

# Regional Association II (Asia)

Sixteenth session

Abu Dhabi

12–16 February 2017

Abridged final report with resolutions and decisions



WORLD  
METEOROLOGICAL  
ORGANIZATION



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## GENERAL SUMMARY OF THE WORK OF THE SESSION

1. The president of Regional Association II (Asia)(RA-II), Mr Abdulla Mohamed A. Al-Mannai, opened the sixteenth session of RA II on Sunday, 12 February 2017, at 9.30 a.m. in the Dusit Thani Hotel, Abu Dhabi. Mr Abdulla Mohamed A. Al-Mannai, Mr Abdullah Ahmed Al Mandoos, Permanent Representative of the United Arab Emirates with the World Meteorological Organization (WMO), and Professor Petteri Taalas, Secretary-General of WMO, addressed delegates. Mr David Grimes, President of WMO, and Mr Wenjian Zhang, Assistant Secretary-General of WMO, also participated in the opening ceremony.
  2. The agenda is given in [Appendix 1](#).
  3. The session adopted 14 Resolutions (given in [Appendix 2](#)) and 37 Decisions (given in [Appendix 3](#)).
  4. Twenty-five Members of RA II, three Members outside the Region, two Presidents of constituent bodies and three international organizations attended the session. Out of a total of 83 participants, nine were women, i.e. 11%. The list of participants is given in [Appendix 4](#).
  5. The Association elected Mr Abdullah Ahmed Al Mandoos (United Arab Emirates) as its president and Mr Rishi Ram Sharma (Nepal) as its vice-president.
  6. The Association decided that its seventeenth session would be held late in 2020.
  7. The sixteenth session of Regional Association II closed at 12.50 p.m. on 16 February 2017.
-

## **APPENDIX 1. AGENDA**

### **1. OPENING OF THE SESSION**

### **2. ORGANIZATION OF THE SESSION**

2.1 Consideration of the report on credentials

2.2 Adoption of the agenda

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### **3. REPORT BY THE PRESIDENT OF THE ASSOCIATION**

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6.1 Private sector engagement

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- 7. WMO REGIONAL OFFICE FOR ASIA AND THE SOUTH-WEST PACIFIC INCLUDING WMO OFFICE FOR WEST ASIA**
  - 8. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS**
  - 9. ELECTION OF OFFICERS**
  - 10. DATE AND PLACE OF THE SEVENTEENTH SESSION**
  - 11. CLOSURE OF THE SESSION**
-

## APPENDIX 2. RESOLUTIONS ADOPTED BY THE SESSION

### Resolution 1 (RA II-16)

#### REGIONAL WMO INTEGRATED GLOBAL OBSERVING SYSTEM IMPLEMENTATION PLAN 2017–2020

REGIONAL ASSOCIATION II (ASIA),

#### Noting:

- (1) Resolution 3 (RA II-15) – Regional WMO Integrated Global Observing System Implementation Plan,
- (2) Resolution 23 (Cg-17) – Pre-operational phase of the WMO Integrated Global Observing System,
- (3) Resolution 69 (Cg-17) – WMO Strategic Plan 2016–2019,
- (4) Resolution 2 (EC-68) – Plan for the WMO Integrated Global Observing System pre-operational phase 2016-2019,

#### Noting further:

- (1) That the WMO Integrated Global Observing System (WIGOS), as a foundational element supporting all WMO priorities, can assist in improving the integrated operations of Members and in building productive partnerships that will improve weather, climate, water and relevant environmental services,
- (2) The critical role of WIGOS for the implementation of the Global Framework for Climate Services, weather and disaster risk reduction services and aviation meteorological services, and for Polar and high-mountain regions and capacity development,

**Adopts** the updated Regional WIGOS Implementation Plan 2017–2020, as contained in the annex to the present resolution;

