended to include the application of satellite-based sand and dust storm products within the framework of WMO SDS-WAS. Oman further advised that as a part of the second phase of development of the Centre it proposes to embed sand and dust storm warnings and other activities related to West Asia RAI within the Multi Hazard Early Warning Centre, which is currently being implemented with IOC UNESCO, to complete the infrastructure required for tsunami and other hazards, including sand and dust storms, within the frame work of WMO SDS-WAS.

## **8. WMO REGIONAL OFFICE FOR ASIA AND THE SOUTH-WEST PACIFIC INCLUDING WMO OFFICE FOR WEST ASIA (agenda item 8)**

8.1 The Association reviewed the activities of the Regional Office for Asia and the South-West Pacific and the WMO Office for West Asia in Bahrain since its fourteenth session. It recognized that, through the reorganization and adjustment of the Development and Regional Activities (DRA) Department aiming at further coordinated and harmonized implementation of

capacity development activities for Members, the Offices were strengthening its functions and responsibilities as an integral part of the WMO Secretariat. The Association noted that effective assistance had been provided by the Offices to the president, vice-president and subsidiary bodies of the Association in discharging their responsibilities. It expressed its appreciation to the Secretary-General and the staff of the Offices for their continued and enhanced support to the activities of the Association during the intersessional period.

8.2 In this connection, the Association welcomed the news that the Intergovernmental Council of Hydrometeorology of the Commonwealth of Independent States (CIS) decided to establish a special WMO office for the Euro-Asian subregion and supported this proposal as an effective mechanism for further strengthening regional activities.

### ***Regional Office for Asia and the South-West Pacific***

8.3 The Association was pleased to note the increasing role of the Regional Office as a focal point for information on regional activities and for assisting Members in implementing WMO Programmes and activities that had a regional focus. It commended the continued efforts of the Regional Office in monitoring the priority needs of the subregions and individual Members and in facilitating the provision of appropriate advice and assistance through relevant technical departments in the Secretariat. The Association requested the Secretary-General to continue his efforts to strengthen the Regional Office in order to respond quickly to the growing needs and requirements of Members in the Region.

8.4 The Association expressed its appreciation for the efforts of the Regional Office in maintaining close contact with Members through visits, in supporting regional events and in developing and implementing technical cooperation projects in order to ensure the enhanced capabilities of NMHSs, in particular developing and Least Developed Countries, in providing weather, climate and water services at national and regional levels.

8.5 The Association welcomed the efforts of the Regional Office in maintaining a close liaison and strengthening collaboration with regional bodies including UNESCAP, the Association of Southeast Asian Nations (ASEAN), and the League of Arab States (LAS), as well as new regional partners such as the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES), the Cooperation Council for the Arab States of the Gulf (GCC), and the South Asian Association for Regional Cooperation (SAARC) Meteorological Research Centre. It encouraged the Office to continue and further strengthen that type of activity to promote weather-, climate- and water-related issues and to increase the awareness of policy makers of the role of NMHSs and WMO in contributing to sustainable development.

8.6 The Association noted with pleasure that the website on regional activities in Asia has been further enhanced for the exchange and dissemination of information on regional activities and for maintaining a close linkage and promoting partnerships between the Regional Office and Members. In that connection, the Association urged its Members to actively contribute news items and articles to the Regional Office website on a regular basis to enable the exchange of information on the activities and programmes being undertaken by Members in the Region.

8.7 The Association recognized that Members continued to benefit from development cooperation activities carried out within the framework of various funding sources such as the WMO VCP and Trust Fund arrangements. The Association was pleased to note that trust fund projects had been implemented by the Regional Office in Saudi Arabia, Sri Lanka and the countries in the Bay of Bengal for the procurement and installation of equipment, education and training, and improvement of services. The Association encouraged its Members to make use of such arrangements, which had proven to be effective for the enhancement of capacities of their NMHSs.

8.8 The Association further recognized that 16 Members of RA II received support within the framework of the WMO VCP during the period 2009–2012, in particular for strengthening WWW operational facilities and for climatological and hydrological activities. It expressed the

desire for potential donor and recipient Members to participate more actively in the VCP Programme.

8.9 The Association expressed its appreciation to the Secretary-General and the Regional Office and the WMO Office for West Asia for the immediate action taken after the occurrence of disasters that had seriously affected the Members, in particular the severe floods in Pakistan in July-August 2010 and the massive earthquake and earthquake-induced tsunamis in the Pacific coast of Japan that occurred on 11 March 2011. The Association noted that WMO emergency assistance was provided to Afghanistan, Bangladesh, Democratic People's Republic of Korea, Iraq, Myanmar, Pakistan and Sri Lanka in response to disasters. The Association, in this context, requested the Secretary-General to continue to take proactive and immediate response and assistance actions to meet the urgent requirements of affected Members for the restoration of key operational hydrological and meteorological facilities and for human resources development.

8.10 The Association further noted that WMO fact-finding and needs assessment missions were carried out by experts in the Region and staff from the Regional Office to Bhutan, Democratic Republic of Korea, Japan, Kuwait, Myanmar, Pakistan and Sri Lanka during 2009–2012. The Association encouraged its Members and the Regional Office to enhance support for such missions to identify Members' needs and requirements.

#### ***WMO Office for West Asia***

8.11 The Association expressed its appreciation to the Government of Bahrain for the continued considerable support to the WMO Office for West Asia provided since its inauguration at the UN House in Manama, Bahrain, on 12 March 2007. It noted that the Office had played a key role in coordinating communications with NMHSs in West Asia for identifying the requirements for the development of the NMHSs and in the organization of several meetings in the subregion. The Office had developed and maintained close working relationships with other UN agencies and regional and subregional organizations in West Asia, including LAS, in particular in the areas of disaster risk reduction, sand and dust storms, and climate change. In Bahrain, the Office has promoted meteorology and meteorology-related issues and supported national activities in relevant areas such as disaster risk reduction, protection of the environment and climate change in direct collaboration with the Bahrain Meteorological Service and other national stakeholders.

8.12 The Association was pleased to note that, during 2009–2012, the main thrust of the Office was centred around the following domains: (a) providing support to RA II; (b) providing support to individual WMO Members, in particular those in West Asia; (c) providing support to various WMO Departments and assisting in implementation of WMO Programmes and activities in the Region; (d) liaising with and providing support to meteorology-related activities of LAS and its institutions; and (e) providing support to the UN Country Team in Bahrain and UN and regional agencies on meteorology-related matters.

8.13 Noting that, through the WMO Office for West Asia, the Regional Office is expected to promote interregional coordination among Regional Associations I (Africa), II (Asia) and VI (Europe), the Association requested the Secretary-General, and urged its Members, to consider further strengthening of the WMO Office for West Asia through increased financial and human resources. It requested the Secretariat to take the necessary actions for thanking the Government of Bahrain on behalf of RA II and for seeking continued or further support to the Office.

#### ***Review of Regional Office location***

8.14 The Association was pleased to note that, at the request of Cg-XVI, the Secretariat initiated a comprehensive review of the resources and location of the Regional Office for Asia and the South-West Pacific, with a special focus on efficient and effective management and operation of the Regional Office. It noted with appreciation that, through the Secretariat's consultations with Members, some Members (Macao, China; Republic of Korea; Singapore; and Thailand) indicated their Government's interest in hosting the Regional Office.

8.15 The Association endorsed the generic criteria for consideration of the Regional Office location developed by the Secretariat and agreed by the Management Groups of RA II and RA V, in light of the efficiency, cost-effectiveness and sustainability, as given below:

(a) Efficiency:

- Linkage with WMO Programmes and technical and administration departments/offices for collaboration and coordination (time difference to be considered);
- Connection to Members, RA presidents and subsidiary bodies;
- Connection to partners (UN, international and regional organizations and financial institutions) for collaboration and increased advocacy;
- Accessibility/geographical convenience (number of available direct flights, flight time to possible venues of regional events, visa issuance, etc.);
- Accessibility to the info/data and info exchange (with IT support);
- Availability of international conference facilities;

(b) Cost-effectiveness:

- Staff salary rate (post adjustment);
- Cost of living and quality of life for staff (e.g., housing, education, healthcare services; crime rate);
- Office running cost (including security cost);
- Accessibility (mission cost for Office staff and participants for the meetings; cost for holding sessions);
- Availability of Government support (including staff costs, office space, furniture and running cost; and programme/activity cost);

(c) Sustainability:

- Political stability of the Government (neutrality of Member and overall social stability);
- Security;
- Environmental friendliness;
- Government commitment to support for longer term (e.g., 4-year period of initial agreement, and continuation).

8.16 In considering the pros and cons of the relocation of the Regional Office for the Region, the Association recognized the advantages of the location of the Office being in the Region in particular in terms of cost-effectiveness, while also recognizing that there is a risk of losing cost-effectiveness in case of possible economic crisis of the potential hosting Member and from other reasons. On the other hand, it noted weakness in the closer day-to-day coordination with the WMO Secretariat and Programmes when the Office is located in the Region.

8.17 In that connection, the Association noted with appreciation that, in the process of adjustment in the Development and Regional Activities (DRA) Department, the Secretary-General assigned the function of regional coordination to a dedicated officer within the DRA Department to overcome the weakness of relocation of the Office to the Region in the criterion of linkage with WMO Programmes and technical and administration departments/offices for collaboration and coordination. The Association also appreciated the recently implemented improvements in video-

conferencing and remote access to WMO's financial and administrative management system which further contributed to improved coordination.

8.18 The Association noted the view of Members that the essential consideration for relocating the Regional Office for Asia and the South-West Pacific should be to provide better service for the Region and in this regard, expressed the view that the Regional Office should be in RA II if it is relocated outside Geneva. In this regard, it proposed that separate Regional Offices for RA II and RA V could be one of the options.

8.19 The session requested the RA II Management Group to further consider the criteria including the possible weight given to specific criteria and to soliciting additional hosting offers from Members and organizations. In this context, India indicated its interest in being considered. It also requested that the option of hosting the Regional Office in Geneva should be retained for consideration along with other possible locations.

8.20 The Association agreed that, with close collaboration with the president of RA V and its Management Group on this issue, the president of RA II, in consultation with the RA II Management Group, proceed with seeking potential candidates for hosting the Regional Office from all Members of RA II and RA V, and make a recommendation to the Secretary-General on the appropriate location of the Office before Cg-17 (May 2015) based on the assessment of the candidates using the regionally agreed criteria.

## **9. SCIENTIFIC LECTURES AND DISCUSSIONS (agenda item 9)**

9.1 The following scientific lectures were presented during the session:

- (a) Tropical cyclone reconnaissance, by Mr C.M. Shun (Hong Kong, China);
- (b) The early warning information on extreme weather provided by JMA and a pilot project to develop an early warning system to mitigate cold/hot damage to rice production, by Dr Noritake Nishide for Dr Mitsuhiko Hatori (Japan);
- (c) RA II contribution to the GFCS through regional climate services at Beijing Climate Center, by Dr Song Lianchun (China);
- (d) Challenges and opportunities of weather and climate services in RA II, by Dr S.D. Attri (India);
- (e) Improving water management efficiency by technology development to overcome climate change impacts, by Dr Sung Kim (Republic of Korea).

9.2 The lectures were followed by fruitful discussions. The Association expressed its appreciation to the lecturers for their interesting and informative presentations. It requested the Secretary-General, in consultation with the president of RA II, to make the necessary arrangements for scientific lectures during the next session of the Association.

## **10. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS (agenda item 10)**

10.1 The Association examined those of its resolutions which were still in force at the time of the fifteenth session.

10.2 The Association noted that most of its past resolutions had been replaced by new resolutions adopted during the session. It further noted that while a few resolutions had been

incorporated in the appropriate WMO publications, some of the previous resolutions were still required to be kept in force.

10.3 The Association accordingly adopted [Resolution 20 \(RA II-15\) – Review of previous resolutions and recommendations of the Association](#).

10.4 The Association noted that Resolution 1 (EC-LXI) on the report of the fourteenth session of the Association was decided not to be kept in force at the sixty-fourth session of the Executive Council.

## **11. ELECTION OF OFFICERS (agenda item 11)**

The Association elected Mr Ahmed Abdulla Mohammed (Qatar) as president and Dr Qamar-uz-Zaman Chaudhry (Pakistan) as vice-president of WMO Regional Association II (Asia).

## **12. DATE AND PLACE OF THE SIXTEENTH SESSION (agenda item 12)**

12.1 In accordance with Regulation 170 of the WMO General Regulations, the president of the Association should determine the date and place of the sixteenth session in agreement with the President of the World Meteorological Organization and after consultation with the Secretary-General, during the intersessional period.

12.2 The Association noted with appreciation the kind offers extended by India and the Islamic Republic of Iran to host the sixteenth session, subject to further confirmation.

## **13. CLOSURE OF THE SESSION (agenda item 13)**

13.1 The principal delegates of Members of the Region, including Afghanistan; China; India; Iraq; Japan; Republic of Korea; and the Russian Federation expressed their gratitude to the Government of the State of Qatar for having hosted the session, and for the excellent arrangements and the warm hospitality extended to all participants. The Association also expressed its appreciation to the WMO Secretariat and the local secretariat for the support that was instrumental in the smooth and efficient running of the session. Mr Ahmed Abdulla Mohammed and Dr Qamar-uz-Zaman Chaudhry were congratulated on their election as president and vice-president, respectively. The Association extended special thanks and acknowledgement to Prof. Victor E. Chub, president by presenting Certificate of Outstanding Services, in recognition of his strong leadership and significant contribution in implementing the activities of the Association.

13.2 Mr Robert O. Masters, the representative of the Secretary-General, thanked the Government of the State of Qatar, as well as Mr Mohammed, Permanent Representative of Qatar with WMO, and his staff for the excellent arrangements and their warm hospitality. Mr Masters highlighted key outcomes of the session including increased participation of RA II Members in the session; adoption of the RA II Strategic Operating Plan 2012–2015 with the identification of eight priority areas of the Region; approval of the RA II WIGOS Implementation Plan; agreement on the preliminary list of principle GISCs; establishment of the new RA II work structure; agreement on the criteria and approach for assessment of Regional Office location; and election of the president and vice-president of the Association. He extended his appreciation to all the delegates and supporting staff for their active participation in and considerable contributions to the session.

13.3 Dr Chaudhry, vice-president of RA II, expressed his appreciation and gratitude to the delegates, the host and the WMO Secretariat for their valuable contributions and support which had led to a very successful session, and further expressed his expectations that the Region, with the support of Members, would be able to successfully implement its newly adopted Strategic

Operating Plan. He also thanked the delegates, especially China; Hong Kong, China; Japan and the Republic of Korea, for their support in his re-election as vice-president of the Association for the next intersessional period.

13.4 Mr Mohammed, Permanent Representative of Qatar with WMO, on behalf of the host country, expressed the hope that the participants had enjoyed a comfortable and memorable stay in Doha. He congratulated the vice-president on his re-election and thanked the delegates for the support for his election as president of the Association. He also thanked all those who had taken part in ensuring the success of the session. He wished all participants a safe journey home.

13.5 In closing, Prof. Victor Chub, outgoing president of RA II, expressed his appreciation to participants, the host country and co-chairs for their valuable contributions, and hoped that the activities of the Association would be further strengthened in the light of the newly adopted RA II Strategic Operating Plan. He also thanked Mr M. Jarraud, Secretary-General of WMO, and his staff, in particular those of the Regional Office for Asia and the South-West Pacific and the WMO Office for West Asia, for their close cooperation and valuable support to the work of the Association and himself during his tenure as president of the Association.

13.6 The fifteenth session of Regional Association II (Asia) closed at 13.35 p.m. on 19 December 2012.

---

# RESOLUTIONS ADOPTED BY THE SESSION

## Resolution 1 (RA II-15)

### IMPLEMENTATION OF THE WMO STRATEGY FOR SERVICE DELIVERY IN REGIONAL ASSOCIATION II (ASIA)

REGIONAL ASSOCIATION II (ASIA),

#### **Noting:**

- (1) That the Sixteenth World Meteorological Congress (Geneva, May–June 2011) approved the WMO Strategy for Service Delivery,
- (2) That Sixteenth Congress requested the Secretary-General to arrange for the development of an Implementation Plan of the Strategy to guide the efforts of Members at the national level,
- (3) That the Strategy and its Implementation Plan are potentially cross-cutting in that they are relevant to, and may not only be applied in, the development of weather and warning services but also in the development of climate services and hydrological services,

#### **Noting further:**

- (1) That Sixteenth Congress requested regional associations to make full use of the Strategy in developing specific plans appropriate to their own Regions, and engaging in regional partnerships,
- (2) That Sixteenth Congress also requested regional associations to seek every opportunity to transfer knowledge through advanced capacity-building approaches presented in the Strategy,

#### **Having considered:**

- (1) That regional associations, including RA II, have expressed the desire for ownership of the Implementation Plan and taking the responsibility to implement it in their own Regions,
- (2) That service delivery-related priorities of RA II as contained in the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015 were fully catered for in the Strategy and its Implementation Plan,

**Decides** that the Association should have a strong role in the execution of the Implementation Plan of the Strategy through oversight by its Management Group, to support a harmonized and synchronized implementation of the Strategy by RA II Members;

**Requests** the Secretary-General to provide support to the Association in the implementation of this decision;

**Requests** the WMO Programmes to support the implementation of the Strategy in the Region by providing expertise and other forms of assistance as may be requested.

---



**Resolution 2 (RA II-15)****IMPLEMENTATION AND OPERATION OF REGIONAL CLIMATE CENTRES**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association II (Asia)* (WMO-No. 1037), Tashkent, 5–11 December 2008, including Resolution 1 (XIV-RA II) – Establishment of a Regional Climate Centre Network in Regional Association II (Asia),
- (2) The *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No. 1077),
- (3) The report of the meeting of the Working Group on Climate Services, Adaptation and Agrometeorology /Sub-group on Climate Applications and Services,
- (4) The *Final Report of the Meeting of the Joint CCI/CBS Expert Team on Regional Climate Centres* (Offenbach, Germany, 12–14 October 2011),
- (5) The *Abridged Final Report with Resolutions of the Sixty-first Session of the Executive Council* (WMO-No. 1042),
- (6) The *Manual on the Global Data-processing and Forecasting System* (WMO-No. 485), Volume 1 (Annex IV to the WMO Technical Regulations),
- (7) The publication *How to establish and run a WMO Regional Climate Centre* (WCASP No. 80, WMO/TD-No. 1534),

**Recognizing:**

- (1) The formal designation of Regional Climate Centres (RCCs) in RA II (RCC-Beijing and RCC-Tokyo), in 2009,
- (2) That the designated RCCs have proven invaluable across the Region for provision to RA II Members of climate monitoring and long-range forecast products and services, as well as coordinating Regional Climate Outlook Forums (RCOFs) and hosting training sessions,
- (3) The successful completion by the North Eurasia Climate Centre (NEACC) in the Russian Federation of its demonstration phase and Recommendation 13 (CBS-15) – Amendments to the *Manual on the Global Data-processing and Forecasting System* (WMO-No. 485) to be submitted to the Executive Council at its sixty-fifth session,
- (4) The intent of India, Saudi Arabia and the Islamic Republic of Iran to also take steps to become WMO RCCs,

**Decides:**

- (1) To enhance climate services in the Association by the implementation and operation of multi-functional RCCs;
- (2) To support Recommendation 13 (CBS-15) that NEACC be formally designated as a WMO RCC;
- (3) To ensure that all RA II Members have access to the products and services of formally designated WMO RCCs in the Region;

- (4) To regularly review the requirements of RA II Members for climate information, products and services, in cooperation with the RA II Working Group on Climate Services (WGCS), and to ensure a state-of-the-art service provision to Members to meet their priority needs;
- (5) That the implementation and operation of RCCs, including during demonstration phases, be carried out under the guidance of the appropriate RA II subsidiary body in charge of climate services (WGCS), and in consultation with, as required, the Commission for Climatology, the Commission for Basic Systems and relevant offices of the WMO Secretariat;

**Encourages:**

- (1) All RA II Members to use the RCC products for supporting climate services at the national level;
- (2) The Members showing their intent to become RCCs to undertake self-appraisals prior to submitting their proposals, to determine their capabilities to fulfil the requirements of RCC designation criteria, develop implementation plans and submit these to the RA II WGCS for assessment and advice on commencing a demonstration phase;
- (3) The RCC proponents in demonstration phase to submit activity reports to the RA II WGCS, and to undertake recommended remedial actions to ensure fulfillment of WMO designation criteria;

**Urges** Members hosting RCCs/RCC proponents:

- (1) To adhere to the requirements for mandatory RCC functions, and carry out as many of the highly recommended functions as feasible (particularly those related to downscaling, climate change and coordinating RCOFs), to meet the needs of countries in the Region;
- (2) To regularly assess the evolving needs for regional climate information, products and services of RA II Members, in cooperation with the RA II WGCS, in order to enable the RCCs to respond to these needs;
- (3) To closely integrate their operational activities with the implementation of the Climate Services Information System in the Region, to enable National Meteorological and Hydrological Services to develop user-targeted climate information products and services;
- (4) To keep abreast of RCC implementation in other Regions, and to support (comply with) development of standardized products and methods;
- (5) To coordinate, support, sustain and participate in RCOFs and related training activities, on a regular basis.

**Requests** the Secretary-General to provide the guidance and encouragement for the further establishment and sustainable implementation of RCCs in Region II, and effective collaboration with the RCCs in other Regions;

**Requests** the president the Association to consult with the Commission for Climatology, the Commission for Basic Systems, the WMO Secretariat and the RA II WGCS in effective implementation of RCCs and in determining the eligibility of new RCC proponents;

**Requests** the designated RCCs to submit activity reports on an annual basis to the RA II WGCS;

**Requests** all Members to support RA II RCC activities by providing feedback to the Regional Climate Centres on product effectiveness and areas for their further improvement.

---

**Note:** This resolution replaces Resolution 1 (XIV-RA II), which is no longer in force.

---

**Resolution 3 (RA II-15)****REGIONAL WMO INTEGRATED GLOBAL OBSERVING SYSTEM  
IMPLEMENTATION PLAN**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 50 (Cg-XVI) – Implementation of the WMO Integrated Global Observing System,
- (2) Resolution 10 (EC-64) – WMO Integrated Global Observing System Framework Implementation Plan,

**Noting further** the final report of the first session of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (WIGOS) and its recommendations on WIGOS implementation, including the development of regional WIGOS Implementation Plans (R-WIP),

**Decides** to adopt the Regional WIGOS Implementation Plan for Regional Association II (Asia) as presented in the annex to the present resolution;

**Requests** the Management Group:

- (1) To keep the Regional Implementation Plan under regular review and update; to guide, oversee and monitor the progress in the implementation of the Plan; and to submit amendments/updates to the Plan to the president of the Association for approval;
- (2) To coordinate with RA II Members the implementation of the Regional Implementation Plan and consult with the appropriate technical commissions on technical aspects of the implementation;

**Requests** Members:

- (1) To develop their national WIGOS implementation plans;
- (2) To organize their activities so as to realize WIGOS goals and associated outcomes as described in the Regional Implementation Plan;
- (3) To communicate and promote the concept and benefits of WIGOS to the Region and to Members;
- (4) To continue to provide resources, including through the WIGOS Trust Fund and/or seconded experts, to help support the implementation of WIGOS;

**Requests** the Secretary-General to provide the necessary assistance and Secretariat support for WIGOS implementation by Regional Association II;

**Invites** the Partners to participate in relevant implementation activities as specified in the Regional WIGOS Implementation Plan For Regional Association II (Asia).

**REGIONAL WIGOS IMPLEMENTATION PLAN  
FOR  
REGIONAL ASSOCIATION II (ASIA)**

**(R-WIP-II)  
Version 1.0**



**CONTENTS****1. INTRODUCTION AND BACKGROUND**

- 1.1 Purpose of WIGOS and scope of the Regional WIGOS framework Implementation Plan for RA II (R-WIP-II)
- 1.2 WIGOS Vision and Congress Guidance for WIGOS Implementation

**2. KEY ACTIVITY AREAS FOR REGIONAL WIGOS IMPLEMENTATION**

- 2.1 Management of the Regional WIGOS Implementation in RA II
- 2.2 Collaboration with WMO and co-sponsored observing systems
- 2.3 Design, planning and optimized evolution of WIGOS component observing systems
- 2.4 Integrated Observing System Operation and Maintenance
- 2.5 Integrated Quality Management.
- 2.6 Standardization, System Interoperability and Data Compatibility
- 2.7 The WIGOS Operational Information Resource
- 2.8 Data Discovery, Delivery and Archival
- 2.9 Capacity Development
- 2.10 Communication and Outreach

**3. REGIONAL PROJECT MANAGEMENT**

- 3.1 Monitoring, review and reporting mechanism
- 3.2 Evaluation

**4. IMPLEMENTATION**

- 4.1 Activities, Deliverables, Milestones, Costs and Risks

**5. RESOURCES****6. RISK ASSESSMENT/MANAGEMENT****7. OUTLOOK**

ANNEX I RA II WIGOS Implementation Activities

ANNEX II RA II WIGOS Implementation Projects

Appendix LIST OF ABBREVIATIONS AND ACRONYMS

## **WIGOS REGIONAL IMPLEMENTATION PLAN FOR REGIONAL ASSOCIATION II (ASIA)**

### **1. INTRODUCTION AND BACKGROUND**

#### **1.1 Purpose of WIGOS and scope of the Regional WIGOS Implementation Plan for RA II (R-WIP-II)**

The WMO Integrated Global Observing System (WIGOS) provides a new framework for WMO observing systems and the contributions of WMO to co-sponsored observing systems. It is important to recognize that WIGOS is not replacing the existing observing systems, but is rather an over-arching framework for the evolution of these systems which will continue to be owned and operated by a diverse array of organizations and programmes. WIGOS will focus on the integration of governance and management functions, mechanisms and activities to be accomplished by contributing observing systems, according to the resources allocated on global, regional and national levels.

The WIGOS Framework Implementation Plan (WIP) addresses the necessary activities to establish an operational WIGOS by the end of the period 2012–2015, as per the direction of WMO Congress. Yet WIGOS will continue to evolve and improve beyond 2015 through the governance and management mechanisms established by the execution of this Plan.

The WIP also addresses a number of additional activities that would substantially improve the operational capabilities of WIGOS beyond the 2012–2015 implementation; however these activities are dependent on resources in addition to the regular budget. If these activities are not completed, WIGOS can still be considered operational. The resulting system will, however, be less effective in achieving its goals and benefits to Members will be reduced or delayed.

The WIP provides a basis for the development of the Regional WIGOS Framework Implementation Plans (R-WIP). The Members of a Region will adhere to the global WIP and to their regional framework (R-WIP) in the design, operation, maintenance and evolution of their national observing systems.

This plan is laid out in several chapters that identify and describe the various activity areas to be addressed within this Region. Specific regional/national activities for each area are included in Table 2 (see Section 4), which identifies deliverables, timelines, responsibilities, costs and risks, and whether the activity requires regional and/or national implementation. Similar activities are grouped under the title corresponding to the respective sub-section of Section 2.

#### **1.2 WIGOS Vision and Congress Guidance for WIGOS Implementation**

The Sixteenth World Meteorological Congress (Cg-XVI), held in 2011, decided that enhanced integration of the WMO observing systems should be pursued as a strategic objective of WMO and identified this as a major expected result of the WMO Strategic Plan<sup>1</sup>.

The WIGOS vision calls for an integrated, coordinated and comprehensive observing system to satisfy, in a cost-effective and sustained manner, the evolving observing requirements of Members in delivering their weather, climate, water and related environmental services. WIGOS will enhance the coordination of WMO observing systems with those of partner organizations for the benefit of society. Furthermore, WIGOS will provide a framework for enabling the integration and optimized evolution of WMO observing systems, and of WMO's contribution to co-sponsored systems. Together with the WMO Information System (WIS), this will allow continuous and reliable access to an expanded set of environmental data and products, and associated metadata, resulting in increased knowledge and enhanced services across all WMO Programmes. The implementation of WIGOS should build upon and add value to the existing WMO observing systems with emphasis

<sup>1</sup> See [http://www.wmo.int/pages/about/documents/1069\\_en.pdf](http://www.wmo.int/pages/about/documents/1069_en.pdf)

on integration of surface- and space-based observations in an evolutionary process to satisfy requirements of WMO and WMO co-sponsored Programmes.

In implementing WIGOS, it is imperative that the current management, governance and support activities be reviewed and aligned with WMO priorities. This alignment will promote cooperation and coordination at the technical, operational and administrative levels.

The integrated satellite systems are a unique source of observational data for monitoring of weather, climate and the environment. It is important to further advance instrument intercalibration, data exchange, data management standardization, and user information and training, in order to take full advantage of space-based capabilities in the context of WIGOS.

WIGOS will be essential for the Global Framework for Climate Services (GFCS), aviation meteorological services, disaster risk reduction (DRR), and capacity development, each of which is a WMO priority. It will also ensure a coordinated WMO contribution to the co-sponsored GCOS, GOOS, GTOS, and to the Global Earth Observation System of Systems (GEOSS).

## **2. KEY ACTIVITY AREAS FOR REGIONAL WIGOS IMPLEMENTATION**

To migrate the existing global observing systems (the Global Observing System (GOS), the Global Atmosphere Watch (GAW), the World Hydrological Cycle Observing System (WHYCOS) and the Global Cryosphere Watch (GCW), including surface-based and space-based components and all WMO contributions to GFCS, GCOS, GOOS, GTOS and GEOSS), particularly their regional components, into a more integrated single system that is WIGOS, focused effort is required at the regional level in the following key areas, detailed in the sub-chapters to follow:

- (a) Management of WIGOS implementation;
- (b) Collaboration with WMO and co-sponsored observing systems;
- (c) Design, planning and optimized evolution;
- (d) Integrated Observing System operation and maintenance;
- (e) Integrated Quality Management;
- (f) Standardization, system interoperability and data compatibility;
- (g) The WIGOS Operational Information Resource;
- (h) Data and metadata management, delivery and archival;
- (i) Capacity development;
- (j) Communication and outreach.

### **2.1 Management of the Regional WIGOS Implementation in RA II**

WIGOS implementation is an integrating activity for all regional components of the WMO and co-sponsored observing systems: it supports all WMO Programmes and activities.

#### ***Executive Council***

The WMO Executive Council (EC) will continue to monitor, guide, evaluate and support the overall implementation of WIGOS. Following the guidance by Cg-XVI, the Executive Council at its sixty-third session established the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS) with a view to providing technical guidance and assistance for the planning, implementation and further

development of the WIGOS components. Progress on implementation of WIGOS will be reported to subsequent sessions of EC. The Council designated the president of the Commission for Basic Systems (CBS) as chairperson of ICG-WIGOS.

### ***Regional Association II (Asia)***

The Regional Association II (RA II) will play the key role in WIGOS implementation in the Region. RA II, through its Expert Group on WIGOS (EG-WIGOS)<sup>2</sup>, will coordinate planning and implementation of WIGOS on the regional level taking into account all WMO future priorities, such as GFCS and DRR. The Expert Group on WIGOS, under guidance from ICG-WIGOS and the Management Group of RA II, and with the support, where required, of the WIGOS Project Office and the Regional Office for Asia and the South-West Pacific in the WMO Secretariat, will be responsible for:

- (a) The development of the Regional WIGOS Framework Implementation Plan (R-WIP);
- (b) The integration of WIGOS regional network components; and
- (c) The evolution of their regional networks according to the implementation plan for the evolution of global observing systems (EGOS-IP)<sup>3</sup>.

R-WIP-II will also address regional aspects of requirements, standardization, observing system interoperability, data compatibility, data management, Quality Management System (QMS) procedures including performance monitoring and data quality monitoring, and proposed improvements in observing networks/systems. An important role of the RA II will be to assess and continuously monitor regional requirements, identify regional gaps and identify capacity development projects within the Region to address those gaps.

### ***The Members of the Region***

Members of the Region will plan, implement, operate and maintain national networks and observing programmes based on the standards and best practices stated in the WMO Technical Regulations, the WIGOS Manual and the respective Manuals of the WIGOS component observing systems (e.g., GOS, GAW, WHYCOS and GCW). They will be encouraged to adopt a composite network approach to their networks and to include the acquisition, and onward transmission, of data from external sources, including NMHSs and other government agencies, the commercial sector and members of the public. A particular area of focus for Members of the Region under WIGOS will be increased attention to site protection and radio frequency spectrum protection.

Plans should also be developed to strengthen cooperation through partnership with different owners overseeing the WIGOS observing components within their countries. Specifically, these activities aim to enhance cooperation amongst meteorological, hydrological, marine/oceanographic and academic/research institutions/services where they are separated at the national level.

## **2.2 Collaboration with WMO and co-sponsored observing systems**

WIGOS will be an integrated, comprehensive, and coordinated system primarily comprising the surface-based and space-based observing components of the GOS, GAW, GCW, and WHYCOS, plus all WMO contributions to GCOS, GOOS and GTOS. It should be noted that in contrast to the primarily NMHS-owned observing systems upon which the WWW was built, the proposed WIGOS component observing systems are owned and operated by a diverse array of organizations, both research and operational. Therefore, the interaction between these various communities at the regional and national levels is important for the implementation of WIGOS within the Region. In particular, strengthening the interaction between research and operational observing communities

<sup>2</sup> RA II15 will make a decision on the working body responsible for implementation of WIGOS in RA II.

<sup>3</sup> <http://www.wmo.int/pages/prog/www/OSY/gos-vision.html#egos-ip>.



is important for sustaining and evolving observing systems and practices, in line with new science and technology outcomes.

### **Partner Organizations**

At the regional level, coordination and cooperation will be supported by a mechanism to be defined by the Regional Association and the respective regional bodies, such as PANGEA<sup>4</sup>, in order to resolve possible problems in data policy, product delivery and other governance issues. This interagency and inter-observing system coordination mechanism will need to be complemented and supported through similar cooperation and coordination arrangements among NMHSs and through national implementation mechanisms for GFCS, GCOS, GOOS, GTOS, and GEOSS.

The Architecture for Climate Monitoring from Space has been defined as an end-to-end system, involving the different stakeholders including operational satellite operators and R&D space agencies, the Coordination Group for Meteorological Satellites (CGMS), the Committee on Earth Observation Satellites (CEOS), the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP) and the Group on Earth Observations (GEO). Within the Regional context, the Architecture shall be part of the space-based component of WIGOS. Therefore, particular emphasis will be placed on their coordinated contribution to WIGOS within the Region, building on existing coordination mechanisms stated above.

### **2.3 Design, Planning and Optimized Evolution of WIGOS component observing systems**

WMO has agreed on the Vision for the Global Observing Systems in 2025<sup>5</sup> which provides high-level goals to guide the evolution of the global observing systems during the coming decades. To complement and respond to this Vision, an Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP) has been considered by CBS-15 (2012). This EGOS-IP focuses on the long-term evolution of WIGOS observing systems components, while the WIP focuses on the integration of these observing system components. Beyond 2015 these plans will provide Members of the Region with clear and focused guidelines, specifying actions that stimulate the cost-effective evolution of the observing systems to address in an integrated way the requirements of all WMO Programmes and relevant parts of co-sponsored programmes.

Concerning the surface-based sub-system of WIGOS, the current composition of mainly separate networks of observing stations comprises numerous different types of sites. With the implementation of WIGOS, these separate networks will continue to evolve but will also be given a more prominent collective identity as the WIGOS surface-based sub-system and for some purposes may be considered as a single composite system of observing (fixed or mobile) sites/platforms. The Regional Association will adopt a broader role in coordinating the implementation of relevant elements of the WIGOS surface-based sub-system, evolving from the previous concepts of mainly the regional synoptic and climatological networks into an integrated concept of a WIGOS regional network.

Similarly, the space-based sub-system of WIGOS is composed of many different platforms and types of satellites. There is already partial integration due to the existence of a globally coordinated plan, which is maintained by WMO and CGMS, and which takes into account the needs of a number of application areas. However, it should be further developed and expanded to better support certain application areas that, at present, are not benefiting from the full potential of space-based observations, for example, other components of GAW and WHYCOS and new initiatives like GFCS and GCW. In addition, further integration shall be pursued in terms of inter-calibration, data and product harmonization, and composite product delivery. RA II will adopt an active role in compiling the views of Members and maintaining documented requirements and priorities for data and products to be available for the Region from the WIGOS space-based sub-system.

---

<sup>4</sup> Another key Partners and stakeholders can be considered.

<sup>5</sup> Available from the WMO Website at: <http://www.wmo.int/pages/prog/www/OSY/gos-vision.html>.

**Rolling Review of Requirements (RRR)<sup>6</sup>**

Coordinated strategic planning at all levels will be based on the RRR process, and will be supported by the WIGOS regulatory material. This activity will be carried out primarily at the global level under the guidance of the ICG-WIGOS.

The RRR process involves regularly reviewing the observational data requirements<sup>7</sup> for each of the defined WMO Application Areas and all required variables (see Table 1). The RRR process also involves reviewing the capabilities of WMO observing systems and co-sponsored systems, and the details of the networks/platforms in existence<sup>8</sup>, for both space-based and surface-based systems, in delivering data on different variables. The comprehensive information collected for the globe on both requirements and capabilities is quantitatively recorded in a database accessible through the Observing Systems Capability Analysis and Review tool (OSCAR<sup>9</sup>) of the WIGOS Information Resource (WIR, see section 2.7 below). The information on surface-based networks and instrumentation details is currently recorded in the WMO Publication No. 9, Volume A, but will ultimately be available, with additional metadata through the OSCAR tool. Space-based capabilities are also recorded and made available through the OSCAR tool. OSCAR allows performing gap analyses to identify weaknesses in existing observing programmes.

The above steps represent the analysis phase of the RRR, which is as objective as possible. Next is the prioritization and planning phase of the RRR in which experts from the various application areas interpret the gaps identified, draw conclusions, identify key issues and priorities for action. This input is composed as Statements of Guidance (SoG) from each application area. The technical commissions respond to the SoG by formulating new global observing system requirements and the regulatory and guidance publications to assist Members in addressing the new requirements. Additionally, CBS and other technical commissions draw on the SoGs to develop a Vision and an Implementation Plan for further development of WIGOS.

**Table 1: The 12 recognized WMO Application Areas**

No.	Application Area	No.	Application Area
1	Global NWP	7	Ocean Applications
2	High Resolution NWP	8	Agricultural Meteorology
3	Nowcasting & Very Short-range Forecasting	9	Hydrology <sup>10</sup>
4	Seasonal to Inter-annual Forecasts	10	Climate Monitoring
5	Aeronautical Meteorology	11	Climate Applications
6	Atmospheric Chemistry	12	Space Weather

<sup>6</sup> Currently specified in the *Manual on the Global Observing System* (WMO-No. 544), elaborated in the *Guide to the Global Observing System* (WMO-No. 488), and described further on the WMO Website at <http://www.wmo.int/pages/prog/www/OSY/GOS-RRR.html>

<sup>7</sup> The RRR describes data requirements, which are expressed in terms of space/time resolution, uncertainty, timeliness, etc., for each of the required observed variables, and are measures independent of observing technology.

<sup>8</sup> Capabilities are derived from the individual platforms characteristics submitted by Members to WMO e.g. through WMO No. 9, Volume A, or its evolution

<sup>9</sup> The following components are currently available via the WMO website: User Requirements:

<http://www.wmo.int/pages/prog/www/OSY/RRR-DB.html>; and Space-based capabilities:

[http://www.wmo.int/pages/prog/sat/gos-dossier\\_en.php](http://www.wmo.int/pages/prog/sat/gos-dossier_en.php). The surface-based capabilities part is currently under development

<sup>10</sup> Hydrological information only; water quality monitoring and information is currently excluded.

### ***At the Regional Level***

Although the primary coordination of the RRR will lie with CBS for overall WIGOS planning, RA II, through its EG-WIGOS, will follow the technical guidance of the technical commissions as represented in the EGOS-IP and other observation system implementation plans in order to evolve and implement observing systems in the Region.