**Requests** the Management Group:

- (1) To regularly review WIGOS implementation efforts in the Region;
- (2) To oversee, guide and prioritize the activities listed in the Plan; to monitor implementation progress and to submit updates to the Plan to the president of the Association for approval;
- (3) To facilitate and coordinate regional WIGOS projects;
- (4) To coordinate with RA II Members the implementation of the Plan and consult with the appropriate technical commissions on technical aspects of the implementation;
- (5) To provide regional support to Members in accordance with the Plan and in response to their requests (subject to availability of resources);
- (6) To oversee the establishment of the Regional Basic Observing Network (RBON) in RA II;
- (7) To oversee the work of regional WIGOS Centre(s) when established in the Region;

- (8) To support training in the Observing Systems Capability Analysis and Review tool (OSCAR)/Surface as a matter of great urgency;

**Requests** Members:

- (1) To organize their activities so as to achieve WIGOS goals and associated outcomes as described in the Plan;
- (2) To continue to provide resources, including through the WIGOS Trust Fund and/or seconded experts, to help support the regional implementation of WIGOS;
- (3) To support the establishment of regional WIGOS Centres;
- (4) To apprise regional and other Members of the benefits of WIGOS;
- (5) To share experiences and lessons learned from the implementation of WIGOS, and WIGOS-related documentation with other Members in the Region;
- (6) To nominate their national WIGOS and OSCAR/Surface focal points if not yet done;

**Requests** the Secretary-General to provide the necessary assistance and Secretariat support for WIGOS implementation in Region II;

**Invites** partners to participate in relevant implementation activities as specified in the Plan.

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Note: This resolution replaces Resolution 3 (RA II-15), which is no longer in force.

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**Annex to Resolution 1 (RA II-16)****REGIONAL WMO INTEGRATED GLOBAL OBSERVING SYSTEM IMPLEMENTATION PLAN  
2017-2020****REGIONAL WIGOS IMPLEMENTATION PLAN  
2017–2020****(R-WIP-II)**

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    - 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
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- 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 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 focuses 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 continues to evolve and improve beyond 2015 through the governance and management mechanisms established by the execution of this Plan.

The WIP provided a basis for the development of the Regional WIGOS Framework Implementation Plans (R-WIP). The Members of a Region adhered 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 Seventeenth World Meteorological Congress (Cg-17), held in 2015, decided that WIGOS, supported by WIS, is one of the WMO strategic priorities for 2016-2019 (see the WMO Strategic Plan<sup>1</sup>).

According to the decision made by Cg-17, the development of WIGOS will continue during its pre-operational phase 2016-2019, building upon and adding to those key building blocks of the WIGOS Framework that have already been implemented, while gradually shifting the emphasis from the global level toward implementation activities at the regional and national levels. The goal is to have Members and their partners benefit from a fully operational system from 2020 onward.

The highest priorities for the WIGOS pre-operational phase are: (1) national WIGOS implementation; (2) WIGOS Regulatory Material complemented with necessary guidance material to assist Members with the implementation of the WIGOS technical regulations; (3) further development of the WIGOS Information Resource (WIR), with special emphasis on the operational deployment of the Observing Systems Capability Analysis and Review (OSCAR) databases; (4) development and implementation of the WIGOS Data Quality Monitoring System; and (5) concept development and initial establishment of Regional WIGOS Centres.

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<sup>1</sup> See [http://library.wmo.int/pmb\\_ged/wmo\\_1161\\_en.pdf](http://library.wmo.int/pmb_ged/wmo_1161_en.pdf)



The Plan for the WIGOS Pre-operational Phase (PWPP) adopted by EC-68 will guide the development of WIGOS over the coming four years, especially at the regional and national levels and will assist in defining priorities and targets.

## **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 Observing System (WHCOS) 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 and interoperability;
- (g) The WIGOS 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

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

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 and metadata 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 standard and recommended practices and procedures stated in the WMO Technical Regulations and the respective Manuals of the WIGOS component observing systems (e.g., GOS, GAW, WHOS and GCW). They will be encouraged to adopt a composite network approach 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 is an integrated, comprehensive, and coordinated system primarily comprising the surface-based and space-based observing components of the GOS, GAW, GCW, and WHOS, 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 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

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

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

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 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 WHOS 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.