RA II will examine, and report back to CBS, its requirements for data, and any issues it identifies with the global WIGOS design, taking into account the particular requirements of the Region and international river basin authorities. This process will involve, in essence: (1) the use of the global data to prepare regional data requirements; (2) use of this for detailed planning of observing system components at the regional scale; and then (3) encouragement of Members of the Region to implement these components, subject to further review at the national or sub-regional level, where appropriate.

### ***At the National or Sub-Regional Level***

The Members of the Region will contribute to the collective regional effort to: (1) assess the regional data requirements and plan the regional observing system components; and (2) implement and evolve observing systems following this plan, the EGOS-IP and other observation system implementation plans.

The Members of the Region will also have the global and regional data requirements information available to use as guidance for the preparation of national requirements information which can then be used to assist with the detailed planning for evolution of national observing components of WIGOS.

In some cases, where countries are small and geographically close or already have established multilateral working relationships, there may be more merit in taking a sub-regional, as opposed to national, approach to WIGOS observing infrastructure planning. In this case, it will be necessary for the Members concerned to work in close cooperation to prepare sub-regional reviews of requirements to be used as a basis for detailed planning at that scale.

## **2.4 Integrated Observing System Operation and Maintenance**

Observing system owners or custodians are responsible for operating and maintaining their systems and for complying with the regulations of the WMO and co-sponsored observing systems to which they contribute. System owners are generally NMHSs or other organizations within WMO Member countries but are sometimes other entities.

WIGOS on the regional level involves a process for sharing of operational experiences, practices and ideas, for sharing of expertise and for pooling resources for joint activities. The benefit is to realize synergies and greater efficiencies. These interactions may be between different teams within a single organization (such as an NMHS) or between regional organizations. These may benefit from technical guidance from relevant technical commissions and, while occurring primarily at a national level, there is a regional role to be played. Within RA II, the following WIGOS implementation projects will be important:

- RA II WIGOS Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations;
- RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training;
- RA II WIGOS Project for Capacity Building in Radar Techniques in Southeast Asia.

## 2.5 Integrated Quality Management

The Region recognizes that meeting the quality requirements and expectations of users will be critical to the success of WIGOS. This will require an in-depth examination of current practices used by WMO observing programmes, specific mission-related requirements that are already in place, and available technological opportunities.

The WIGOS Quality Management approach is to apply the WMO QMF to the WIGOS observing components (see WMO *Technical Regulations*, Vol. IV (WMO-No. 49)). WIGOS quality management at the regional level will strive for compliance of all components of WIGOS with international standards, such as ISO 9001/9004 and the ISO 17025 standard where appropriate (i.e., with respect to instrument calibration and traceability of data). Compliance with international standards should be pursued in all quality assurance (QA) procedures applied by Members of the Region to all their national WIGOS observing components. In addition to the WMO QMF document, further guidance to Members will be provided by WMO via the standards and best practices described in the Regulatory Materials, such as the WIGOS Manual and Guide. Such guidance, for both mandatory and desirable practices, can be referred to for the application and implementation of quality management in national observing systems. In this context, the Region will give attention to:

- (a) The examination of current quality management practices being used in the Region;
- (b) The documentation of the quality of observations from the WIGOS regional networks at all stages of data processing; and
- (c) Ensuring, where possible, traceability of observations to the International System of Units (SI).

CGMS, in coordination and collaboration with WMO, supports the development of quality assurance standards and formats for satellite observations, multi-satellite and multi-sensor algorithms for estimating retrieved data and products, and advanced atmospheric sounding derivation packages for use by WMO Members. To assist this effort, RA II will ensure that surface-based sites that are needed for calibration/validation of satellite data are specified.

A key aspect of regional quality management that requires particular attention under WIGOS is the systematic and rigorous performance monitoring and evaluation (PM&E) of WIGOS capabilities, in terms of both: (a) the flow of observational data/products to models; and (b) provision of products/information for decision-support tools and services in accordance with requirements specified by end users. Effective PM&E can improve the overall performance of WIGOS and its ability to effectively interact with its user community and to meet community needs and requirements.

Members of the RA II will be responsible for ensuring compliance with the WIGOS quality management principles (such as ISO 9001, 9004, 17025).

## 2.6 Standardization, System Interoperability<sup>11</sup> and Data Compatibility

WIS has an important role in regional WIGOS implementation, in relation to data exchange and discovery, and the provision of effective standards and practices for data management. Therefore, RA II will coordinate WIGOS and WIS implementation activities.

Taking into account the ongoing rapid progress in technology that will continue to provide a basis for further improvements in the capability, reliability, quality and cost-effectiveness of observations, the Members of the Region will ensure that WIGOS utilizes international standards and best practices set by WMO and partner organizations and described in the WMO Regulatory Materials in the following areas:

---

<sup>11</sup> Interoperability is a property referring to the ability of diverse systems to work together (inter-operate)

- (a) Instruments and methods of observation across all components including surface-based and space-based elements (observations and their metadata);
- (b) WIS information exchange, as well as discovery, access and retrieval (DAR) services; and
- (c) Data Management (Data Processing, Quality Control, Monitoring and Archival).

RA II will support all activities leading to the interoperability (including data compatibility) of WIGOS observing components through utilization and application of the same, internationally accepted standards and best practices (that is, standardization). Data compatibility will also be supported through the use of standardized data representation and formats.

Any regional deviations from the standard practices (documented in the WMO Technical Regulations through the WIGOS Manual and other relevant Manuals) will be reported to the WIGOS Project Office.

## **2.7 The WIGOS Operational Information Resource**

The WIGOS Operational Information Resource (WIR), accessible via a centralized point (web portal), will provide all WIGOS related operational information, including observational user requirements, a description of the contributing observing networks (instrument/site/platform metadata), and their capabilities, list of standards used in the WIGOS framework, data policies applicable, and information on how to access data. It will also provide general information on WIGOS benefits, and impacts to Members. It will be a tool for conducting critical reviews as part of the Rolling Review of Requirements (RRR), and can assist Members and the Regional Association in conducting observing network design studies as appropriate. It will provide guidance on how to develop capacities in developing countries according to WIGOS requirements, and will provide Members of the Region with a toolbox to be used nationally if and when required. The information collected is intended in particular to identify the gaps in the observational networks, identify areas where existing observing systems could be used, or where their scope could be expanded at limited cost to address the requirements of more application areas. The information provided on standards will support the production of more homogeneous data-sets and make the observations traceable and of known quality.

The key support tools of WIGOS are: (a) a central web portal (WIGOS Portal); (b) The WIGOS Standardization of Observations Reference Tool (SORT); and (c) the Observing System Capabilities Analysis and Review tool (OSCAR) which includes information on observational user requirements and observing systems capabilities, and allow to perform the critical review by comparing the two.

Understanding that sources of the individual components of the WIGOS Operational Information Resource (WIR) rely on the inputs from its Members, RA II is committed to provide regular inputs to keep the information resource up-to-date.

## **2.8 Data Discovery, Delivery and Archival**

Within the WIGOS framework, the WMO Information System (WIS<sup>12</sup>) provides exchange of data and interpretation of metadata<sup>13</sup>, and management of related discovery metadata<sup>14</sup>. These discovery metadata play an important role in the discovery, access and retrieval of WIGOS observations and products by the entire WMO community.

Submission, management and archival of the data themselves is generally the responsibility of observing system owners/data custodians. However, several World Data Centres and a number of

<sup>12</sup> <http://www.wmo.int/wis>

<sup>13</sup> Interpretation metadata is the information required to interpret the data.

<sup>14</sup> Discovery metadata is the information describing the datasets, generally using ISO-19115 standard, and WMO core profile in case of WIS.

regional or specialized data centres exist that collect, manage and archive basic observational data that are relevant to WMO Applications. Members of the Region are responsible for submitting their data to these regional or specialized data centres. RA II will encourage its Members to abide by this commitment.

Members of the Region will adopt WIGOS and WIS standards and make their data and metadata available through WIS for delivery or for discovery, access and retrieval services. In this regard, promotion and implementation of DCPCs (Data Collection and Production Centres) as well as National Centres will be supported and encouraged by RA II. Guidance will be developed and provided through the appropriate WIGOS regulatory and technical documents.

## 2.9 Capacity Development

A coordinated capacity-development effort at global, regional and national levels is of paramount importance to the developing countries in the implementation of WIGOS. This is especially the case for NMHSs of Least Developed Countries (LDCs) and Small Island Developing States (SIDS), to enable them to develop, improve and sustain national WIGOS observing components. This needs to be complemented by capacity development efforts outside of WIGOS but in closely related areas to improve access to and effective utilization of observations, data and products, and related technologies. The WIGOS capacity development activities at the regional level are focused on:

- (a) Providing assistance to Members of the Region to introduce or improve institutional mandates and policies that enable effective implementation, operation and management of observing systems;
- (b) Filling the existing gaps in the design, operation and maintenance of WIGOS observing systems, including both the infrastructure and human capacities development;
- (c) Technological innovation, technology transfer, technical assistance and decision-support tools.

Capacity development in satellite applications for developing countries, LDCs and SIDS are also addressed in the *Implementation Plan for the Evolution of the GOS* (see WMO/TD-No. 1267). The virtual laboratory (VL) will continue to grow and help all WMO Members realize the benefits of satellite data.

## 2.10 Communication and Outreach

The Region will establish its communication and outreach strategy through the efforts of WMO Members, Programmes, Regional Associations (RAs) and Technical Commissions (TCs), and co-sponsors. The strategy will provide details on WIGOS benefits, increased effectiveness, and efficiency, and impact on the activities of the Members of the Region, as well as on the socio-economical benefits of WIGOS data. It will take advantage of outreach programmes developed and effectively deployed so far by WMO and its partner organizations within the Region.

The WIGOS Portal will provide convenient access to relevant information on the regional communication, outreach and capacity development, aimed at complementing, not duplicating, others' efforts. A variety of outreach materials will be developed to educate the Members, funding agencies, policy-makers and the general public, on the importance of WIGOS to society. Materials will include posters and other educational material for elementary and high school classes, a WIGOS brochure, a semi-annual or annual newsletter, an online photo and video library, and information on the current state of the observing systems.

## 3. REGIONAL PROJECT MANAGEMENT

RA II will be responsible for the implementation of WIGOS in the Region through its EG-WIGOS with the support from the Regional Office for Asia and the South-West Pacific and the WMO Office for West Asia.

### **3.1 Monitoring, review and reporting mechanism**

- (a) RA II, through its Management Group, will monitor, review, guide and support the overall implementation of WIGOS in the Region, and update the Implementation Plan if and when necessary;
- (b) RA II, through the Coordinator of EG-WIGOS, will report to the ICG-WIGOS and the WIGOS Project Office on the progress in implementation of WIGOS in the Region;
- (c) The president of RA II will report to the sessions of RA II on WIGOS implementation.

### **3.2 Evaluation**

The evaluation methodology will be designed against WIGOS implementation activity tables, i.e. with respect to the activities, deliverables, timeline, responsibility and budget allocations. This will include a schedule of monitoring and evaluation activities and related responsibilities. Mid-term evaluation, interim progress reports and post-implementation reviews are planned as a means of providing early feedback on progress towards success, and as a means of meeting accountability and transparency requirements for the whole implementation phase. RA II and NMHSs will provide progress reports at the request of the WIGOS Project Office.

## **4. IMPLEMENTATION**

### **4.1 Activities, Deliverables, Milestones, Costs and Risks**

Table 2 given in Annex I to this Plan presents the key implementation activities that are required for the Regional WIGOS implementation within the timeframe from 2012 to 2015. The table is arranged to correspond to the activity areas presented in Section 2. In the table each implementation activity is presented along with its associated deliverables, timelines, responsibilities, costs and associated risk.

Most of the activities in Table 2 will be implemented through the RAII WIGOS projects under the initiative of key regional players given in Annex II. EG-WIGOS has responsibility for tracking execution of these activities and projects.

## **5. RESOURCES**

The possible resources will be described here.

## **6. RISK ASSESSMENT/ MANAGEMENT**

The Risk Management Plan (RMP) will be developed for each implementation activity/projects, including risk mitigation. The following risk areas have been identified:

- (a) Lack of resources (funds, expertise);
- (b) Lack of understanding of benefits that WIGOS can bring to the Region, sub-regions and Members;
- (c) Lack of cooperation and collaboration with key partners and stakeholders;
- (d) Low commitment of Members.

## **7. OUTLOOK**

This document has described the key activities for the period 2012 to 2015. As determined by Cg-XVI, the goal is to have WIGOS operational by 2016. This is a challenging task. The experience gained during the WIGOS test of the concept phase clearly shows that it will be impossible to complete integration of all observing systems on global, regional and national levels in only four years. While WIGOS operations should start in 2016, there will still be a strong need to continue a significant number of implementation activities.

---

## ANNEX I

TABLE 2 RA II WIGOS IMPLEMENTATION ACTIVITIES

Depending on the implementation scale, planned activities are specified as follows:  
 R = Regional activity; SR = Sub-regional activity and N = National activity.

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					Total	ARB	Shortfall	
<b>1. Management of WIGOS Implementation in RA II</b>								
1.1 R	Develop and update R-WIP-II	Regional WIGOS Implementation Plan for RA II (R-WIP-II)	Develop in 2012 and update if necessary	Drafted by TT-R-WIP-II, to be adopted by RA II-15 (Dec. 2012) and updated by RA II EG-WIGOS/MG				Low (ongoing)
1.2 R	Report progress of the RA II R-WIP-II Projects <sup>1</sup> to RA II MG	Progress reports	2013–2015 every year	Coordinators of Projects <sup>2</sup>				Low
1.3 R N	Encourage RA II Members to appoint National Focal Points and submit national reports on progress of EGOS-IP	A list of RA II EGOS-IP National Focal Points	2013–2015 every year	RA II Members (Project No. I)				Mod
<b>2. Collaboration with WMO and co-sponsored observing systems</b>								
2.1 SR	Examine data policy and exchange of surface-based remote sensing datasets/ products for NWP use on an offline basis	Exchange of datasets	2013–2014	East Asia (China, Japan, Republic of Korea) (Project No. III.1)				High
2.2 SR	Examine data policies and exchange observational sand and dust data	Exchange of datasets	2013	SDS-WAS Asian Node WG (China, Japan, Republic of Korea) (Project No. V)				High
<b>3. Design, planning and optimized evolution of WIGOS and its regional, sub-regional and national observing components</b>								
3.1 R	Review the progress of EGOS-IP in RA II based on EGOS national reports submitted by RA II Members	Prioritized actions listed in the EGOS-IP	2015	China, Hong Kong, China (Project No. I)				Mod

<sup>1</sup> See Annex II: RA II WIGOS implementation projects

<sup>2</sup> See Annex II



No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					Total	ARB	Shortfall	
3.2 SR	Design feasible and optimal draft design of integration of surface-based remote sensing observations based on OSE; use the results to update the RRR user requirements database and to fine tune the EGOS-IP and observing system plans.	Draft design of integration of surface-based remote sensing observation based on OSE	2015	East Asia (Project No. III.1)				High
3.3 SR	Assess enhanced capacity in monitoring and forecasting of sand and dust storms by exchanged datasets; use the results to update the RRR user requirements database and to fine tune the EGOS-IP and observing system plans.	Identified benefits from exchange of sand and dust data on a near real-time basis	2015	SDS-WAS Asian Node WG (Project No. V)				High
3.4 SR	Develop strategic plan on development of the Southeast Asia radar network.	Draft strategic plan on development of the Southeast Asia radar network	2015	Southeast Asia (ASEAN— SCMG: Thailand, Malaysia) (Project No. III.2)				Mod
3.5 R	Identify the requirements of NMHSs of developing countries, regarding satellite imagery, data and products, use the results to update the RRR user requirements database and to fine tune the EGOS-IP	Reports on requirements of NMHSs of developing countries, regarding satellite imagery, data and products		Japan, Republic of Korea, other satellite operators (Project No. VI)				Mod
<b>4. Integrated Observing System Operation and Maintenance</b>								
4.1 R	Collect and share standard and best practices documents from RA II Members	Shared best practices on integration of observational systems	2013–2015	Republic of Korea (Project No. II)				Low
4.2 SR	Develop and share national reports toward operational rainfall estimation/forecasting based on radar data.	Identified technical issues and lessons learned on operation of radar systems among ASEAN countries	2015	Southeast Asia (ASEAN— SCMG: Thailand, Malaysia) (Project No. III.2)				Mod
<b>5. Integrated Quality Management</b>								
5.1 R	Survey and share the status on calibration instruments for surface-based observations in RA II	Reports on status on calibration instruments for surface-based observations in RA II	2012–13	China, India, Japan (Project No. IV)				Low (ongoing)
5.2 R	Monitor data quality by utilizing NWP QC monitoring reports on surface observations	Improved data quality of surface observations	2012–15	Japan (Project No. IV)				Low (ongoing)
5.3 R	Organize intercomparison between regional standards of RICs	Traceability between RICs	2013–15	China, Japan (Project No. IV)				High

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					Total	ARB	Shortfall	
5.4 R	Obtain ISO/IEC 17025	Enhanced RIC's capacity	2013–15	China, Japan (Project No. IV)				Mod
5.5 R	Enhance support by RICs, and encourage Members to work with RICs to ensure traceability to SI	Improved data quality of surface observations	2013–15	China, Japan (Project No. IV)				Mod
<b>6. Standardization, System Interoperability and Data Compatibility</b>								
6.1 R	Survey and share the status on QC/QA procedures and site management for the network of RBCN and RBSN stations	Reports on status on QC/QA procedures and site management in RA II	2013–15	Japan (Project No. IV)				Mod
6.2 N	Encourage the collection of metadata on observing stations	Collection of metadata on observing stations	2013–15	RA II Members				High
<b>7. The WIGOS Operational Information Resource</b>								
7.1 R	Develop a portal to share EGOS national reports	Portal to share EGOS national reports	2013–15	China (Project No. I)				Low
7.2 R	Develop a standards and best practices Portal	Standards and best practices Portal	2013–15	Republic of Korea (Project No. II)				Low
7.3 R	Develop QA/QC Portal	QA/QC Portal	2013–15	Japan (Project No. IV)				Mod
<b>8. Data discovery, delivery and archival</b>								
8.1 R	Encourage RA II Members to be designated as NCs and DCPCs	RA II Members designated as NCs and DCPCs	2012–15	RA II EG on WIGOS				Mod
8.2 R	Encourage RA II Members to share data via WIS, including from organizations other than NMHSs	New sources of data are available through WIS	2012–15	RA II EG on WIGOS				Mod
<b>9. Capacity development<sup>3</sup></b>								
9.1 R	Technical Training on QA/QC procedures	Improved QA/QC at RBCN and RBSN stations	2013–15	China; India; Japan; Republic of Korea; Hong Kong, China; Kuwait; Russian Federation (Project No. IV)				High

<sup>3</sup> Congress stressed that an effective capacity-building strategy is an essential component of the WIGOS implementation. Specialized education, training activities and improvement of necessary observing infrastructure should be reflected in the regional, sub-regional and national WIGOS implementation plans, especially for NMHSs of LDCs, LLDCs and SIDS. Hence, capacity building is not to be limited to scientific and technological concerns, but also to strategic and management consideration including human resources development, resource mobilization and communications and outreach activities.

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					Total	ARB	Shortfall	
9.2 R	Hold training workshops on maintenance and calibration of meteorological instruments	Improved capacity in maintenance and calibration of meteorological instruments	2013	Japan (Project No. IV)				Low (being planned)
9.3 R	Develop training materials on maintenance and calibration of meteorological instruments	Training materials on maintenance and calibration of meteorological instruments	2013–15	Japan (Project No. IV)				Low (being planned)
9.4 R	Coordinate training activities on utilization of satellite data/products	Improved capacity in utilization of satellite data/products	2012–15	Japan, Republic of Korea, other satellite operators (Project No. VI)				Low (ongoing)
9.5 R	Establishing filed intercomparison campaign for observation techniques	Guidance to operate and maintain observation instruments	2013–15	Republic of Korea (Project No. II)				Low
<b>10. Communication and outreach</b>								
10.1 R	Interlink RA II WIGOS portals and related Websites	Better access to RA II WIGOS-related information and products	2013–15	China; Hong Kong, China; India; Japan; Republic of Korea				low
10.2 R	Develop RIC Websites	Improved access to information on RICs	2012–15	China, Japan (Project No. IV)				Low (ongoing)
10.3 R	Publish newsletter regularly	Improved access to information on satellite data/products	2012–15	Japan, Republic of Korea, other satellite operators (Project No. VI)				Low (ongoing)

**ANNEX II****RA II WIGOS IMPLEMENTATION PROJECTS****List of RA II WIGOS Projects**

<b>No.</b>	<b>Project title</b>	<b>Key regional players</b>
I	Monitor and review the Implementation of EGOS- IP in RA II	China; Hong Kong, China
II	Standard and best practice Portal, including technical documents with necessary details in English from all RA II Members	Republic of Korea
III.1	Observing systems integration for supporting disaster risk reduction – Integration of Surface-based Remote Sensing Data in the East Asia	China, Japan, Republic of Korea
III.2	Observing systems integration for supporting disaster risk reduction – Capacity Building in Radar Techniques in the Southeast Asia	ASEAN (Thailand, Malaysia)
IV	Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations	Japan
V	Developing a Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) in Asia Node	China, Japan, Republic of Korea
VI	Develop Support for NMHSs in Satellite Data, Products and Training	Japan, Republic of Korea

**Project No. I**

<b>Project Title</b>	<b>RA II WIGOS Project to Monitor and Review the Implementation of EGOS-IP in RA II</b>
<b>Type</b>	Regional Implementation Project (RA II)
<b>Status</b>	Draft Design
<b>Overview</b>	<p>A vision for the Global Observing Systems in 2025 which provides high-level goals to guide the evolution of the global observing systems during the coming decades has been approved by EC-LXI in 2009. Accordingly, CBS-15 adopted a recommendation for the Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP) to complement and respond to this Vision. The Implementation Plan outlined the key activities to be implemented during the period 2012 to 2025 aiming at maintaining and developing all WMO component observing systems. Thus, a project can be established to monitor the progress of RA II Members on the implementation of EGOS-IP, analyze gaps in the regional observing network, and therefore, prioritize actions listed in EGOS-IP. The concerned information should be shared by RA II Members and all users by establishing a portal. This project will:</p> <ul style="list-style-type: none"> <li>• Encourage RA II Members to appoint National Focal Points and submit EGOS National Reports annually,</li> <li>• Identify gaps and prioritize actions listed in EGOS-IP through reviewing the progress of EGOS-IP in RA II,</li> <li>• Develop a Portal to share the progress of EGOS-IP Implementation of RA II Members.</li> </ul>
<b>Aim(s)</b>	<ul style="list-style-type: none"> <li>• To identify gaps and prioritize actions listed in the EGOS-IP through reviewing the progress of the Evolution of Global Observing Systems (EGOS),</li> <li>• The progress and experiences are shared by RA II members when implementing the EGOS-IP.</li> </ul>
<b>Benefits</b>	The Portal will provide Members and users with a platform for sharing updated progress of EGOS-IP implementation in RA II
<b>Key Regional Players</b>	China and Hong Kong, China
<b>Capacity development requirements</b>	<ul style="list-style-type: none"> <li>• Technical assistance by CBS,</li> <li>• Workshop(s) on gaps analysis and actions prioritizing listed in EGOS-IP.</li> </ul>
<b>Partners/Participants</b>	All RA II Members
<b>Funding Source(s)</b>	This project will rely on existing budget allocations at the national level. Additional funding will be needed to facilitate some elements such as the cost for developing the portal software.
<b>Overall Costs</b>	(TBD)
<b>Timescale</b>	2013–2016
<b>Expected Key Deliverables/Key responsible body</b>	<ul style="list-style-type: none"> <li>• A list of RA II EGOS National Focal Points,</li> <li>• Prioritized actions listed in the EGOS-IP,</li> <li>• Portal to share progress EGOS IP implementation in RA II.</li> </ul>
<b>Main risk(s)</b>	Lack of resources (funds/expertise), lack of cooperation and missing or mistaken information from Members
<b>Website</b>	Not available
<b>Summary</b>	This project will develop a Portal that will provide updated progress on EGOS-IP in RA II, identify gaps and prioritize actions listed in EGOS-IP identify regional prioritized actions to be taken.
<b>Date of the update</b>	21 November 2012

<b>Contact Person 1</b>	Ms GUO Jianxia Meteorological Observation Center, China Meteorological Administration (CMA) China Tel: +86 10 68407934 Fax: +86 10 68400936 E-mail: <a href="mailto:gjxaoc@cma.gov.cn">gjxaoc@cma.gov.cn</a>
<b>Contact Person 2</b>	Mr LEE Lap Shun Hong Kong Observatory Hong Kong, China Tel.: +852-2926-8416 Fax: +852-2311-9448 E-mail: <a href="mailto:lslee@hko.gov.hk">mailto:lslee@hko.gov.hk</a>

**Project No. II**

<b>Title</b>	<b>RA II WIGOS Project for Standard and Best Practice Portal, including Technical Documents with Necessary Details in English from all RA II Members</b>
<b>Type</b>	Regional Implementation Project (RA II)
<b>Status</b>	Draft Design
<b>Overview</b>	This project will develop a Standard and Best Practice Portal including mechanism and procedures needed for a regular updating process.
<b>Aim(s)</b>	<ul style="list-style-type: none"> <li>• To develop a Standard and Best Practice Portal,</li> <li>• To establish regional standard and best practices documentation (regional practices database) for enhanced observational data/products utilization, including data/metadata management,</li> <li>• To specify mechanisms, procedures for regular monitoring and updating of the portal.</li> </ul>
<b>Benefits</b>	The standard and best practices portal will enhance and improve quality and utilization of data/products.
<b>Key Regional Player</b>	Republic of Korea
<b>Capacity development requirements</b>	Technical assistance by CBS and CIMO
<b>Partners/Participants</b>	RA II Members
<b>Relationship with existing project(s)</b>	KMA WIGOS demonstration project
<b>Funding Source(s)</b>	This project will rely on existing budget allocations at the national level
<b>Overall Costs</b>	(TBD)
<b>Timescale</b>	2013–2016
<b>Expected Key Deliverables / Key responsible body</b>	Portal on standards and best practices with mechanisms and procedures for regular monitoring and keeping the portal up-to-dated.
<b>Main risk(s)</b>	Lack of resources (funds/expertise), lack of cooperation and missing or mistaken information from Members.
<b>Website</b>	Not available
<b>Summary</b>	This subproject will establish a RA II Portal of standards and best practices for enhanced observational data/products utilization.
<b>Date of the update</b>	21 November 2012
<b>Contact Person</b>	Dr WON Jaegwang Korea Meteorological Administration (KMA) Republic of Korea Tel.: +82-2-2181-0694 Fax: +82-2-2181-0709 E-mail: <a href="mailto:wonjg@kma.go.kr">wonjg@kma.go.kr</a> , <a href="mailto:ecotus37@korea.kr">ecotus37@korea.kr</a>
<b>Contact Person</b>	Dr PARK Seongchan Korea Meteorological Administration (KMA) Republic of Korea Tel. +82-2-2181-0696 Fax: +82-2-2181-0709 E-mail: <a href="mailto:scpark@korea.com">scpark@korea.com</a>

**Project No. III.1**

<b>Project Title</b>	<b>RA II WIGOS Project for Observing Systems Integration for Supporting Disaster Risk Reduction</b>
<b>Subproject Title</b>	<b>Integration of Surface-based Remote Sensing Data in the East Asia</b>
<b>Type</b>	Regional Implementation Project (RA II)
<b>Status</b>	Draft Design
<b>Overview</b>	<p>In order to enhance observing capabilities in severe weather monitoring and forecasting, specifically in East Asia, surface-based remote sensing datasets/products, such as radar and GPS data, should be integrated for their better utilization.</p> <p>This project, as a first step, aims at developing a feasible and optimal draft design of integrated surface-based remote sensing observations toward future operational assimilation in mesoscale NWP system at the subregional level, as well as real-time quality-assured radar composite maps. The project will be Observing System Experiments (OSE) driven and proceed as follows:</p> <ol style="list-style-type: none"> <li>1. Offline Exchange of surface-based remote sensing datasets/products including radar echo intensity, Doppler velocity, AWS data, and, if available, GPS precipitable water vapour, together with supplementary information (e.g. data format, details on observations, and data quality) among participating organs.</li> <li>2. Examination of impacts of assimilation of exchanged remote sensing observation on its NWP performance. Also, subregional radar composite maps meeting their own operational requirements will be developed. Results and identified technical issues (e.g. data format, data policies, telecommunication for real-time data exchange, and quality of data) will be shared with and worked out cooperatively by the participating organs. Thus, requirements of data exchange for operational phase will be specified.</li> <li>3. A feasible and optimal draft design of integration of surface-based remote sensing observations will be developed based on the results of the project.</li> </ol> <p>To proceed with this project, existing frameworks such as CMA-JMA-KMA NWP meeting will be expanded to include this project into its agenda.</p>
<b>Aim(s)</b>	The aim of this project is to develop a feasible and optimal draft design of integrated surface-based remote sensing observations toward operational assimilation of those data in meso-scale NWP model of the participating organs at the sub-regional level, as well as real-time quality-assured radar composite maps.
<b>Benefits</b>	<p>Members in East Asia will benefit from this project through enhancement of their capabilities in observations for better early monitoring/warning/nowcasting/very short-range forecasting.</p> <p>All the other RA II Members, particularly ones in Southeast Asia which might plan a similar project in the future, will benefit from shared outcomes of this project, namely: (1) solutions to identified issues for integration of surface-based remote sensing observations at sub-regional level; as well as (2) results of impact analysis on capacities in severe weather monitoring and forecasting.</p>
<b>Key Regional Player</b>	China, Japan and Republic of Korea
<b>Capacity development requirements</b>	Workshop(s) on better utilization (decision making & assimilation)
<b>Partners/Participants</b>	CMA, JMA, KMA
<b>Relationship with existing project(s)</b>	<ol style="list-style-type: none"> <li>1. WMO Workshop on the Impact of Various Observing Systems on Numerical Weather Prediction.</li> <li>2. CMA-JMA-KMA joint workshop on NWP (The 1st CMA-JMA-KMA joint workshop on NWP was held in September 2011).</li> <li>3. WMO/CIMO Radar Quality Control and Quantitative Precipitation Estimation Intercomparison (RQEI).</li> </ol>



<b>Funding Source(s)</b>	This project will rely on existing budget allocations at the national level. The project will build on existing national observational networks and information management infrastructures. Additional funding might be needed to regularly hold technical meetings among CMA, JMA, and KMA to proceed with this project.
<b>Overall Costs</b>	(TBD)
<b>Timescale</b>	2013 – 2016
<b>Expected Key Deliverables / Key responsible body</b>	<ol style="list-style-type: none"> <li>1. Establishment of collaborative working mechanism toward integrated surface-based remote sensing observations in the East Asia for operational monitoring and forecasting severe weather.</li> <li>2. Solutions to identify issues to be solved for integration of surface-based remote sensing observations at sub-regional level and their solutions.</li> <li>3. Impacts on capacities of NMHSs in severe weather monitoring and forecasting through utilization of surface-based remote sensing observations.</li> </ol>
<b>Main risk(s)</b>	<ol style="list-style-type: none"> <li>1. Limited exchange of observational data, for instance, due to data policies of providers.</li> <li>2. Lack of sharing relevant technical documentation on exchanged data.</li> </ol>
<b>Website</b>	Not to be established
<b>Summary</b>	This project will develop a feasible and optimal draft design of integrated surface-based remote sensing observations toward the sub-regional utilization in East Asia.
<b>Date of the update</b>	21 November 2012
<b>Contact Person 1</b>	<p>Mr Yuki HONDA  Office of International Affairs  Japan Meteorological Agency (JMA)  Japan  Tel.: +81-3-3211-4966  Fax: +81-3-3211-2032  E-mail: <a href="mailto:iao-jma@met.kishou.go.jp">iao-jma@met.kishou.go.jp</a>,</p>
<b>Contact Person 2</b>	<p>Dr Jaegwang WON  Korea Meteorological Administration (KMA)  Republic of Korea  Tel.: +82-2-2181-0694  Fax: +82-2-2181-0709  E-mail: <a href="mailto:wonjg@kma.go.kr">wonjg@kma.go.kr</a>, <a href="mailto:ecotus37@korea.kr">ecotus37@korea.kr</a></p>
<b>Contact Person 3</b>	<p>Mr LI Feng  Meteorological Observation Center  China Meteorological Administration (CMA)  China  Tel.: +86 10 68409293  Fax: +86 10 68400936  E-mail: <a href="mailto:liflif04@cma.gov.cn">liflif04@cma.gov.cn</a></p>

**Project No. III.2**

<b>Project Title</b>	<b>RA II WIGOS Project for Observing Systems Integration for Supporting Disaster Risk Reduction</b>
<b>Subproject Title</b>	<b>Capacity Building in Radar Techniques in the Southeast Asia</b>
<b>Type</b>	Cross-regional Implementation Project (RAs II and V)
<b>Status</b>	Draft Design
<b>Overview</b>	<p>Developing countries in Southeast Asia share common challenges for severe weather monitoring and forecasting. In spite of many radars having been installed in the region, they are not fully utilized due to lack of their expertise in weather radar techniques. Thus, capacity building in weather radar techniques is crucial concern for the countries.</p> <p>Although their levels of operational usage of radar vary, they are often facing common technical challenges. In this regard, sharing their technical issues and lessons learnt among countries in the Region and developing the regional strategy on development of the radar network in the Region will enable them to tackle those challenges collaboratively with help from the WMO community in an effective and efficient manner.</p> <p>This project, initiated by Thailand and Malaysia, within the framework of the ASEAN Sub-Committee on Meteorology and Geophysics (SCMG), aims at establishing a collaborative mechanism within SCMG through the following steps:</p> <ol style="list-style-type: none"> <li>1) Thailand and Malaysia, as leaders of this project, will develop their national reports toward operational rainfall estimation/forecasting based on radar data. In order to share their experiences and lessons learnt among the participating organs, and to identify technical problems to be solved and necessary technical supports for, the reports should include the following items in a well-structured format: <ol style="list-style-type: none"> <li>(a) overview of the current radar systems,</li> <li>(b) organization (department, division, staff, and budget),</li> <li>(c) specification of radar systems,</li> <li>(d) maintenance of equipment,</li> <li>(e) data processing (QC, calibration, and composite technique),</li> <li>(f) radar products,</li> <li>(g) details of current technical problems associated with (a) to (f),</li> <li>(h) lessons learnt from the past experiences,</li> <li>(i) recent progress,</li> <li>(j) future development plans.</li> </ol> <p>The reports will be submitted to the 35<sup>th</sup> SCMG meeting (2013).</p> </li> <li>2) The other ASEAN member countries will also develop their national reports in the same format as that of <u>Thailand and Malaysia</u>, and submit their reports to 36<sup>th</sup> SCMG meeting. Based on the submitted report, the meeting will develop a regional strategic plan on radar which identifies common technical issues and necessary actions to be taken.</li> <li>3) During the period of the project, all the above Members will be requested to update their national reports and submit the latest version to a SCMG meeting every year. Thailand and Malaysia are requested to encourage the other Members to develop and keep their national reports up-to-date. The regional strategic plan is also to be updated at every SCMG meeting.</li> </ol> <p>*Each Member will consult with the WMO or advanced RA II Members about appropriate technical missions focused on identified technical issues in the reports such as dispatch of radar experts to recipient countries, with the VCP or other funds. On completion of such a mission, the recipient Member is requested to update its national report by including details of the outcomes of the mission.</p> <p>*SCMG set up a new agenda item for discussion on the progress of this project.</p>
<b>Aim(s)</b>	This project aims to develop effective early warning systems building on radar data in Southeast Asia.