#### ***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.

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

<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>

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 recorded in the WMO Publication No. 9, Volume A, will ultimately be available, with additional metadata through the OSCAR/Surface 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.

**Table 1: The 14 recognized WMO Application Areas**

No.	Application Area	No.	Application Area
1	Global NWP	8	Providing Atmospheric Composition information to support services in urban and populated areas
2	High Resolution NWP	9	Ocean Applications
3	Nowcasting & Very Short-range Forecasting	10	Agricultural Meteorology
4	Sub-seasonal to longer predictions	11	Hydrology <sup>10</sup>
5	Aeronautical Meteorology	12	Climate Monitoring
6	Forecasting Atmospheric Composition	13	Climate Applications
7	Monitoring Atmospheric Composition	14	Space Weather

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

<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.

commissions draw on the SoGs to develop a Vision and an Implementation Plan for further development of WIGOS.

As part of the regional WIGOS implementation, the Regional Basic Observing Network (RBON) concept is being introduced to replace the existing RBSN and RBCN networks.

### ***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/IEC 17025:2005 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 standard and recommended practices and procedures described in the WMO Regulatory Materials, such as the *Manual on WIGOS* (WMO-No. 1160) and *Guide to WIGOS*. 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).

A network of Regional WIGOS Centres (RWCs) is needed to assist RA II Members to successfully implement WIGOS at the national and regional levels. Under the governance and guidance of the management group and with the support of relevant regional working bodies, the overall purpose of the RWCs is to provide support and assistance to Members of the Region for their national and regional WIGOS implementation efforts.

Basic functions of the RWC must be regional coordination, guidance, oversight and support of WIGOS implementation and operational activities at the regional and national levels (day-to-day level of activities). The proposed mandatory functions are directly linked with two of the priority areas of the WIGOS Pre-operational phase (2016-2019):

1. Regional WIGOS metadata management (work with data providers to facilitate collecting, updating and providing quality control of WIGOS metadata in OSCAR/Surface);
2. Regional WIGOS performance monitoring and incident management (WIGOS Data Quality Monitoring System) and follow-up with data providers in case of data availability or data quality issues.

Depending on available resources and regional needs, one or more optional functions may be adopted, e.g.: (a) assistance with the coordination of regional/sub-regional and national WIGOS projects; (b) assistance with regional and national observing network management; and (c) support for regional capacity development activities.

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.

The key priority will be the development of a modern and efficient performance monitoring and reporting system for observational data availability and data quality. This is essential for measuring the effectiveness and impact of WIGOS, and for developing robust incident management practices that will lead to improved WIGOS data quality and availability.

The plan is to put in place mechanisms and regional structures to handle incident management actions and support Members in improving the data availability and quality by 2018 (dependent on establishment of RWCs).

## **2.6 Standardization and Interoperability<sup>11</sup>**

A key area for WIGOS standardization relates to instruments and methods of observation. Standardization of observations is required to achieve system interoperability (including data compatibility) across all WIGOS component observing systems and these are key to turning observations into effective data/products that meet real needs of all Members.

WIGOS standardization should build on existing WMO and other international standards, recommended and best practices and procedures, and take 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.

System interoperability and data compatibility also rely on the use of standardized data representation and formats, standardized methods for information exchange, and standardization in data management. The first two lie in the WIS domain and the third is a natural extension of WIS responsibilities. It is important that WIGOS and WIS implementation activities are closely coordinated in this respect, and that WMO agrees on an approach to standardizing data management across Programmes.

All WIGOS related standard and recommended practices and procedures are documented in the *Technical Regulations* (WMO-No. 49), its Annex VIII, the *Manual on WMO Integrated Global Observing System* (WMO-No. 1160) and other relevant Manuals. Guidance material will be documented in the Guides and other technical documentation under the responsibility of the respective technical commissions.

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 standard and recommended practices and procedures (that is, standardization). Data compatibility will also be supported through the use of standardized data representation and formats.

Any regional deviations from the standards (documented in the *Technical Regulations* (WMO-No. 49) and its Annexes) will be reported to the Secretary-General.

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



## 2.7 The WIGOS Information Resource

The WIGOS 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.

The central piece of the WIR will be a living, robust, modern, electronic inventory of all observing assets within WIGOS, including all relevant metadata and vocabularies. No meaningful network design activities, gap mitigation or resource optimization can take place without such an inventory. Accordingly, the development, operational deployment and operational uptake of OSCAR/Surface is assigned very high priority for WIGOS in the WIGOS pre-operational.

Subsequent development of the WIR will address the migration and further development of the OSCAR/Space and OSCAR/Requirement, the development of the Gap Analysis Module, OSCAR/Analysis, and the development of the Standardization of Observations Reference Tool (SORT), and the WIGOS Web Portal.

Understanding that sources of the individual components of the WIGOS 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 and metadata themselves is generally the responsibility of observing system owners/data custodians. However, several World Data Centres and a number of 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.

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<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.



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 Data Collection and Production Centres (DCPCs) as well as National Centres will be supported and encouraged by RA II. Guidance is being developed and provided through the appropriate WIGOS non-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-economic 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 provides 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 are being 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. The members of the Region will provide progress reports at the request of the RA II Management Group.

## **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 RA II 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**

Both human and funding resources will be needed. As WIGOS will ultimately be implemented at the national level, RA II should emphasize to the Members to use their own resources as much as possible.

## **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.
-

## 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	Potential Risks
<b>1. Management of WIGOS Implementation in RA II</b>					
1.1 R	Regularly update R-WIP-II	R-WIP-II updated	when necessary	RA II EG-WIGOS/MG	Low (ongoing)
1.2 R	Report progress of the <b>RA II R-WIP-II Projects</b> <sup>1</sup> to RA II MG	Progress reports	every year	Coordinators of Projects <sup>2</sup>	Low
1.3 R N	Encourage RA II Members to appoint and update National Focal Points and submit national reports on progress of EGOS-IP	A list of RA II EGOS-IP National Focal Points	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 policies and exchange observational sand and dust data	Exchange of datasets	2020	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	every day	China, Hong Kong, China (Project No. I)	Mod
3.2 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	2020	SDS-WAS Asian Node WG (Project No. V)	Mod
3.3	Develop strategic plan on development of the	Draft strategic plan on	2020	Japan, Thailand, Malaysia,	High

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

<sup>2</sup> See Annex II

No.	Activity	Deliverables	Timeline	Responsibility	Potential Risks
SR	Southeast Asia radar network	development of the Southeast Asia radar network		Indonesia(Project No. III)	
3.4 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	2020	Japan, Republic of Korea, other satellite operators (Project No. VI)	Mod
3.5	Migrate from the existing RBSN/RBCN into an integrated RBON	RBON adopted by RA II	2021	RA-II/TT-RBON	High
<b>4. Integrated Observing System Operation and Maintenance</b>					
4.1 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	2020	All Members in Southeast Asia (RA II and RA V) (Project No. III)	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	2020	China, Japan, RA II Members (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	2020	Japan (Project No. IV)	Low (ongoing)
5.3 R	Organize intercomparison between regional standards of RICs	Traceability between RICs	2020	China, Japan (Project No. IV)	High
.4 R	Obtain ISO/IEC 17025:2005	Enhanced RIC's capacity	2020	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	2020	China, Japan (Project No. IV)	Mod
<b>6. Standardization and Interoperability</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	2020	Japan, RA II Members (Project No. IV)	Mod
6.2 N	Encourage the collection of metadata on observing stations	Collection of metadata on observing stations	2020	RA II Members	High