<b>Benefits</b>	Capacity in monitoring and forecasting of the severe weather using radar data will be enhanced by shared experiences and lessons among the participating organs and technical missions focused on technical issues identified in national reports and the regional strategic plan.
<b>Key Regional Player</b>	ASEAN-SCMG: Thailand, Malaysia
<b>Partners/ Participants</b>	All the ASEAN Member countries (Cambodia, Brunei Darussalam, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam)
<b>Relationship with existing project(s)</b>	<ul style="list-style-type: none"> <li>- Radar composite map in Southeast Asia, one of the ongoing projects under the Meteorological Working Group of the WMO/ESCAP Typhoon Committee,</li> <li>- Severe Weather Forecasting Demonstration Project (SWFDP) for Southeast Asia,</li> <li>- ASEAN Sub-Committee on Meteorology and Geophysics(SCMG).</li> </ul>
<b>Funding Source(s)</b>	This project will rely on existing budget allocations at the national level. The project will build on existing national observational networks and information management infrastructures. Additional funding will be needed for technical cooperation for those countries by dispatching appropriate experts and/or providing training workshops.
<b>Overall Costs</b>	(TBD)
<b>Timescale</b>	2013–2016
<b>Expected Key Deliverables / Key responsible body</b>	<ul style="list-style-type: none"> <li>- National reports in the Southeast Asia toward operational rainfall estimation/forecasting based on radar data,</li> <li>- Regional strategic plan on development of the radar network.</li> </ul>
<b>Main risk(s)</b>	<ol style="list-style-type: none"> <li>1) Failure of development of national reports by participating organs.</li> <li>2) Lack of available experts.</li> <li>3) Lack of funds available.</li> </ol>
<b>Website</b>	Not to be established
<b>Date of the update</b>	21 November 2012
<b>Contact Person 1</b>	Dr Somchai Baimoung Deputy Director-General/Acting Director-General Thai Meteorological Department Thailand Tel.: +66 81 989 9025 Email: <a href="mailto:somchaib@tmd.go.th">somchaib@tmd.go.th</a>
<b>Contact Person 2</b>	Mr A. Kamiluddin Hj Ibrahim Director, Radar Meteorology Division Malaysian Meteorological Department Malaysia Tel.: +603 7967 8154 Fax: +603 7955 0964 E-mail: <a href="mailto:kamiluddin@met.gov.my">kamiluddin@met.gov.my</a>

**Project No. IV**

<b>Project Title</b>	<b>RA II WIGOS Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations</b>
<b>Type</b>	Regional Implementation Project (RA II)
<b>Status</b>	Draft Design
<b>Overview</b>	<p>The Japan Meteorological Agency (JMA)/World Meteorological Organization (WMO) Workshop on Quality Management in Surface, Climate and Upper-air Observations, held at Tokyo in July 2010 as part of activities of the Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations (hereafter, Pilot Project), found out that primary factors adversely affecting data quality in RA II are calibration and maintenance of instruments mainly due to lack of traceability of measurements to international standards and calibration facilities. This project will build on outcomes of the workshop.</p> <p>It consists of the following two activities: (i) improvements of data quality of RBCN/RBSN stations; and (ii) enhancement of capabilities of RIC-Tsukuba and RIC-Beijing. All the outcomes of this project will be shared at a Portal to be established by the Coordinator.</p> <p>1. Improvements of data quality at RBCN/RBSN stations</p> <p>(a) Monitoring Data Quality</p> <p>The Coordinator checks data quality of RA II stations and identifies and requests RA II Members to identify technical issues, based on the following results:</p> <ul style="list-style-type: none"> <li>• Questionnaire on the Surface, Climate, and Upper-air Observations and Quality Management in Regional Association II (Asia) (conducted in July 2010),</li> <li>• Questionnaire on meteorological instruments, calibration and training in Regional Association II (Asia) (conducted in January 2012),</li> <li>• 6-monthly monitoring reports by the Lead Centre for monitoring the quality of land surface observations in Region II.</li> </ul> <p>(b) Survey on status on QA/QC procedures and site managements for the network of RBCN/RBSN stations, and report the results.</p> <p>Based on requests from the Coordinator, the following Members will consider the possibility of technical support if funds are available, and share the summary of the technical missions with RA II Members:</p> <ul style="list-style-type: none"> <li>- CMA, HKO, JMA, and KMA for Southeast Asia,</li> <li>- IMD for South Asia,</li> <li>- Roshydromet for Central Asia,</li> <li>- Kuwait for Middle East.</li> </ul> <p>2. Enhancement of RIC's Services</p> <p>RICs plan to implement the following action items for further enhancement of their services in capacity building and calibration during the project:</p> <p>(a) Organization of a training workshop to improve understanding of calibration and maintenance of meteorological instruments according to needs of RA II Members to be identified by the "Questionnaire on Meteorological Instruments, Calibration and Training in Regional Association II (Asia)",</p> <p>(b) Development of training materials on calibration and maintenance of instruments (to be prepared for publication as an Instruments and Methods of Observation Programme (IMOP) technical document),</p> <p>(c) Obtaining the International Standard ISO/IEC 17025 – General requirements for the competence of testing and calibration laboratories – certification for air pressure, temperature, and humidity,</p> <p>(d) Development of RIC's Websites,</p> <p>(e) Intercomparison between RIC-Tsukuba and RIC-Beijing,</p> <p>(f) Reports on status on calibration instruments for surface-based observations in RA II (to be prepared for publication as an Instruments and Methods of Observation Programme (IMOP) technical document).</p>

<b>Aim(s)</b>	This project aims at improvement of data quality at RBCN/RBSN stations and enhancement of services of RA II RICs.
<b>Benefits</b>	RA II Members, especially those with technical issues on data quality of observations, will potentially benefit from this project.
<b>Role/Involvement of WMO Regional Centres in RA II</b>	Regional Instrument Centres (RICs) Lead Centre for monitoring the quality of land surface observations
<b>Key Regional Player</b>	JMA (Coordinator), and Members of Coordination Group  Technical Mission: - CMA, HKO, JMA, and KMA for Southeast Asia, - IMD for South Asia, - Roshydromet for Central Asia, - Kuwait for Middle East.
<b>Capacity development requirements</b>	1. Workshop on maintenance, field inspection, etc. (basic level), 2. Workshop on traceability, measurement uncertainty, etc. (advanced level).
<b>Partners/Participants</b>	RA II Members
<b>Funding Source(s)</b>	This project will rely on existing budget allocations at the national level. Additional funding will be needed to dispatch experts to NMHSs in developing countries and/or invite their observational staff to RICs for trainings and calibrations of national standards.
<b>Overall Costs</b>	(TBD)
<b>Timescale</b>	2013–2016
<b>Expected Key Deliverables / Key responsible body</b>	1. Provision of technical support for instrument maintenance and calibration by experts from RICs. 2. Holding a RIC's training workshop for RA II Members. 3. Development of training materials (to be prepared for publication as an IMOP technical document). 4. Obtaining ISO/IEC 17025 certification. 5. Portal Website to share outcomes of this project. 6. Report on status on QC/QA procedures and site management in RA II. 7. Reports on status on meteorological instruments, calibration and training in Regional Association II.
<b>Main risk(s)</b>	<ul style="list-style-type: none"> <li>• Lack of funding for technical missions by RICs,</li> <li>• Insufficient communication between the Coordinator, RICs, and RA II Members on their status on maintenance and calibration of instruments to specify needs of technical supports,</li> <li>• Lack of responses from RA II Members.</li> </ul>
<b>Website</b>	RIC's Website/Portal on QC/QA
<b>Summary</b>	Improvement of data quality of RA II Members through enhancement of RIC's services and capacity
<b>Date of the update</b>	21 November 2012
<b>Contact Person 1</b>	Mr Yoshihisa KIMATA Senior Coordinator for Observation Networks Administration Division, Observations Department Japan Meteorological Agency (JMA) Japan Tel.: +81 3 3211 6018 Fax: +81 3 3211 7084 Email: kimata@met.kishou.go.jp
<b>Contact Person 2</b>	Mr He Xiaolei Meteorological Observation Center China Meteorological Administration (CMA) China Tel: +86 10 68409767 Fax: +86 10 68400936 E-mail: hxlaoc@cma.gov.cn

**Project No. V**

<b>Project Title</b>	<b>RA II WIGOS Project to Develop a Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) in Asia Node</b>
<b>Type</b>	Regional Implementation Project (RA II)
<b>Status</b>	Draft Design
<b>Overview</b>	<p>SDS-WAS was established in 2007 to achieve comprehensive, coordinated and sustained observations and modelling capabilities of sand and dust storms in order to improve the monitoring of sand and dust storms to increase the understanding of the dust processes and to enhance dust prediction capabilities for mitigation of risks in many affected area (aviation, health impacts, etc.).</p> <p>The WMO SDS-WAS Region for Asia third meeting of Regional Steering Group (RSG) was held at Tsukuba, Japan in March 2012. At the meeting, it was confirmed that observation data exchange schemes should be implemented promptly in order to enhance systematic near-real-time (NRT) monitoring of sand and dust events in each country, and the following near-term implementation plan was agreed within the SDS-WAS Asia Node activity:</p> <ul style="list-style-type: none"> <li>• Each country will confirm their data policy on observation data delivery, to reach an agreement on the provision of observation data to be shared within the Node in NRT,</li> <li>• Regional Centre (RC: China) will provide a portal website with a function for sharing the observation data and announce it to the Node members,</li> <li>• At the beginning, experimental observation data sharing will be conducted in off-line basis (not NRT) for the sand/dust storms (SDS) seasons,</li> <li>• For the data exchange, the ad-hoc working group will propose appropriate data format and parameters,</li> <li>• In SDS season in the spring (from February to June) 2013, the NRT (with a goal of approximately 1-day delay) data exchange will be conducted regularly,</li> <li>• NRT data will be used for intercomparison of sand and dust storm forecast model to improve forecast accuracy as well as for monitoring of sand and dust storms.</li> </ul>
<b>Aim(s)</b>	This project aims at mitigation of risks in many affected areas in the Asia Node countries through enhancement of systematic NRT monitoring of sand and dust storm.
<b>Benefits</b>	The systematic NRT monitoring of sand and dust storm will provide the Asia Node countries with useful information for sand and dust storm risk mitigation.
<b>Role/Involvement of WMO Regional Centres in RA II</b>	Regional Specialized Meteorological Centre with activity specialization on Atmospheric Sand and Dust Forecast (RSMC-ASDF) (TBD)
<b>Key Regional Player</b>	China, Japan, Republic of Korea
<b>Partners/Participants</b>	Countries in SDS-WAS Asia Node (China, Japan, Kazakhstan, Republic of Korea and Mongolia)
<b>Funding Source(s)</b>	This project will rely on existing budget allocations at the national level.
<b>Overall Costs</b>	(TBD)
<b>Timescale</b>	2013–2015
<b>Expected Key Deliverables / Key responsible body</b>	The systematic NRT monitoring of sand and dust storm in SDS-WAS Asia Node

<b>Main risk(s)</b>	Lack of resources (funds/expertise)
<b>Website</b>	SDS-WAS Asia Node portal
<b>Summary</b>	Improvement of sand and dust storms monitoring in the SDS-WAS Asia Node
<b>Date of the update</b>	12 November 2012
<b>Contact Person 1</b>	Prof. ZHANG Xiaoye Chinese Academy of Meteorological Sciences China Meteorological Administration (CMA) China Tel.: +86 10 68406601 Fax: +86 10 62175931 E-mail: xiaoye@cams.cma.gov.cn
<b>Contact Person 2</b>	Mr Hiroshi Koide Senior Coordinator for Global Atmosphere Watch Atmospheric Environment Division Global Environment and Marine Department Japan Meteorological Agency (JMA) Japan Tel.: +81-3-3287-3439 Fax: +81-3-3211-4640 E-mail: hkoide@met.kishou.go.jp
<b>Contact Person 3</b>	Dr Youngsin Chin Korea Meteorological Administration (KMA) Republic of Korea Tel.: +82 70 7850 6752 Fax: +82 2 831 4930 E-mail: hwangsa@korea.kr

**Project No. VI**

<b>Project Title</b>	<b>RA II WIGOS Project to Develop Support for NMHSs in Satellite Data, Products and Training</b>
<b>Type</b>	Regional Implementation Project (RA II)
<b>Status</b>	Draft Design
<b>Overview</b>	<p>At its fourteenth session (December 2008), Regional Association II adopted a resolution to establish a pilot project for the development of support for National Meteorological and Hydrological Services (NMHSs) in the areas of satellite data, products and training. The Coordinating Group of the Pilot Project is composed of Japan (Co-coordinator); Republic of Korea (Co-coordinator); Bahrain; China; Hong Kong, China; India; Kyrgyzstan; Maldives; Oman; Pakistan; Russian Federation; Uzbekistan; Viet Nam and EUMETSAT (observer).</p> <p>The object of this project is to encourage NMHSs in RA II to make a kind of self-help effort to improve the flow of satellite-derived information by:</p> <ul style="list-style-type: none"> <li>• Identifying the requirements of NMHSs of developing countries, regarding satellite imagery, data and products, use the results to update the RRR user requirements database and to fine tune the EGOS-IP,</li> <li>• Facilitating the timely provision of satellite-related information by satellite operators themselves to users via the project web page, newsletters, etc., and</li> <li>• Aligning with VLab activities to optimize assistance to NMHSs in RA II and coordinating training activities on use of satellite data/products).</li> </ul>
<b>Aim(s)</b>	<ul style="list-style-type: none"> <li>• To encourage NMHSs in RA II to make a kind of self-help effort to improve the flow of satellite-derived information,</li> <li>• To improve the knowledge and techniques to use satellite data and products.</li> </ul>
<b>Benefits</b>	NMHSs in RA II have benefited from this project to find means to access satellite data, products and training they want, and to improve the usage of satellite-derived information. This is expected to improve NMHSs' activities from nowcasting to climate and environment monitoring.
<b>Key Regional Player</b>	Japan, Republic of Korea and other satellite operators in RA II
<b>Capacity development requirements</b>	<ul style="list-style-type: none"> <li>• Assistance (or support) of WMO VLab activities and other regional training activities,</li> <li>• Assistance of satellite operators,</li> <li>• Liaison with EGOS-IP.</li> </ul>
<b>Partners/Participants</b>	<p>Members of the Coordination Group members: Japan (Co-coordinator); Republic of Korea (Co-coordinator); Bahrain; China; Hong Kong, China; India; Kyrgyzstan; Maldives; Oman; Pakistan; Russian Federation; Uzbekistan; Viet Nam, RA V (observer) and EUMETSAT (observer)</p> <p>All other RA II Members can be nominated as the Group members.</p>
<b>Relationship with existing project(s)</b>	(TBD)
<b>Funding Source(s)</b>	Regular activities of this project rely on existing budget allocations at the national level. Additional funding will be needed to hold the Coordination Group meetings and training events regularly.
<b>Overall Costs</b>	(TBD)
<b>Timescale</b>	2012–2016



<b>Expected Key Deliverables / Key responsible body</b>	<ul style="list-style-type: none"> <li>• Reports on requirements of NMHSs regarding satellite imagery, data and products,</li> <li>• Improvement on access to information on satellite data/products,</li> <li>• Improvement on capacity in use of satellite data/products and facilitation of training datasets and toolboxes.</li> </ul>
<b>Main risk(s)</b>	Lack of resources (funds/expertise) and lack of cooperation from Members
<b>Website</b>	The portal site of the project is operated on the WMO web server. <a href="http://www.wmo.int/pages/prog/sat/ra2pilotproject-intro_en.php">http://www.wmo.int/pages/prog/sat/ra2pilotproject-intro_en.php</a>
<b>Summary</b>	The project will encourage NMHSs in RA II to make a kind of self-help effort to improve the flow of satellite-related information.
<b>Date of the update</b>	12 November 2012
<b>Contact Person 1</b>	Mr Hironobu Yokota Senior Coordinator for Meteorological Satellite Systems Satellite Program Division, Observations Department Japan Meteorological Agency (JMA) Japan Tel: +81-3201-8677 Fax: +81-3217-1036 E-mail:hyokota@met.kishou.go.jp
<b>Contact Person 2</b>	Dr Dohyeong KIM Senior Scientist National Meteorological Satellite Center Korea Meteorological Administration Republic of Korea Tel: +82-70-7850-5705 Fax: +82-43-717-0210 E-mail: dkim@kma.go.kr

---

**APPENDIX****LIST OF ABBREVIATIONS AND ACRONYMS**

CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CONOPS	Concept of Operations
DAR	Discovery, Access and Retrieval
DB	Database
DCPC	Data Collection or Production Centre (of WIS)
DRR	Disaster Risk Reduction
ET	Expert Team (of WMO Technical Commission)
FAO	Food and Agriculture Organization of the United Nations
GAW	Global Atmosphere Watch
GCOS	Global Climate Observing System
GCW	Global Cryosphere Watch
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GISC	Global Information System Centre(of WIS)
GFCS	Global Framework for Climate Services
GOOS	Global Ocean Observing System
GTOS	Global Terrestrial Observing System
ICG-WIGOS	Inter-Commission Coordination Group on WIGOS
ICPC	Interagency Coordination and Planning Committee for Earth Observations
ICSU	International Council for Science
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
ISO	International Organization for Standardization
ITU	International Telecommunication Union
LDC	Least Developed Country
MOU	Memorandum of Understanding
NMHS	National Meteorological and Hydrological Service
NOS	National Observing System
OSEs	Observing Systems Experiments
OSCAR	WIGOS Observing Systems Capabilities Analysis and Review tool
OSSEs	Observing System Simulation Experiments
QA	Quality Assurance
QC	Quality Control
QMF	Quality Management Framework
QMS	Quality Management System
PANGEA	Partnership for new GEOSS Application
RA	Regional Association
RCC	Regional Climate Centre
RIC	Regional Instrument Centre
RMIC	Regional Marine Instrument Centre
RRR	Rolling Review of Requirements
SIDS	Small Island Developing State
SoG	Statement of Guidance
SORT	Standardization of Observations Reference Tool (of WIGOS)
SLA	Service Level Agreement
TC	Technical Commission
TOR	Terms of Reference
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCRP	World Climate Research Programme
WIGOS	WMO Integrated Global Observing System
WIP	WIGOS framework Implementation Plan
WIR	WIGOS Operational Information Resource
WIS	WMO Information System
WHYCOS	World Hydrological Cycle Observation System
WWW	World Weather Watch

---

**Resolution 4 (RA II-15)****REGIONAL BASIC SYNOPTIC NETWORKS AND REGIONAL BASIC CLIMATOLOGICAL NETWORKS IN REGION II**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 2 (XIV-RA II) – Regional Basic Synoptic Network in Region II,
- (2) Resolution 3 (XIV-RA II) – Regional Basic Climatological Network in Region II,
- (3) The *Manual on the Global Observing System* (WMO-No. 544), Volume I, Part III, Regulations 2.1.3.1–2.1.3.5, and the definition of the Regional Basic Synoptic and Climatological Networks,
- (4) The *Manual on Codes* (WMO-No. 306),
- (5) The *Manual on the Global Telecommunication System* (WMO-No. 386),

**Considering:**

- (1) That the establishment and maintenance of a Regional Basic Synoptic Network (RBSN) of surface and upper-air synoptic stations, adequate to meet the requirements of Members and of the World Weather Watch, constitute one of the most important obligations of Members under Article 2 of the WMO Convention,
- (2) That the Fourteenth World Meteorological Congress welcomed the establishment of Regional Basic Climatological Networks (RBCNs) in all WMO Regions and urged Members to ensure that their operational observing stations compiled and transmitted the CLIMAT messages according to existing regulations,

**Decides:**

- (1) That the stations and the observational programmes listed in Annex 1 to the present resolution constitute the RBSN in Region II;
- (2) That the stations listed in Annex 2 to the present resolution constitute the RBCN in Region II;

**Urges Members:**

- (1) To secure, at the earliest date possible, full implementation of the network of RBSN and RBCN stations and observational programmes set forth in Annexes 1 and 2 to the present resolution;
- (2) To comply fully with the standard times of observation, the global and regional coding procedures and data collection standards as laid down in the *WMO Technical Regulations* (WMO-No. 49) and the *Manual on the Global Observing System* (WMO-No. 544), the *Manual on Codes* (WMO-No. 306) and the *Manual on the Global Telecommunication System* (WMO-No. 386);

**Authorizes** the president of the Association to approve, at the request of the Members concerned and in consultation with the Secretary-General, amendments to the list of RBSN and RBCN stations in accordance with the procedures laid down in the *Manual on the Global Observing System* (WMO-No. 544), Volume II – Regional Aspects, Region II (Asia), and to monitor the implementation by Members and to address non-compliance in consultation with the Member concerned and the Secretary General.

---

**Note:** This resolution replaces Resolution 2 (XIV-RA II) and Resolution 3 (XIV-RA II), which are no longer in force.

---

## Annex 1 to Resolution 4 (RA II-15)

## LIST OF STATIONS COMPRISING THE REGIONAL BASIC SYNOPTIC NETWORK IN REGION II

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
<b>AFGHANISTAN</b>					
40904	0	FAIZABAD	S		
40913	0	KUNDUZ	S		
40922	0	MIMANA	S		
40938	0	HERAT	S	R	
40942	0	CHAKHCHARAN	S		
40945	0	BAMIYAN	S		
40948	0	KABUL AIRPORT		R	
40954	0	JALALABAD	S		
40971	0	KHOST	S		
40974	0	FARAH	S		
40977	0	TIRIN KOT	S		
40988	0	BUST	S		
40990	0	KANDAHAR AIRPORT	S		
40996	0	DESHOO	S		
<b>BAHRAIN</b>					
41150	0	BAHRAIN (INT. AIRPORT)	S		
41152	0	HAWAR ISLAND	S		
41153	0	KING FAHAD CAUSEWAY	S		
41154	0	JABAL AL DUKHAN	S		
41155	0	F1 (FORMULA 1)	S		
<b>BANGLADESH</b>					
41859	0	RANGPUR	S		
41883	0	BOGRA	S	R	
41886	0	MYMENSINGH	S		
41891	0	SYLHET	S		
41907	0	ISHWARDI	S		
41923	0	DHAKA	S	R	
41936	0	JESSORE	S		
41943	0	FENI	S		
41950	0	BARISAL	S		
41977	0	CHITTAGONG (AMBAGAN)	S	R	
41978	0	CHITTAGONG (PATENGA)	S		
41992	0	COX'S BAZAR	S		
<b>CAMBODIA</b>					
48962	0	BATTAMBONG	S		
48963	0	PAILIN	S		
48964	0	PREAH VIHEAR	S		
48965	0	KOMPONGTHOM	S		
48966	0	SIEMREAP	S		
48967	0	KOMKPONG CHNANG	S		
48968	0	PURSAT	S		
48969	0	BANTEAY MEANCHEY	S		
48970	0	KRATIE	S		
48971	0	MONDOLKIRI	S		
48972	0	STUNG TRENG	S		
48973	0	RATANAKIRI	S		
48983	0	KOMPONG SOM/VILLE (EX SIHANOUKVILLE)	S		
48985	0	KAMPOT	S		
48986	0	KOHKONG	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
48990	0	KANDAL	S		
48962	0	BATTAMBONG	S		
48963	0	PAILIN	S		
48964	0	PREAH VIHEAR	S		
48965	0	KOMPONGTHOM	S		
48966	0	SIEMREAP	S		
48967	0	KOMKPONG CHNANG	S		
48968	0	PURSAT	S		
48969	0	BANTEAY MEANCHEY	S		
48970	0	KRATIE	S		
48971	0	MONDOLKIRI	S		
48972	0	STUNG TRENG	S		
48973	0	RATANAKIRI	S		
48983	0	KOMPONG SOM/VILLE (EX SIHANOUKVILLE)	S		
48985	0	KAMPOT	S		
48986	0	KOHKONG	S		
48990	0	KANDAL	S		
48962	0	BATTAMBONG	S		
48963	0	PAILIN	S		
48964	0	PREAH VIHEAR	S		
48965	0	KOMPONGTHOM	S		
48966	0	SIEMREAP	S		
48967	0	KOMKPONG CHNANG	S		
48968	0	PURSAT	S		
48991	0	PHNOM-PENH/ POCHENTONG	S		
48992	0	KOMPONG SPEU	S		
48993	0	TAKEO	S		
48995	0	KOMPONG-CHAM	S		
48997	0	PREY VENG	S		
48998	0	SVAY RIENG	S		
<b>CHINA</b>					
50527	0	HAILAR	S	R	
50557	0	NENJIANG	S	R	
50603	0	XIN BARAG YOUQI	S		
50632	0	BUGT	S		
50727	0	ARXAN	S		
50745	0	QIQIHAR	S		
50756	0	HAILUN	S		
50774	0	YICHUN	S	R	
50788	0	FUJIN	S		
50915	0	ULIATAI	S		
50949	0	QIAN GORLOS	S		
50953	0	HARBIN	S	R	
50963	0	TONGHE	S		
50978	0	JIXI	S		
51076	0	ALTAY	S	R	
51087	0	FUYUN	S		
51133	0	TACHENG	S		
51156	0	HOBOKSAR	S		
51243	0	KARAMAY	S		
51288	0	BAYTIK SHAN	S		
51334	0	JINGHE	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
51431	0	YINING	S	R	
51463	0	WU LU MU QI	S	R	
51495	0	SHISANJIANFANG	S		
51542	0	BAYANBULAK	S		
51573	0	TURPAN	S		
51644	0	KUQA	S	R	
51656	0	KORLA	S		
51709	0	KASHI	S	R	
51716	0	BACHU	S		
51730	0	ALAR	S		
51747	0	TAZHONG	S		
51765	0	TIKANLIK	S		
51777	0	RUOQIANG	S	R	
51811	0	SHACHE	S		
51828	0	HOTAN	S	R	
51839	0	MINFENG		R	
51886	0	MANGNAI	S		
52203	0	HAMI	S	R	
52267	0	EJIN QI	S	R	
52323	0	MAZONG SHAN	S	R	
52418	0	DUNHUANG	S	R	
52495	0	BAYAN MOD	S		
52533	0	JIUQUAN	S	R	
52602	0	LENGHU	S		
52652	0	ZHANGYE	S		
52681	0	MINQIN	S	R	
52713	0	DA-QAIDAM	S		
52754	0	GANGCA	S		
52818	0	GOLMUD	S	R	
52836	0	DOULAN	S	R	
52866	0	XINING	S		
52866	1	XINING		R	
52983	0	YU ZHONG	S	R	
53068	0	ERENHOT	S		
53068	1	ERENHOT		R	
53083	0	NARAN BULAG	S		
53149	0	MANDAL	S		
53192	0	ABAG QI	S		
53231	0	HAILS	S		
53276	0	JURH	S		
53336	0	HALIUT	S		
53391	0	HUADE	S		
53463	0	HOHHOT	S	R	
53502	0	JARTAI	S		
53513	0	LINHE	S	R	
53529	0	OTOG QI	S		
53543	0	DONGSHENG	S		
53564	0	HEQU	S		
53588	0	WUTAI SHAN	S		
53614	0	YINCHUAN	S	R	
53646	0	YULIN	S		
53723	0	YANCHI	S		
53772	0	TAIYUAN	S	R	
53798	0	XINGTAI	S		
53845	0	YAN AN	S		
53845	1	YAN AN		R	
53915	0	PINGLIANG	S	R	
53959	0	YUNCHENG	S		
54012	0	XI UJIMQIN QI	S		
54026	0	JARUD QI	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
54027	0	LINDONG	S		
54094	0	MUDANJIANG	S		
54102	0	XILIN HOT	S	R	
54135	0	TONGLIAO	S	R	
54161	0	CHANGCHUN	S	R	
54208	0	DUOLUN	S		
54218	0	CHIFENG	S		
54218	1	CHIFENG		R	
54236	0	ZHANGWU	S		
54273	0	HUADIAN	S		
54292	0	YANJI	S	R	
54337	0	JINZHOU	S		
54342	0	SHENYANG	S	R	
54374	0	LINJIANG	S	R	
54377	0	JI'AN	S		
54401	0	ZHANGJIAKOU	S		
54423	0	CHENGDE	S		
54471	0	YINGKOU	S		
54497	0	DANDONG	S		
54511	0	BEIJING	S	R	
54539	0	LETING	S		
54618	0	POTOU	S		
54662	0	DALIAN	S	R	
54727	0	ZHANGQIU		R	
54753	0	LONGKOU	S		
54776	0	CHENGSHANTOU	S		
54823	0	JINAN	S		
54843	0	WEIFANG	S		
54857	0	QINGDAO	S	R	
54909	0	DINGTAO	S		
55228	0	SHIQUANHE	S		
55279	0	BAINGOIN	S		
55299	0	NAGQU	S	R	
55472	0	XAINZA	S		
55578	0	XIGAZE	S		
55591	0	LHASA	S	R	
55664	0	TINGRI	S		
55696	0	LHUNZE	S		
55773	0	PAGRI	S		
56004	0	TUOTUOHE	S		
56018	0	ZADOI	S		
56021	0	QUMARLEB	S		
56029	0	YUSHU	S		
56029	1	YUSHU		R	
56033	0	MADOI	S		
56046	0	DARLAG	S		
56079	0	RUO'ERGAI	S		
56080	0	HEZUO	S	R	
56096	0	WUDU	S		
56106	0	SOG XIAN	S		
56116	0	DENGQEN	S		
56137	0	QAMDO	S		
56137	1	QAMDO		R	
56146	0	GARZE		R	
56152	0	SERTAR	S		
56172	0	BARKAM	S		
56182	0	SONGPAN	S		
56187	0	WENJIANG	S		
56187	1	WENJIANG		R	
56247	0	BATANG	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
56312	0	NYINGCHI	S		
56444	0	DEQEN	S		
56462	0	JIULONG	S		
56492	0	YIBIN	S		
56571	0	XICHANG	S	R	
56651	0	LIJING	S		
56691	0	WEINING	S	R	
56739	0	TENGCHONG	S	R	
56778	0	KUNMING	S	R	
56951	0	LINCANG	S		
56964	0	SIMAO	S	R	
56969	0	MENGLA	S		
56985	0	MENGZI	S	R	
57067	0	LUSHI	S		
57083	0	ZHENGZHOU	S	R	
57127	0	HANZHONG	S	R	
57131	0	JINGHE	S	R	
57178	0	NANYANG	S	R	
57245	0	ANKANG	S		
57265	0	GUANGHUA	S		
57297	0	XINYANG	S		
57328	0	DA XIAN	S		
57411	0	NANCHONG	S		
57447	0	ENSHI	S	R	
57461	0	YICHANG	S	R	
57494	0	WUHAN	S	R	
57516	0	CHONGQING	S		
57516	1	CHONGQING		R	
57633	0	YOUYANG	S		
57662	0	CHANGDE	S		
57679	0	CHANGSHA		R	
57687	0	CHANGSHA	S		
57745	0	ZHIJIANG	S		
57749	0	HUAIHUA		R	
57799	0	JI'AN	S		
57816	0	GUIYANG	S		
57816	1	GUIYANG		R	
57866	0	LINGLING	S		
57902	0	XINGREN	S		
57957	0	GUILIN	S	R	
57972	0	CHENZHOU	S	R	
57993	0	GANZHOU	S		
57993	1	GANZHOU		R	
58027	0	XUZHOU	S	R	
58040	0	GANYU	S		
58102	0	BOXIAN	S		
58141	0	HUAIYIN	S		
58150	0	SHEYANG	S	R	
58203	0	FUYANG	S	R	
58221	0	BENGBU	S		
58238	0	NANJING	S	R	
58251	0	DONGTAI	S		
58265	0	LUSI	S		
58314	0	HUOSHAN	S		
58362	0	SHANGHAI (BAOSHAN)	S	R	
58424	0	ANQING	S	R	
58457	0	HANGZHOU	S	R	
58472	0	SHENGSI	S		
58477	0	DINGHAI	S		
58527	0	JINGDEZHEN	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
58606	0	NANCHANG	S	R	
58633	0	QUZHOU	S	R	
58665	0	HONGJIA		R	
58666	0	DACHEN DAO	S		
58725	0	SHAOWU	S	R	
58752	0	RUIAN	S		
58847	0	FUZHOU	S	R	
58921	0	YONG'AN	S		
58968	0	TAIBEI	S	R	
58974	0	PENGJIA YU	S		
59007	0	GUANGNAN	S		
59023	0	HECHI	S		
59082	0	SHAOGUAN	S		
59117	0	MEI XIAN	S		
59134	0	XIAMEN	S	R	
59211	0	BAISE	S	R	
59265	0	WUZHOU	S	R	
59280	0	QINGYUAN		R	
59287	0	GUANGZHOU	S		
59293	0	HEYUAN	S		
59316	0	SHANTOU	S		
59316	1	SHANTOU		R	
59358	0	TAINAN	S		
59417	0	LONGZHOU	S		
59431	0	NANNING	S	R	
59501	0	SHANWEI	S		
59559	0	HENGCHUN	S		
59644	0	BEIHAI	S		
59663	0	YANGJIANG	S		
59758	0	HAIKOU	S	R	
59792	0	DONGSHA DAO	S		
59838	0	DONGFANG	S		
59948	0	SANYA	S		
59981	0	XISHA DAO	S	R	
59985	0	SANHU DAO	S		
59995	0	YONGSHUJIAO	S		
59997	0	NANSHA DAO	S		
<b>DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA</b>					
47003	0	SENBONG	S		
47005	0	SAMJIYON	S		
47008	0	CHONGJIN	S		
47014	0	CHUNGGANG	S		
47016	0	HYESAN	S		
47020	0	KANGGYE	S		
47022	0	PUNGSAN	S		
47025	0	KIMCHAEK	S		
47028	0	SUPUNG	S		
47031	0	CHANGJIN	S		
47035	0	SINUJU	S		
47037	0	KUSONG	S		
47039	0	HUICHON	S		
47041	0	HAMHEUNG	S		
47046	0	SINPO	S		
47050	0	ANJU	S		
47052	0	YANGDOK	S		
47055	0	WONSAN	S		
47058	0	PYONGYANG	S	R	
47060	0	NAMPO	S		
47061	0	CHANGJON	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
47065	0	SARIWON	S		
47067	0	SINGYE	S		
47068	0	RYONGYON	S		
47069	0	HAEJU	S		
47070	0	KAESONG	S		
47075	0	PYONGGANG	S		
<b>HONG KONG, CHINA</b>					
45004	0	KOWLOON		R	
45007	0	HONG KONG INTERNATIONAL AIRPORT	S		
<b>INDIA</b>					
42027	0	SRINAGAR	S	R	
42071	0	AMRITSAR	S		
42101	0	PATIALA	S	R	
42111	0	DEHRADUN	S		
42131	0	HISSAR	S		
42165	0	BIKANER	S		
42182	0	NEW DELHI/SAFDARJUNG	S	R	
42189	0	BAREILLY	S		
42260	0	AGRA	S		
42309	0	NORTH LAKHIMPUR	S		
42314	0	DIBRUGARH/MOHANBARI	S	R	
42328	0	JAISALMER	S		
42339	0	JODHPUR	S	R	
42348	0	JAIPUR / SANGANER	S		
42361	0	GWALIOR	S	R	
42369	0	LUCKNOW/AMAUSI	S	R	
42379	0	GORAKHPUR	S	R	
42397	0	SILIGURI		R	
42398	0	SILIGURI	S		
42410	0	GUWAHATI	S	R	
42415	0	TEZPUR	S		
42452	0	KOTA AERODROME	S		
42475	0	ALLAHABAD/BAMHRAULI	S		
42492	0	PATNA	S	R	
42559	0	GUNA	S		
42571	0	SATNA	S		
42587	0	DALTONGANJ	S		
42591	0	GAYA	S		W
42623	0	IMPHAL/TULIHAI	S		W
42634	0	BHUJ-RUDRAMATA	S		W
42647	0	AHMADABAD	S	R	
42667	0	BHOPAL/BAIRAGHAR	S	R	
42675	0	JABALPUR	S		W
42701	0	M.O. RANCHI	S	R	
42706	0	BANKURA	S		
42724	0	AGARTALA	S	R	
42734	0	JAMNAGAR			W
42737	0	RAJKOT	S		
42754	0	INDORE	S		
42779	0	PENDRA ROAD	S		
42798	0	JAMSHEDPUR	S		
42809	0	KOLKATA/DUM DUM	S	R	
42840	0	SURAT	S		
42867	0	NAGPUR SONEGAON	S	R	
42874	0	PBO RAIPUR	S	R	
42886	0	JHARSIGUDA	S		
42895	0	BALASORE	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
42909	0	VERAVAL	S		W
42921	0	NASIK CITY	S		
42933	0	M.O. AKOLA	S		
42971	0	BHUBANESHWAR	S	R	
42977	0	SANDHEADS	S		
43003	0	BOMBAY/SANTACRUZ	S	R	
43014	0	AURANGABAD CHIKALTHANA AERODROME	S	R	
43041	0	JAGDALPUR	S	R	
43063	0	PUNE	S		
43086	0	RAMGUNDAM	S		
43110	0	RATNAGIRI	S		
43117	0	SHOLAPUR	S		
43128	0	HYDERABAD AIRPORT	S	R	
43150	0	VISHAKHAPATNAM/WALT AIR	S	R	
43185	0	MACHILIPATNAM/FRANCHPET	S	R	
43189	0	KAKINADA	S		
43192	0	GOA/PANJIM	S	R	
43198	0	BELGAUM/SAMBRE	S		
43201	0	GADAG	S		
43213	0	KURNOOL	S		
43226	0	HONAVAR	S		
43233	0	CHITRADURGA	S		
43237	0	PBO ANANTAPUR	S		
43245	0	NELLORE	S		
43279	0	CHENNAI/MINAMBAKKAM	S	R	
43284	0	MANGALORE/BAJPE	S		
43285	0	MANGALORE/PANAMBUR		R	
43295	0	BANGALORE	S	R	
43311	0	AMINIDIVI	S	R	
43314	0	KOZHIIKODE	S		
43321	0	COIMBATORE/PEELAMEDU	S		
43329	0	CUDDALORE	S		
43333	0	PORT BLAIR	S	R	
43344	0	TIRUCHCHIRAPALLI	S		
43346	0	KARAIKAL	S	R	
43369	0	MINICOY	S	R	
43371	0	THIRUVANANTHAPURAM	S	R	
<b>IRAN, ISLAMIC REPUBLIC OF</b>					
40700	0	PARS ABAD MOGHAN	S		
40701	0	MAKKO	S		
40703	0	KHOY	S		
40704	0	AHAR	S		
40706	0	TABRIZ	S	R	
40708	0	ARDEBIL	S		
40710	0	SARAB	S		
40712	0	ORUMIEH	S		
40713	0	MARAGHEH	S		
40716	0	MEYANEH	S		
40718	0	ANZALI	S		
40719	0	RASHT	S		
40721	0	MARAVEH-TAPPEH	S		
40723	0	BOJNOURD	S		
40726	0	MOHABAD	S		
40727	0	SAGHEZ	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
40729	0	ZANJAN	S		
40731	0	GHAZVIN	S		
40732	0	RAMSAR	S		
40734	0	NOSHAHR	S		
40736	0	BABULSAR	S		
40737	0	GHARAKHIL	S		
40738	0	GORGAN	S		
40739	0	SHAHRUD	S		
40740	0	GHUCHAN	S		
40741	0	SARAKHS	S		
40743	0	SABZEVAR	S		
40745	0	MASHHAD	S	R	
40747	0	SANANDAJ	S		
40754	0	TEHRAN-MEHRABAD	S	R	
40757	0	SEMNAN	S		
40762	0	TORBAT-HEYDARIEH	S		
40763	0	KASHMAR	S		
40766	0	KERMANSHAH	S	R	
40768	0	HAMEDAN	S		
40769	0	ARAK	S		
40780	0	ILAM	S		
40782	0	KHORRAM ABAD	S		
40783	0	ALI-GOODARZ	S		
40785	0	KASHAN	S		
40789	0	KHOR	S		
40791	0	TABAS	S		
40792	0	FERDOUS	S		
40794	0	SAFI-ABAD DEZFUL	S		
40798	0	SHAHRE-KORD	S		
40800	0	ESFAHAN	S	R	
40809	0	BIRJAND	S	R	
40811	0	AHWAZ	S		
40812	0	MASJED-SOLEYMAN	S		
40818	0	ABADEH	S		
40821	0	YAZD	S		
40827	0	NEHBANDAN	S		
40829	0	ZABOL	S		
40831	0	ABADAN	S		
40833	0	OMIDYEH-AGHAJARI	S		
40835	0	GACH SARAN DU GUNBADAN	S		
40836	0	YASOGE	S		
40841	0	KERMAN	S	R	
40848	0	SHIRAZ	S	R	
40851	0	SIRJAN	S		
40853	0	BAFT	S		
40854	0	BAM	S		
40856	0	ZAHEDAN	S		W
40857	0	BUSHEHR	S		
40859	0	FASA	S		
40872	0	BANDAR-E-DAYYER	S		
40875	0	BANDARABBASS	S	R	
40877	0	KAHNUJ	S		
40878	0	SARAVAN	S		
40879	0	IRANSHAHR	S		
40882	0	KISH ISLAND	S		
40883	0	BANDAR LENGEH	S		
40889	0	SIRI ISLAND	S		
40890	0	ABU MUSA	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
40893	0	JASK	S		
40897	0	KONARAK	S		
40898	0	CHAHBAHAR	S		
<b>IRAQ</b>					
40608	0	MOSUL	S		
40621	0	KIRKUK	S		
40634	0	HADITHAH	S		
40637	0	KHANAQIN	S		
40642	0	RUTBAH	S		
40650	0	BAGHDAD INT. AIRPORT		R	
40658	0	NUKHEB	S		
40665	0	KUT-AL-HAI	S		
40672	0	DIWANIYA	S		
40676	0	NASIRIYA	S		W
40684	0	AL-SALMAN	S		
40686	0	BUSAYAH	S		
40689	0	BASRAH-HUSSEN			W
<b>JAPAN</b>					
47401	0	WAKKANAI	S	R	
47407	0	ASAHIKAWA	S		
47409	0	ABASHIRI	S		
47412	0	SAPPORO	S	R	
47418	0	KUSHIRO	S		
47418	1	KUSHIRO		R	
47420	0	NEMURO	S		
47421	0	SUTTSU	S		
47426	0	URAKAWA	S		
47430	0	HAKODATE	S		
47570	0	WAKAMATSU	S		
47575	0	AOMORI	S		
47582	0	AKITA	S		
47582	1	AKITA		R	
47584	0	MORIOKA	S		
47590	0	SENDAI	S		
47600	0	WAJIMA	S	R	
47604	0	NIIGATA	S		
47605	0	KANAZAWA	S		
47610	0	NAGANO	S		
47624	0	MAEBASHI	S		
47629	0	MITO	S		
47636	0	NAGOYA	S		
47646	0	TATENO		R	
47648	0	CHOSHI	S		
47651	0	TSU	S		
47655	0	OMAEZAKI	S		
47662	0	TOKYO	S		
47675	0	OSHIMA	S		
47678	0	HACHIJOJIMA	S	R	
47740	0	SAIGO	S		
47741	0	MATSUE	S	R	
47746	0	TOTTORI	S		
47750	0	MAIZURU	S		
47765	0	HIROSHIMA	S		
47772	0	OSAKA	S		
47778	0	SHIONOMISAKI	S		
47778	1	SHIONOMISAKI		R	
47800	0	IZUHARA	S		
47807	0	FUKUOKA	S	R	



INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
47815	0	OITA	S		
47817	0	NAGASAKI	S		
47827	0	KAGOSHIMA	S	R	
47830	0	MIYAZAKI	S		
47843	0	FUKUE	S		
47887	0	MATSUYAMA	S		
47891	0	TAKAMATSU	S		
47893	0	KOCHI	S		
47895	0	TOKUSHIMA	S		
47909	0	NAZE	S		
47909	1	NAZE/FUNCHATOGE		R	
47918	0	ISHIGAKIJIMA	S	R	
47927	0	MIYAKOJIMA	S		
47936	0	NAHA	S		
47945	0	MINAMIDAITOJIMA	S	R	
47971	0	CHICHIJIMA	S	R	
47991	0	MINAMITORISHIMA	S	R	
<b>KAZAKHSTAN (IN ASIA)</b>					
28676	0	PETROPAVLOVSK	S		
28766	0	BLAGOVESHCHENKA	S		
28867	0	URITSKY	S		
28879	0	KOKSHETAY	S		
28951	0	KOSTANAI		R	
28952	0	KOSTANAY	S		
28966	0	RUZAEVKA	S		
28978	0	BALKASINO	S		
28984	0	SUCINSK	S		
29802	0	MIKHAILOVKA	S		
29807	0	ERTIS	S		
35067	0	ESIL'	S		
35078	0	ATBASAR	S		
35085	0	AKKOL'	S		
35108	0	URALSK	S		
35173	0	ZHALTYR	S		
35188	0	ASTANA	S		
35217	0	DZHAMBEJTY	S		
35229	0	AKTOBE	S	R	
35302	0	CHAPAEVO	S		
35357	0	BARSHINO	S		
35358	0	TORGAI	S		
35394	0	KARAGANDA	S	R	
35406	0	TAIPAK	S		
35416	0	UIL	S		
35426	0	TEMIR	S		
35497	0	ZHARYK	S		
35532	0	MUGODZARSKAJA	S		
35576	0	KYZYLZHAR	S		
35671	0	ZHEZKAZGAN	S	R	
35699	0	BEKTAUATA	S		
35700	0	ATYRAU	S	R	
35746	0	ARALSKOE MORE	S		
35796	0	BALHASH	S		
35849	0	KAZALINSK	S		
35925	0	SAM	S		
35953	0	DZHUSALY	S		
35969	0	ZLIKHA	S		
36003	0	PAVLODAR	S	R	
36152	0	SEMIJARKA	S		
36177	0	SEMIPALATINSK	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
36208	0	RIDDER	S		
36397	0	ZHALGYZTOBE	S		
36428	0	ULKEN NARYN	S		
36535	0	KOKPEKTY	S		
36639	0	URDZHAR	S		
36686	0	ALGAZY OSTROV	S		
36821	0	BAKANAS	S		
36859	0	ZHARKENT	S		
36864	0	OTAR	S		
36870	0	ALMATY	S		
36872	0	ALMATY		R	
38001	0	FORT SHEVCHENKO	S		
38062	0	KYZYLORDA	S		
38069	0	CHIILI	S		
38196	0	ACHISAY	S		
38198	0	TURKESTAN	S		
38222	0	TOLE BI	S		
38232	0	AKKUDUK	S		
38328	0	SHYMKENT	S		
38334	0	AUL TURARA RYSKULOVA	S		
38341	0	TARAZ	S	R	
38343	0	KULAN	S		
38439	0	CHARDARA	S		
<b>KUWAIT</b>					
40570	0	SALMY	S		
40582	0	KUWAIT INTERNATIONAL AIRPORT	S		
40582	1	KUWAIT INTERNATIONAL AIRPORT		R	
<b>KYRGYZSTAN</b>					
36911	0	TOKMAK	S		
36974	0	NARYN	S		
36982	0	TIAN-SHAN'	S		
38345	0	TALAS	S		
38353	0	BISHKEK	S		
38613	0	DZHALAL-ABAD	S		
38616	0	KARA-SUU	S		
<b>LAO PEOPLE'S DEMOCRATIC REPUBLIC</b>					
48924	0	LUANG NAMTHA (M.SING)	S		
48925	0	OUDOMXAY	S		
48926	0	HOU EI-SAI *	S		
48927	0	VIENGSAY	S		
48928	0	SAMNEUA	S		
48930	0	LUANG-PRABANG	S		
48935	0	PLAINE DES JARRES (XIENKHOANG)	S		
48940	0	VIENTIANE	S		
48945	0	PARKXANH	S		
48946	0	THAKHEK	S		
48947	0	SAVANNAKHET	S		
48952	0	SARAVANE	S		
48955	0	PAKSE	S		
48957	0	ATTOPEU	S		
<b>MACAO, CHINA</b>					
45011	0	TAIPA GRANDE	S		
<b>MALDIVES</b>					
43533	0	HANIMAADHOO	S		
43555	0	MALE	S		W

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
43577	0	KADHDHOO	S		
43588	0	KAADEDHDHOO	S		
43599	0	GAN	S	R	
<b>MONGOLIA</b>					
44203	0	RINCHINHUMBE	S		
44207	0	HATGAL	S		
44212	0	ULAANGOM	S	R	
44213	0	BARUUNTURUUN	S		
44214	0	ULGI	S		
44215	0	OMNO-GOBI	S		
44218	0	HOVD	S		
44230	0	TARIALAN	S		
44231	0	MUREN	S	R	
44232	0	HUTAG	S		
44239	0	BULGAN	S		
44241	0	BARUUNHARAA	S		
44256	0	DASHBALBAR	S		
44259	0	CHOIBALSAN	S	R	
44265	0	BAITAG	S		
44272	0	ULIASTAI	S		
44277	0	ALTAI	S	R	
44282	0	TSETSERLEG	S		
44284	0	GALUUT	S		
44285	0	HUJIRT	S		
44287	0	BAYANHONGOR	S		
44288	0	ARVAIHEER	S	R	
44292	0	ULAANBAATAR (CTBT)	S	R	
44294	0	MAANTI	S		
44298	0	CHOIR	S		
44302	0	BAYAN-OVOO	S		
44304	0	UNDERKHAAN	S		
44305	0	BARUUN-URT	S		
44313	0	KHALKH-GOL	S		
44314	0	MATAD	S		
44336	0	SAIKHAN-OVOO	S		
44341	0	MANDALGOBI	S		
44347	0	TSOGT-OVOO	S		
44352	0	BAYANDELGER	S		
44373	0	DALANZADGAD	S		
<b>MYANMAR</b>					
48001	0	PUTAO	S		
48004	0	HKAMTI	S		
48008	0	MYITKYINA	S	R	
48010	0	HOMALIN	S		
48018	0	KATHA	S		
48019	0	BHAMO	S		
48020	0	MAWLAIK	S		
48025	0	KALEWA	S		
48035	0	LASHIO	S		
48037	0	MONYWA	S		
48042	0	MANDALAY	S	R	
48045	0	MINDAT	S		
48048	0	NYAUNG-U	S		
48053	0	MEIKTILA	S	R	
48057	0	TAUNGGYI	S		
48060	0	KENGTUNG	S		W
48062	0	SITTWE	S	R	
48071	0	KYAUKPYU	S		
48077	0	PROME	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
48078	0	TOUNGOO	S		
48080	0	SANDOWAY	S		
48094	0	PATHEIN	S		W
48097	0	YANGON	S	R	
48108	0	DAWEI	S		
48109	0	COCO ISLAND	S		W
48110	0	MERGUI	S		
48112	0	VICTORIA POINT	S		
<b>NEPAL</b>					
44404	0	DADEL DHURA	S		
44406	0	DIPAYAL	S		
44409	0	DHANGADHI (ATARIYA)	S		
44416	0	SURKHET	S		
44418	0	NEPALGUNJ AIRPORT	S		
44424	0	JUMLA	S		
44429	0	DANG	S		
44434	0	POKHARA AIRPORT	S		
44438	0	BHAIRAWA AIRPORT	S		
44449	0	SIMARA AIRPORT	S		
44454	0	KATHMANDU AIRPORT	S		
44462	0	OKHALDHUNGA	S		
44474	0	TAPLEJUNG	S		
44477	0	DHANKUTA	S		
44478	0	BIRATNAGAR AIRPORT	S		
<b>OMAN</b>					
41240	0	KHASAB PORT	S		
41242	0	DIBA	S		
41244	0	BURAIMI	S		
41246	0	SOHAR MAJIS	S		
41253	0	RUSTAQ	S		
41254	0	SAIQ	S		
41255	0	NIZWA	S		
41256	0	SEEB, INT'L AIRPORT	S	R	
41257	0	SAMAIL	S		
41258	0	MINA SULTAN QABOOS	S		
41262	0	FAHUD	S		
41263	0	BAHLA	S		
41264	0	ADAM	S		
41265	0	IBRA	S		
41267	0	QALHAT	S		
41268	0	SUR	S		
41275	0	QARN ALAM	S		
41288	0	MASIRAH	S		
41304	0	MARMUL	S		
41312	0	MINA SALALAH	S		
41314	0	THUMRAIT	S		
41315	0	QAIROON HAIRITI	S		
41316	0	SALALAH	S	R	
<b>PAKISTAN</b>					
41504	0	GUPIS	S		
41506	0	CHITRAL	S		
41508	0	DIR	S		
41515	0	DROSH	S		
41516	0	GILGIT	S		
41517	0	SKARDU	S		
41518	0	BUNJI	S		
41519	0	CHILLAS	S		
41520	0	ASTORE	S		
41523	0	SAIDU SHARIF	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
41529	0	PESHAWAR	S		W
41532	0	MUZAFFAR ABAD	S		
41533	0	RISALPUR	S		
41535	0	KAKUL	S		
41536	0	BALAKOT	S		
41560	0	PARACHINAR	S		
41564	0	KOHAT	S		
41565	0	CHERAT	S		
41571	0	ISLAMABAD AIRPORT	S		
41573	0	MURREE	S		
41577	0	ISLAMABAD CITY	S		
41592	0	MIANWALI	S		
41594	0	SARGODHA	S	R	
41598	0	JHELUM	S		W
41600	0	SIALKOT	S		W
41620	0	ZHOB	S		
41624	0	DERA ISMAIL KHAN	S		W
41630	0	FAISALABAD	S		
41640	0	LAHORE CITY		R	
41641	0	LAHORE AIRPORT	S		
41660	0	QUETTA AIRPORT	S		
41661	0	QUETTA (SHEIKH MANDA)			W
41672	0	RAFIQUI	S		
41675	0	MULTAN	S		W
41678	0	BAHAWALNAGAR	S		W
41685	0	BARKHAN	S		
41696	0	KALAT	S		
41697	0	SIBI	S		
41700	0	BAHAWALPUR	S		
41710	0	NOKKUNDI	S		
41712	0	DAL BANDIN	S		
41715	0	JACOBABAD	S		W
41718	0	KHANPUR	S		W
41725	0	ROHRI	S		
41738	0	TURBAT	S		
41739	0	PANJGUR	S		W
41744	0	KHUZDAR	S		
41746	0	PADIDAN	S		
41749	0	NAWABSHAH	S		W
41756	0	JIWANI	S		W
41757	0	GAWADAR	S		
41759	0	PASNI	S		
41764	0	HYDERABAD	S		W
41768	0	CHHOR	S		W
41780	0	KARACHI AIRPORT	S	R	
41785	0	BADIN	S		
<b>QATAR</b>					
41170	0	DOHA INTERNATIONAL AIRPORT	S	R	
<b>REPUBLIC OF KOREA</b>					
47090	0	SOKCHO	S	R	
47095	0	CHEORWON	S		
47098	0	DONGDUCHAEON	S		
47099	0	MUNSAN	S		
47100	0	DAEGWALLYEONG	S		
47101	0	CHUNCHEON	S		
47102	0	BAENGNYEONGDO	S	R	
47105	0	GANGNEUNG	S		
47106	0	DONGHAE	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
47108	0	SEOUL	S		
47112	0	INCHEON	S		
47114	0	WONJU	S		
47115	0	ULLEUNGDO	S		
47119	0	SUWON	S		
47121	0	YEONGWOL	S		
47122	0	OSAN AB		R	
47127	0	CHUNGJU	S		
47129	0	SEOSAN	S		
47130	0	ULJIN	S		
47131	0	CHEONGJU	S		
47133	0	DAEJEON	S		
47135	0	CHUPUNGNYEONG	S		
47136	0	ANDONG	S		
47137	0	SANGJU	S		
47138	0	POHANG	S	R	
47140	0	GUNSAN	S		
47143	0	DAEGU	S		
47146	0	JEONJU	S		
47152	0	ULSAN	S		
47155	0	CHANGWON	S		
47156	0	GWANGJU	S		
47158	0	GWANGJU AB		R	
47159	0	BUSAN	S		
47162	0	TONGYEONG	S		
47165	0	MOKPO	S		
47168	0	YEOSU	S		
47169	0	HEUKSANDO	S	R	
47170	0	WANDO	S		
47175	0	JINDO	S		
47184	0	JEJU	S		
47185	0	GOSAN	S	R	
47189	0	SEOGWIPO	S		
47192	0	JINJU	S		
<b>RUSSIAN FEDERATION (IN ASIA)</b>					
20046	0	POLARGMO IM. E.T. KRENKELJA	S	R	
20069	0	OSTROV VIZE	S		
20087	0	OSTROV GOLOMJANNYJ	S		
20292	0	GMO IM.E.K. FEDOROVA	S	R	
20471	0	IZVESTIJ TSIK	S		
20476	0	STERLEGOVA	S		
20667	0	IM. M.V. POPOVA	S		
20674	0	OSTROV DIKSON	S	R	
20744	0	MALYE KARMAKULY	S		
20744	1	MALYE KARMAKULY		R	
20871	0	SOPOCHNAYA KARGA	S		
20891	0	HATANGA	S		
20892	0	HATANGA		R	
20946	0	IM.E.K. FEDOROVA	S		
20967	0	SEYAHA	S		
20978	0	KARAU	S		
21432	0	OSTROV KOTEL'NYJ	S	R	
21535	0	SANNIKOVA	S		
21608	0	ANABAR	S		
21636	0	KIGILYAH	S		
21711	0	UST'-OLENEK	S		
21721	0	IM.YU.A. HABAROVA	S		
21802	0	SASKYLAH	S		
21813	0	TYUMYATI	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
21821	0	BYKOV (MYS)	S		
21824	0	TIKSI	S	R	
21908	0	DZALINDA	S		
21921	0	KJUSJUR	S		
21931	0	JUBILEJNAJA	S		
21937	0	KUJGA	S		
21946	0	CHOKURDAH	S	R	
21978	0	VAL'KARKAJ	S		
21982	0	OSTROV VRANGELJA	S		
23022	0	AMDERMA	S		
23032	0	MARESALE	S		
23058	0	ANTIPAYUTA	S		
23074	0	DUDINKA	S		
23078	0	NORIL'SK	S	R	
23112	0	VARANDEJ	S		
23114	0	MYS KONSTANTINOVSKIJ	S		
23174	0	POTAPOVO	S		
23179	0	SHEZHNOGORSK	S		
23205	0	NAR'JAN-MAR	S	R	
23219	0	HOSEDA-HARD	S		
23226	0	VORKUTA	S		
23242	0	NOVYJ PORT	S		
23256	0	TAZOVSKIJ	S		
23274	0	IGARKA	S		
23305	0	OKUNEV NOS	S		
23324	0	PETRUN	S		
23330	0	SALEHARD	S	R	
23339	0	POLUJ	S		
23345	0	NYDA	S		
23358	0	NOVYJ URENGOJ	S		
23376	0	SVETLOGORSK	S		
23383	0	AGATA	S		
23405	0	UST'-CIL'MA	S		
23412	0	UST'-USA	S		
23415	0	PECHORA		R	
23418	0	PECHORA	S		
23426	0	MUZI	S		
23431	0	PITLYAR	S		
23443	0	PANGODY	S		
23445	0	NADYM	S		
23453	0	URENGOJ	S		
23463	0	YANOV STAN	S		
23465	0	KRASNOSEL'KUPSK	S		
23471	0	NIZHNEVARTOVSK	S		
23472	0	TURUHANSK	S	R	
23503	0	IZHMA	S		
23518	0	UST'-SHCHUGOR	S		
23527	0	SARANPAUL'	S		
23552	0	TARKO-SALE	S		
23578	0	VERESHCHAGINO	S		
23589	0	TUTONCHANY	S		
23606	0	UHTA	S		
23625	0	SOSVA	S		
23631	0	BEREZOVO	S		
23635	0	YUIL'SK	S		
23656	0	HALESOVAYA	S		
23657	0	NOYABR'SK	S		
23662	0	TOL'KA	S		
23678	0	VERHNEIMBATSK	S		
23699	0	KERBO	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
23701	0	VESLYANA	S		
23708	0	LUN'	S		
23711	0	TROICKO-PECHERSKOE	S		
23724	0	NJAKSIMVOL'	S		
23734	0	OKTJABR'SKOE	S		
23741	0	NIZHNESORTYMSK	S		
23748	0	KOGALYM	S		
23758	0	RADUZHNYJ	S		
23774	0	KELLOG	S		
23776	0	BAHTA	S		
23788	0	KUZ'MOVKA	S		
23803	0	UST'-KULOM	S		
23802	0	SYKTYVKAR		R	
23804	0	SYKTYVKAR	S		
23812	0	YAKSHA	S		
23823	0	VON'EGAN	S		
23847	0	SYTOMINO	S		
23849	0	SURGUT	S		
23862	0	KORLIKI	S		
23867	0	LAR'YAK	S		
23884	0	BOR	S	R	
23891	0	BAJKIT	S		
23909	0	GAJNY	S		
23914	0	CHERDYN'	S		
23921	0	IVDEL'	S	R	
23929	0	SHAIM	S		
23933	0	HANTY-MANSIJSK	S	R	
23939	0	ALTAJ	S		
23946	0	UGUT	S		
23947	0	SALYM	S		
23955	0	ALEKSANDROVSKOE	S	R	
23966	0	VANZIL'-KYNNAK	S		
23973	0	VOROGOVO	S		
23975	0	SYM	S		
23982	0	VEL'MO	S		
23986	0	SEVERO-ENISEJSK	S		
23987	0	JARCEVO	S		
23992	0	UST'-KAMO	S		
24076	0	DEPUTATSKIJ	S		
24125	0	OLENEK	S		
24125	1	OLENEK		R	
24136	0	SUHANA	S		
24143	0	DZARDZAN	S		
24194	0	BELAYA GORA	S		
24219	0	YAROL'IN	S		
24261	0	BATAGAJ-ALYTA	S		
24263	0	BATAGAJ	S		
24266	0	VERHOJANSK	S	R	
24322	0	POLYARNYJ	S		
24329	0	SHELAGONTSY	S		
24338	0	EJK	S		
24343	0	ZHIGANSK	S	R	
24361	0	EKYUCHCHYU	S		
24371	0	UST'-CHARKY	S		
24382	0	UST'-MOMA	S		
24449	0	BESTYAHSKAYA ZVEROFERMA	S		
24462	0	SEBYAN-KYUEL'	S		
24477	0	IEMA	S		
24507	0	TURA	S	R	

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
24525	0	HABARDINO	S		
24538	0	CHUMPURUK	S		
24557	0	SOGO-HAYA	S		
24585	0	NERA	S		
24588	0	YURTY	S		
24606	0	KISLOKAN	S		
24639	0	NJURBA	S		
24641	0	VILJUJSK	S	R	
24643	0	HATYRYK-HOMO	S		
24644	0	VERHNEVILYUJSK	S		
24652	0	SANGARY	S		
24656	0	BATAMAJ	S		
24661	0	SEGEN-KYUEL'	S		
24668	0	VERHOYANSKIJ PEREVOZ	S		
24671	0	TOMPO	S		
24679	0	VOSTOCHNAYA	S		
24684	0	AGAYAKAN	S		
24688	0	OJMJAKON	S	R	
24691	0	DELYANKIR	S		
24724	0	CHERNISHEVSKIJ	S		
24725	0	TUOJ-HAYA	S		
24726	0	MIRNVY	S	R	
24737	0	KRESTYAH	S		
24738	0	SUNTAR	S		
24739	0	CHAINGDA	S		
24753	0	NAMTSY	S		
24758	0	BERDIGESTYAH	S		
24763	0	KREST-HAL'DZHAI	S		
24768	0	CHURAPCA	S		
24771	0	TEPLYJ KLYUCH	S		
24790	0	SUSUMAN	S		
24802	0	STRELKA CHUNYA	S		
24807	0	MUTORAJ	S		
24817	0	ERBOGACEN	S		
24826	0	DOROZHNYJ	S		
24843	0	TONGULAH	S		
24856	0	POKROVSK	S		
24871	0	OHOTSKIJ PEREVOZ	S		
24894	0	KOLYMSKAYA	S		
24898	0	UST'-OMCHUG	S		
24908	0	VANAVARA	S	R	
24918	0	PREOBRAZHENKA	S		
24923	0	LENSK	S		
24928	0	KOMAKA	S		
24933	0	KILEER	S		
24944	0	OLEKMINSK	S		
24944	1	OLEKMINSK		R	
24951	0	ISIT'	S		
24959	0	JAKUTSK	S	R	
24962	0	AMGA	S		
24966	0	UST'-MAJYA	S		
24967	0	TEGYULTYA	S		
24975	0	YNYKCHAN	S		
24982	0	UEGA	S		
24988	0	ARKA	S		
25017	0	ANDRYUSHKINO	S		
25034	0	AMBARCIK (BUHTA)	S		
25042	0	AJON	S		
25044	0	RAUCHUA	S		
25051	0	PEVEK	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
25062	0	MYS BILLINGSA	S		
25121	0	KOLYMSKAYA	S		
25123	0	CHERSKIJ	S	R	
25129	0	KONSTANTINOVSKAYA	S		
25138	0	OSTROVNOE	S		
25147	0	BILIBINO	S		
25151	0	CHAUN	S		
25173	0	MYS SHMIDTA	S		
25206	0	SREDNEKOLYMSK	S		
25248	0	ILIRNEJ	S		
25282	0	MYS VANKAREM	S		
25325	0	UST'-OLOJ	S		
25335	0	BAIMKA	S		
25356	0	EN'MUVEEM	S		
25378	0	EGVEKINOT	S		
25399	0	MYS UELEN	S		
25400	0	ZYRYANKA	S		
25400	1	ZYRYANKA		R	
25428	0	OMOLON	S	R	
25469	0	KANCHALAN	S		
25503	0	KORKODON	S		
25538	0	VERHNEE PENZINO	S		
25551	0	MARKOVO	S		
25561	0	TANYURER	S		
25563	0	ANADYR'	S		
25594	0	BUHTA PROVIDENYA	S		
25627	0	LABAZNAYA	S		
25648	0	SLAUTNOE	S		
25677	0	BERINGOVSKIJ	S		
25700	0	EL'GEN (SOVHOZ)	S		
25703	0	SEJMCHAN	S	R	
25705	0	SREDNEKAN	S		
25707	0	BOHAPCHA	S		
25715	0	OMSUKCHAN	S		
25745	0	KAMENSKOE	S		
25767	0	HATYRKA	S		
25808	0	TALAYA	S		
25820	0	EVENSK	S		
25904	0	MADAUN	S		
25913	0	MAGADAN	S	R	
25916	0	ALEVINA (MYS)	S		
25919	0	BRAT'EV (MYS)	S		
25922	0	SHELIHOVA	S		
25927	0	BROHOVO	S		
25932	0	TAJGONOS	S		
25941	0	CHEMURNAUT	S		
25956	0	APUKA	S		
28009	0	KIRS	S		
28044	0	SEROV	S		
28049	0	GARI	S		
28064	0	LEUSI	S		
28076	0	DEM'JANSKOE	S		
28097	0	TAUROVO	S		
28116	0	KUDYMKAR	S		
28138	0	BISER	S		
28144	0	VERHOTUR'E	S		
28165	0	KUMINSKYA	S		
28214	0	GLAZOV	S		
28224	0	PERM'	S		
28225	1	PERM'		R	

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
28240	0	NIZHNYJ TAGIL	S		
28255	0	TURINSK	S		
28275	0	TOBOL'SK	S	R	
28319	0	NOZOVKA	S		
28321	0	OHANSK	S		
28334	0	SAMARY	S		
28366	0	YARKOVO	S		
28367	0	TYUMEN'	S		
28382	0	UST'-ISIM	S		
28411	0	IZHEVSK	S		
28418	0	SARAPUL	S		
28434	0	KRASNOUFIMSK	S		
28440	0	EKATERINBURG	S		
28445	0	EKATERINBURG (VERHNEE DUBROVO)		R	
28465	0	YALUTOROVSK	S		
28481	0	VIKULOVO	S		
28491	0	BOL'SIE UKI	S		
28493	0	TARA	S		
28502	0	VYATSKIE POLYANY	S		
28506	0	ELABUGA	S		
28517		MENZELINSK	S		
28522	0	ASKINO	S		
28541	0	VERHNIJ UFALEJ	S		
28552	0	SADRINSK	S		
28573	0	ISHIM	S		
28593	0	BOL'SHERECH'E	S		
28612		MUSLYUMOVO	S		
28621	0	BIRSK	S		
28645	0	CHELYABINSK-GOROD	S		
28661	0	KURGAN (VORONOVKA)	S		
28661	1	KURGAN		R	
28666	0	MAKUSINO	S		
28698	0	OMSK	S		
28698	1	OMSK		R	
28704	0	CHULPANOVO	S		
28705	0	CHELNO-VERSHINY	S		
28711	0	BUGUL'MA	S		
28719	0	AKSAKOVO	S		
28722	0	UFA-DIOMA	S	R	
28748	0	TROIJK	S		
28786	0	POLTAVKA	S		
28797	0	ODESSKOE	S		
28799	0	CERLAK	S		
28806	0	BUGURUSLAN	S		
28807	0	SAMARA (SMYSHLJAEVKA)	S		
28825	0	STERLITAMAK	S		
28838	0	MAGNITOGORSK	S		
28908	0	AVANGARD ZERNOSOVHOZ	S		
28916	0	SHARLYK	S		
29023	0	NAPAS	S		
29059	0	ALEKSANDROVSKIJ SHLYUZ	S		
29068	0	NAZIMOVO	S		
29111	0	SREDNY VASJUGAN	S		
29122	0	KARGASOK	S		
29149	0	STEPANOVKA	S		
29203	0	NOVYJ VASYUGAN	S		
29209	0	MAJSK	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
29231	0	KOLPASEVO	S	R	
29253	0	LOSINOBOORSKOE	S		
29263	0	ENISEJSK	S	R	
29274	0	STRELKA	S		
29276	0	MOTYGINO	S		
29282	0	BOGUCANY	S	R	
29313	0	PUDINO	S		
29328	0	BAKCHAR	S		
29332	0	MOLCHANOVO	S		
29348	0	PERVOMAJSKOE	S		
29363	0	PIROVSKOE	S		
29367	0	NOVOBIRILYUSSY	S		
29374	0	KAZACHINSKOE	S		
29379	0	TASEEVO	S		
29393	0	CHERVYANKA	S		
29405	0	KYSTOVKA	S		
29418	0	SEVERNOE	S		
29430	0	TOMSK	S		
29456	0	TYUHTET	S		
29464	0	BOL'SHOJ ULUJ	S		
29467	0	ACHINSK	S		
29471	0	BOL'SHAJA MURTA	S		
29477	0	SUHOBUZIMSKOE	S		
29481	0	DZERZHINSKOE	S		
29485	0	ABAN	S		
29524	0	KRESCHENKA	S		
29551	0	MARIINSK	S		
29553	0	BOGOTOL	S		
29558	0	GGP KATEK	S		
29561	0	NAZAROVO	S		
29562	0	KEMCHUG	S		
29563	0	KACHA	S		
29566	0	SHUMIHA	S		
29570	0	KRASNOJARSK OPYTNOE POLE	S		
29571	0	MININO	S		
29572	0	EMEL' YANOVO		R	
29576	0	UYAR	S		
29578	0	SHALINSKOE	S		
29580	0	SOLYANKA	S		
29581	0	KANSK	S		
29587	0	IRBEJSKOE	S		
29594	0	TAJSHET	S		
29602	0	CHANY	S		
29605	0	TATARSK	S		
29612	0	BARABINSK	S	R	
29631	0	KOLYVAN'	S		
29634	1	NOVOSIBIRSK		R	
29636	0	TOGUCHIN	S		
29638	0	NOVOSIBIRSK (OGOURTSOVO)	S		
29645	0	KEMEROVSKIJ	S		
29653	0	UZUR	S		
29654	0	CENTRAL'NYJ RUDNIK	S		
29662	0	BALAHTA	S		
29664	0	SVETOLYUBOVO	S		
29674	0	ANASTASINO	S		
29676	0	AGINSKOE	S		
29698	0	NIZHNEUDINSK	S	R	
29706	0	KUPINO	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
29712	0	ZDVINSK	S		
29724	0	KOCHKI	S		
29726	0	ORDYNSKOE	S		
29736	0	MASLJANINO	S		
29752	0	NENASTNAYA	S		
29759	0	KOMMUNAR	S		
29766	0	IDRINSKOE	S		
29768	0	LEBYASHCH'E	S		
29771	0	SHCHETININO	S		
29772	0	ARTEMOVSK	S		
29789	0	VERHNJAJA GUTARA	S		
29814	0	KARASUK	S		
29827	0	BAEVO	S		
29838	0	BARNAUL	S		
29839	0	BARNAUL		R	
29846	0	NOVOKUZNETSK	S		
29862	0	ABAKAN		R	
29864	0	UYBAT	S		
29866	0	MINUSINSK	S		
29869	0	ERMAKOVSKOE	S		
29874	0	KARATUZSKOE	S		
29876	0	KAZYR	S		
29892	0	HADAMA	S		
29923	0	REBRIHA	S		
29937	0	ALEJSKAJA	S		
29939	0	BIJSK ZONAL'NAYA	S		
29956	0	TASTYP	S		
29974	0	OLEN'YA RECHKA	S		
29998	0	ORLIK	S		
30028	0	IKA	S		
30054	0	VITIM	S	R	
30074	0	MACHA	S		
30089	0	DZHIKIMDA	S		
30127	0	TOKMA	S		
30142	0	VIZIRNYJ	S		
30157	0	MAMA	S		
30165	0	SVETLYJ	S		
30173	0	TYANYA	S		
30198	0	SUON-TIT	S		
30230	0	KIRENSK	S	R	
30252	0	MAMAKAN	S		
30309	0	BRATSK	S	R	
30323	0	UST'-KUT	S		
30328	0	ORLINGA	S		
30337	0	KAZACHINSK	S		
30372	0	CHARA	S	R	
30385	0	UST'-NJUKZHA	S		
30393	0	CUL'MAN	S		
30405	0	TANGUJ	S		
30433	0	NIZHNEANGARSK	S		
30439	0	TOMPA	S		
30455	0	UAKIT	S		
30469	0	KALAKAN	S		
30493	0	NAGORNYJ	S		
30499	0	TYNDA	S		
30504	0	TULUN	S		
30521	0	ZHIGALOVO	S		
30526	0	TYRKA	S		
30554	0	BAGDARIN	S		
30554	1	BAGDARIN		R	

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
30603	0	ZIMA	S		
30612	0	BALAGANSK	S		
30622	0	KACHUG	S		
30627	0	BAJANDAJ	S		
30635	0	UST'-BARGUZIN	S	R	
30636	0	BARGUZIN	S		
30637	0	UZUR	S		
30650	0	ROMANOVKA	S		
30664	0	TUNGOKOCEN	S		
30669	0	ZILOVO	S		
30673	0	MOGOCHA	S	R	
30683	0	EROFEJ PAVLOVIC	S		
30692	0	SKOVORODINO	S		
30695	0	DZALINDA	S		
30703	0	INGA	S		
30710	0	IRKUTSK	S		
30712	0	USOL'E-SIBIRSKOE	S		
30714	0	DABADY	S		
30715	0	ANGARSK		R	
30731	0	GORJACINSK	S		
30739	0	HORINSK	S		
30741	0	ZAMAKTA	S		
30745	0	SOSNOVO-OZERSKOE	S		
30758	0	CHITA	S	R	
30764	0	USUGLI	S		
30777	0	SRETENSK	S		
30781	0	URJUPINO	S		
30802	0	MONDY	S		
30815	0	HAMAR-DABAN	S		
30822	0	BABUSHKIN	S		
30823	0	ULAN-UDE	S		
30829	0	NOVOSELENGINSK	S		
30838	0	PETROVSKIJ ZAVOD	S		
30844	0	HILOK	S		
30846	0	ULETY	S		
30859	0	AGINSKOE	S		
30862	0	SHILKA	S		
30879	0	NERCHINSKIJ ZAVOD	S		
30925	0	KJAHTA	S		
30935	0	KRASNYJ CHIKOJ	S	R	
30949	0	KYRA	S		
30957	0	AKSA	S		
30965	0	BORZYA	S	R	
30975	0	PRIARGUNSK	S		
31004	0	ALDAN	S	R	
31005	0	TOMMOT	S		
31011	0	BUYAGA	S		
31016	0	UGINO	S		
31026	0	UCHUR	S		
31041	0	UST'-MIL'	S		
31054	0	UST'-JUDOMA	S		
31062	0	YUGORENOK	S		
31083	0	HEJDZHAN	S		
31087	0	UL'YA	S		
31088	0	OHOTSK	S	R	
31096	0	SPAFAR'EVA (OSTROV)	S		
31102	0	KANKU	S		
31123	0	CJUL'BJU	S		
31137	0	TOKO	S		
31152	0	NEL'KAN	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
31168	0	AYAN	S	R	
31174	0	BOL'SHOJ SHANTAR	S		
31253	0	BOMNAK	S		
31285	0	UDSKOE	S		
31295	0	MAGDAGACI	S		
31300	0	ZEJA	S	R	
31329	0	EKIMCHAN	S		
31348	0	BURUKAN	S		
31369	0	NIKOLAEVSK-NA-AMURE	S	R	
31371	0	CHERNJAEVO	S		
31388	0	NORSK	S		
31416	0	IM POLINY OSIPENKO	S		
31418	0	VESELAJA GORKA	S		
31439	0	BOGORODSKOE	S		
31442	0	SIMANOVSK	S		
31445	0	SVOBODNYJ	S		
31474	0	UST'-UMAL'TA	S		
31478	0	SOFIJSKIJ PRIISK	S		
31484	0	HULARIN	S		
31489	0	GORIN	S		
31510	0	BLAGOVESCEMSK		R	
31512	0	BLAGOVESCEMSK	S		
31521	0	BRATOLJUBOVKA	S		
31527	0	ZAVITAJA	S		
31532	0	CEKUNDA	S		
31534	0	SEKTAGLI	S		
31538	0	SUTUR	S	R	
31561	0	KOMSOMOL'SK-NA-AMURE	S		
31587	0	POJARKOVO	S		
31594	0	ARHARA	S		
31624	0	URMI	S		
31632	0	KUR	S		
31655	0	TROICKOE	S		
31683		TUMNIN	S		
31702	0	OBLUC'E	S		
31707	0	EKATERINO-NIKOL'SKOE	S		
31713	0	BIROBIDZHAN	S		
31725	0	SMIDOVICH	S		
31733	0	ELABUGA	S		
31735	0	HABAROVSK	S		
31736	0	HABAROVSK		R	
31754	0	TIVJAKU	S		
31770	0	SOVETSKAYA GAVAN'	S	R	
31801	0	GVASJUGI	S		
31825	0	AGZU	S		
31832	0	BIKIN	S		
31845	0	KRASNYJ JAR	S		
31866	0	SOSUNOVO	S		
31873	0	DAL'NERECHENSK	S	R	
31878	0	KIROVSKIJ	S		
31909	0	TERNEJ	S		
31915	0	POGRANICHNYJ	S		
31921	0	ASTRAHANKA	S		
31959	0	RUDNAJA PRISTAN'	S		
31960	0	VLADIVOSTOK	S		
31961	0	TIMIRYAZEVSKIJ	S		
31969	0	POS'ET	S		
31977	0	VLADIVOSTOK (SAD GOROD)		R	
31981	0	ANUCINO	S		
31987	0	PARTIZANSK	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
31989	0	PREOBRAZHENIE	S		
32027	0	POGIBI	S		
32053	0	NOGLIKI	S		
32061	0	ALEKSANDROVSK-SAHALINSKIJ	S	R	
32069	0	PIL'VO	S		
32076	0	POGRANICHNOE	S		
32098	0	PORONAJSK	S	R	
32099	0	MYS TERPENIYA	S		
32121	0	ILYINSKIY	S		
32150	0	JUZHNO-SAHALINSK	S	R	
32165	0	JUZHNO-KURIL'SK	S		
32213	0	MYS LOPATKA	S		
32215	0	SEVERO-KURIL'SK	S	R	
32222	0	TEVI	S		
32252	0	UST'-VOYAMPOLKA	S		
32287	0	UST'-HAJRYUZOVO	S		
32333	0	OZERNOJ (MYS)	S		
32389	0	KLJUCHI	S	R	
32408	0	UST'-KAMCHATSK	S		
32411	0	ICHA	S		
32477	0	SOBOLEVO	S	R	
32509	0	SEMYACHIK	S		
32519	0	KRONOKI	S		
32540	0	PETROPAVLOVSK-KAMCHATSKIJ		R	
32562	0	BOL'SHERETZK	S		
32583	0	PETROPAVLOVSK-KAMCHATSKIJ	S		
32594	0	OZERNAJA	S		
32618	0	OSTROV BERINGA	S		
35001	0	BOL'SHAYA GLUSHITSA	S		
35007	0	PERELYUB	S		
35026	0	ZILAIR	S		
35037	0	AK'YAR	S		
35011	0	SOROCHINSK	S		
35121	0	ORENBURG	S	R	
35127	0	AKBULAK	S		
35138	0	ORSK	S		
36021	0	KLJUCI	S		
36022	0	VOLCIHA	S		
36034	0	RUBCOVSK	S		
36038	0	ZMEINOGORSK	S		
36058	0	CHEMAL	S		
36061	0	TUROCHAK	S		
36064	0	YAJLYU	S		
36073	0	KANTEGIR	S		
36078	0	TELI	S		
36083	0	UST'-USA	S		
36090	0	HOVU-AKSY	S		
36091	0	NISHCHNEUSINSKOE	S		
36092	0	TURAN	S		
36096	0	KYZYL	S	R	
36103	0	TOORA-HEM	S		
36104	0	SARYG-SEP	S		
36229	0	UST'-KOKSA	S		
36259	0	KOSH-AGACH	S		
36278	0	MUGUR-AKSY	S		
36307	0	ERZIN	S		



INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
<b>SAUDI ARABIA</b>					
40356	0	TURAIIF	S		
40357	0	ARAR	S		
40360	0	GURIAT	S		
40361	0	AL-JOUF	S		
40362	0	RAFHA	S		
40369	0	HAQL	S		
40373	0	AL-QAISUMAH	S	R	
40375	0	TABUK	S	R	
40377	0	HAFR AL-BATIN	S		
40386	0	AL-HULAIFAH	S		
40394	0	HAIL	S	R	
40400	0	AL-WEJH	S		
40405	0	GASSIM	S		
40416	0	DHAHRAN	S		
40417	0	K.F.I.A. (KING FAHAD INT. AIRPORT) DAMMAM		R	
40420	0	AL-AHSA	S		
40430	0	AL-MADINAH	S	R	
40432	0	UQLAT AL-SUQOR	S		
40435	0	AL-DAWADAMI	S		
40437	0	KING KHALED INT. AIRPORT	S	R	
40438	0	RIYADH OBS. (O.A.P.)	S		
40439	0	YENBO	S		
41006	0	MUWAIH	S		
41010	0	LAYLA	S		
41014	0	OBAYLAH	S		
41016	0	SHAWALAH	S		
41024	0	JEDDAH (KING ABDUL AZIZ INT. AIRPORT)	S	R	
41036	0	AL-TAIF	S		
41061	0	WADI AL-DAWASSER AIRPORT	S		
41080	0	AL-QUNFUDAH	S		
41084	0	BISHA	S		
41112	0	ABHA	S	R	
41114	0	KHAMIS MUSHAIT	S		
41128	0	NAJRAN	S		
41136	0	SHARORAH	S		
41140	0	GIZAN	S		
<b>SRI LANKA</b>					
43415	0	VAVUNIYA	S		
43418	0	TRINCOMALEE	S		
43424	0	PUTTALAM	S		
43436	0	BATTICALOA	S		
43450	0	KATUNAYAKE	S		
43466	0	COLOMBO	S	R	
43473	0	NUWARA ELIYA	S		
43495	0	GALLE	S		
43497	0	HAMBANTOTA	S		
<b>TAJIKISTAN</b>					
38598	0	KAJRAKKUMSKOE VODOHRANILISHCHE	S		
38599	0	KHUDJANT	S		
38705	0	PENDZHIKENT	S		
38713	0	ISTARVSHAN	S		
38715	0	SHAHRISTANSKIY PEREVAL	S		
38718	0	ISKANDERKUL'	S		
38719	0	ANZOBSKIY PEREVAL	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
38725	0	MADRUSHKAT	S		
38734	0	DEHAVZ	S		
38744	0	LAHSH	S		
38836	0	DUSHANBE	S	R	
38838	0	ISAMBAJ	S		
38844	0	SANGLOK	S		
38846	0	KHOVALING	S		
38847	0	DANGARA	S		
38851	0	RASHT	S		
38856	0	DARVAZ	S		
38869	0	IRHT	S		
38875	0	KARAKUL'	S		
38878	0	MURGAB	S		
38932	0	GANDZHINA	S		
38933	0	KURGAN-TYUBE	S		
38944	0	PARKHAR	S		
38947	0	PYANDZH	S		
38951	0	RUSHAN	S		
38954	0	KHOROG	S	R	
38957	0	ISHKASHIM	S		
<b>THAILAND</b>					
48300	0	MAE HONG SON	S		
48303	0	CHIANG RAI	S		
48307	0	THUNG CHANG	S		
48310	0	PHAYAO	S		
48315	0	THA WANG PHA	S		
48325	0	MAE SARIANG	S		
48327	0	CHIANG MAI	S	R	
48328	0	LAMPANG	S		
48329	0	LAMPHUN	S		
48330	0	PHRAE	S		
48331	0	NAN	S		
48351	0	UTTARADIT	S		
48352	0	NONG KHAI	S		
48353	0	LOEI	S		
48354	0	UDON THANI	S		
48356	0	SAKON NAKHON	S		
48357	0	NAKHON PHANOM	S		
48372	0	SUKHOTHAI	S		
48374	0	LOM SAK	S		
48375	0	MAE SOT	S		
48376	0	TAK	S		
48377	0	BHUMIBOL DAM	S		
48378	0	PHITSANULOK	S		
48379	0	PHETCHABUN	S		
48380	0	KAM PHAENG PHET	S		
48381	0	KHON KAEN	S		
48382	0	KOSUM PHISAI	S		
48383	0	MUKDAHAN	S		
48385	0	UMPHANG	S		
48386	0	PICHIT AGROMET	S		
48400	0	NAKHON SAWAN	S		
48402	0	CHAI NAT AGROMET	S		
48403	0	CHAIYAPHUM	S		
48405	0	ROI ET	S		
48407	0	UBON RATCHATHANI	S	R	
48409	0	SISAKET AGROMET	S		
48413	0	WICHIAN BURI	S		
48415	0	AYUTTHAYA AGROMET	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
48416	0	THA TUM	S		
48418	0	BUA CHUM	S		
48419	0	PATHUMTHANI AGROMET	S		
48421	0	THONG PHA PHUM	S		
48425	0	SUPHAN BURI	S		
48426	0	LOP BURI	S		
48429	0	SUARNABHUMI INTERNATIONAL AIRPORT	S		
48430	0	PRACHIN BURI	S		
48431	0	NAKHON RATCHASIMA	S		
48432	0	SURIN	S		
48434	0	CHOK CHAI	S		
48436	0	NANG RONG	S		
48437	0	BURIRAM	S		
48439	0	KABIN BURI	S		
48440	0	SRAKAEW	S		
48450	0	KANCHANA BURI	S		
48451	0	NAKHONPATHOM AGROMET	S		
48453	0	BANGNA AGROMET	S	R	
48455	0	BANGKOK METROPOLIS	S		
48456	0	DON MUANG	S		
48458	0	CHACHOENGSAO AGROMET	S		
48459	0	CHON BURI	S		
48461	0	PHATTHAYA	S		
48462	0	ARANYAPRATHET	S		
48465	0	PHETCHABURI	S		
48475	0	HUA HIN	S		
48477	0	SATTAHIP	S		
48478	0	RAYONG	S		
48480	0	CHANTHA BURI	S		W
48500	0	PRACHUAP KHIRIKHAN	S		
48501	0	KHLONG YAI	S		
48517	0	CHUMPHON	S		
48532	0	RANONG	S		
48550	0	KO SAMUI	S		
48551	0	SURAT THANI	S		W
48552	0	NAKHONSI THAMMARAT	S		
48556	0	PHRASANG	S		
48557	0	CHAWANG	S		
48560	0	PHATTHALUNG AGROMET	S		
48561	0	TAKUA PA	S		
48563	0	KRABI	S		
48564	0	PHUKET	S		
48565	0	PHUKET AIRPORT	S	R	
48567	0	TRANG	S		
48568	0	SONGKHLA	S	R	
48569	0	HAT YAI AIRPORT	S		
48570	0	SATUN	S		
48574	0	SA DAO	S		
48583	0	NARATHIWAT	S		
<b>TURKMENISTAN</b>					
38388	0	EKEZHE	S		
38392	0	DASHOGUZ	S		
38507	0	TURKMENBASHI	S		
38507	1	TURKMENBASHI		R	
38511	0	CHAGYL	S		
38545	0	BIRATA	S		
38647	0	BEREKET	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
38656	0	ERBENT	S		
38687	0	TURKMENABAT	S		
38750	0	ESENGULY	S		
38763	0	SERDAR	S		
38774	0	BAKHARLY	S		
38799	0	BAGTIYARLYK	S		
38806	0	BURDALYK	S		
38880	0	ASHGABAT	S		
38886	0	TEDZHEN	S		
38895	0	BAYRAMALY	S		
38911	0	ATAMYRAT	S		
38915	0	KOYTENDAG	S		
38974	0	SARAKHS	S		
38987	0	SERKHETABAT	S		
<b>UNITED ARAB EMIRATES</b>					
41184	0	RAS AL KHAIMAH INTERNATIONAL AIRPORT	S		
41194	0	DUBAI INTERNATIONAL AIRPORT	S		
41196	0	SHARJAH INTER. AIRPORT	S		
41198	0	FUJAIRAH	S		
41217	0	ABU DHABI INTER. AIRPORT	S	R	
41218	0	AL AIN INT'L AIRPORT	S		
41200	0	DUBAI WORLD CENTRAL-DWC	S		
<b>UZBEKISTAN</b>					
38141	0	JASLYK	S		
38149	0	KUNGRAD	S		
38178	0	AK-BAJTAL	S		
38262	0	CHIMBAJ	S		
38264	0	NUKUS	S		
38396	0	URGENCH	S		
38403	0	BUZAUBAJ	S		
38413	0	TAMDY	S		
38457	0	TASHKENT	S		
38462	0	PSKEM	S		
38565	0	NURATA	S		
38579	0	DZIZAK	S		
38583	0	SYR-DAR'JA	S		
38611	0	NAMANGAN	S		
38618	0	FERGANA	S		
38683	0	BUHARA	S		
38696	0	SAMARKAND	S		
38812	0	KARSHI	S		
38927	0	TERMEZ	S		
<b>VIET NAM</b>					
48803	0	LAO CAI	S		
48806	0	SON LA	S		
48808	0	CAO BANG	S		
48823	0	NAM DINH	S		
48825	0	HA DONG	S		
48826	0	PHU LIEN	S		
48830	0	LANG SON	S		
48839	0	BACH LONG VI	S		
48840	0	THANH HOA	S		
48845	0	VINH	S		
48848	0	DONG HOI	S		
48852	0	HUE	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
48855	0	DA NANG	S	R	
48860	0	HOANG SA (PATTLE)	S		
48870	0	QUY NHON	S		
48877	0	NHA TRANG	S		
48887	0	PHAN THIET	S		
48892	0	SONG TU TAY (SOUTH WEST CAY)	S		
48900	0	TAN SON HOA	S	R	
48914	0	CA MAU	S		W
48916	0	THO CHU	S		
48917	0	PHU QUOC	S		
48918	0	CON SON	S		
48919	0	HUYEN TRAN	S		
48920	0	TRUONG SA	S		
<b>YEMEN</b>					
41363	0	AL-BOUQE	S		
41372	0	SAADA	S		
41391	0	HAJJAH	S		

INDEX	SUB-INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
41393	0	AL-JOUF	S		
41396	0	SEIYOUN	S		
41398	0	AL-GHAIDAH	S		
41399	0	AMRAN	S		
41404	0	SANA'A	S		
41407	0	MARIB	S		
41431	0	HODEIDAH	S		
41434	0	DHAMAR	S		
41437	0	ATAQ	S		
41438	0	AL-SADDAH	S		
41443	0	RIYAN	S		
41450	0	AL-KOOD	S		
41452	0	IBB	S		
41466	0	TAIZ	S		
41477	0	MOKHA	S		
41480	0	ADEN	S		
41481	0	TOWAHI	S		
41482	0	SAHAREEG	S		
41494	0	SOCOTRA	S		

**Note:** An up-to-date list of Regional Basic Synoptic Network stations is available at <http://www.wmo.int/pages/prog/www/ois/rbsn-rbcn/rbsn-rbcn-home.htm>.

### Annex 2 to Resolution 4 (RA II-15)

#### LIST OF STATIONS COMPRISING THE REGIONAL BASIC CLIMATOLOGICAL NETWORK IN REGION II

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
<b>AFGHANISTAN</b>					
40930	0	NORTH-SALANG	X	X	
40938	0	HERAT	X		
40942	0	CHAKHCHARAN	X		
40990	0	KANDAHAR AIRPORT	X		
<b>BAHRAIN</b>					
41150	0	BAHRAIN (INT. AIRPORT)	X	X	
<b>BANGLADESH</b>					
41859	0	RANGPUR	X		
41883	0	BOGRA	X		
41891	0	SYLHET	X		
41907	0	ISHWARDI	X		
41923	0	DHAKA	X		
41936	0	JESSORE	X		
41943	0	FENI	X		
41950	0	BARISAL	X		

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
41978	0	CHITTAGONG (PATENGA)	X		
41992	0	COX'S BAZAR	X		
<b>CAMBODIA</b>					
48966	0	SIEMREAP	X		
48991	0	PHNOM-PENH/POCHENTONG	X		
<b>CHINA</b>					
50527	0	HAILAR	X	X	
50527	1	HAILAR			X
50745	0	QIQIHAR	X	X	
50963	0	TONGHE	X		
51076	0	ALTAY	X	X	
51243	0	KARAMAY	X		
51431	0	YINING	X		
51463	0	WU LU MU QI	X	X	
51644	0	KUQA	X		
51656	0	KORLA	X		
51709	0	KASHI	X	X	X
51747	0	TAZHONG	X		

<sup>1</sup> GCOS Surface Network (GSN) and GCOS Upper-Air Network (GUAN) for reference only

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
51777	0	RUOQIANG	X	X	
51828	0	HOTAN	X	X	
52203	0	HAMI	X	X	
52267	0	EJIN QI	X		
52323	0	MAZONG SHAN	X		
52418	0	DUNHUANG	X		
52495	0	BAYAN MOD	X		
52533	0	JIUQUAN	X	X	
52681	0	MINQIN	X		X
52836	0	DOULAN	X	X	
52866	0	XINING	X		
52983	0	YU ZHONG	X	X	
53068	0	ERENHOT	X	X	X
53336	0	HALIUT	X		
53463	0	HOHHOT	X		
53614	0	YINCHUAN	X	X	
53845	0	YAN AN	X		
54026	0	JARUD QI	X		
54102	0	XILIN HOT	X		
54161	0	CHANGCHUN	X		
54218	0	CHIFENG	X		
54292	0	YANJI	X		
54342	0	SHENYANG	X	X	
54511	0	BEIJING	X	X	
54823	0	JINAN	X		
54857	0	QINGDAO	X	X	
55228	0	SHIQUANHE	X		
55299	0	NAGQU			X
55472	0	XAINZA	X		
55591	0	LHASA	X	X	
56004	0	TUOTUOHE	X		
56029	0	YUSHU	X		
56046	0	DARLAG	X		
56079	0	RUO'ERGAI	X		
56106	0	SOG XIAN	X		
56137	0	QAMDO	X	X	
56187	0	WENJIANG	X	X	
56444	0	DEQEN	X		
56571	0	XICHANG	X	X	
56739	0	TENGCHONG	X	X	
56778	0	KUNMING	X		X
56964	0	SIMAO	X		
56985	0	MENGZI	X	X	
57083	0	ZHENGZHOU	X	X	
57461	0	YICHANG	X	X	X
57494	0	WUHAN	X		
57516	0	CHONGQING	X		
57687	0	CHANGSHA	X		
57745	0	ZHIJIANG	X	X	
57816	0	GUIYANG	X		
57993	0	GANZHOU	X	X	

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
58027	0	XUZHOU	X		
58238	0	NANJING	X		
58362	0	SHANGHAI (BAOSHAN)	X	X	
58606	0	NANCHANG	X	X	
58633	0	QUZHOU	X		
58666	0	DACHEN DAO	X		
58847	0	FUZHOU	X		
58968	0	TAIBEI	X		
59211	0	BAISE	X		
59287	0	GUANGZHOU	X	X	
59316	0	SHANTOU	X	X	
59358	0	TAINAN	X		
59431	0	NANNING	X	X	
59758	0	HAIKOU	X	X	
59792	0	DONGSHA DAO	X		
59948	0	SANYA	X		
59981	0	XISHA DAO	X		
<b>DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA</b>					
47014	0	CHUNGGANG	X	X	
47016	0	HYESAN	X		
47025	0	KIMCHAEK	X		
47035	0	SINUJU	X		
47055	0	WONSAN	X		
47058	0	PYONGYANG	X		
47069	0	HAEJU	X		
<b>HONG KONG, CHINA</b>					
45004	0	KOWLOON	X		X
<b>INDIA</b>					
42027	0	SRINAGAR	X	X	
42071	0	AMRITSAR	X		
42083	0	SHIMLA	X	X	
42147	0	MUKTESHWAR KUMAON	X		
42165	0	BIKANER	X	X	
42182	0	NEW DELHI/ SAFDARJUNG	X	X	
42295	0	DARJEELING	X	X	
42314	0	DIBRUGARH/ MOHANBARI	X		
42339	0	JODHPUR	X		
42379	0	GORAKHPUR	X		
42404	0	DHUBRI	X		
42410	0	GUWAHATI	X	X	
42452	0	KOTA AERODROME	X		
42475	0	ALLAHABAD/ BAMHRAULI	X		
42515	0	CHERRAPUNJI	X	X	
42539	0	DEESA	X	X	
42587	0	DALTONGANJ	X	X	
42619	0	SILCHAR	X		
42647	0	AHMADABAD	X		
42671	0	SAGAR	X	X	

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
42731	0	DWARKA	X	X	
42754	0	INDORE	X		
42779	0	PENDRA ROAD	X	X	
42798	0	JAMSHEDPUR	X		
42807	0	KOLKATA/ALIPORE	X		
42867	0	NAGPUR SONEGAON	X		
42909	0	VERAVAL	X		
42933	0	M.O. AKOLA	X		
42971	0	BHUBANESHWAR	X		
42977	0	SANDHEADS	X		
43041	0	JAGDALPUR	X	X	
43057	0	BOMBAY/COLABA	X		
43063	0	PUNE	X	X	
43128	0	HYDERABAD AIRPORT	X	X	
43150	0	VISHAKHAPATNAM/ WALT AIR	X		
43185	0	MACHILIPATNAM/ FRANCHPET	X		
43192	0	GOA/PANJIM	X		
43198	0	BELGAUM/SAMBRE	X		
43279	0	CHENNAI/ MINAMBAKKAM	X	X	
43284	0	MANGALORE/BAJPE	X		
43295	0	BANGALORE	X	X	
43311	0	AMINIDIVI	X		
43314	0	KOZHICODE	X		
43333	0	PORT BLAIR	X	X	
43339	0	KODAIKANAL	X	X	
43363	0	PAMBAN	X	X	
43369	0	MINICOY	X	X	
43371	0	THIRUVANANTHAPURA M	X		
<b>IRAN, ISLAMIC REPUBLIC OF</b>					
40706	0	TABRIZ	X	X	
40712	0	ORUMIEH	X		
40718	0	ANZALI	X		
40745	0	MASHHAD	X	X	X
40754	0	TEHRAN-MEHRABAD	X	X	
40766	0	KERMANS SHAH	X	X	
40800	0	ESFAHAN	X		
40827	0	NEHBANDAN	X		
40831	0	ABADAN	X		
40841	0	KERMAN	X	X	
40848	0	SHIRAZ	X	X	
40856	0	ZAHEDAN	X	X	
40879	0	IRANSHAHR	X		
<b>IRAQ</b>					
40608	0	MOSUL	X		
40621	0	KIRKUK	X		
40634	0	HADITHAH	X		
40637	0	KHANAQIN	X		
40642	0	RUTBAH	X		

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
40665	0	KUT-AL-HAI	X	X	
40676	0	NASIRIYA	X		
<b>JAPAN</b>					
47401	0	WAKKANAI	X	X	
47407	0	ASAHIKAWA	X		
47409	0	ABASHIRI	X		
47412	0	SAPPORO	X		X
47418	0	KUSHIRO	X		
47420	0	NEMURO	X	X	
47421	0	SUTTSU	X		
47426	0	URAKAWA	X		
47430	0	HAKODATE	X		
47570	0	WAKAMATSU	X		
47575	0	AOMORI	X		
47582	0	AKITA	X	X	
47584	0	MORIOKA	X		
47590	0	SENDAI	X		
47600	0	WAJIMA	X	X	
47604	0	NIIGATA	X		
47605	0	KANAZAWA	X		
47610	0	NAGANO	X		
47624	0	MAEBASHI	X		
47629	0	MITO	X		
47636	0	NAGOYA	X		
47646	0	TATENO			X
47648	0	CHOSHI	X	X	
47651	0	TSU	X		
47655	0	OMAEZAKI	X		
47662	0	TOKYO	X		
47675	0	OSHIMA	X		
47678	0	HACHIJOJIMA	X		
47740	0	SAIGO	X		
47741	0	MATSUE	X		
47746	0	TOTTORI	X		
47750	0	MAIZURU	X		
47765	0	HIROSHIMA	X		
47772	0	OSAKA	X		
47778	0	SHIONOMISAKI	X	X	
47800	0	IZUHARA	X		
47807	0	FUKUOKA	X		
47815	0	OITA	X	X	
47817	0	NAGASAKI	X	X	
47827	0	KAGOSHIMA	X		X
47830	0	MIYAZAKI	X		
47843	0	FUKUE	X		
47887	0	MATSUYAMA	X		
47891	0	TAKAMATSU	X		
47893	0	KOCHI	X		
47895	0	TOKUSHIMA	X		
47909	0	NAZE	X		
47918	0	ISHIGAKIJIMA	X		X

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
47927	0	MIYAKOJIMA	X	X	
47936	0	NAHA	X	X	
47945	0	MINAMIDAITOJIMA	X	X	
47971	0	CHICHIJIMA	X	X	X
47991	0	MINAMITORISHIMA	X	X	X
<b>KAZAKHSTAN</b>					
28676	0	PETROPAVLOVSK	X		
28766	0	BLAGOVESHCHENKA	X		
28879	0	KOKSHETAY	X		
28952	0	KOSTANAY	X	X	
28966	0	RUZAEVKA	X		
28978	0	BALKASINO	X		
29807	0	ERTIS	X	X	
35067	0	ESIL'	X		
35078	0	ATBASAR	X	X	
35108	0	URALSK	X	X	
35188	0	ASTANA	X		
35217	0	DZHAMBETJY	X		
35229	0	AKTOBE	X		
35357	0	BARSHINO	X		
35394	0	KARAGANDA	X	X	
35406	0	TAIPAK	X		
35416	0	UIL	X	X	
35426	0	TEMIR	X		
35532	0	MUGODZARSKAJA	X		
35576	0	KYZYLZHAR	X		
35700	0	ATYRAU	X		
35746	0	ARALSKOE MORE	X		
35796	0	BALHASH	X	X	
35849	0	KAZALINSK	X	X	
35925	0	SAM	X	X	
35953	0	DZHUSALY	X		
36003	0	PAVLODAR	X		
36177	0	SEMIPALATINSK	X	X	
36208	0	RIDDER	X		
36428	0	ULKEN NARYN	X		
36535	0	KOKPEKTY	X	X	
36859	0	ZHARKENT	X	X	
36870	0	ALMATY	X	X	
38062	0	KYZYLORDA	X		
38069	0	CHIILI	X		
38198	0	TURKESTAN	X		
38232	0	AKKUDUK	X		
38328	0	SHYMKENT	X		
38334	0	AUL TURARA RYSKULOVA	X		
38341	0	TARAZ	X		
38343	0	KULAN	X		
38439	0	CHARDARA	X		
<b>KUWAIT</b>					
40582	0	KUWAIT	X	X	

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
		INTERNATIONAL AIRPORT			
<b>KYRGYZSTAN</b>					
36974	0	NARYN	X	X	
36982	0	TIAN-SHAN'	X		
38345	0	TALAS	X		
38353	0	BISHKEK	X	X	
38616	0	KARA-SUU	X		
<b>LAO PEOPLE'S DEMOCRATIC REPUBLIC</b>					
48930	0	LUANG-PRABANG	X		
48940	0	VIENTIANE	X		
48947	0	SAVANNAKHET	X		
48955	0	PAKSE	X		
<b>MACAO, CHINA</b>					
45011	0	TAIPA GRANDE	X		
<b>MALDIVES</b>					
43555	0	MALE	X	X	
43599	0	GAN	X		X
<b>MONGOLIA</b>					
44203	0	RINCHINHUMBE	X		
44207	0	HATGAL	X		
44212	0	ULAANGOM	X	X	
44213	0	BARUUNTURUUN	X		
44214	0	ULGI	X		
44215	0	OMNO-GOBI	X		
44218	0	HOVD	X	X	
44230	0	TARIALAN	X		
44231	0	MUREN	X	X	
44232	0	HUTAG	X		
44239	0	BULGAN	X	X	
44241	0	BARUUNHARAA	X		
44256	0	DASHBALBAR	X		
44259	0	CHOIBALSAN	X	X	
44265	0	BAITAG	X		
44272	0	ULIASTAI	X	X	
44277	0	ALTAI	X		
44282	0	TSETSERLEG	X		
44284	0	GALUUT	X		
44285	0	HUJIRT	X		
44287	0	BAYANHONGOR	X		
44288	0	ARVAIHEER	X	X	
44292	0	ULAANBAATAR (CTBT)	X		
44294	0	MAANTI	X		
44298	0	CHOIR	X		
44302	0	BAYAN-OVOO	X		
44304	0	UNDERKHAAN	X		
44305	0	BARUUN-URT	X		
44313	0	KHALKH-GOL	X		
44314	0	MATAD	X		
44317	0	ERDENETSAGAAN	X	X	

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
44336	0	SAIKHAN-OVOO	X		
44341	0	MANDALGOBI	X	X	
44347	0	TSOGT-OVOO	X		
44352	0	BAYANDELGER	X		
44373	0	DALANZADGAD	X	X	
<b>MYANMAR</b>					
48008	0	MYITKYINA	X		
48042	0	MANDALAY	X	X	
48062	0	SITTWE	X	X	
48097	0	YANGON	X	X	
48112	0	VICTORIA POINT	X		
<b>NEPAL</b>					
44454	0	KATHMANDU AIRPORT	X	X	
44477	0	DHANKUTA	X		
<b>OMAN</b>					
41246	0	SOHAR MAJIS	X		
41253	0	RUSTAQ	X		
41254	0	SAIQ	X	X	
41256	0	SEEB, INT'L AIRPORT	X		
41262	0	FAHUD	X		
41264	0	ADAM	X		
41265	0	IBRA	X		
41268	0	SUR	X		
41288	0	MASIRAH	X	X	
41304	0	MARMUL	X		
41314	0	THUMRAIT	X		
41316	0	SALALAH	X	X	
<b>PAKISTAN</b>					
41515	0	DROSH	X		
41529	0	PESHAWAR	X		
41560	0	PARACHINAR	X	X	
41571	0	ISLAMABAD AIRPORT	X		
41594	0	SARGODHA	X		
41598	0	JHELUM	X		
41600	0	SIALKOT	X		
41620	0	ZHOB	X	X	
41624	0	DERA ISMAIL KHAN	X		
41640	0	LAHORE CITY	X	X	
41660	0	QUETTA AIRPORT	X		
41675	0	MULTAN	X		
41685	0	BARKHAN	X		
41710	0	NOKKUNDI	X		
41712	0	DAL BANDIN	X	X	
41715	0	JACOBABAD	X		
41718	0	KHANPUR	X		
41739	0	PANJGUR	X		
41744	0	KHUZDAR	X		
41749	0	NAWABSHAH	X		
41756	0	JIWANI	X		
41759	0	PASNI	X	X	

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
41764	0	HYDERABAD	X	X	
41768	0	CHHOR	X		
41780	0	KARACHI AIRPORT	X		X
<b>QATAR</b>					
41170	0	DOHA INTERNATIONAL AIRPORT	X	X	
<b>REPUBLIC OF KOREA</b>					
47101	0	CHUNCHEON	X		
47105	0	GANGNEUNG	X		
47108	0	SEOUL	X		
47112	0	INCHEON	X	X	
47115	0	ULLEUNGDO	X	X	
47133	0	DAEJEON	X		
47138	0	POHANG	X		X
47159	0	BUSAN	X		
47165	0	MOKPO	X	X	
47168	0	YEOSU	X		
47184	0	JEJU	X		
<b>RUSSIAN FEDERATION</b>					
20046	0	POLARGMO IM. E.T. KRENKELJA	X	X	
20069	0	OSTROV VIZE	X	X	
20087	0	OSTROV GOLOMJANNYJ	X	X	
20292	0	GMO IM.E.K. FEDOROVA	X	X	
20476	0	MYS STERLEGOVA	X		
20667	0	IM. M.V. POPOVA	X	X	
20674	0	OSTROV DIKSON	X	X	X
20744	0	MALYE KARMAKULY	X	X	
20891	0	HATANGA	X	X	
20982	0	VOLOCHANKA	X	X	
21432	0	OSTROV KOTEL'NYJ	X	X	
21802	0	SASKYLAH	X	X	
21908	0	DZALINDA	X		
21921	0	KJUSJUR	X	X	
21931	0	JUBILEJNAJA	X	X	
21946	0	CHOKURDAH	X	X	
21982	0	OSTROV VRANGELJA	X	X	
23022	0	AMDERMA	X		
23032	0	MARESALE	X		
23058	0	ANTIPAJUTA	X		
23074	0	DUDINKA	X	X	
23205	0	NAR'JAN-MAR	X	X	
23242	0	NOVYJ PORT	X		
23256	0	TAZOVSKIJ	X		
23274	0	IGARKA	X		
23324	0	PETRUN'	X		
23330	0	SALEHARD	X	X	
23383	0	AGATA	X	X	
23405	0	UST'-CIL'MA	X	X	
23445	0	NADYM	X		

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
23463	0	YANOV-STAN	X		
23472	0	TURUHAN SK	X	X	X
23552	0	TARKO-SALE	X	X	
23631	0	BEREZOVO	X	X	
23662	0	TOL'KA	X		
23678	0	VERHNEIMBATSK	X	X	
23711	0	TROICKO-PECHERSKOE	X	X	
23724	0	NJAKSIMVOL'	X	X	
23734	0	OKTJABR'SKOE	X		
23867	0	LAR' YAK	X		
23884	0	BOR	X	X	
23891	0	BAJKIT	X	X	
23914	0	CHERDYN'	X	X	
23921	0	IVDEL'	X		X
23933	0	HANTY-MANSIJSK	X	X	
23955	0	ALEKSANDROVSKOE	X	X	
23966	0	VANZIL'-KYNAK	X		
23986	0	SEVERO-ENISEJSK	X		
24125	0	OLENEK	X	X	
24136	0	SUHANA	X		
24143	0	DZARDZAN	X	X	
24266	0	VERHOJANSK	X	X	X
24329	0	SHELAGONTSY	X	X	
24343	0	ZHIGANSK	X	X	
24382	0	UST'-MOMA	X	X	
24507	0	TURA	X	X	
24606	0	KISLOKAN	X		
24641	0	VILJUJSK	X	X	
24661	0	SEGEN-KYUEL'	X		
24671	0	TOMPO	X	X	
24688	0	OJMJAKON	X	X	
24713	0	NAKANNO	X		
24738	0	SUNTAR	X	X	
24790	0	SUSUMAN	X		
24817	0	ERBOGACEN	X	X	
24908	0	VANAVARA	X	X	
24959	0	JAKUTSK	X	X	
24966	0	UST'-MAJYA	X	X	
24967	0	TEGYULTYA	X		
25062	0	MYS BILLINGSA	X		
25138	0	OSTROVNOE	X		
25173	0	MYS SHMIDTA	X	X	
25206	0	SREDNEKOLYMSK	X		
25248	0	ILIRNEJ	X	X	
25282	0	MYS VANKAREM	X		
25325	0	UST'-OLOJ	X	X	
25356	0	EN' MUVEEM	X	X	
25378	0	EGVEKINOT	X		
25399	0	MYS UELEN	X	X	
25400	0	ZYRYANKA	X	X	
25428	0	OMOLON	X		

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
25503	0	KORKODON	X		
25538	0	VERHNEE PENZINO	X	X	
25551	0	MARKOVO	X	X	
25563	0	ANADYR'	X	X	
25594	0	BUHTA PROVIDENJA	X	X	
25677	0	BERINGOVSKAJA	X		
25705	0	SREDNIKAN	X	X	
25745	0	KAMENSKOE	X	X	
25927	0	BROHOVO	X	X	
25932	0	TAJGONOS	X		
28009	0	KIRS	X	X	
28064	0	LEUSI	X	X	
28138	0	BISER	X	X	
28224	0	PERM'	X	X	
28255	0	TURINSK	X		
28275	0	TOBOL'SK	X	X	
28418	0	SARAPUL	X	X	
28434	0	KRASNOUFIMSK	X		
28493	0	TARA	X	X	
28552	0	SADRINSK	X	X	
28573	0	ISHIM	X		
28666	0	MAKUSINO	X		
28698	0	OMSK	X	X	
28698	1	OMSK			X
28704	0	CULPANOVO	X		
28722	0	UFA-DIOMA	X	X	
28748	0	TROI ZK	X		
29111	0	SREDNY VASJUGAN	X		
29231	0	KOLPASEVO	X	X	
29263	0	ENISEJSK	X	X	
29282	0	BOGUCANY	X	X	
29313	0	PUDINO	X		
29328	0	BAKCHAR	X		
29379	0	TASEEVO	X		
29570	0	KRASNOJARSK OPYTNOE POLE	X	X	
29594	0	TAJSHET	X		
29612	0	BARABINSK	X	X	
29645	0	KEMEROVSKIJ	X		
29752	0	NENASTNAYA	X		
29789	0	VERHNJAJA GUTARA	X	X	
29862	0	ABAKAN			X
29866	0	MINUSINSK	X	X	
29939	0	BIJSK ZONAL'NAYA	X	X	
30054	0	VITIM	X	X	
30089	0	DZHIKIMDA	X		
30230	0	KIRENSK	X	X	X
30252	0	MAMAKAN	X		
30309	0	BRATSK	X	X	
30372	0	CHARA	X	X	
30385	0	UST'-NJUKZHA	X		
30433	0	NIZHNEANGARSK	X	X	



INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
30521	0	ZHIGALOVO	X		
30554	0	BAGDARIN	X	X	
30612	0	BALAGANSK	X		
30636	0	BARGUZIN	X	X	
30650	0	ROMANOVKA	X		
30673	0	MOGOCHA	X	X	
30710	0	IRKUTSK	X	X	
30758	0	CHITA	X	X	
30777	0	SRETENSK	X		
30844	0	HILOK	X		
30879	0	NERCHINSKIJ ZAVOD	X	X	
30925	0	KJAHTA	X	X	
30935	0	KRASNYJ CHIKOJ	X		
30949	0	KYRA	X	X	
30965	0	BORZYA	X	X	
31004	0	ALDAN	X	X	
31088	0	OHOTSK	X	X	X
31137	0	TOKO	X		
31152	0	NEL' KAN	X		
31168	0	AYAN	X	X	
31174	0	BOL'SHOJ SHANTAR	X		
31253	0	BOMNAK	X	X	
31329	0	EKIMCHAN	X	X	
31369	0	NIKOLAEVSK-NA-AMURE	X	X	
31416	0	IM POLINY OSIPENKO	X	X	
31439	0	BOGORODSKOE	X		
31478	0	SOFIJSKIJ PRIISK	X		
31707	0	EKATERINO-NIKOL'SKOE	X	X	
31770	0	SOVETSKAYA GAVAN'	X		
31873	0	DAL'NERECHENSK	X	X	
31960	0	VLADIVOSTOK	X	X	
31961	0	TIMIRYAZEVSKIJ	X		
31989	0	PREOBRAZHENIE	X		
32027	0	POGIBI	X		
32061	0	ALEKSANDROVSK-SAHALINSKIJ	X	X	
32076	0	POGRANICHNOE	X		
32098	0	PORONAJSK	X	X	
32099	0	MYS TERPENIYA	X		
32150	0	JUZHNO-SAHALINSK	X	X	
32165	0	JUZHNO-KURL'SK	X		
32213	0	MYS LOPATKA	X		
32252	0	UST'-VOYAMPOLKA	X	X	
32287	0	UST'-HAJRJUZOVO	X		
32389	0	KLJUCHI	X	X	
32477	0	SOBOLEVO	X		
32509	0	SEMYACHIK	X		
32540	0	PETROPAVLOVSK-KAMCHATSKIJ			X
32618	0	OSTROV BERINGA	X	X	
35011	0	SOROCHINSK	X	X	

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
35121	0	ORENBURG			X
36038	0	ZMEINOGORSK	X		
36064	0	YAJLJU	X		
36096	0	KYZYL	X		
36229	0	UST'-KOKSA	X		
36259	0	KOSH-AGACH	X	X	
36307	0	ERZIN	X		
<b>SAUDI ARABIA</b>					
40356	0	TURAIF	X		
40357	0	ARAR	X		
40360	0	GURIAT	X		
40361	0	AL-JOUF	X	X	
40362	0	RAFHA	X		
40373	0	AL-QAISUMAH	X		
40375	0	TABUK	X		
40377	0	HAFR AL-BATIN	X		
40394	0	HAIL	X	X	
40400	0	AL-WEJH	X		
40405	0	GASSIM	X		
40410	0	KHAYBER	X		
40416	0	DHAHRAN	X		
40420	0	AL-AHSA	X		
40430	0	AL-MADINAH	X	X	
40435	0	AL-DAWADAMI	X		
40437	0	KING KHALED INT. AIRPORT	X		
40438	0	RIYADH OBS. (O.A.P.)	X	X	
40439	0	YENBO	X		
41006	0	MUWAIH	X		
41024	0	JEDDAH (KING ABDUL AZIZ INT. AIRPORT)	X	X	
41030	0	MAKKAH	X		
41036	0	AL-TAIF	X		
41061	0	WADI AL-DAWASSER AIRPORT	X		
41084	0	BISHA	X		
41112	0	ABHA	X		X
41114	0	KHAMIS MUSHAIT	X		
41128	0	NAJHRAN	X		
41136	0	SHARORAH	X		
41140	0	GIZAN	X	X	
41141	0	GIZAN	X		
<b>SRI LANKA</b>					
43418	0	TRINCOMALEE	X		
43424	0	PUTTALAM	X		
43436	0	BATTICALOA	X	X	
43466	0	COLOMBO	X	X	
43473	0	NUWARA ELIYA	X	X	
43497	0	HAMBANTOTA	X	X	
<b>TAJIKISTAN</b>					
38599	0	KHUDJANT	X		

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
38715	0	SHAHRISTANSKIJ PEREVAL	X		
38725	0	MADRUSHKAT	X		
38734	0	DEHAVZ	X		
38744	0	LAHSH	X		
38836	0	DUSHANBE	X		
38851	0	RASHT	X		
38856	0	DARVAZ	X		
38869	0	IRHT	X		
38878	0	MURGAB	X		
38933	0	KURGAN-TYUBE	X	X	
38944	0	PARKHAR	X		
38954	0	KHOROG	X	X	
<b>THAILAND</b>					
48303	0	CHIANG RAI	X	X	
48327	0	CHIANG MAI	X		X
48354	0	UDON THANI	X		
48378	0	PHITSANULOK	X		
48400	0	NAKHON SAWAN	X	X	
48431	0	NAKHON RATCHASIMA	X		
48453	0	BANGNA AGROMET	X		X
48455	0	BANGKOK METROPOLIS	X		
48462	0	ARANYAPRATHET	X	X	
48480	0	CHANTHA BURI	X		
48500	0	PRACHUAP KHIRIKHAN	X	X	
48517	0	CHUMPHON	X	X	
48568	0	SONGKHLA	X	X	
<b>TURKMENISTAN</b>					
38388	0	EKEZHE	X		
38392	0	DAHSOGUZ	X		
38507	0	TURKMENBASHI	X	X	
38511	0	CHAGYL	X		
38545	0	BIRATA	X		
38656	0	ERBENT	X		
38687	0	TURKMENABAT	X		
38750	0	ESENGULY	X	X	
38763	0	SERDAR	X	X	
38880	0	ASHGABAT	X		
38895	0	BAYRAMALY	X	X	
38915	0	KOYTENDAG	X	X	
38974	0	SARAKHS	X		

INDEX	SUB-INDEX	STATION NAME	GCOS1		
			CLIMAT	GSN	GUAN
<b>UNITED ARAB EMIRATES</b>					
41196	0	SHARJAH INTER. AIRPORT	X	X	
41217	0	ABU DHABI INTER. AIRPORT	X		X
<b>UZBEKISTAN</b>					
38178	0	AK-BAJTAL	X		
38262	0	CHIMBAJ	X	X	
38396	0	URGENCH	X		
38403	0	BUZAUBAJ	X		
38413	0	TAMDY	X	X	
38457	0	TASHKENT	X	X	
38611	0	NAMANGAN	X		
38618	0	FERGANA	X		
38683	0	BUHARA	X		
38696	0	SAMARKAND	X		
38812	0	KARSHI	X		
38927	0	TERMEZ	X		
<b>VIET NAM</b>					
48806	0	SON LA	X		
48808	0	CAO BANG	X		
48825	0	HA DONG	X		
48826	0	PHU LIEN	X		
48830	0	LANG SON	X		
48840	0	THANH HOA	X		
48845	0	VINH	X		
48848	0	DONG HOI	X		
48852	0	HUE	X		
48855	0	DA NANG	X	X	
48870	0	QUY NHON	X		
48877	0	NHA TRANG	X		
48887	0	PHAN THIET	X		
48892	0	SONG TU TAY (SOUTH WEST CAY)	X		
48900	0	TAN SON HOA	X	X	
48914	0	CA MAU	X		
48920	0	TRUONG SA	X		
<b>YEMEN</b>					
41407	0	MARIB	X		
41443	0	RIYAN	X		
41480	0	ADEN	X		
41494	0	SOCOTRA	X		

**Note:** An up-to-date list of Regional Basic Climatological Network stations is available at <http://www.wmo.int/pages/prog/www/ois/rbsn-rbcn/rbsn-rbcn-home.htm>.