No.	Activity	Deliverables	Timeline	Responsibility	Potential Risks
6.3 R	The web-interface for sharing status of standardization and experience and monitoring synoptic observations in RA II	Shared best practices on integration of observational systems	2018	Republic of Korea (Project No. II)	Low
<b>7. WIGOS Information Resource</b>					
7.1 R	Develop a portal to share EGOS national reports	Portal to share EGOS national reports	2020	China (Project No. I)	Low
7.2 R	Develop a standards and best practices Portal	Standards and best practices Portal	2018	Republic of Korea (Project No. II)	Low
7.3 R	Develop QA/QC Portal	QA/QC Portal	2020	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	2020	RA II EG-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	2020	RA II EG-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	2020	China; Japan; (Project No. IV)	High
9.2 R	Hold training workshops on maintenance and calibration of meteorological instruments	Improved capacity in maintenance and calibration of meteorological instruments	2020	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	2020	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	2020	Japan, Republic of Korea, other satellite operators (Project No. VI)	Low (ongoing)
9.5	Establishing filed intercomparison campaign for	Guidance to operate and	2018	Republic of Korea	Low

<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	Potential Risks
R	observation techniques	maintain observation instruments		(Project No. II)	
<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	2020	China; Hong Kong, China; Japan; Republic of Korea	low
10.2 R	Develop RIC Websites	Improved access to information on RICs	2020	China, Japan (Project No. IV)	Low (ongoing)
10.3 R	Publish newsletter regularly	Improved access to information on satellite data/products	2020	Japan, Republic of Korea, other satellite operators (Project No. VI)	Low (ongoing)

## ANNEX II

### RA II WIGOS IMPLEMENTATION PROJECTS

No.	Project title	Project Coordinator(s)
I	Monitor and Review the Implementation of EGOS-IP in RA II	China; Hong Kong, China
II	The web-interface for sharing status of standardization and experience and monitoring synoptic observations in RA II	Republic of Korea
III	Capacity Building in Radar Techniques in the Southeast Asia	Japan, Thailand, Malaysia, and Indonesia (RA V)
IV	Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations	Japan, China
V	Developing a Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) in Asia Node	China
VI	Develop Support for NMHSs in Satellite Data, Products and Training	Japan, Republic of Korea

### Project No. I

Project Title	Monitor and Review the Implementation of EGOS-IP in RA II
Type	Regional Implementation Project (RA II)
Timescale	2017-2020
Background	<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, analyse 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.</p>
Plan/Activities	<p>This project involves the following three activities: (i) monitor the progress of RA II Members on the implementation of EGOS-IP; (ii) analyse gaps in the regional observing network, and prioritize actions listed in EGOS-IP; and (iii) upgrade and maintain a Portal to facilitate monitoring and reviewing activities. All the outcomes of this project will be shared at a Portal established by the coordinator.</p> <ol style="list-style-type: none"> <li>1. Monitor the progress of RA II Members on the implementation of EGOS-IP: <ul style="list-style-type: none"> <li>• With the help and guidance of the WMO Secretariat and RA II EG-WIGOS MG, setup a complete list of RA II Member focal points, and establish a regular contact mechanism.</li> <li>• Conduct a survey on the progress review criteria and national report template among the RA II Members, and formalize the procedures on monitoring Implementation of EGOS-IP.</li> <li>• Collect national progress reports by means of the established Portal, with RA II Member focal points assigned high privilege. Member focal points can upload reports conveniently. The Portal is also open to the public.</li> <li>• Project coordinators are responsible of drafting and submitting the final monitoring report.</li> </ul> </li> <li>2. Analyse gaps in the regional observing network, and prioritize actions listed in EGOS-IP: <ul style="list-style-type: none"> <li>• Offer assistance and consultation to RA II Members focal points while preparing the national reports.</li> <li>• Collect comments and recommendations from regional Members on implementation of EGOS-IP.</li> <li>• Carry out gaps analysis in the regional observing network.</li> <li>• Prioritize actions listed in EGOS-IP.</li> <li>• Provide feedbacks and recommendations to RA II EG-WIGOS MG regularly.</li> <li>• Incorporate all the information into the final monitoring and reviewing report.</li> </ul> </li> <li>3. Upgrade and maintain the Portal: <ul style="list-style-type: none"> <li>• According to Members and users' growing requirements, the Portal functions can be enhanced gradually.</li> <li>• More information can be shared within the Portal in accordance to RA II Members' request.</li> <li>• Relevant links will be provided within the Portal.</li> </ul> </li> </ol>
Aim(s)	To identify gaps and prioritize actions listed in the EGOS-IP through



	monitoring and reviewing the progress of the Evolution of Global Observing Systems (EGOS) in RA II. Promote progress and experiences sharing among RA II Members when implementing the EGOS-IP.
Benefits	RA II Members and RA II EG-WIGOS MG are kept informed of the progresses on implementing the EGOS-IP in RA II. The established Portal acts as an information sharing platform.
Achievements in the previous period (2013-2016)	<ul style="list-style-type: none"> <li>• A portal for sharing the national progress of EGOS-IP implementation has been established by CMA Meteorological Observation Centre (MOC) and further testing and improvement is being carried out.</li> <li>• Relevant monitoring and reviewing indexes have been designed. The indexes contain seven parts, namely management, integration, observation capacity, products, standardization, data quality and acquisition, and cooperation.</li> <li>• An implementation plan has been improved with efforts of CMA and Hong Kong China.</li> </ul>
Player(s)	RA II Members
Global and Regional Partnership	WMO/CIMO, WMO/CBS
Relationship with existing framework/project(s)	
Expected Key Deliverables	<ol style="list-style-type: none"> <li>1. Provision of national progress reports on Implementation of EGOS-IP.</li> <li>2. Provision of overall progress monitoring and reviewing report on Implementation of EGOS-IP in RA II.</li> <li>3. A full functional information sharing Portal platform for monitoring and reviewing the progress of the Evolution of Global Observing Systems (EGOS) in RA II.</li> </ol>
Major risk(s)	<ul style="list-style-type: none"> <li>• Insufficient data and information on implementing the EGOS-IP provided by RA II Members.</li> <li>• Lack of responses from some RA II Members focal points.</li> </ul>
Website	Portal for Monitoring and Reviewing the Implementation of EGOS-IP in RA II
Project Coordinator	CMA (China)
Co-coordinator	Hong Kong, China

**Project No. II**

Project Title	The web-interface for sharing status of standardization and experience and monitoring synoptic observations in RA II
Type	Regional Implementation Project (RA II)
Timescale	2017-2018
Background	Need to improve the previous project - establishing best practice portal
Plan/Activities	Develop the dashboard for sharing status of each Member's standardization and monitoring the observations collected in GISC Seoul.
Aim(s)	1. Develop a web-interface for sharing the status and the experiences of standardizing the observation systems within each Member's area. 2. Provide service for regular monitoring of synoptic observations collected in GISC Seoul.
Benefits	This systematic process will help not only understand the status of Members' own integrated observations but also monitor their production of observation.
Achievements in the previous period (2013-2016)	Established best practice portal just showing introduction of KMA's domestic standardization ( <a href="http://www.kma.go.kr/eng/wigos">www.kma.go.kr/eng/wigos</a> ).
Player(s)	KMA
Global and Regional Partnership	RA II Members
Relationship with existing framework/project(s)	RA II WIGOS Project for Standard and Best Practice Portal, including Technical Documents with Necessary Details in English from all RA II Members (2013~2016).
Expected Key Deliverables	1. Web-interface to show the statistical results of survey among RA II Members. 2. Web-interface to share reports on the integrated-management of observations and the related metadata in each country. 3. 3.Quantity monitoring of RA II with synoptic observations collected in GISC Seoul.
Major risk(s)	Lack of resources (funds/expertise), lack of cooperation and missing or mistaken information from Members.
Website	-
Project Coordinator	KMA
Co-coordinator	-