**Resolution 5 (RA II-15)****WMO INFORMATION SYSTEM`**

REGIONAL ASSOCIATION II (ASIA),

**Noting** the *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No. 1077),

**Noting further** Resolution 12 (EC-64) – Designation of Centres of the WMO Information System,

**Having considered** Recommendation 8 (CBS-15) – Amendments to the *Manual on the WMO Information System* (WMO-No. 1060),

**Recognizing** that the Area Meteorological Data Communication Networks in Region II will be defined by formally recording the association between WMO Information System (WIS) centres and Global Information System Centres (GISCs),

**Recommends:**

- (1) That the *Manual on the WMO Information System*, Appendix B, Table B.3 be updated to reflect the association between National Centres in Region II and their principal GISCs provided in the annex to the present resolution;
- (2) That the initial Area Meteorological Data Communication Networks for GISCs supporting RA II include the National Centres and GISC associations listed in the annex to the present resolution;

**Requests** Members:

- (1) To confirm to the Secretary-General the details of their WIS Focal Points;
- (2) To register authorized Discovery Metadata editors with their Principal GISCs and WIS Interim Metadata Management Service (WIMMS) centres identified in the annex to the present resolution;
- (3) To put in place, in consultation with their principal and associated GISCs, agreements for the authorization of users to access the services of GISCs;

**Requests** the Commission for Basic Systems to develop a management procedure to deal with the future requests for possible changes of the associations between National Centres and their principal GISCs and associated GISCs;

**Requests** GISCs in Region II to take a leading role in implementing WIS functionality and to assist their associated centres in implementing WIS;

**Requests** the Secretary-General to inform the Commission for Basic Systems and the Executive Council at its sixty-fifth session of the RA II recommended WIS centres and GISC associations as provided in the annex to the present resolution;

**Urges** all RA II Members:

- (1) To review the WIS Discovery Metadata for their centres via their principal GISC or nominated WIMMS centre;
- (2) To publish Discovery Metadata for other data, products and services they provide so these can be discovered by national users via the WMO Information System;

**Encourages** all WIS centres in Region II:

- (1) To facilitate participation of their experts and WIS Focal Points in training and capacity-building activities aimed at enhancing their ability to create and manage Discovery Metadata and to benefit from the WMO Information System;
- (2) To make the new functionality of WIS available to their national users through their centres' Web interfaces and/or associated GISCs.

### Annex to Resolution 5 (RA II-15)

#### LIST OF PRINCIPAL AND ASSOCIATED GLOBAL INFORMATION SYSTEM CENTRES FOR NATIONAL CENTRES IN REGION II AND, WHERE RELEVANT, WIS INTERIM METADATA MANAGEMENT SERVICE

Member/ Organization	Centre Name	GTS Function	Centre Location (City)	Principal GISC	Associated GISCs	Interim WIMMS	Constituent Body
Afghanistan	Afghan Meteorological Authority	NMC	Kabul	Beijing	Tehran		CBS
Bahrain	Bahrain Meteorological Service	NMC	Manama	Jeddah	Beijing	Beijing	CBS
Bangladesh	Bangladesh Meteorological Department	NMC	Dhaka	New Delhi	Tokyo	Tokyo	CBS
Bhutan	Council for Renewable Natural Resources Research	NMC	Thimphu	New Delhi			CBS
Cambodia	Department of Meteorology	NMC	Phnom Penh	Tokyo			CBS
China	China Meteorological Administration	NMC	Beijing	Beijing			CBS
Democratic People's Republic of Korea	State Hydro- meteorological Administration	NMC	Pyöngyang	TBD			CBS
Hong Kong, China	Hong Kong Observatory	NMC	Hong Kong	Beijing	Tokyo		CBS
India	India Meteorological Department	NMC	New Delhi	New Delhi	Tokyo		CBS
Iran, Islamic Republic of	Islamic Republic of Iran Meteorological Organization	NMC	Tehran	Tehran		Tokyo	CBS
Iraq	Iraqi Meteorological Organization	NMC	Baghdad	Tehran	Jeddah	Beijing	CBS
Japan	Japan Meteorological Agency	NMC	Tokyo	Tokyo			CBS
Kazakhstan	Kazhydromet	NMC	Almaty	Moscow			CBS

Member/ Organization	Centre Name	GTS Function	Centre Location (City)	Principal GISC	Associated GISCs	Interim WIMMS	Constituent Body
Kuwait	Department of Meteorology	NMC	Kuwait City	Jeddah	Tokyo	Tokyo	CBS
Kyrgyzstan	Main Hydro- meteorological Administration	NMC	Bishkek	Moscow			CBS
Lao People's Democratic Republic	Department of Meteorology and Hydrology	NMC	Vientiane	Tokyo			CBS
Macao, China	Meteorological and Geophysical Bureau	WSO	Macau	Beijing			CBS
Maldives	Department of Meteorology	NMC	Malé	New Delhi	Tokyo	Tokyo	CBS
Mongolia	National Agency for Meteorology, Hydrology and Environment Monitoring	NMC	Ulaanbaatar	Beijing			CBS
Myanmar	Department of Meteorology and Hydrology	NMC	Yangon	Tokyo			CBS
Nepal	Department of Hydrology and Meteorology	NMC	Kathmandu	Beijing	New Delhi		CBS
Oman	Department of Meteorology	NMC	Muscat	Jeddah	Tokyo	Tokyo	CBS
Pakistan	Pakistan Meteorological Department (Karachi)	NMC	Karachi	Beijing	Seoul		CBS
Qatar	Civil Aviation Authority	NMC	Doha	Jeddah	Tokyo		CBS
	Civil Aviation Authority	Aviation Centre	Doha	Jeddah	Tokyo		CAeM
Republic of Korea	Korea Meteorological Administration	NMC	Seoul	Seoul			CBS
Russian Federation	Roshydromet (Khabarovsk)	WSO	Khabarovsk	Moscow			CBS
	Roshydromet (Novosibirsk)	WSO	Novosibirsk	Moscow			CBS
Saudi Arabia	Presidency of Meteorology and Environment	NMC	Jeddah	Jeddah			CBS
Sri Lanka	Department of Meteorology	NMC	Colombo	New Delhi			CBS
Tajikistan	Main Administration of Hydrometeorology and Monitoring of the Environment	NMC	Dushanbe	Moscow	Tehran		CBS
Thailand	Thai Meteorological Department	NMC	Bangkok	Tokyo			CBS
Turkmenistan	Administration of Hydrometeorology	NMC	Ashgabad	Moscow	Seoul		CBS
United Arab Emirates	Meteorological Department	NMC	Abu Dhabi	Jeddah			CBS
Uzbekistan	Uzhydromet	NMC	Tashkent	Seoul	Moscow		CBS

Member/ Organization	Centre Name	GTS Function	Centre Location (City)	Principal GISC	Associated GISCs	Interim WIMMS	Constituent Body
Viet Nam	Hydro- meteorological Service	NMC	Hanoi	Tokyo			CBS
Yemen	Yemen Meteorological Service	NMC	Sana'a	Jeddah			CBS

**Notes:**

- \* An associated GISC is defined by a bilateral agreement between a centre and a GISC for the purposes of uploading or downloading data. A centre can have multiple associated GISCs but shall identify a principal GISC for uploading and management of metadata.
- \* WIMMS (WIS Interim Metadata Management Service) is a temporary service for those centres whose Principal GISC is not yet operational. WIMMS is provided by volunteer operational GISCs, currently GISCs Beijing and Tokyo and GISC Seoul in the near future.

**Resolution 6 (RA II-15)****AMENDMENTS TO THE *MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM* (WMO-No. 386), VOLUME II**

REGIONAL ASSOCIATION II (ASIA),

**Noting** the *Manual on the Global Telecommunication System* (WMO-No. 386), Volume II, paragraph 4 of the introduction, which states that "The material contained in Volume II does not form part of the WMO Technical Regulations and is applicable only to the Members of the regional associations concerned.",

**Considering** that much of the information contained in the current Volume II of the Manual is no longer specific to Region II, but that some regional aspects persist,

**Decides** that the Region II – Asia section in Volume II of the Manual be amended as per the annex to the present resolution;

**Requests** the Secretary-General to make the amendments and consequent purely editorial changes to the *Manual on the Global Telecommunication System*, Volume II, Regional Aspects – Region II (Asia).

**Annex to Resolution 6 (RA II-15)****AMMENDMENTS TO THE *MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM* (WMO-No. 386), VOLUME II****Amendments to main text of the Volume II of the Manual on the GTS**

Text --- No change

~~Text~~ --- Deletion

Text --- Addition

**PART I**

(1) Redundant paragraph 2.1.3 with Volume I should be deleted

~~2.1.3 Each NMC is responsible for the meteorological checking of all the meteorological reports it collects before they are included in bulletins for dissemination.~~

(2) Redundant paragraph (a), (b) and (d) of 3.3.2 with Volume I, and (c) radio broadcast should be deleted.

~~3.3.2 In particular, each RTH in the Region should have the following duties:~~

- ~~(a) Collection of observational and processed data within its zone of responsibility;~~
- ~~(b) Exchange on point-to-point circuits of meteorological information with WMCs, RSMCs and RTHs as agreed;~~
- ~~(c) Selective distribution on point-to-point circuits and/or radio broadcasts of the meteorological information from its own zone of responsibility and retransmission of data received from WMCs, RSMCs or other RTHs to meet, in the first instance, the requirements of the NMCs within its zone of responsibility;~~
- ~~(d) Checking and correcting in order to maintain standard transmission procedures.~~

(3) Add file data format

3.5.3 Each NMC should be connected with the associated RTHs (see 3.4 above) by point-to-point circuits to transmit its collected observational data and to receive required observational data as well as processed information in both alphanumeric, binary ~~and~~ pictorial ~~and file~~ form; NMCs may be connected to more than one RTH.

(4) Replace radio broadcast with satellite based broadcasts and Internet

3.5.4 If the point-to-point links are not available, and until such links are established, the exchange of meteorological information between the NMCs and the associated RTH ~~should~~ could be made by ~~radio broadcasts~~ satellite based broadcasts and/or Internet. ~~In this case:~~

(5) Delete (a) and (b) of paragraph 3.5.4

- ~~(a) The NMC should beam its territorial transmission to the associated RTH to ensure more reliable reception of its collected data at the associated RTH;~~
- ~~(b) Each NMC should be equipped with at least one facsimile and two RTT receiving sets complete with directional antennae to be able to receive the required information initially from the associated RTH (see 3.6 below).~~

(6) Data type should be more flexible.

3.6.1 The programmes transmitted by NMCs, or centres with similar functions, to the associated RTHs should comprise the ~~following~~ data: expected for regional and global exchange.

- ~~(a) Surface synoptic reports for main and intermediate standard hours and all upper-air data, TEMP and PILOT, Parts A, B, C and D, from all stations included in the regional basic synoptic network of the relevant country;~~
- ~~(b) All weather reports received from ships and aircraft;~~
- ~~(c) Priority messages, such as warnings of dangerous weather conditions;~~
- ~~(d) CLIMAT and CLIMAT TEMP once per month;~~
- ~~(e) Satellite data as available;~~
- ~~(f) BATHY and TESAC reports as available;~~
- ~~(g) Other types of information as agreed.~~

(7) Replace radio broadcast with satellite based broadcasts and Internet in the paragraph 3.6.3

3.6.3 Each RTH is responsible for providing the NMCs within its zone of responsibility (see 3.4 above) with the observational and processed data required by the Members concerned on point-to-point circuits and/or satellite based broadcasts and/or Internet ~~radio broadcasts~~. For this purpose, the transmission programmes of the RTH should be established jointly by the Member responsible for the RTH and the associated NMCs, and included in WMO Publication No. 9, Volume C—Transmissions.

(8) Delete radio broadcast and add Internet instead in the paragraph 3.6.4.

3.6.4 To meet the requirements of those Members not yet connected with the associated RTHs by point-to-point circuits, each RTH ~~should~~ could provide data dissemination service through satellite

~~based broadcast and/or establish a circuit over the Internet, and maintain a radio broadcast where transmission programmes are based on the following principles:~~

- ~~(a) An NMC should be able to receive the observational data and processed information it needs from the associated RTH;~~  
~~(b) If this is not feasible, the NMC should be able to receive the data it needs from not more than two RTHs;~~  
~~(c) Each RTH should ensure reliable reception of its radio broadcasts at least in its zone of responsibility for collection (see 3.4 above).~~

(9) Delete figure 4 in paragraph 3.8.2. No need to show the actual programmes.

3.8.2 Figures 2 and 3 show the basic exchange programmes of observational data and processed information from RA II on circuits linking RTHs in RA II, respectively. ~~Figure 4 shows the actual exchange programmes of observational data.~~

(10) Delete non-operation RTHs in paragraph 3.10 (based on the survey as of 20/Oct./2011)

3.10 Regional facsimile plan

In addition to the point-to-point transmissions, the following designated RTHs and RSMCs should establish and maintain radio-facsimile broadcasts or satellite based broadcasts for dissemination of products of WMCs, RSMCs and WAFS as required: Bangkok, Beijing, ~~Beijing~~, ~~Jeddah~~, ~~Khabarovsk~~, ~~New Delhi~~, ~~Novosibirsk~~, ~~Tashkent~~, Tehran, and Tokyo.

(11) Replace the reference to VSAT previously operated by China by CMACast

~~3.11 Satellite-based communication systems~~

~~The satellite-based communication system (VSAT) operated by China is an element of the regional meteorological network for the exchange and distribution of meteorological information within the area of coverage of the AsiaSat II satellite (Ku band).~~

The satellite-based broadcast system (CMACast) operated by China is an element of the regional meteorological network for the distribution of meteorological information within the area of coverage of the AsiaSat IV satellite (C band).

(12) Delete "Tokyo-Honolulu", add "Bangkok-Singapore" and "Tokyo-Exeter" links in the paragraph 4

**between RA II and RA I:**

Jeddah–Cairo,  
New Delhi–Cairo,  
Jeddah–Algiers.

**between RA II and RA IV:**

Tokyo–Washington.

**between RA II and RA V:**

Bangkok–Kuala Lumpur,  
New Delhi–Melbourne,  
Tokyo–Melbourne,  
Tokyo–Manila,  
~~Tokyo–Honolulu.~~

Bangkok–Singapore.

**between RA II and RA VI:**

Beijing–Moscow,  
Beijing–Offenbach,  
Hanoi–Moscow,  
Jeddah–Offenbach,  
New Delhi–Moscow,  
Khabarovsk–Moscow,  
Novosibirsk–Moscow,  
Tashkent–Moscow,  
Tehran–Moscow.

Tokyo–Exeter.

(13) Reflect the Resolution 3 CCI-XV, Antalya, Turkey, 2010 (discontinued CLIMAT TEMP)

5.6 CLIMAT ~~and CLIMAT TEMP~~ reports

5.6.1 CLIMAT ~~and CLIMAT TEMP~~ reports should be transmitted as soon as possible after the end of the month and not later than the fifth day of the following month.

5.6.2 CLIMAT ~~and CLIMAT TEMP~~ reports should be included by NMCs and RTHs at the end of the transmission schedule at the main synoptic hours.

5.6.3 The RTHs Beijing, Jeddah, New Delhi and Tokyo shall ensure the regular transmission of CLIMAT ~~and CLIMAT TEMP~~ reports on the MTN.

5.6.4 A NIL report is transmitted whenever a CLIMAT ~~or CLIMAT TEMP~~ report is not available at the scheduled time.

5.6.5 The transmission schedules of CLIMAT ~~and CLIMAT TEMP~~ reports should be published in Volume C of WMO Publication No. 9



(14) Delete Figure 4, Page B-II-11

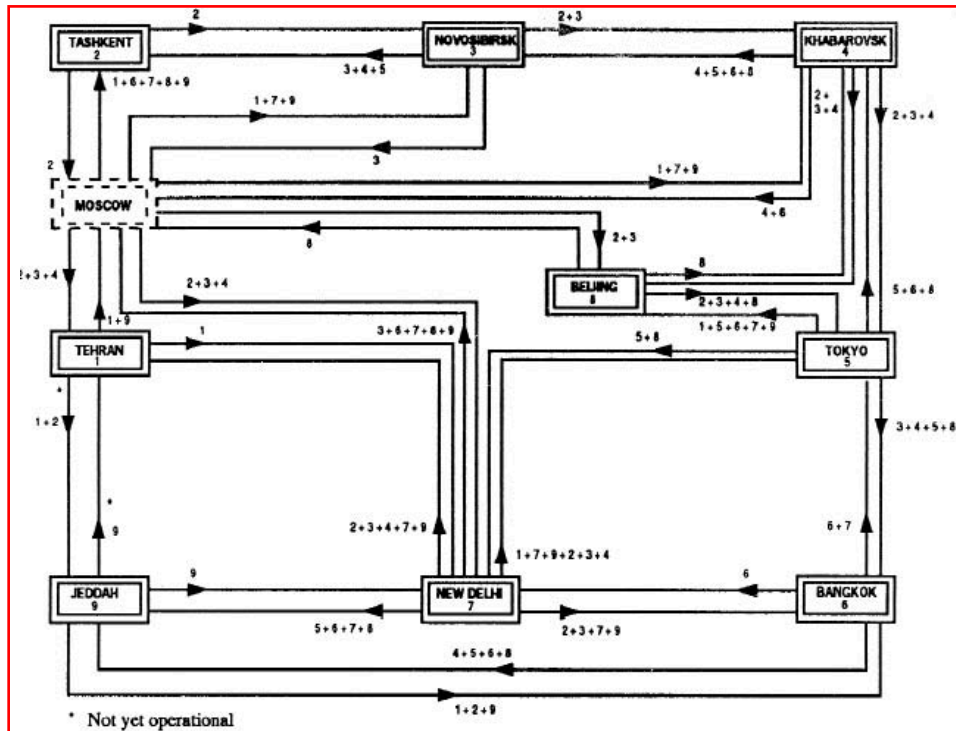


Figure 4—Actual exchange programmes of observational data (RA-II) between RTHs in Region II

(15) Replace the contents of Table A, page B.II-12 by the contents of transmission programmes of RTHs in Region II (Asia) by satellite-based broadcasts.

TABLE A

Contents of transmission programmes of RTHs in Region II (Asia) by RTT broadcasts

Name of RTH	Zone of responsibility
Bangkok	Cambodia, China (southern part), Hong Kong, India, Japan, Lao People's Democratic Republic, Macao, Myanmar, Thailand, Viet Nam (Socialist Republic of), selections from Region V, adjacent sea and ocean areas
Beijing	China, Democratic People's Republic of Korea, Viet Nam (Socialist Republic of), selections from Region II and Region VI, adjacent sea and ocean areas
Jeddah	Bahrain, Iran (Islamic Republic of), Iraq, Oman, Qatar, Saudi Arabia, other Arabian territories, selections from Region I, adjacent sea and ocean areas
Khabarovsk	Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, USSR (Asian part), adjacent sea and ocean areas
New Delhi	Afghanistan, Bahrain, Bangladesh, Bhutan, Cambodia, China (south-western part), India, Iraq, Islamic Republic of Iran, Kuwait, Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Pakistan, Republic of Yemen, Saudi Arabia, Sikkim, Sri Lanka, Thailand, USSR (Central Asian Republics), Viet Nam (Socialist Republic of), selections from Region I and Region V, adjacent sea and ocean areas
Novosibirsk	Mongolia, USSR (west of 115°E)
Tashkent	Afghanistan, Bahrain, India, Iran (Islamic Republic of), Iraq, Kuwait, Pakistan, Republic of Yemen, Saudi Arabia, USSR (west of 90°E), selections from the eastern part of Region I and the south-eastern part of Region VI, adjacent sea and ocean areas
Tehran	Afghanistan, Bahrain, Iran (Islamic Republic of), Iraq, Kuwait, Pakistan, Republic of Yemen, Saudi Arabia, USSR (Central Asian Republics) selections from Region I and Region VI, adjacent sea and ocean areas
Tokyo	Cambodia, China, Hong Kong, Japan, Lao People's Democratic Republic, Macao, Mongolia, Republic of Korea, Thailand, USSR (south-eastern part), Viet Nam (Socialist Republic of), selections from Region V, adjacent sea and the Pacific Ocean areas

**PART II**

(1) Redundant paragraph 1.3 with Volume I should be deleted

~~1.3 Message format for routine transmission of alphanumeric data~~

~~The use of the following groups in the world-wide message format relating to routine transmission of alphanumeric data, as given in Part II, Volume I of this Manual, shall be as follows:~~

~~(a) The use of the transmission sequence number nnn shall be mandatory in International Telegraph Alphabet No. 2 and International Alphabet No. 5. Unless otherwise agreed, the number shall be cyclic 000 to 999 inclusive, regardless of time;~~

~~(b) Requests for repetition of meteorological messages and analogue facsimile transmissions shall be made as soon as possible, as defined in 2.5, Part II, Volume I of this Manual.~~

(2) Delete FM code form in the paragraph 1.4.2. TAC has already been migrated to TDCF

1.4.2 Telecommunication centres (WMCs, RSMCs, RTHs and NMCs), which at present are not capable of separating the regional sections of the report from the global section, should compile bulletins for international exchange containing reports in which the global and regional sections of the code for surface observations (~~FM 12-IX Ext. and FM13-IX Ext.~~) are included.

(3) Delete paragraph 1.4.3. Attachment I-4, Part I, Volume I has already deleted.

~~1.4.3 The further relay of global data messages by the RTHs concerned should be given high priority.~~

~~NOTE: Lists of stations to be included in global exchanges are found in Attachment I-4 to Part I, Volume I of this Manual.~~

(4) X.25 in paragraph 3 should be replaced with TCP/IP

3. DATA COMMUNICATION PROTOCOLS

Data communication protocols to be used on the RMTN should be ~~elements of procedures as specified in CCITT Recommendation X.25~~ [TCP/IP](#) which are given in section 2.12.3 ~~and Attachment II-15~~, Part II, Volume I of the present Manual.

**PART III**

(1) Delete paragraph 2.2

~~2.2 For data transmission at data signalling rates of 2400, 4800 and 9600 bit/s on telephone-type dedicated circuits, preference should be given to use of modems in accordance with CCITT Recommendation V.29, including multiplexing. When using V.29-type modems, independent channels provided by multiplexing techniques should be used for the transmission of data and facsimile. Further guidance for the application of multiplexing techniques provided by modems conforming to CCITT Recommendation V.29 is given in the annex.~~

(2) Delete paragraphs 3.3.1, 3.3.1.1, 3.3.1.2, 3.3.1.3, 3.3.2 and 3.3.3

~~3.3.1—Main regional circuits~~

~~3.3.1.1—Transmission~~

~~(a) Mode of operation ISB. On one side-band, low-speed or medium-speed data channels and on the other sideband, one or two facsimile channels. For the establishment of VFT equipment, two-tone keying should be used;~~

~~(b) The transmitter output power should be adequate to provide the proper signal-to-noise ratio at the receiving site according to the CCIR recommendation;~~

~~(c) Modulation rate 75 bauds (an alternative higher modulation rate may be used as agreed bilaterally);~~

~~(d) Directional antenna systems (e.g. rhombic, log-periodic or dipole arrays).~~

~~3.3.1.2—Reception~~

~~Receivers for ISB operation with the necessary VFT equipment (channelling to be agreed bilaterally).~~

~~3.3.1.3—Error detection and correction systems~~

~~Error detection and correction systems should be employed as agreed bilaterally.~~

~~3.3.2—Regional circuits~~

~~The technical specifications for the main regional circuits should be applied, as far as practicable, to the regional circuits.~~

~~3.3.3—Interregional and supplementary interregional circuits~~

The technical specifications for the main regional circuits should be applied, as far as practicable, to the interregional and supplementary interregional circuits.

(3) Delete ANNEX for V.29 multiplexing

~~ANNEX  
APPLICATION OF MULTIPLEXING TECHNIQUES PROVIDED BY MODEMS  
CONFORMING TO CCITT RECOMMENDATION V. 29~~

~~1. GENERAL~~

- ~~(a) Dedicated circuits should be terminated at both ends with modems, in accordance with the CCITT Recommendation V.29;~~
- ~~(b) A telephone type circuit refers to a cable, landline, UHF or satellite link with a bandwidth of 300 Hz to 3400 Hz;~~
- ~~(c) The modem conforming to CCITT Recommendation V.29 is intended to be used primarily on special quality leased circuits, e.g. Recommendations M.1020 or M.1025 circuits, but this does not preclude the use of this modem over circuits of lower quality;~~
- ~~(d) All channels provided by multiplexing have an interface according to CCITT Recommendations V.24 and V.28.~~

~~2. POSSIBLE ARRANGEMENTS FOR CHANNELLING~~

- ~~(a) A telephone type circuit with a data signalling rate of 9600 bit/s;~~
- ~~(b) A telephone type circuit with a data signalling rate of 9600 bit/s subdivided into 2 x 4800 bit/s channels;~~
- ~~(c) A telephone type circuit with a data signalling rate of 9600 bit/s subdivided into 4 x 2400 bit/s channels;~~
- ~~(d) A telephone type circuit with a data signalling rate of 9600 bit/s subdivided into 1 x 4800 and 2 x 2400 bit/s channels;~~
- ~~(e) In addition to the above specified channelling, one or two low speed channels can be provided in some models of modems. Since these channels are not specified in CCITT Recommendation V. 29, their operation is subject to agreement between adjacent centres.~~

~~3. USE OF MULTIPLEXED CHANNELS~~

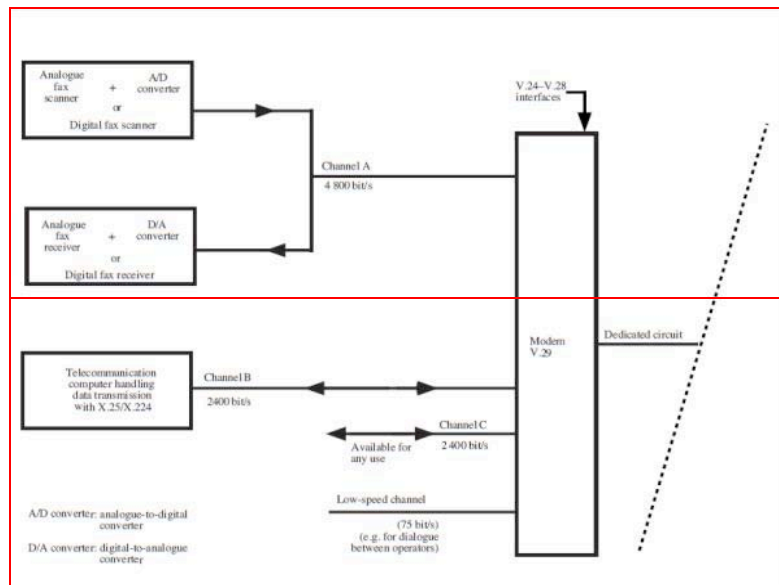
- ~~(a) All channels can be used for data transmission;~~
- ~~(b) All channels can be used for coded or non-coded digital facsimile transmission. A data signalling rate of 4800 bit/s is recommended for coded digital facsimile or non-coded digital facsimile with a scanning frequency of 120 lines/mn;~~
- ~~(c) As an interim measure, all channels with a minimum data signalling rate of 2400 bit/s can be used for asynchronous data transmission with a speed ranging from 50 to 600 bit/s (distortion of a 2400 bit/s channel used for asynchronous transmission with 600 bit/s equals 25%).~~

~~NOTE: An example of the use of multiplexed channels is given in the appendix to this annex.~~

~~4. OPERATIONAL CONDITIONS~~

- ~~(a) The conventional types of analogue facsimile scanners and recorders can be used for non-coded digital facsimile transmissions with the addition of low-cost analogue-to-digital or digital-to-analogue converters;~~
- ~~(b) The automatic line equalizers incorporated into the modems according to CCITT Recommendation V. 29 are suitable to cope with marginal circuit conditions of links according to CCITT Recommendation M.1020;~~
- ~~(c) Data transmission carried out with an EDC procedure requiring a separate backward channel (WMO software and hardware EDC procedures as specified in Volume I of the Manual on the GTS, Part II) will occupy two channels provided by multiplexing or one channel provided by multiplexing and another channel as described in 2(e) above.~~

**APPENDIX TO ANNEX  
EXAMPLE OF USE OF MULTIPLEXED CHANNELS**



**Resolution 7 (RA II-15)**

**REGIONAL ASSOCIATION II MANAGEMENT GROUP**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No. 1077),
- (2) The *Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association II (Asia)* (WMO-No. 1037),
- (3) The reports of the sessions of the RA II Management Group,
- (4) The *WMO Strategic Plan 2012–2015* (WMO-No. 1069),
- (5) The WMO Operating Plan 2012–2015 (October 2011 version),
- (6) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,

**Considering** the proposal of the Management Group of the Association,

**Recognizing** the increased importance of the effective management and oversight of the activities of the Association and the need to have a mechanism to address cross-cutting issues and issues not handled by other working groups, in particular activities related to Expected Results 6 – Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates; 7 – New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategic issues; and 8 – An effective and efficient Organization, of the WMO Strategic Plan 2012–2015,

**Decides:**

- (1) To re-establish the Regional Association II Management Group with the following terms of reference:
  - (a) To advise the president of RA II on all matters related to the work of the Association, in particular, on emerging matters requiring actions during the intersessional period;
  - (b) To prioritize, plan, coordinate and manage the work of the Association and its subsidiary bodies;
  - (c) To review the structure and work of the subsidiary bodies of the Association, including advice on the implementation of their recommendations and taking into account financial and other resources needed in the work of these bodies, and to terminate or reorganize these bodies as necessary;
  - (d) To select working group members from candidates nominated by Members of the Association; and to propose to the president of the Association on the replacement of a member, should the member not contribute at the expected level, or in a case of total silence;
  - (e) To coordinate and monitor the implementation of the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015, and to provide the Region's contribution to the WMO Strategic Plan;
  - (f) To assess and evaluate the implementation of activities of Regional Association II as per the WMO Strategic Plan;
  - (g) To review the requirements and priorities of training and other events to be organized in the Region;
  - (h) To oversee the activities of the Regional Centres, for example, Regional Specialized Meteorological Centres, Regional Climate Centres, Regional Instrument Centres, WMO Information System centres, Regional Training Centres;
  - (i) To collaborate with the Secretariat on resource mobilization and advise on the alignment of resources with regional priorities and implementation of the RA II Strategic Operating Plan;
  - (j) To address ways and means of capacity development of NMHSs of Members in the Region for the implementation of WMO Programmes and activities;
  - (k) To address other issues not covered by working groups, including strengthening of strategic partnerships with regional organizations;
- (2) To invite the president to act as chair of the Management Group, which is composed of the president, the vice-president, other Executive Council member Permanent Representatives of the Region and the regional hydrological adviser to the president. The president would also invite, as appropriate, other Directors of NMHSs and chairs of RA II working groups to each session, subject to the availability of financial resources;

**Authorizes** the president to take necessary decisions on behalf of the Association, after consultation with the Management Group, on important matters;

**Requests** the president:

- (1) To ensure that subregions are represented as appropriate on the Management Group and that the Group meets annually, or as needed, preferably in conjunction with other meetings or events;

- (3) To report to the Association during the intersessional period, as necessary, and at its next regular session on the activities of the Management Group and relevant decisions taken on behalf of the Association;

**Requests** the Secretary-General to support the work of the Management Group.

---

### **Resolution 8 (RA II-15)**

#### **REGIONAL ASSOCIATION II WORKING GROUP ON WEATHER SERVICES**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *WMO Strategic Plan 2012–2015* (WMO-No. 1069),
- (2) Resolution 1 (Cg-XVI) – World Weather Watch Programme for 2012–2015,
- (3) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,
- (4) The decision of the Sixteenth World Meteorological Congress for the development and implementation of the WMO Integrated Global Observing System (WIGOS), the WMO Information System (WIS) and the Global Data-processing and Forecasting System (GDPFS),
- (5) Resolution 20 (Cg-XVI) – Public Weather Services Programme,
- (6) Resolution 26 (Cg-XVI) – WMO Quality Management Framework,
- (7) Resolution 53 (Cg-XVI) – Aeronautical Meteorology Programme,
- (8) Resolution 7 (EC-64) – Social, economic and policy impacts of weather, climate and water services,

**Considering** that Regional Association II should continue to play an important and active role in the implementation of WMO regional activities in the delivery of aeronautical meteorological services, operational forecast services and public weather services (PWS); and that civil aviation as a key enabler for economic growth and development in the Region is vigorous and requires increased efforts from all service providers, and that Sixteenth Congress designated the Aeronautical Meteorology Programme a priority area for the sixteenth financial period,

**Decides:**

- (1) To establish the Regional Association II Working Group on Weather Services (WGWS) with the following terms of reference:
  - (a) To coordinate and support the work of the expert teams in Aeronautical Meteorology in the Region in cooperation with the Commission for Aeronautical Meteorology;
  - (b) To coordinate all activities related to the GDPFS, including the Emergency Response Activities, and PWS in the Region in cooperation with the Commission for Basic System;

- (2) That the Working Group should be composed of three expert groups, as follows:
- (a) Expert Group on Aeronautical Meteorological Services Delivery (EG-AeM) with the following terms of reference:
    - (i) To coordinate and support the implementation and maintenance of an ISO 9000-based quality management system for the services to international air navigation, in particular to coordinate urgent assistance, for example, in the form of twinning/mentoring arrangements, to NMHSs not yet implementing a quality management system, given that following the deadline of 15 November 2012 the provisions of the International Civil Aviation Organization (ICAO) concerning the implementation of quality management for aeronautical meteorological services were upgraded from ICAO Recommended Practices to that of ICAO Standards;
    - (ii) To coordinate and support the implementation of competency assessment for aeronautical meteorological personnel (forecasters and observers);
    - (iii) To coordinate and support the development and implementation of meteorological services to air traffic management and SIGMET provision;
  - (b) Expert Group on Operational Forecasting (EG-OF) with the following terms of reference:
    - (i) To inform RA II Members of technical and scientific developments relating to the forecasting process, and to advise on the implementation of new techniques; and to coordinate organizational and planning aspects of the GDPFS including the requirements, procedures and practices for designating and maintaining GDPFS Centres in the Region;
    - (ii) To monitor the performance of GDPFS in the Region and review compliance of GDPFS Centres against the designated criteria, which include, amongst others, standardized verification of numerical weather prediction (NWP) products, as part of the WMO Quality Management Framework;
    - (iii) To coordinate existing and new requirements stated by RA II Members for GDPFS products, and for the production of analysed and forecast data by the RA II GDPFS Centres on all time scales, including on education and training materials;
    - (iv) To promote the integrated use of Ensemble Prediction Systems, high-resolution NWP, radar and satellite-based products into core operational forecasting, and the exchange, use and interpretation of meteorological products;
    - (v) To coordinate within RA II the operational production of forecasts of sub-seasonal to longer-time scales, on the basis of the emerging requirements from Regional Climate Centres, Regional Climate Outlook Forums and NMHSs, and in the context of the Climate Services Information System of the Global Framework for Climate Services;
    - (vi) To monitor the provision of products and services by designated RA II GDPFS Centres within the framework of the Emergency Response Activities (ERA) Programme, and advise on evolving requirements for ERA operational systems and services;
    - (vii) To coordinate, monitor and facilitate the implementation of the Severe Weather Forecasting Demonstration Project in RA II;

- (c) Expert Group on Public Weather Services Delivery (EG-PWS) with the following terms of reference:
- (i) To coordinate all activities related to PWS in the Region in cooperation with the Commission for Basic Systems;
  - (ii) To mainstream service delivery as contained in the WMO Strategy for Service Delivery and its Implementation Plan, as a main priority in the work of the PWS Programme and in guiding its future development in the Region;
  - (iii) To facilitate the implementation of the Strategy to address specific aspects of PWS through activities such as conducting socio-economic studies and evaluations, improving media relations, and designing and implementing pilot and demonstration projects related to PWS delivery;
  - (iv) To coordinate the contribution of PWS to such high-priority areas as the Global Framework for Climate Services with particular focus on the User Interface Platform; WIGOS and WIS; disaster reduction and mitigation; and capacity development;
  - (v) To assist NMHSs strengthen their capabilities to ensure efficient and effective preparation and delivery of warning services through the national PWS programmes and channels by embedding early warning systems within an operational end-to-end service delivery framework;
  - (vi) To encourage stronger dialogue between NMHSs and development partners and users (for example, media, health, emergency management) in areas relevant to PWS;
  - (vii) To encourage and provide guidance to Members to assert the authority of NMHSs as the sole providers of official high-impact weather warnings;
  - (viii) To collaborate with development partners and other WMO entities to assist NMHSs in the identification and assessment of societal, economic and environmental impacts and benefits of hydrometeorological services;
  - (ix) To promote and support the education and training of the public and other users of forecasts and warnings products and services on their use and interpretation, including uncertainty information;
  - (x) To inform Members of, and evaluate, technical and scientific developments relating to the formulation, content, presentation, and dissemination of weather information, as well as the inclusion of information on the impacts of weather phenomena and the corresponding advice, and coordinate the related recommendations for application by Members;
  - (xi) To establish education and training requirements related to the PWS delivery, in accordance with the competency requirements established by the Commission for Basic Systems;
  - (xii) To improve procedures for the exchange of severe weather warnings between neighbouring countries;
  - (xiii) To monitor progress on the implementation of the current WMO Strategic Plan on matters related to PWS in the Region;
- (3) That the Expert Group on Aeronautical Meteorological Services Delivery (EG-AeM) should be composed of the following core members:



- (a) The co-coordinators of the EG-AeM;
- (b) Theme leader in quality management system implementation and maintenance;
- (c) Theme leader in competency assessment;
- (d) Theme leader in meteorological support to Air Traffic Management and provision of SIGMETs;

The theme leaders should function both individually within their designated responsibilities and also as a team in order to accomplish the work of the Expert Group with respect to its terms of reference and those of theme leaders to be decided by the Expert Group;

- (4) That the Expert Group on Operational Forecasting (EG-OF) should be composed of the following core members:

- (a) The co-coordinators of the EG-OF;
- (b) Theme leader in operational forecasting process and support, from nowcasting to medium-range forecasting, including severe weather forecasting;
- (c) Theme leader in operational predictions from sub-seasonal to longer-time scales;
- (d) Theme leader in Emergency Response Activities;

The theme leaders should function both individually within their designated responsibilities and also as a team in order to accomplish the work of the Expert Group with respect to its terms of reference and those of theme leaders to be decided by the Expert Group;

- (5) That the Expert Group on Public Weather Services Delivery (EG-PWS) should be composed of the following core members:

- (a) The co-coordinators of the EG-PWS;
- (b) Theme leader in socio-economic benefits of meteorological and hydrological services;
- (c) Theme leader in all aspects related to formulation, dissemination and assessment of warnings and delivery of warning services, including coordination and collaboration with disaster management agencies and organizations and the media;
- (d) Theme leader in education and public outreach related to PWS;

The theme leaders should function both individually within their designated responsibilities and also as a team in order to accomplish the work of the Expert Group with respect to its terms of reference and those of theme leaders to be decided by the Expert Group;

- (6) To designate, in accordance with Regulation 33 of the WMO General Regulations, an expert to be decided by the Management Group as chair of the Working Group, Mr Boon-leung Choy (Hong Kong, China) and Ms Marina Petrova (Russian Federation) as co-coordinators of the Expert Group on Aeronautical Meteorological Services Delivery and Mr Yuki Honda (Japan) and Ms Irina Zaytseva (Uzbekistan) as co-coordinators of the Expert Group on Operational Forecasting; and Mr Lap-shun Lee (Hong Kong, China), Dr Muhammad Hanif (Pakistan) and Mr Alexey Lyakhov (Russian Federation) as co-coordinators of the Expert Group on Public Weather Services Delivery;
- (7) To invite theme leaders and other voluntary experts, to be decided by the Management Group of RA II in consultation with the chairs of the Working Group and co-coordinators of Expert Groups, to serve as members of the Expert Groups;

- (8) To request the chair of the Working Group to develop a Working Group implementation plan, in collaboration with the co-coordinators of Expert Groups and in consultation with the president and Management Group of the Association, with reference to the key performance indicators/targets and action plans under the respective expected results of the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015, to undertake work on the various theme areas under the charge of the Expert Groups; and submit to the president of the Association an annual report by 31 December every year and a final report in time for presentation to the sixteenth session of the Association, both copied to the WMO Secretariat, with inputs from the co-coordinators and theme leaders under the Working Group;
- (9) To request the co-coordinators of the Expert Groups to submit annual reports to the chair of the Working Group and a final report no later than three months before the sixteenth session of the Association;
- (10) To request the theme leaders to submit annual reports to the co-coordinators of the respective Expert Groups;