**Project No. III**

Project Title	Capacity Building in Radar Techniques in the Southeast Asia
Type	Cross-regional Implementation Project (RAs II and V)
Timescale	2017-2020
Background	<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 many Members in the Region. To address this concern, capacity-building and development of national radar network in Members have been conducted in the previous WIGOS project in cooperation with ASEAN Sub-Committee on Meteorology and Geophysics (SCMG). The Members, mainly the leading ones such as Thailand and Malaysia, have steadily developed their technique through the project.</p> <p>As a result of development of national radar networks in many countries, the necessity of effective utilization of the radar data has been increasing. Among others, improved quality control and international real-time data exchange are very important in contributing to disaster risk reduction (DRR) in the Region, and agreed as such by the Jakarta Declaration (RA-II/V Joint WIGOS Workshop, October 2015). The Members will conduct this project with RA V in collaboration with SCMG and the ESCAP/WMO Typhoon Committee, and leading countries including Indonesia, Japan, Malaysia and Thailand are expected to be key players and advise technical matters to neighbour Members. All other Members in the Region are expected to join and contribute to the project.</p>
Plan/Activities	<ul style="list-style-type: none"> <li>i) Each Member will develop the capacity building on QA/QC techniques of weather radars, as well as establishment of domestic radar network.</li> <li>ii) Key regional players (Indonesia, Japan, Malaysia, and Thailand) and also other Members, if they wish, will conduct experimental data exchange during the project period to achieve international data exchange for national DRR activities. The specifications of the international exchange including the data policy will be considered if need be.</li> <li>iii) Noting the required functions as the Regional WIGOS Centre(s), key regional players will consider providing technical advice to other Members in the region as well as data exchange platform.</li> <li>iv) ASEAN member countries will be requested to submit their national reports on radar system annually at every SCMG meeting. Based on the submitted report, the meeting will identify the technical issues and update the regional strategic plan.</li> <li>v) Malaysia and Thailand will further develop advanced technologies of radar data utilization, in particular data quality management and integration, as an activity of the ESCAP/WMO Typhoon Committee. Both countries are expected to share acquired expertise with other Members.</li> <li>vi) The Coordination Group will be established to facilitate the project efficiently and effectively.</li> </ul>
Aim(s)	<p>This project aims to develop effective early warning systems building on radar data in Southeast Asia.</p> <ul style="list-style-type: none"> <li>i) Improvement of data quality of existing radars.</li> <li>ii) Development and expansion of national radar networks.</li> <li>iii) Near real-time international exchange of radar data.</li> <li>iv) Development of «sub-regional» radar data centre(s).</li> </ul>
Benefits	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.
Achievements in the previous period (2013-2016)	<ul style="list-style-type: none"> <li>- ASEAN Regional Training Workshop on Weather Radar Maintenance, QPE and Forecast (Bangkok, 2014) with 20 participants from 7 ASEAN members.</li> <li>- National reports of many ASEAN members on usage of weather radar to the 35<sup>th</sup> and consecutive ASEAN/SCMG annual meetings.</li> <li>- TMD-JMA technical meetings on radar issues started in 2011 and followed by every year as activities of the WMO/ESCAP Typhoon Committee.</li> <li>- Experimental international radar data exchange among TMD, MMD and JMA has started in 2016 as an activity of the WMO/ESCAP Typhoon Committee.</li> <li>- MMD-JMA technical meetings on radar issues started in 2014.</li> <li>- BMKG-JMA technical meetings on remote-sensing technology started in 2015.</li> </ul>
Player(s)	All Members in Southeast Asia (RA II and RA V) with technical support of JMA.
Global and Regional Partnership	ASEAN-SCMG, ESCAP/WMO Typhoon Committee, WMO Regional Association V, WMO/CIMO/IPET-OWR, WMO RA-II EG-WIS.
Relationship with existing framework/project(s)	<ul style="list-style-type: none"> <li>- Radar network in Southeast Asia, one of the on-going projects under the Working Group on Meteorology of the ESCAP/WMO 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>
Expected Key Deliverables	<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>
Major risk(s)	<ul style="list-style-type: none"> <li>- Failure of development of national reports by participating organs.</li> <li>- Lack of available experts.</li> <li>- Lack of funds available.</li> </ul>
Website	Not to be established
Project Coordinator	JMA (Japan)
Co-coordinator 1	TMD (Thailand)
Co-coordinator 2	MMD (Malaysia)
Co-coordinator 3	BMKG (Indonesia)