**Requests** the Secretary-General to support the work of the Working Group, Expert Groups and theme leaders.

### Resolution 9 (RA II-15)

#### REGIONAL ASSOCIATION II WORKING GROUP ON CLIMATE SERVICES

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The Final Report of the Meeting of the RA II Sub-group on Climate Applications and Services, Daegu, Republic of Korea, 30 November to 2 December 2010,
- (2) The *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No. 1077), including its decisions within Resolution 17 (Cg-XVI) – Implementation of the Climate Services Information System, Resolution 18 (Cg-XVI) – World Climate Programme, Resolution 22 (Cg-XVI) – Agricultural Meteorology Programme and Resolution 48 (Cg-XVI) – Implementation of the Global Framework for Climate Services,
- (3) The *Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association II (Asia)* (WMO-No. 1037), including its Resolution 9 (XIV-RA II) – RA II Working Group on Climate Services, Adaptation and Agrometeorology,
- (4) The *WMO Strategic Plan 2012–2015* (WMO-No. 1069),
- (5) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,

**Considering** that Regional Association II should continue to play an important and active role in the implementation of WMO regional activities in the field of climate services including agrometeorological services, with particular attention to matters relevant to implementation of the Global Framework for Climate Services in the Region,

**Decides:**

- (1) To establish the Regional Association II Working Group on Climate Services (WGCS) with the following terms of reference:
  - (a) To provide assistance and advice to the president of Regional Association II on all matters pertaining to the regional aspects of the relevant components of the World Climate Programme and the Agricultural Meteorology Programme and, in particular, to assist and advise the president of RA II all matters relevant to implementation of the Global Framework for Climate Services in the Region;
  - (b) To cooperate with the Commission for Climatology and the Commission for Agricultural Meteorology and other WMO bodies on activities related to climate services;
  - (c) To undertake and to coordinate activities relating to climate services as listed in 2 (a) and (b) below, respectively;
  - (d) To report, through the chair of the WGCS, to the president of RA II on an annual basis on activities relative to the above terms of reference;
- (2) That the Working Group should be composed of two expert groups, as follows:
  - (a) Expert Group on Climate Services (EG-CS) with the following terms of reference:
    - (i) To foster, promote and advise on the implementation of the Global Framework for Climate Services, particularly its Climate Services Information System and User Interface Platform, in the Region, including through pilot projects;
    - (ii) To assist and advise the president of RA II on all matters relevant to implementation and operation of Regional Climate Centres (RCCs) in the Region;
    - (iii) To promote the use of Global Producing Centre and RCC products in national climate services;
    - (iv) To seek cooperation with relevant regional bodies and organizations on issues related to implementing user-targeted climate services for key sectors (for example, agriculture, water resources, health), including to foster and promote best practices in establishing national frameworks for climate services;
    - (v) To identify the optimal means of meeting regional and national needs for climate information, products and services for Climate Risk Management and Adaptation;
    - (vi) To promote best practices in and to advise on implementation of new Regional Climate Outlook Forums;
    - (vii) To promote best practices in climate system monitoring and operational climate watch initiatives;
    - (viii) To promote regionally coordinated capacity development activities in support of climate services;
    - (ix) To promote and advise on research initiatives required to improve operational production of climate products;
    - (x) To report, through the EG-CS co-coordinators, to the chair of the WGCS annually;

- (b) Expert Group on Agrometeorology (EG-AgM) with the following terms of reference:
- (i) To survey RA II Members to identify agrometeorological experts/staff and training needs in the Region;
  - (ii) To make recommendations on establishing Agromet Advisory Services in RA II countries;
  - (iii) To review the monitoring and forecasting of soil moisture conditions and their use in assessing crop water requirements;
  - (iv) To review the monitoring and preparedness strategies for drought including drought indices and early warning systems, and the extent of their implementation in the Region;
  - (v) To review and evaluate the operational use of seasonal to interannual climate forecast applications to agriculture in RA II and make recommendations to improve the presentation of these forecasts to the agricultural community;
  - (vi) To review studies on the socio-economic impact of agrometeorological information in the Region to agriculture, livestock management, forestry, rangelands and fisheries sectors;
  - (vii) To report, through the EG-AgM co-coordinators, to the chair of the WGCS annually;

- (3) That the Expert Group on Climate Services (EG-CS) should be composed of the following core members:

- (a) The co-coordinators of EG-CS;
- (b) Theme leader in user liaison and applications of climate information and products for climate risk management and adaptation to climate change;
- (c) Theme leader in implementation and operation of Regional Climate Centres;
- (d) Theme leader in operational regional and national Climate Outlook Forums;
- (e) Theme leader in climate monitoring and climate watch;
- (f) Theme leader in climate research for development as well as applications of climate information tailored to key sectors;

The theme leaders should function both individually within their designated responsibilities and also as a team in order to accomplish the work of the Expert Group with respect to its terms of reference and those of the theme leaders to be decided by the Expert Group;

- (4) That the Expert Group on Agrometeorology (EG-AgM) should be composed of the following core members:

- (a) The co-coordinators of EG-AgM;
- (b) Theme leader in RA II agrometeorological training needs;
- (c) Theme leader in soil moisture monitoring;
- (d) Theme leader in drought preparedness and management strategies;
- (e) Theme leader in seasonal climate forecast applications for agriculture;

(f) Theme leader in socio-economic impact of agrometeorological information;

The theme leaders should function both individually within their designated responsibilities and also as a team in order to accomplish the work of the Expert Group with respect to its terms of reference and those of the theme leaders to be decided by the Expert Group;

- (5) To designate, in accordance with Regulation 33 of the WMO General Regulations, an expert to be decided by the Management Group as chair of the Working Group; Mr Ryuji Yamada (Japan) and Dr Ghulam Rasul (Pakistan) as co-coordinators of the Expert Group on Climate Services; and Dr N. Chattopadhyay (India) and Dr Alexander Kleshchenko (Russian Federation) as co-coordinators of the Expert Group on Agrometeorology;
- (6) To invite theme leaders and other voluntary experts, to be decided by the Management Group of RA II in consultation with the chairs of the Working Group and co-coordinators of Expert Groups, to serve as members of the Expert Groups;
- (7) To request the chair of the Working Group to develop a Working Group implementation plan, in collaboration with the co-coordinators of Expert Groups and in consultation with the president and Management Group of the Association, with reference to the key performance indicators/targets and action plans under the respective expected results of the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015, to undertake work on the various theme areas under the charge of the Expert Groups; and submit to the president of the Association an annual report by 31 December every year and a final report in time for presentation to the sixteenth session of the Association, both copied to the WMO Secretariat, with inputs from the co-coordinators and theme leaders under the Working Group;
- (8) To request the co-coordinators of each Expert Group to submit annual reports to the chair of the Working Group on Climate Services and a final report no later than three months before the sixteenth session of the Association;
- (9) To request the theme leaders to submit annual reports to the co-coordinators of the respective Expert Groups;

**Requests** the Members concerned to provide full support to the experts nominated in order to ensure that they are able to fulfil the tasks assigned to them;

**Requests** the Secretary-General to support the work of the Working Group, Expert Groups and theme leaders.

### **Resolution 10 (RA II-15)**

#### **REGIONAL ASSOCIATION II WORKING GROUP ON HYDROLOGICAL SERVICES**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 17 (Cg-XIV) – Hydrology and Water Resources Programme,
- (2) Resolution 25 (Cg-XIII) – Exchange of hydrological data and products,

- (3) Resolution 10 (XIV-RA II) – RA II Working Group on Hydrological Forecasts and Assessments,
- (4) The report of the meeting of the Working Group on Hydrological Forecasts and Assessments, Seoul, Republic of Korea, 23–26 November 2010,
- (5) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,

**Considering** that Regional Association II should continue to play an important and active role in the implementation of WMO regional activities in the field of hydrology and water resources,

**Decides:**

- (1) To establish the Regional Association II Working Group on Hydrological Services (WGHS) with the following terms of reference:
  - (a) To provide assistance and advice to the president of the Association on all questions pertaining to the regional aspects of the Hydrology and Water Resources Programme;
  - (b) To engage in and monitor the implementation of water-related activities documented in the RA II Strategic Operating Plan;
  - (c) To undertake activities relating to the Hydrology and Water Resources Programme as listed in (2) below;
  - (d) To cooperate with the Commission for Hydrology and other WMO bodies on activities and projects related to hydrology and water resources;
  - (e) To seek cooperation with other regional bodies and organizations on issues related to the Hydrology and Water Resources Programme;
  - (f) To actively contribute to the Global Framework for Climate Services through dedicated components in the identified theme areas of work during the next intersessional period 2013–2016;
  - (g) To undertake activities related to the transfer of technology through the Hydrological Operational Multipurpose System and capacity-building in a cross-cutting manner;
- (2) To invite all Members of the Region to designate hydrological experts to serve on the Working Group and attend its meetings in the following theme areas identified for the work of the Group:
  - (a) Strengthening the capability of Members to assess their water resources: water resources assessment, its variability and use (surface water including reservoirs and groundwater);
  - (b) Improve accuracy and timeliness of forecasting floods of different cause and origin through enhanced cooperation between National Meteorological Services and National Hydrological Services, within the context of the WMO Flood Forecasting Initiative;
  - (c) Hydrological aspects of drought, including drought monitoring, and assessment of water scarcity and deficits;
  - (d) Hydrological responses to climate variability and change and promotion of the use of climate information by water managers;

- (e) Improved accuracy of hydrometric and sediment observations including space-based technologies;
- (f) Sediment disasters and mass movements (flood and rainfall induced);
- (3) To designate, in accordance with Regulations 33 and 168 of the WMO General Regulations, Dr Sung Kim (Republic of Korea) as the Hydrological Adviser to the president of RA II and as chair of the Working Group;
- (4) To designate Mr Muhammad Riaz (Pakistan) as vice-chair of the Working Group;

**Requests** the chair of the Working Group:

- (1) In his capacity as Hydrological Adviser, to assist the president of RA II in accordance with the duties stipulated in Regulation 168 (b) of the WMO General Regulations;
- (2) To develop a Working Group implementation plan in consultation with the president and the Management Group of the Association, with reference to the key performance indicators/targets and action plans under the respective expected results of the RA II Strategic Operating Plan, to undertake work on the various theme areas under the charge of the Working Group;
- (3) To participate in Executive Council sessions, when invited, representing the regional interests in relation to hydrology and water resources and to coordinate the WGHS activities with the Commission for Hydrology and other regional Working Groups on Hydrology;
- (4) To submit to the president of the Association an annual report by 31 December every year and a final report in time for presentation to the sixteenth session of the Association, both copied to the WMO Secretariat, with inputs from theme leaders under the Working Group;

**Requests** theme leaders to submit annual reports to the chair;

**Urges** the Members concerned to provide full support to the WGHS in order to ensure that the Working Group is able to fulfil the tasks assigned to it;

**Requests** the Secretary-General to support the work of the Working Group and theme leaders.

### Resolution 11 (RA II-15)

#### REGIONAL ASSOCIATION II WORKING GROUP ON WMO INTEGRATED GLOBAL OBSERVING SYSTEM AND WMO INFORMATION SYSTEM

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *WMO Strategic Plan* (WMO-No. 1028),
- (2) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,
- (3) Resolution 1 (Cg-XVI) – World Weather Watch Programme for 2012–2015,

- (4) Resolution 3 (Cg-XVI) – Global Observing System,
- (5) Resolution 7 (Cg-XVI) – Instruments and Methods of Observation Programme,
- (6) Resolution 10 (Cg-XVI) – Global Atmosphere Watch Programme,
- (7) Resolution 11 (Cg-XVI) – World Weather Research Programme,
- (8) Resolution 19 (Cg-XVI) – Development of an architecture for climate monitoring from space,
- (9) Resolution 24 (Cg-XVI) – Marine Meteorology and Oceanography Programme,
- (10) Resolution 26 (Cg-XVI) – WMO Quality Management Framework,
- (11) Resolution 36 (Cg-XVI) – WMO Strategic Plan (2012–2015),
- (12) Resolution 48 (Cg-XVI) – Implementation of the Global Framework for Climate Services,
- (13) Resolution 50 (Cg-XVI) – Implementation of the WMO Integrated Global Observing System (WIGOS),
- (14) Resolution 51 (Cg-XVI) – Designation of Centres of the WMO Information System,
- (15) Resolution 55 (Cg-XVI) – Antarctic Observing Network,
- (16) Resolution 60 (Cg-XVI) – Global Cryosphere Watch,
- (17) Resolution 1 (EC-64) – Review of the role and responsibilities of regional associations,
- (18) Resolution 10 (EC-64) – WMO Integrated Global Observing System Framework Implementation Plan,
- (19) Resolution 11 (EC-64) – Radio frequencies for meteorological and related environmental activities,
- (20) Resolution 12 (EC-64) – Designation of Centres of the WMO Information System,
- (21) Recommendation 6 (CBS-15) – Implementation Plan for the Evolution of Global Observing Systems,
- (22) Resolution 3 (RA II-15) – Regional WMO Integrated Global Observing System Implementation Plan,
- (23) Resolution 4 (RA II-15) – Regional Basic Synoptic Network and Regional Basic Climatological Network in Region II,
- (24) The annex to Resolution 4 (EC-LX) – Role and terms of reference of the Meetings of Presidents of Technical Commissions, entitled Volunteerism in the work of technical commissions and regional associations,

**Considering:**

- (1) That WMO observing systems' and co-sponsored systems' data are of vital importance to the Members of Regional Association II to meet existing and new requirements for meteorological services,
- (2) That the WMO Information System provides for the collection and sharing of information for all WMO and related international programmes, through three fundamental types of



services: (a) routine collection and dissemination service for time-critical and operation-critical data and products; (b) data discovery, access and retrieval service; and(c) timely delivery service for data and products,

- (3) That the implementation of the World Weather Watch and other relevant WMO Programmes and co-sponsored Programmes in the Region needs to be kept under constant review,
- (4) That the introduction of the new concepts and technology into the World Weather Watch will be of great benefit to all Members in the Region,

**Decides:**

- (1) To re-establish the Regional Association II Working Group on WMO Integrated Global Observing System and WMO Information System (WG-WIGOS/WIS) with the following terms of reference:
  - (a) To monitor and coordinate the implementation of WIGOS and WIS in the Region; propose measures for improvements, especially for overcoming gaps, deficiencies and inconsistencies in the implementation of these systems; and promote active involvement of the Members of the Region in the implementation of these systems;
  - (b) To advise on and provide overall technical guidance, assistance and support to the Members of the Region for the implementation of WIGOS and WIS at the regional and national levels;
  - (c) To promote capacity-development and outreach activities to assist Members in the implementation of WIGOS and WIS;
  - (d) To liaise with the relevant RA II Working Groups on matters related to WIGOS and WIS implementation;
  - (e) To advise the president of the Association on matters concerning the implementation of WIGOS and WIS in the Region;
  - (f) To provide the president of the Association with recommendations for presentation under appropriate agenda items in sessions of technical commissions, joint sessions of the presidents of technical commissions and presidents of regional associations, and the Executive Council;
- (2) That the Working Group should be composed of two expert groups, as follows:
  - (a) Expert Group on WMO Integrated Global Observing System (EG-WIGOS) with the following terms of reference:
    - (i) To coordinate planning and implementation of WIGOS in the Region, in accordance with the Regional WIGOS Implementation Plan, taking into account needs and priorities specified by the RA II Strategic Operating Plan;
    - (ii) To coordinate the development and implementation on the national WIGOS Implementation Plans;
    - (iii) To monitor the progress made in the implementation and operation of WIGOS component observing systems in the Region; advise on possible improvements and priorities for appropriate actions and the need for external support, where required, according to the technical guidance of the technical commissions as represented in the EGOS-IP and other observation system implementation plans in order to evolve and implement observing systems in the Region;

- (iv) To assess and continuously monitor regional observational requirements, identify regional gaps and identify capacity development projects within the Region to address those gaps;
  - (v) To support an effective implementation of the EGOS-IP in the Region;
  - (vi) To keep abreast of new developments in WMO observing systems and co-sponsored systems and to make recommendations for their implementation in the Region;
  - (vii) To keep under review regional practices and guidelines relevant to observing networks and instruments and methods of observation, and to foster an efficient collaborative network of Regional Instrument Centres in the Region;
  - (viii) To coordinate relevant activities with the regional groupings involved in observations to ensure consistency of approach and integration in respect of observing networks, procedures and monitoring;
  - (ix) To act as lead for the Regional Association, working with Members, to maintain regulatory material related to regional aspects of WIGOS and WIS;
  - (x) To advise the president of the Association and the chair of the Working Group on the proposed composition and changes to the Regional Basic Synoptic Network and Regional Basic Climatological Network;
- (b) Expert Group on WMO Information System (EG-WIS) with the following terms of reference:
- (i) To monitor the progress made in the implementation and operation of WIS in the Region and advise on possible improvements and priorities for appropriate actions to be carried out under the respective WMO Programmes and co-sponsored Programmes;
  - (ii) To keep abreast of new developments in WIS, promote the relevant WIS support to all WMO Programmes, and make recommendations, in compliance with relevant WMO Technical Regulations, for WIS implementation in the Region as regards communication techniques, communication structure, data management, data and metadata representation and relevant monitoring activities;
  - (iii) To keep under constant review the Regional Meteorological Telecommunication Network and its implementation, as the WIS component for time-critical and operation-critical exchange, identify shortcomings and recommend appropriate measures for remedial action in the Region;
  - (iv) To provide guidance to the Members of the Region in capacity-building for information and outreach relevant to improving WIS;
- (3) That the Working Group on the WMO Integrated Global Observing System and WMO Information System (WG-WIGOS/WIS) should be composed of the following core members:
- (a) The chair and vice-chair of the Working Group;
  - (b) The co-coordinators of the Expert Group on WIGOS (EG-WIGOS), with theme leaders to be proposed by the co-coordinators of EG-WIGOS and decided by the Management Group;

- (c) The co-coordinators of the Expert Group on WIS (EG-WIS), with theme leaders to be proposed by the co-coordinators of EG-WIS and decided by the Management Group;
  - (d) Chairs of task teams as decided by the Management Group, when necessary;
- (4) To designate, in accordance with Regulation 33 of the WMO General Regulations, an expert to be decided by the Management Group as chair of the Working Group, an expert to be decided by the Management Group as vice-chair of the Working Group; Mr Yongqing Chen (China) and Dr Jaegwang Won (Republic of Korea) as co-coordinators of the Expert Group on WIGOS; and Ms Xiang Li (China) and Mr Kenji Tsunoda (Japan) as co-coordinators of the Expert Group on WIS;
- (5) To request the chair to:
- (a) Submit to the Management Group within three months a Working Group work programme and action plan for the period 2012–2015 with due account of the deliverables outlined in the RA II Strategic Operating Plan;
  - (b) Submit proposals to the Management Group for establishment of task teams, including terms of reference, as necessary, to facilitate successful implementation of the RA II Strategic Operating Plan in the area of responsibility of the Working Group;
  - (c) Submit an annual progress report to the president of the Association and WMO Secretariat in due time before Executive Council sessions;
  - (d) Submit a final report to the president of the Association at least three months before the sixteenth session of the Association;
- (6) To invite Members to nominate experts who are committed to serve actively on the Working Group;

**Requests** the Secretary-General to support the work of the Working Group, Expert Groups and theme leaders.

---

### Resolution 12 (RA II-15)

#### REGIONAL ASSOCIATION II IMPLEMENTATION COORDINATION TEAM ON SERVICE DELIVERY

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *WMO Strategic Plan 2012–2015* (WMO-No. 1069),
- (2) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,
- (3) Resolution 6 (EC-LXIII) – Executive Council Working Group on Service Delivery,
- (4) Resolution 12 (Cg-XVI) – Hydrology and Water Resources Programme,
- (5) Resolution 17 (Cg-XVI) – Implementation of the Climate Services Information System,

- (6) Resolution 20 (Cg-XVI) – Public Weather Services Programme,
- (7) Resolution 23 (Cg-XVI) – Tropical Cyclone Programme,
- (8) Resolution 24 (Cg-XVI) – Marine Meteorology and Oceanography Programme,
- (9) Resolution 26 (Cg-XVI) – WMO Quality Management Framework,
- (10) Resolution 48 (Cg-XVI) – Implementation of the Global Framework for Climate Services,
- (11) Resolution 49 (Cg-XVI) – WMO Strategy for Capacity Development,
- (12) Resolution 53 (Cg-XVI) – Aeronautical Meteorology Programme,

**Noting further** that weather, climate and water information are important factors in decision-making in many socio-economic sectors of Regional Association II,

**Having considered** that service delivery is a cross-cutting issue requiring the expertise of weather, climate and water professionals and also the expertise of social and economic specialists and sector-based experts,

**Decides:**

- (1) To establish the Regional Association II Implementation Coordination Team on Service Delivery (ICT-SD) in support of the development of capacity for RA II Members to deliver weather-, climate- and water-related services with the following terms of reference:
  - (a) To facilitate the implementation of the WMO Strategy for Service Delivery as laid out in the RA II Regional Implementation Plan to guide all aspects of Service Delivery in the Association, including pilot and demonstration projects, and twinning arrangements between National Meteorological and Hydrological Services in the Region;
  - (b) To provide guidance to RA II Members on strengthening partnerships at the national to international levels, including between providers of weather-, climate- and water-related products and services and users in the public and private sectors: the media; academia; social and economic sciences; international and intergovernmental agencies; and non-governmental organizations;
  - (c) To provide guidance to RA II Members in capacity-building for information and outreach relevant to improving service delivery;
  - (d) To recommend strategies and priorities for research and development as well as infrastructure relevant to, and enabling, effective service delivery in the Region;
  - (e) To assess the effectiveness of programmes in improving services down to the end-user level, and advise on corrective steps where necessary;
  - (f) To keep under review education and training requirements related to service delivery;
- (2) To designate, in accordance with Regulation 33 of the WMO General Regulations, Mr Jianjun Xue (China) as chair of the Implementation Coordination Team on Service Delivery;

**Requests** the chair of the Implementation Coordination Team on Service Delivery (ICT-SD):

- (1) To develop an implementation plan, in consultation with the president and Management Group of the Association, with reference to the key performance indicators/targets and activities under the respective expected results of the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional

Association II (Asia) 2012–2015, to undertake work as mandated by the terms of reference of the Implementation Coordination Team;

- (2) To participate in the relevant sessions of WMO constituent bodies and expert groups, when invited, representing the regional interests, including regional needs and priorities, in relation to service delivery and to coordinate the Implementation Coordination Team on Service Delivery activities with the Joint WMO/IOC Commission for Oceanography and Marine Meteorology, Commission for Aeronautical Meteorology, Commission for Agricultural Meteorology, Commission for Hydrology and Commission for Climatology;
- (3) To submit to the president of the Association an annual report by 31 December every year and a final report in time for presentation to the sixteenth session of the Association, both copied to the WMO Secretariat, with inputs from all relevant expert groups in RA II whose role includes service delivery;

**Requests** the Secretary-General to support the work of the Implementation Coordination Team.

### Resolution 13 (RA II-15)

#### REGIONAL ASSOCIATION II IMPLEMENTATION COORDINATION TEAM ON DISASTER RISK REDUCTION

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *WMO Strategic Plan 2012–2015* (WMO-No. 1069),
- (2) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,
- (3) The *Abridged Final Report with Resolutions of the Sixty-fourth Session of the Executive Council* (WMO-No. 1092), general summary, agenda item 4 and Resolution 8 – Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements including its annex,
- (4) The *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No. 1077), general summary, paragraphs 11.5.1 to 11.5.21, and Resolution 52 (Cg-XVI) – Disaster Risk Reduction Programme,
- (5) The Final Report of the 2012 Meeting of Presidents of Technical Commissions, Geneva, 30 January–1 February 2012,
- (6) The Final Report of the 2012 Meeting of Presidents of Regional Associations, Geneva, 30–31 January 2012,

**Noting further:**

- (1) The adoption of the Beijing Action for Disaster Risk Reduction in Asia adopted at the First Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) (Beijing, China, 2005),
- (2) The adoption of the Delhi Declaration for Disaster Risk Reduction in Asia at the Second AMCDRR (New Delhi, India, 2007),

- (3) The adoption of the Kuala Lumpur Declaration for Disaster Risk Reduction in Asia and the Pacific at the Third AMCDRR (Kuala Lumpur, Malaysia, 2008),
- (4) The adoption of the Incheon Declaration for Disaster Risk Reduction in Asia and the Pacific at the Fourth AMCDRR (Incheon, Republic of Korea, 2010),
- (5) The adoption of the Yogyakarta Declaration for Disaster Risk Reduction in Asia and the Pacific at the Fifth AMCDRR (Yogyakarta, Indonesia, 2012),

**Considering:**

- (1) Disaster risk reduction as one of the five priority areas for consideration under voluntary resources of WMO and among the high-priority areas recommended by the High-level Taskforce on the Global Framework for Climate Services,
- (2) The WMO Disaster Risk Reduction (DRR) Programme as cross-cutting and inextricably linked to other WMO Programmes, technical commissions, regional associations and the Secretariat,
- (3) The importance of a user-driven approach to development and delivery of meteorological, hydrological and climate services to support policy development, risk analysis, multi-hazard early warning systems, sectoral risk management and disaster risk financing,
- (4) The WMO Disaster Risk Reduction Programme Work Plan (2012–2015) approved by the Executive Council at its sixty-fourth session,

**Considering further:**

- (1) The expressed need of Members for guidelines, standards and training modules for development and delivery of meteorological, hydrological and climate services to support DRR decision-making, in alignment with principles of quality management systems,
- (2) The experiences of Asia as one of the most natural hazard-prone regions and that the Region is one of the most active around the world with respect to the development of regional DRR strategy through the regular convening of the high-level AMCDRR,
- (3) The opportunities for coordination of the Association's strategy with the regional DRR strategies through the Association's representation and active engagement at the high-level AMCDRR,
- (4) That a number of NMHSs in the Region demonstrated good practices for provision of such services to the user community, and could thus support the development of DRR knowledge products and training materials,
- (5) The importance of lessons learned from national/regional coordinated DRR and adaptation projects for further implementation of the DRR Programme and governance mechanism,
- (6) That a number of technical assistance projects, namely, the Severe Weather Forecasting Demonstration Project, Flash Flood Guidance systems and Coastal Inundation Forecasting Demonstration Project, Integrated Drought Management, WMO Flood Management, the WMO Emergency Response Activities as well as further development of the Global Data-processing and Forecasting System, the WMO Integrated Global Observing System and the WMO Information System are critical in supporting disaster risk reduction in the Region,
- (7) That one of the three comprehensive and coordinated DRR national/regional projects, approved by the Sixteenth World Meteorological Congress and the Executive Council at its sixty-fourth session was located in South-East Asia. This project involves Lao People's Democratic Republic, Cambodia, Thailand, Viet Nam, Indonesia and the Philippines (spanning RA II and RA V) provided an enabling environment for demonstrating the

benefits of integrated planning and coordination engaging the WMO technical commissions and Programmes and RA V with the Association, Members, WMO coordinated network of Regional Specialized Meteorological Centres, Regional Climate Centres, Global Producing Centres, Regional Training Centres, and various regional mechanisms such as the Tropical Cyclone Committees and regional and national DRR Platforms as well as the Association of Southeast Asian Nations and other partners to assist Members,

**Decides** to establish the Regional Association II Implementation Coordination Team on Disaster Risk Reduction (ICT-DRR), that would report directly to the RA II Management Group, comprised of the chairs of the RA II Working Groups, and that the chair of the ICT-DRR would serve as the DRR Coordinator for the RA II Management Group;

**Requests** the Secretary-General:

- (1) To provide further details on requirements and needs of the DRR Programme Work Plan (2012–2015) to the president, the DRR Coordinator of the Management Group (that is, the chair of ICT-DRR) and Permanent Representatives of Members in RA II;
- (2) To assist, in coordination with the Regional Office for Asia and the Pacific of the United Nations Strategy for Disaster Risk Reduction (UNISDR), the president of the Association, and the DRR Coordinator of the Management Group to participate and actively engage in the AMCDRR;

**Decides:**

- (1) That the terms of reference of the ICT-DRR would include:
  - (a) To support the planning and engagement of the Association's participation in the AMCDRR;
  - (b) To ensure coordinated engagement of the relevant RA II Working Groups to support the assessments, development of the requirements, prioritization of capacity development needs, execution, evaluation and draw lessons learned from the DRR project in South-East Asia;
  - (c) To prepare recommendations drawn from lessons learned and other regional considerations of the Management Group and ultimately report to the Congress pertaining to strengthening of the role of regional associations and their working groups and their cooperation with regional DRR mechanisms for implementation;
  - (d) To identify countries and examples of good practices in the Region based on criteria developed by the DRR Expert Advisory Groups;
  - (e) To compile a list of experts from NMHSs, Regional Specialized Meteorological Centres and Regional Climate Centres nominated by the Permanent Representatives of Members with experiences in relevant areas related to DRR, who could be engaged to support the work of DRR Expert Advisory Groups related to the implementation of the Disaster Risk Reduction Programme Work Plan (2012–2015);
  - (f) In collaboration with the technical commissions and the Secretariat, to ensure alignment of the technical cooperation projects within the comprehensive, coordinated and user-driven approach of the Disaster Risk Reduction Programme Work Plan (2012–2015) to ensure that meteorological, hydrological and climate services are developed based on user-requirements and linked to the institutional frameworks for DRR and climate adaptation nationally and regionally;
- (2) That the terms of reference of the chair of the ICT-DRR would include:
  - (a) To serve as the DRR Coordinator of the RA II Management Group;

- (b) In coordination with the Secretariat and the UNISDR Regional Office for Asia and the Pacific, to assist the president of the Association to participate and actively engage in the AMCDRR;
  - (c) To liaise as the DRR Focal Point of the RA II Management Group with the WMO Secretariat and regional stakeholders pertaining to the implementation of the Disaster Risk Reduction Programme Work Plan (2012–2015);
  - (d) To participate on behalf of the WMO and RA II in the regional DRR Platforms and related events;
  - (e) To submit to the president of the Association an annual report by 31 December every year and a final report in time for presentation to the sixteenth session of the Association, both copied to the WMO Secretariat;
- (3) To designate, in accordance with Regulation 33 of the WMO General Regulations, Dr K.J. Ramesh (India) as chair of the Implementation Coordination Team on Disaster Risk Reduction;

**Urges** Members to support the implementation of the Disaster Risk Reduction Programme Work Plan (2012–2015) in the context of regional/national development and contributions through documentation of their respective good practices;

**Requests** the Secretary-General to support the work of the Implementation Coordination Team.

---

### Resolution 14 (RA II-15)

#### PILOT PROJECT TO DEVELOP SUPPORT FOR NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN NUMERICAL WEATHER PREDICTION

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,
- (2) The *Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association II (Asia)* (WMO-No. 1037), particularly Resolution 6 (XIV-RA II) – Pilot project to develop support for National Meteorological and Hydrological Services in numerical weather prediction,

**Noting with satisfaction:**

- (1) That a coordinating group comprising numerical weather prediction (NWP) operators and product providers, under the coordination of the Republic of Korea and Hong Kong, China, was established by the Association at its fourteenth session to support and assist NMHSs in the use of NWP products,
- (2) That the China Meteorological Administration and the Japan Meteorological Agency have agreed to provide the source codes, documentation and support for operating two community NWP models, namely the Global and Regional Assimilation Prediction System and the Non-Hydrostatic Model respectively,



- (3) That a number of NMHSs have indicated an interest to participate as users on applications of the community NWP models,
- (4) That a web-based portal called the “-Asian Consortium for NWP Forecasts (ACNF) is being developed by the Hong Kong Observatory to provide online resources and information to access: (a) the existing NWP products from RA II Members, including, among others, Hong Kong, China and the Republic of Korea, and (b) the source code and documentation of the community NWP models,

**Noting further:**

- (1) That a training workshop was successfully organized by Hong Kong, China in December 2012 under the Voluntary Cooperation Programme on the ACNF website, the use and interpretation of NWP products and the two community NWP models,
- (2) That feedback from participants of the training workshop in Hong Kong, China on the first phase of the pilot project as well as NWP research and development activities to be covered in the next phase of the pilot project has been sought,
- (3) That the coordinating group agrees to pursue the second phase of the pilot project in the next few years with emphases on post-processing of NWP products as well as data assimilation, with the relevant materials to be put up on the ACNF website,

**Recognizing:**

- (1) That the pilot project will contribute to enhancing weather services delivery, disaster risk reduction and capacity development efforts of NMHSs in Region II,
- (2) The plan of the coordinating group to continue in the second phase of the pilot project in developing the ACNF portal to enhance the resources and support on the post-processing of the existing NWP and Ensemble Prediction System products as well as data assimilation techniques such as remote-sensing data assimilation,

**Decides:**

- (1) To continue taking forward the pilot project to develop support for NMHSs in NWP based on the plan of the coordinating group and the feedback solicited at the training workshop in Hong Kong, China in December 2012;
- (2) To continue the work of the coordinating group with the following terms of reference:
  - (a) To establish the requirements of NMHSs of developing countries regarding their NWP activities and NWP development plans;
  - (b) To facilitate communication between NWP operators and product providers willing to engage in the exchange of knowledge and best practices with the recipient Members, including such areas as data assimilation, modelling, post-processing and computational aspects of numerical weather prediction;
  - (c) To develop brief and effective action plans, taking into account the relevant existing activities, for consortium members and recipient Members;
  - (d) To organize assistance to recipient Members in accessing and using NWP products as a priority, and in development and operation of models and data assimilation systems, through training activities and exchange of scientific expertise;
  - (e) To monitor the progress of the project;
  - (f) To assess the effectiveness of the project;

- (3) To further invite Members desiring to participate in the pilot project to designate experts to serve as members of the Coordinating Group;
- (4) To request the co-coordinators of the coordinating group to submit annual progress reports and a final report to the president of the Association not later than three months prior to the sixteenth session of the Association;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

---

### **Resolution 15 (RA II-15)**

#### **PILOT PROJECT ON INFORMATION SHARING ON CLIMATE SERVICES**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,
- (2) Resolution 48 (Cg-XVI) – Implementation of the Global Framework for Climate Services,
- (3) The Implementation Plan of the Global Framework for Climate Services adopted by the World Meteorological Congress at its the extraordinary session in 2012, especially Initial Priority Project 7 – Strengthening regional systems for providing climate services,
- (4) Resolution 1 (Cg-Ext.(2012)) – Implementation Plan of the Global Framework for Climate Services,

**Recognizing:**

- (1) That the information on climate services (product details, frequency of issuance, and so forth) provided by NMHSs is not fully shared among Members at present,
- (2) That, for the successful implementation of the Global Framework for Climate Services, it is important to share good practices and lessons learned, including experienced project management capabilities, to develop projects and improve climate services by NMHSs as well as to avoid duplication and minimize the risk of failure,

**Considering:**

- (1) That the Internet offers a good and cost-effective opportunity to collect and share information and lessons learned among Members,
- (2) That the network of Regional Climate Centres is an appropriate mechanism to provide such an opportunity,

**Decides:**

- (1) To establish a pilot project on information sharing on climate services, for collecting and sharing information on climate services provided by NMHSs as well as activities related to the Global Framework for Climate Services mainly through a dedicated website;
- (2) To designate the Tokyo Climate Centre, as Lead, to establish and maintain the dedicated website for this project;

- (3) To request the Tokyo Climate Centre to submit annual progress reports and a final report to the president of the Association not later than three months prior to the sixteenth session of the Association;

**Invites Members:**

- (1) To designate a focal point from each Member on this issue;
- (2) To actively participate in the pilot project by providing the designated centre with information on their climate services and activities related to the Global Framework for Climate Services, as appropriate;
- (3) To use the information available on the project website to develop their own activities and project as necessary;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

---

**Resolution 16 (RA II-15)**

**PILOT PROJECT TO DEVELOP SUPPORT FOR NATIONAL METEOROLOGICAL AND  
HYDROLOGICAL SERVICES IN THE COLLECTION AND APPLICATION OF  
AIRCRAFT METEOROLOGICAL DATA RELAY DATA**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 3 (Cg-XVI) – Global Observing System,
- (2) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,

**Considering:**

- (1) That Aircraft Meteorological Data Relay (AMDAR) is an important source of upper-air observations and is a crucial source of data being assimilated in numerical weather prediction (NWP) models,
- (2) That the Region contributes about 25 000 AMDAR observations from 7 airlines on the Global Telecommunication System daily out of about 300 000 AMDAR observations daily from 33 airlines worldwide, indicating a substantial room for potential growth in AMDAR programmes in Region II,

**Recognizing:**

- (1) That several NMHSs have experience in establishing an AMDAR programme,
- (2) That experience sharing by NMHSs already implementing an AMDAR programme would be beneficial to other NMHSs in planning for implementing their own AMDAR programme,
- (3) That there is synergy in coordinating existing and emerging AMDAR programmes to achieve optimization and streamlining of AMDAR data collection,

- (4) That there is potential for further development of products from AMDAR data to support NWP data assimilation and weather forecasting and warning services,

**Decides:**

- (1) To establish a pilot project to develop support for NMHSs in the collection and application of AMDAR data with the following terms of reference:
- (a) To promote experience sharing among NMHSs in setting up and operating AMDAR programmes;
- (b) To assist NMHSs in Region II in establishing their own AMDAR programme;
- (c) To promote sharing of AMDAR data from different AMDAR programmes;
- (d) To identify and explore means to optimize the collection of AMDAR data;
- (e) To assist NMHSs Region II in decoding, processing and visualization of AMDAR data;
- (f) To assist NMHSs Region II in the assimilation of AMDAR data in NWP models, development of new products/applications from AMDAR data to enhance the provision of weather forecasting and warning services;
- (g) To share experience in the collection and application of AMDAR data with Members Region II especially developing country Members;
- (h) To liaise with the WMO AMDAR Panel for assistance, as necessary;
- (2) To establish a coordinating group to take forward this pilot project and designate the Civil Aviation Administration of China, the China Meteorological Administration and the Hong Kong Observatory as co-coordinators;
- (3) To request the coordinating group to submit annual progress reports and a final report to the president of the Association not later than three months prior to the sixteenth session of the Association;

**Invites** Members:

- (1) To actively participate in the pilot project by designating a focal point on this issue;
- (2) To nominate an expert to participate in the work of the coordinating group;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

---

**Resolution 17 (RA II-15)**

**PILOT PROJECT TO SUSTAIN AND ENHANCE THE CAPACITY OF  
NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN THE  
PROVISION OF OFFICIAL WEATHER FORECASTS FOR THE MEDIUM RANGE**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 20 (Cg-XVI) – Public Weather Services Programme,

- (2) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,

**Considering** that numerical weather prediction (NWP) products are becoming indispensable in supporting the provision of weather forecasts by NMHSs especially in the medium-range forecasts,

**Noting further:**

- (1) That NMHSs, particularly those in the developing countries, still face difficulties in providing official weather forecasts for their cities and for longer forecast periods in the medium range,
- (2) That the World Weather Information Service (WWIS) is currently providing official weather forecasts for about 1 600 cities and there is room for more official city weather forecasts from NMHSs,
- (3) That there are increasing challenges of growing popularity of unofficial automatically-generated weather forecasts for extended period for many more cities (and even small districts within cities) around the world, which are available free of charge on the internet and mobile platforms (for example, mobile apps) in response to public demand, marginalizing the role of NMHSs, and presenting information inconsistent with the official and safety-critical weather information and warnings to the public,

**Recognizing:**

- (1) That the Project on the Provision of City-Specific NWP Products to Developing Countries via the Internet is a possible source of reliable NWP products to support the provision of official weather forecasts for longer periods in the medium range by developing countries,
- (2) That other notable global weather forecast centres are producing reliable NWP products that are also useful to assist NMHSs in the provision of weather forecasts in the medium range,
- (3) That additional city weather forecasts with longer forecast periods from NMHSs will significantly enhance the WWIS to face the increasing challenges of unofficial weather forecasts available on the Internet and mobile platforms,
- (4) That enhancing the capability of NMHSs to provide weather forecasts of longer range would project a positive image of NMHSs in providing reliable and user-friendly weather forecasting and warning services to reduce the risk of natural disasters due to inclement weather,

**Decides:**

- (1) To establish a pilot project to sustain and enhance the capacity of NMHSs in the provision of official weather forecasts for the medium range with the following terms of reference:
  - (a) To assist NMHSs in Region II in enhancing their provision of weather forecasts in the medium range;
  - (b) To explore and identify reliable sources of NWP products that are useful to support NMHSs in the provision of weather forecasts in the medium range,
  - (c) To explore means to post-process NWP products to better support NMHSs in the provision of weather forecasts in the medium range,
  - (d) To explore means to verify and validate NWP products with a view to ensuring the quality of the NWP-based weather forecasts in the medium range, in compliance with the heads of NMHSs to be supported,

- (e) To share experience in the post-processing, verification and validation of NWP products with Members of RA II especially developing country Members,
  - (f) To liaise with co-coordinators of the Project on the Provision of City-Specific NWP Products to Developing Countries via the Internet for providing the required NWP products in support of this pilot project,
- (2) To establish a coordinating group to take forward this pilot project and designate the Hong Kong Observatory and the Korea Meteorological Administration as co-coordinators;
  - (3) To request the coordinating group to submit annual progress reports and a final report to the president of the Association not later than three months prior to the sixteenth session of the Association;

**Invites Members:**

- (1) To actively participate in the pilot project by designating a focal point on this issue;
- (2) To nominate an expert to participate in the work of the coordinating group;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

---

**Resolution 18 (RA II-15)**

**PILOT PROJECT TO ENHANCE THE SEAMLESS PROVISION OF REGIONAL SEVERE WEATHER WARNINGS AND ADVISORIES**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 52 (Cg-XVI) — Disaster Risk Reduction Programme,
- (2) The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015,

**Considering** that the Sixteenth World Meteorological Congress called for further enhancement of regional and global websites such as the WMO Severe Weather Information Centre (SWIC) for access to official national information and warnings, standardization of advisory and warning formats, in particular tropical cyclone information issued by Regional Specialized Meteorological Centres and national tropical cyclone warning centres, and alignment with the emerging protocols for “authoritative” warnings on a nation-by-nation basis,

**Noting further:**

- (1) That there is a lack of standardized format for severe weather warnings and advisories, especially tropical cyclone advisories, making it difficult to decode them for exchange and further application,
- (2) That, while several weather warnings and advisories from NMHSs are already available on the SWIC website, there is no integrated view of all relevant severe weather warnings and advisories to enable users to have an overall and seamless picture of the official severe weather warnings and advisories. Users have to revert to the website of a particular NMHS to view the individual severe weather warnings/advisories, making it ineffective in respect of disseminating such essential severe weather warnings/advisories to the public,

**Recognizing:**

- (1) That data format designated for exchange of such essential information as severe weather warnings/advisories is already on the market, for example the Common Alerting Protocol (CAP). Internet platforms providing so-called crisis maps based on CAP, for example, Google.org, have already included severe weather information from various data sources, with the potential for presenting information inconsistent with the official severe weather warnings,
- (2) That there is benefit in exploring a common data format for severe weather warnings/advisories to facilitate their global exchange such that official severe weather warning/advisories can reach the users via more dissemination channels,
- (3) That, with a common data format that can be used to automatically decode severe weather warnings/advisories, it will be possible to display these official warnings/advisories in an overall and seamless manner on common platforms, for example, SWIC, noting that similar integrated display is available on certain "unofficial" websites,
- (4) That the severe weather warnings/advisories, when available in common data format, will enable NMHSs in developing more user-friendly products to enhance their provisions of severe weather warning services,
- (5) That the severe weather warnings/advisories, when available in common data format, will also enable NMHSs in obtaining and displaying warnings/alerts offered by other alerting authorities more readily,

**Decides:**

- (1) To establish a pilot project to enhance the seamless provision of regional severe weather warnings and advisories with the following terms of reference:
  - (a) To share experiences in data formats for tropical cyclone warnings/advisories among RA II Members;
  - (b) To identify challenges to be solved for converting tropical cyclone warnings/advisories of RA II Members into a common data format;
  - (c) To seek potential benefits from using a common data format for tropical cyclone warnings/advisories;and, based on the lessons learned from activities in (a) to (c):
  - (d) To assess the feasibility of developing a common data format for severe weather warnings/advisories by RA II Members;
  - (e) To give the Coordinator of SWIC advice on its development of a consolidated and seamless provision of severe weather warnings/advisories through SWIC;
- (2) To establish a coordinating group to take forward this pilot project and designate the Hong Kong Observatory as coordinator;
- (3) To request the coordinating group to submit annual progress reports and a final report to the president of the Association no later than three months prior to the sixteenth session of the Association;

**Invites** Members to nominate an expert to participate in the work of the coordinating group;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

---

**Resolution 19 (RA II-15)**

**STRATEGIC OPERATING PLAN FOR THE ENHANCEMENT OF  
NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN  
REGIONAL ASSOCIATION II (ASIA) (2012–2015)**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association II (Asia)* (WMO-No.1037), particularly Resolution 13 (XIV-RA II) – Strategic Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association II (Asia) (2009–2011),
- (2) The *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No.1077), especially Resolution 36 (Cg-XVI) – WMO Strategic Plan (2012–2015) and related discussion as well as Resolution 38 (Cg-XVI) – Preparation of the Strategic Plan for 2016–2019,
- (3) The WMO Operating Plan 2012–2015,

**Noting with satisfaction:**

- (1) The usefulness of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association II (Asia) (2009–2011) as guidance for Members in formulating their own development plans to contribute to and support weather-, climate- and water-related disciplines as well as their applications,
- (2) The great progress achieved in the implementation of the above regional strategic plan by Members of RA II during the period 2009–2011,

**Recognizing:**

- (1) That the WMO Strategic Plan 2012–2015 provides a high-level statement of the future direction and priorities of WMO in terms of three Global Societal Needs, five Strategic Thrusts and eight Expected Results,
- (2) That the WMO Operating Plan 2012–2015 lists time-bound programme activities planned for implementation by the technical commissions, regional associations and the Secretariat to achieve the vision and mission of WMO as presented in the WMO Strategic Plan for 2012–2015,
- (3) That the above framework provides a direction in establishing an overall strategic operating plan for the Region,

**Considering** the usefulness of a regional strategic operating plan that encompasses the development and/or enhancement of weather, climate, water and related environmental services,

**Agrees** that the Region's priorities be expressed in terms of Regional Key Outcomes and corresponding Key Performance Indicators associated with the eight WMO Expected Results, with each Regional Key Outcome having identifiable deliverables, activities, implementation schedule, and baselines and targets;

**Adopts** the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II (Asia) 2012–2015;



**Authorizes** its president to make the necessary adjustments to the Regional Strategic Operating Plan in consultation with the RA II Management Group and Working Groups in the light of the discussions of the Association at its present session;

**Urges** Members to participate actively in the implementation of the Regional Strategic Operating Plan of RA II, and take it into account in developing, carrying out and enhancing their national programmes in meteorology, hydrology and related disciplines to better respond to the demand for a widening range of services to meet the sustainable development goals of nations;

**Invites** the Members of Regional Association II to contribute to the trust fund established by WMO for the development and implementation of the RA II Strategic Operating Plan;

**Requests** the Management Group of Regional Association II:

- (1) To accord due priority, in collaboration with RA II Working Groups and relevant technical commissions, to the activities proposed in the Strategic Operating Plan;
- (2) To keep the Strategic Operating Plan under regular review and to monitor and evaluate the progress in the implementation of the Plan;
- (3) In collaboration with the Secretary-General, to seek partnerships with, and collaboration of, relevant institutions and programmes within the United Nations system, multilateral donors and international/regional agencies, particularly in the provision of technical and financial support for the implementation of the Plan;

**Requests** the Secretary-General:

- (1) To assist Members in mobilizing resources for development cooperation activities in line with the Strategic Operating Plan;
- (2) To arrange for the publication of this Plan and its dissemination to Members of the Association, the presidents of other regional associations and the presidents of technical commissions, among others;
- (3) To report to Regional Association II at its sixteenth session on the progress made on the implementation of the Strategic Operating Plan;

**Further requests** the Secretary-General to take into account the experience gained concerning strategic planning at the regional level in the development of the succeeding WMO Strategic Plan and WMO-wide Operating Plan and the associated planning process as well as in relation to the monitoring and evaluation of these Plans.

---

### **Resolution 20 (RA II-15)**

#### **REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION**

REGIONAL ASSOCIATION II (ASIA),

**Noting** paragraph 3.7.1 of the general summary of the ninth session of the Executive Committee,

**Considering:**

- (1) That a number of its resolutions adopted before its fifteenth session have been revised and incorporated in resolutions of the fifteenth session,
- (2) That others of its previous resolutions have been incorporated in appropriate WMO publications or have become obsolete,
- (3) That some of the previous resolutions are still to be implemented,

**Decides:**

- (1) To keep in force Resolutions 9 (VII-RA II), 11 (VII-RA II), 12 (X-RA II) and 14 (XII-RA II);
- (2) Not to keep in force the other resolutions adopted before its fifteenth session;
- (3) To publish the text of the resolutions kept in force in the annex to the present resolution.

---

**Note:** This resolution replaces Resolution 14 (XIV-RA II), which is no longer in force.

---

**Annex to Resolution 20 (RA II-15)**

**RESOLUTIONS OF REGIONAL ASSOCIATION II ADOPTED PRIOR TO ITS  
FIFTEENTH SESSION AND MAINTAINED IN FORCE**

**Resolution 9 (VII-RA II)**

**INCLUSION OF INFORMATION ON WAVES AND PRESSURE SYSTEMS IN  
WEATHER AND SEA BULLETINS**

THE REGIONAL ASSOCIATION FOR ASIA,

**NOTING** WMO Technical Regulations (C.1)2.3.2, (C.1)2.4.1 and (C.1)2.4.2,

**CONSIDERING:**

- (1) That in response to a recent inquiry shipmasters have stated that wind data alone do not always suffice in providing the necessary information for safe navigation,
- (2) That a specific requirement has been expressed for information on sea conditions, particularly swell waves, and on movements of significant pressure systems,

**URGES** Members:

- (1) To follow strictly the provisions of WMO Technical Regulations Chapter C.1, in respect of the format and contents of weather and sea bulletins issued for the high seas;
  - (2) To include in weather and sea bulletins, as appropriate, information on height and direction of waves above a particular threshold value (say two metres), along with an indication of areas where such waves occur or are expected to occur, as well as on direction and speed of movement of significant pressure systems;
  - (3) To maintain close contact with users with a view to ensuring that the information issued keeps up with their requirements.
-

**Resolution 11 (VII-RA II)****PROVISION OF MARINE METEOROLOGICAL SERVICES FOR COASTAL AND OFF-SHORE ACTIVITIES**

THE REGIONAL ASSOCIATION FOR ASIA,

**NOTING** that coastal and off-shore activities such as coastal fisheries, shore mining operations, harbour development, coastal development and engineering works have been on the increase in recent years,

**CONSIDERING:**

- (1) That the increasing coastal and off-shore activities call for corresponding expansion of marine meteorological services for the safety and economy of these activities,
- (2) That the services should include, where necessary, information on storm surges, in addition to gale and storm warnings and warnings on high waves,
- (3) That an adequate forecast service to coastal and off-shore areas would need the backing of observational data from these areas and that, in addition, these data would be helpful in building up the statistics for studies on coastal climatology,
- (4) That application of satellite products to coastal and off-shore services has proved highly useful,

**URGES** Members:

- (1) To provide marine meteorological services for coastal and off-shore areas, if such services do not already exist and to develop the services to meet the specific requirements of the users, taking advantage, where possible, of satellite products available;
- (2) To issue, where necessary, warnings on storm surges;
- (3) To give full consideration to increasing by all possible means the observations from coastal and off-shore areas by including in the observing programmes of coastal stations and off-shore platforms such sea parameters as waves, sea-surface temperature, sea ice, ice accretion, etc. and by establishing data buoy stations.

---

**Resolution 12 (X-RA II)****USE OF INMARSAT FOR THE COLLECTION OF SHIPS' METEOROLOGICAL AND OCEANOGRAPHIC REPORTS**

REGIONAL ASSOCIATION II (ASIA),

**NOTING:**

- (1) Resolution 19 (Cg-XI) – The collection and dissemination of marine meteorological and oceanographic information using INMARSAT,
- (2) The operation of Coast Earth Stations (CES) of INMARSAT in Region II,
- (3) The equipping of an increased number of ships participating in the WMO Voluntary Observing Ships (VOS) scheme with Ship Earth Stations (SES) of INMARSAT, in particular with the INMARSAT-C facility,

**CONSIDERING:**

- (1) The need to increase the number of ships' meteorological and oceanographic reports from most of the sea areas of Region II,
- (2) The considerable improvements to be expected in the receipt of marine meteorological and oceanographic observations from ships at sea through the enhanced use of the INMARSAT system,
- (3) The cost-savings which will accrue to those Members collecting such reports through INMARSAT by the increased use of the new INMARSAT-C facility for this purpose,

**RECOGNIZING WITH APPRECIATION** that certain Members operating INMARSAT CES have already arranged through their CES to accept ships' meteorological and oceanographic reports that are of general value to all Members of WMO,

**BEING CONCERNED**, however, that these reports are at present concentrated on a limited subset of the CES already in operation, and that problems continue to be related to the timely redistribution to the countries closest to the geographical origin of reports collected through INMARSAT,

**URGES:**

- (1) Those Members in the Region operating CES to accept ships' meteorological and oceanographic reports transmitted through their CES free of charge to ships;
- (2) All Members concerned to make every effort to ensure the timely redistribution of reports collected through INMARSAT to countries in the areas of the geographical origins of those reports;
- (3) All Members in the Region operating VOS equipped with INMARSAT-C to make every effort for these ships to be supplied with the new software package for the compilation and transmission of meteorological reports through INMARSAT-C, to ensure the maximum efficiency and cost-effectiveness of such an operation;

**REQUESTS** the Secretary-General to assist Members in the implementation of this resolution.

---

**Resolution 14 (XII-RA II)**

**SUPPORT FOR JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)**

REGIONAL ASSOCIATION II (ASIA),

**NOTING:**

- (1) Resolution 14 (Cg-XIII) – Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM),
- (2) IOC Assembly Resolution XX-12 – The Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (J-COMM),

**CONSIDERING** that oceanographic and marine meteorological observations not only make a significant contribution to operational meteorology and the provision of marine services, but also are essential to global climate studies generally,

**RECOGNIZING:**

- (1) That JCOMM is now the main body within WMO for the international coordination and regulation of a global operational ocean observing, data management and services system,
- (2) That some Members of the Association are actively involved in the deployment and maintenance of a variety of ocean observation facilities, for both operational and research purposes,
- (3) That Members of the Association are also increasingly being required to provide coordinated meteorological and oceanographic services for a large variety of marine user groups,
- (4) That the Global Telecommunication System (GTS) will continue to be essential for the operational collection and exchange of many types of ocean data;

**RECOGNIZING FURTHER** that a substantial increase in the amount of ocean data available operationally is needed to satisfy the requirements of operational meteorology, oceanographic services and research and global climate studies for such data,

**URGES** Members:

- (1) To continue and, where possible, expand their existing operational ocean observing system facilities and activities, as contributions to the WWW, GCOS and GOOS and with international coordination effected through JCOMM;
- (2) To participate actively in the planning and implementation of these systems and in the work of JCOMM;
- (3) To coordinate with appropriate national oceanographic agencies and institutions to ensure the long-term operational maintenance of oceanographic observing systems;
- (4) To coordinate with appropriate national oceanographic agencies and institutions in developing oceanographic data management capabilities and oceanographic services;
- (5) To enhance two-way ship-shore telecommunication arrangements for oceanographic data and products, in particular through the greater use of satellite-based telecommunications facilities such as the INMARSAT and Argos systems;

**REQUESTS** the Secretary-General to take any action considered necessary, and within the available budgetary resources, to assist Members to participate in the development and maintenance of JCOMM.

**NOTE:** This resolution replaces Resolution 13 (XI-RA II) which is no longer in force.

---

---

# ANNEXES

## ANNEX I

Annex to [paragraph 4.6.11](#) of the general summary

### REGIONAL TRAINING CENTRES IN REGION II

Regional Training Centre	Component	URL
China	China Meteorological Administration Training Centre (CMATC) – wide range of face-to-face courses	<a href="http://edu.cma.gov.cn/cmatac/">http://edu.cma.gov.cn/cmatac/</a>
	Nanjing University of Science and Technology (NUIST) – long term BSc and MSc courses and some short term courses	<a href="http://en.nuist.edu.cn/">http://en.nuist.edu.cn/</a>
India	India Meteorological Department, New Delhi – primarily technical courses	<a href="http://www.imd.gov.in/doc/training.htm">http://www.imd.gov.in/doc/training.htm</a>
	India Meteorological Department, Pune – primarily meteorologist courses	<a href="http://www.imdpune.gov.in/training/training_index.html">http://www.imdpune.gov.in/training/training_index.html</a>
	National Water Academy, Pune – primarily short hydrology courses. Testing online training	<a href="http://nwa.mah.nic.in/">http://nwa.mah.nic.in/</a>
Iran, Islamic Republic of	Iranian Meteorological Organization (IMO), Tehran – technical short courses	<a href="http://www.irimo.ir/">http://www.irimo.ir/</a> (Arabic only)
Iraq	Iraq Meteorological Organization (IMO), Baghdad	No website available
Qatar	Qatar Aeronautical College – specialist in aviation meteorology	<a href="http://www.qac.edu.qa/">http://www.qac.edu.qa/</a>
Uzbekistan	Tashkent Hydrometeorological Professional College (THMPC)	No website available

**ANNEX II**  
**Annex to paragraph 5.1.15 of the general summary**

**MEMBERSHIP OF SUBSIDIARY BODIES OF REGIONAL ASSOCIATION II (ASIA)**

**Management Group (MG)**

The president (Chair)

with the vice-president and other Executive Council member Permanent Representatives of the Region and Regional Hydrological Adviser to the president, and, as appropriate, other Directors of NMHSs and chairs of RA II working groups, to be invited by the president for each session.

**Working Group on Weather Services (WGWS)**

..... (Chair of WGWS to be decided by the Management Group)

**Expert Group on Aeronautical Meteorological Services Delivery (EG-AeM)**

Mr Boon-leung Choy (Co-Coordinator of EG-AeM)  
(Hong Kong, China)

Ms Marina Petrova (Co-Coordinator of EG-AeM)  
(Russian Federation)

with the following Theme Leaders to be decided by the Management Group:

- Theme Leader in QMS Implementation and Maintenance
- Theme Leader in Competency Assessment
- Theme Leader in Meteorological Support to Air Traffic Management and Provision of SIGMETs

**Expert Group on Operational Forecasting (EG-OF)**

Mr Yuki Honda (Co-Coordinator of EG-OF)  
(Japan)

Ms Irina Zaytseva (Co-Coordinator of EG-OF)  
(Uzbekistan)

with the following Theme Leaders to be decided by the Management Group:

- Theme Leader in Operational Forecasting Process and Support
- Theme Leader in Operational Predictions
- Theme Leader in Emergency Response Activities

**Expert Group on Public Weather Services Delivery (EG-PWS)**

Mr Lap-shun Lee (Co-Coordinator of EG-PWS)  
(Hong Kong, China)

Dr Muhammad Hanif (Co-Coordinator of EG-PWS)  
(Pakistan)

Mr Alexey Lyakhov (Co-Coordinator of EG-PWS)  
(Russian Federation)

with the following Theme Leaders to be decided by the Management Group:

- Theme Leader in Socio-economic Benefits of Meteorological and Hydrological Services
- Theme Leader in Delivery of Warning Services
- Theme Leader in Education and Public Outreach related to PWS

### **Working Group on Climate Services (WGCS)**

..... (Chair of WGCS to be decided by the Management Group)

#### **Expert Group on Climate Services (EG-CS)**

Mr Ryuji Yamada (Co-Coordinator of EG-CS)  
(Japan)

Dr Ghulam Rasul (Co-Coordinator of EG-CS)  
(Pakistan)

with the following Theme Leaders to be decided by the Management Group:

- Theme Leader in User Liaison and Applications of Climate Information and Products for Climate Risk Management and Adaptation to Climate Change
- Theme Leader in Implementation and Operation of Regional Climate Centres
- Theme Leader in Operational Regional and National Climate Outlook Forums
- Theme Leader in Climate Monitoring and Climate Watch
- Theme Leader in Climate Research for Development

#### **Expert Group on Agrometeorology (EG-AgM)**

Dr N. Chattopadhyay (Co-Coordinator of EG-AgM)  
(India)

Dr Alexander Kleshchenko (Co-Coordinator of EG-AgM)  
(Russian Federation)

with the following Theme Leaders to be decided by the Management Group:

- Theme Leader in Agrometeorological Training Needs
- Theme Leader in Soil Moisture Monitoring
- Theme Leader in Drought Preparedness and Management Strategies
- Theme Leader in Seasonal Climate Forecast Applications for Agriculture
- Theme Leader in Socio-economic Impact of Agrometeorological Information

### **Working Group on Hydrological Services (WGHS)**

Dr Sung Kim (Chair of WGHS and Hydrological Adviser to  
(Republic of Korea) the president)

Mr Muhammad Riaz (Vice-chair of WGHS)  
(Pakistan)

with the following Theme Leaders to be decided by the Management Group:

- Theme Leader in Water Resources Assessment
- Theme Leader in Flood Forecasting
- Theme Leader in Hydrological Aspects of Drought
- Theme Leader in Hydrological Responses to Climate Variability and Change and Promotion of the Use of Climate Information by Water Managers
- Theme Leader in Improved Accuracy of Hydrometric and Sediment Observations including Space-based Technologies
- Theme Leader in Sediment Disasters and Mass Movements



**Working Group on WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) (WG-WIGOS/WIS)**

..... (Chair of WG-WIGOS/WIS)  
 ..... (Vice-chair of WG-WIGOS/WIS)  
 to be decided by the Management Group

**Expert Group on WIGOS (EG-WIGOS)**

Mr Yongqing Chen (Co-Coordinator of EG-WIGOS)  
 (China)  
 Dr Jaegwang Won (Co-Coordinator of EG-WIGOS)  
 (Republic of Korea)

with Theme Leaders to be proposed by the co-coordinators of EG-WIGOS and decided by the Management Group

**Expert Group on WIS (EG-WIS)**

Ms Xiang Li (Co-Coordinator of EG-WIS)  
 (China)  
 Mr Kenji Tsunoda (Co-Coordinator of EG-WIS)  
 (Japan)

with Theme Leaders to be proposed by the co-coordinators of EG-WIS and decided by the Management Group

**Implementation Coordination Team on Service Delivery (ICT-SD)**

Mr Jianjun Xue (Chair of ICT-SD)  
 (China)

**Implementation Coordination Team on Disaster Risk Reduction (ICT-DRR)**

Dr K.J. Ramesh (Chair of ICT-DRR)  
 (India)

**ANNEX III**

**Annex to [paragraph 5.1.23](#) of the general summary**

**LIST OF EXPERTS TO WHOM CERTIFICATES WERE AWARDED**

<b>Name</b>	<b>Contribution – in recognition of:</b>
Mr Hiroyuki ICHIJO (Japan)	His long and dedicated services to the implementation of the WMO Information System and the Global Telecommunication System in Regional Association II (Asia), especially as Coordinator of the Sub-Group on WIS (2008–2012) and the Sub-Group on GTS and Data Management (2004–2008)
Mr Lap-shun LEE (Hong Kong, China)	His dedicated services for the implementation of the Project on Provision of City-Specific Numerical Weather Prediction Products to Developing Countries via the Internet; development of the Strategic Operating Planning for National Meteorological and Hydrological Services in Regional Association II (Asia); and development of the Regional WMO Integrated Global Observing System Implementation Plan for Regional Association II (Asia)
Mr Arif MAHMOOD (Pakistan)	His leadership to guide the work of the Working Group on WMO Integrated Observing System and WMO Information System as Chairperson

Name	Contribution – in recognition of:
Dr Kiyoharu TAKANO (Japan)	His leadership to guide the work of the Sub-Group on Climate Applications and Services of the Working Group on Climate Services, Adaptation and Agrometeorology as Coordinator
Dr Sung KIM (Republic of Korea)	His leadership to guide the work of the Working Group on Hydrological Forecasts and Assessments as Chairperson
Mr Zhongfeng ZHANG (China)	His dedicated services for the implementation of the Pilot Project on Support for the Developing Countries in the Aeronautical Meteorology Programme
Ms Jiao MEIYAN (China)	Her dedicated services for the implementation of the Pilot Project on Support for the Developing Countries in the Aeronautical Meteorology Programme
Mr Yoshihisa KIMATA (Japan)	His dedicated services for the implementation of the Pilot Project to Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations
Mr Pak Wai CHAN (Hong Kong, China)	His dedicated services for the implementation of the Pilot Project to Develop Support for National Meteorological and Hydrological Services in Numerical Weather Prediction
Mr H.C. SHIN (Republic of Korea)	His dedicated services for the implementation of the Pilot Project to Develop Support for National Meteorological and Hydrological Services in Numerical Weather Prediction
Mr Toshiyuki KURINO (Japan)	His dedicated services for the implementation of the Pilot Project to Develop Support for National Meteorological and Hydrological Services in Satellite Data, Products and Training
Dr Do-hyeong KIM (Republic of Korea)	His dedicated services for the implementation of the Pilot Project to Develop Support for National Meteorological and Hydrological Services in Satellite Data, Products and Training
Dr Boon-ying LEE (Hong Kong, China)	His dedicated services for the development of the Strategic Operating Plan for National Meteorological and Hydrological Services in Regional Association II (Asia)
Mr Naoyuki HASEGAWA (Japan)	His dedicated services for the development of the Strategic Operating Plan for National Meteorological and Hydrological Services in Regional Association II (Asia)
Mr CHEN Yongqing (China)	His dedicated services for the development of Regional WMO Integrated Global Observing System Implementation Plan for Regional Association II (Asia)
Dr Jae-Gwang WON (Republic of Korea)	His dedicated services for the development of Regional WMO Integrated Global Observing System Implementation Plan for Regional Association II (Asia)
Mr Naohisa KOIDE (Japan)	His dedicated services for the development of Regional WMO Integrated Global Observing System Implementation Plan for Regional Association II (Asia)
Dr Songkran AGSORN (Thailand)	His dedicated services for the development of Regional WMO Integrated Global Observing System Implementation Plan for Regional Association II (Asia)
Ms Xiang LI (China)	Her dedicated services for the work of the Sub-group on WMO Information System of the Working Group on WMO Integrated Observing System and WMO Information System as Theme Leader in Regional WIS Requirements
Mr Yuki HONDA (Japan)	His dedicated services for the work of the Sub-group on Service Delivery of the Working Group on Disaster Risk Reduction and Service Delivery as Theme Leader in Numerical Weather Prediction Systems and Products

---

**ANNEX IV**  
Annex to [paragraph 5.1.50](#) of the general summary

**STRATEGY PART OF THE STRATEGIC OPERATING PLAN FOR THE ENHANCEMENT OF  
NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES (NMHSs)  
IN REGIONAL ASSOCIATION II (ASIA) 2012–2015**

## 1. Introduction

This RA II Strategic Operating Plan aims at providing a clear path forward for the Region to address critical societal needs. It takes into account the framework of the WMO Strategic Plan 2012–2015 which was approved in the Sixteenth World Meteorological Congress (Geneva, May/June 2011), with eight Expected Results grouped within five Strategic Thrusts under three Global Societal Needs. A schematic representation of the structure of WMO Strategic Plan 2012–2015 is given below.

Three Global Societal Needs	Five Strategic Thrusts	Eight Expected Results
Improved protection of life and property (related to the impacts of hazardous weather, climate, water and other environmental events, and increased safety of transport on land, at sea, and in the air)	<b>Improving service quality and service delivery</b>	1. Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate, water and related environmental predictions, information, warnings and services in response to users' needs, and to enable their use in decision-making by relevant societal sectors.
		2. Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements.
Poverty alleviation, sustained livelihoods and economic growth (in connection with the Millennium Development Goals), including improved health and social well-being of citizens (related to weather, climate, water and environmental events and influence)	<b>Advancing scientific research and application, as well as development and implementation of technology</b>	3. Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies.
		4. Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO.
		5. Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development.
Sustainable use of natural resources and improved environmental quality	<b>Strengthening capacity-building</b>	6. Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates.
	<b>Building and enhancing partnerships and cooperation</b>	7. New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategic issues.
	<b>Strengthening good governance</b>	8. An effective and efficient Organization.

## 2. Priority areas of RA II

Within the five Strategic Thrusts and eight Expected Results, WMO as a whole has identified the following five priority areas that have significant contribution to the achievement of the expected results:

- Global Framework for Climate Services (GFCS);
- Aviation meteorological services;
- Capacity-building for the developing and least developed countries;
- Implementation of the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS); and
- Disaster Risk Reduction (DRR).

Considering the circumstances in the Region, RA II identified the following highest priority areas:

- Implementation of the WIS/WIGOS and necessary improvement of the GTS;
- Sustainable capacity development including human resources development;
- Implementation of the GFCS in support of agriculture and food security; water; health; and disaster risk reduction, as well as energy and other sectors, through, but not limited to enhancement and operation of the RA II RCC network and RCOFs;
- Climate services to address the slow-onset impacts of climate variability and climate change;
- Establishment of a Region-wide multi-hazard early warning system for Disaster Risk Reduction;
- Implementation of aeronautical meteorological services enhancements in coordination with CAeM and upgrading of service delivery capability in other application areas including marine meteorological services;
- Implementation of the WMO Flood Forecasting Initiative, water resources assessment and regional exchange of hydrological data and information; and
- Reduction of risks and impacts of Region specific hazards caused by sand and dust storms, thunderstorms and associated extreme weather events.

## 3. RA II Operating Plan

In accordance with the highest priority areas of RA II, a set of deliverables and associated activities were developed in the following RA II Operating Plan. They are listed under the relevant WMO Strategic Plan Expected Results, Regional Key Outcomes (RKOs) and corresponding Key Performance Indicators (KPIs). Relevant Programmes and technical commissions responsibility and implementation schedules are also presented. Baselines and targets are listed for each deliverable to measure the progress towards achieving the Expected Results.

For a number of the activities with “Members” listed in the “Responsibility” column, relevant Members should reaffirm the goals and consider means to implement the deliverables, and in particular each NMHS should conduct action items to improve their own services and/or help other NMHSs in the Region.

## 4. Monitoring and evaluation mechanism

Monitoring and evaluation are tools to measure the performance of implementation of the Strategic Operating Plan. They also contribute to the identification of good practices and lessons learned with respect to implementation, as well as policy, strategy and programmatic design that will inform the next phase of strategic planning. While monitoring is an ongoing function, evaluations are conducted routinely and results are reported to the future RA II sessions.

Surveys of the basic capability of NMHSs in RA II were carried out in 2008 and 2011. The results of the latter one were used to form the baseline of achievement of the deliverables in the RA II Operating Plan 2012–2015, with a view to monitoring and evaluating the progress of the implementation of the deliverables. Information will be regularly gathered from Members through surveys to analyse the likely trends, developments, evolving needs and deficiencies of the Region.

---

**ANNEX V****Annex to paragraph 7.2.1 of the general summary****DESIGNATION AND MANDATORY FUNCTIONS OF REGIONAL SPECIALIZED METEOROLOGICAL CENTRES WITH ACTIVITY SPECIALIZATION IN ATMOSPHERIC SANDSTORM AND DUSTSTORM FORECASTS**

The mandatory function of the Regional Specialized Meteorological Centre(s) with activity specialization in Atmospheric Sand and Dust storm Forecasts (RSMC-ASDF) include creating, developing and maintaining a web portal to display forecast products as well as additional information, including a system to collect users' feedback. The goal is to provide guidance on the risk of sand and dust storm occurrence within an identified geographical domain of responsibility, and help the NMHSs-concerned improve their warning services to the national authorities.

RSMC-ASDF are recognized as such by CBS following the guidance by CAS and at the request of the Regional Association(s) concerned, including for sensitive areas whose boundaries extend beyond or are outside those of a single Regional Association.

Designated RSMCs for the provision of Sand and Dust storm Forecasts, including their geographical region of responsibility, are:

RSMC-ASDF 'CITYNAME' (geographical area)

The RSMC-ASDF shall:

**Real-time functions**

- Prepare regional forecast fields using a dust forecast model continuously throughout the year on a daily basis. The model shall consist of a numerical weather prediction model incorporating on-line parameterizations of all the major phases of the atmospheric dust cycle.
- Generate forecasts of the following minimum set of variables:
  - Dust load ( $\text{kg}\cdot\text{m}^{-2}$ )
  - Dust concentration at the surface ( $\mu\text{g}\cdot\text{m}^{-3}$ )
  - Dust optical depth at 550 nm (–)
  - 3-hour accumulated dry and wet deposition ( $\text{kg}\cdot\text{m}^{-2}$ )
- Forecasts shall cover the period from the starting forecast time (00 and/or 12 UTC) up to a forecast time of at least 72 hours, with an output frequency of at least 3 hours. They shall cover the whole designated area. The horizontal resolution shall be finer than about  $0.5\times 0.5$  degrees.
- Disseminate through the GTS/WIS and provide on its web portal the forecast products in pictorial form not later than 12 hours after the starting forecast time.
- Issue an explanatory note on the web portal when operations are stopped due to technical problems.

**Non-real-time functions**

- Store the generated products in WMO GRIB format.
  - Maintain the web portal built to display forecast products as well as additional information.
  - Perform seasonal and annual forecast evaluation based on available observational data.
  - Issue annual activity reports.
  - Support user training courses.
  - Provide information on methodologies and product specifications and the guidance on their use.
-

# APPENDIX

## LIST OF PARTICIPANTS

### 1. Officers

Victor E. CHUB	President
Qamar-uz-Zaman CHAUDHRY	Vice-president

### 2. Representatives of WMO Members within Region II

#### Afghanistan

Mohd Ishaq NOORI	Principal Delegate
------------------	--------------------

#### Bahrain

Yousif KHALAF	Principal Delegate
Adel TARAR DAHAM	Alternate

#### Bangladesh

Ms Arjumand HABIB (MS)	Principal Delegate
------------------------	--------------------

#### Bhutan

Karma TSERING	Principal Delegate
---------------	--------------------

#### China

SHEN Xiaonong	Principal Delegate
ZHOU Heng	Alternate
TIAN Cuiying (Ms)	Delegate
ZHANG Peiqun	Delegate
LI Xiang (Ms)	Delegate
XU Xianghua	Delegate
CHEN Yongqing	Delegate
ZHANG Zhongfeng	Delegate
SONG Lianchun	Delegate

#### Hong Kong, China

C.M. SHUN	Principal Delegate
C.M. CHENG	Alternate
L.S. LEE	Delegate

#### India

S.D. ATTRI	Principal Delegate
------------	--------------------

#### Iran, Islamic Republic of

Mina JABBARI (Ms)	Principal Delegate
-------------------	--------------------

#### Iraq

Tahir Hassan HANTOSH	Principal Delegate
Ali Abdulkaleq ALI	Delegate
Faten Rashid HAMEED	Delegate
Arkan Abdullah MOZAN	Delegate

#### Japan

Noritake NISHIDE	Principal Delegate
Hiroyuki ICHIJO	Delegate
Tatsuya KIMURA	Delegate
Yoshiaki KANNO	Delegate

#### Kazakhstan

Tursynbek KUDEKOV	Principal Delegate
-------------------	--------------------

**Kuwait**

Mohammad Karam ALI	Principal Delegate
Naser ALFADHLI	Delegate
Ali ALMOTAWA	Delegate
Abdulhamd DASHTI	Delegate

**Lao People's Democratic Republic**

Sithank SOUTHICHACK	Principal Delegate
Singthong PATHOUMMADY	Alternate
Souksamone PATHAMMAVONG	Delegate

**Macao, China**

Soi Kun FONG	Principal Delegate
Iu Man TANG	Alternate

**Maldives**

Abdul Muhsin RAMIZ	Principal Delegate
--------------------	--------------------

**Mongolia**

Enkhtuvshin SEVJID	Principal Delegate
Sarantuya GANJUUR	Delegate

**Myanmar**

Kyaw Moe OO	Principal Delegate
-------------	--------------------

**Nepal**

Kamal Prakash BUDHATHOKI	Principal Delegate
--------------------------	--------------------

**Oman**

Abdul Rahim Salim AL HARMI	Principal Delegate
Ahmed AL HARTHI	Delegate
Juma Said AL MASKARI	Delegate
Musallem Said AL MASHANI	Delegate

**Pakistan**

Qamar-uz-Zaman CHAUDHRY	Principal Delegate
Arif Mahmood RANA	Delegate

**Qatar**

Ahmed Abdulla MOHAMMED	Principal Delegate
Abdulla AL MANNAI	Alternate
R. MONIKUMAR	Delegate

**Republic of Korea**

Il-soo LEE	Principal Delegate
Chung-kyu PARK	Alternate
Se-won KIM	Delegate
Yong-seob LEE	Delegate
Jun-ho CHA	Delegate
Hyo-Seob CHO	Delegate
Eun-jin CHOI (MS)	Delegate
Hyun-suk KANG	Delegate
Do-hyeong KIM	Delegate
Hee-jong KIM	Delegate
Sung KIM	Delegate
O-ung KWON	Delegate
Hee-sang LEE	Delegate
Kwan-joon PARK	Delegate
Sung-wha SON (Ms)	Delegate

**Russian Federation**

Alexander GUSEV	Principal Delegate
A.A. NURULLAEV	Alternate
A.V. GAVRILOV	Delegate
M.V. PETROVA (Ms)	Delegate
R.M. VILFAND	Delegate

**Saudi Arabia**

Saad MOHALFI	Principal Delegate
Mohammed BABIDHAN	Delegate
Ayman GHULAM	Delegate

**Tajikistan**

Zafar MAKHMUDOV	Principal Delegate
-----------------	--------------------

**Thailand**

Worapat TIEWTHANOM	Principal Delegate
Wirat WARANUCHIT	Delegate

**United Arab Emirates**

Abdullah A. AL MANDOOS	Principal Delegate
Mohamed M. Ali AL HAMIRI	Delegate
Omar A. Abdulla AL YAZEEDY	Delegate
Abdulla ALDHANHANI	Delegate

**Uzbekistan**

Victor E. CHUB	Principal Delegate
Sergey MYAGKOV	Delegate
Malika NAZAROVA (Ms)	Delegate

**Viet Nam**

Van Duc BUI	Principal Delegate
Van Thang NGUYEN	Delegate
Thuy Hang NGUYEN (Ms)	Delegate

**Yemen**

Abdo A. ALMAKALEH	Alternate
Ahmed Saeed AL-SHOGAA	Delegate
Mohammed Abdulrahim TARESH	Delegate

**3. Representatives of WMO Members outside Region II****Canada**

David GRIMES	WMO President
--------------	---------------

**Croatia**

Ivan CACIC	President RA VI
------------	-----------------

**Finland**

Petteri TAALAS	Principal Delegate
Myllymaka JAAKKO	Delegate
Harri PIETARILA	Delegate

**France**

Jean-Marc BARRETY	Delegate
Patrick BENICHO	Delegate
Jean-Sebastien CASES	Delegate
Michel POUSSE	Delegate

**United States of America**

Grant CALVERLEY	Delegate
-----------------	----------



**4. Representatives of intergovernmental organizations****Niger Basin Authority (NBA)**

Delegate

Ibraheem OLOMODA

---





For more information, please contact:

**World Meteorological Organization**

**Communications and Public Affairs Office**

Tel.: +41 (0) 22 730 83 14/15 – Fax: +41 (0) 22 730 80 27

E-mail: [cpa@wmo.int](mailto:cpa@wmo.int)

7 bis, avenue de la Paix – P.O. Box 2300 – CH 1211 Geneva 2 – Switzerland

[www.wmo.int](http://www.wmo.int)