**Project No. IV**

Project Title	Enhance the Availability and Quality Management Support for NMHSs in Surface, Climate and Upper-air Observations
Type	Regional Implementation Project (RA II)
Timescale	2017-2020
Background	RA II Survey on Surface, Climate and Upper-air Observations and Quality Management (2008), and RA II Survey on Meteorological Instruments, Calibration and Training (2011), found out that there are some major gaps between NMHSs' efforts and insufficient data quality due to the lack of capability and traceability with international standards.
Plan/Activities	<p>This project will facilitate enhancement of capability and available services toward the improvement of observation data quality in RA II. It consists of the following three activities: (i) improvements of data quality of RBCN/RBSN stations; (ii) enhancement of capabilities of RICs; and (iii) gap analysis of data migration. 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 (expected to be RBON) stations The coordinator plans to implement the following action items for improvements of data quality at RBCN/RBSN (RBON) during the project:</p> <p>(a) Quality monitoring of surface and upper-air observations in RA II under the framework of WDQMS (WIGOS Data Quality Monitoring System), and incident management.</p> <p>(b) Study and share the best practices on QA/QC procedures at surface observation through following process:</p> <ul style="list-style-type: none"> <li>• Conduct a survey on best practice on QA/QC procedures on surface observation by RA II Members and report the results.</li> <li>• Develop a website on QA/QC of observation data in RA II.</li> </ul> <p>(c) Possibility of technical support and information sharing within sub-regional area. 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 RICs Services 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 on in-situ check and calibration of instruments at observation stations, as well as instrument maintenance management and field environment.</p> <p>(b) Seek, and promotion of, package-type cooperation (including calibration of standards, lectures and practices, and technical support) if funds are available.</p> <p>(c) Maintaining and expansion of elements for the International Standard ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.</p> <p>(d) Promotion of intercomparison between RICs (including other RAs).</p> <p>(e) Update of training materials on calibration and maintenance of instruments and sharing through RIC's website.</p> <p>(f) Development of database of RIC's calibration results and sharing</p>

	<p>through RIC's website.</p> <p>3. Investigation on migration error in code forms of observation data. The coordinator, with collaboration with EG-WIS, conducts a survey on a status on data migration from observation signals into Table Driven Code Forms (TDCF) in RA II and share the results with Members.</p>
Aim(s)	This project aims at improvement of data quality at RBCN/RBSN (RBON) stations and enhancement of services of RA II RICs.
Benefits	RA II Members, especially those with technical issues on data quality of observations, will potentially benefit from this project.
Achievements in the previous period (2013-2016)	<ul style="list-style-type: none"> <li>• WMO/JMA Survey on Meteorological Instruments, Calibration and Training in RA II was implemented, and the consolidated report was issued as WMO/IOM No. 122 (available on RIC Tsukuba website).</li> <li>• The users' needs were clarified (i.e. lack of standard instruments, SI traceability etc.).</li> <li>• So-called "RIC-Tsukuba Package", combination of the following cooperative activities, have been successfully implemented in some NMHSs (i.e. Bangladesh, Sri Lanka): <ul style="list-style-type: none"> <li>(a) Preliminary survey,</li> <li>(b) Provision of standard instruments and/or inspection equipment,</li> <li>(c) On-the-job training,</li> <li>(d) Follow-up.</li> </ul> </li> </ul>
Player(s)	RA II Members
Global and Regional Partnership	WMO/CIMO/ET-OIST, WMO/RA II/EG-WIS
Relationship with existing framework/project(s)	
Expected Key Deliverables	<ol style="list-style-type: none"> <li>1. Provision of technical support for instrument maintenance and calibration by experts from RICs.</li> <li>2. Holding a RICs training workshop for RA II Members.</li> <li>3. Development of training materials (to be prepared for publication as a WMO/IOM technical document).</li> <li>4. Obtaining ISO/IEC 17025 certification.</li> <li>5. Portal website to share outcomes of this project.</li> <li>6. Report on status on QC/QA procedures and site management in RA II.</li> <li>7. Reports on status on meteorological instruments, calibration and training in RA II.</li> </ol>
Major risk(s)	<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>
Website	RIC's website/Portal on QC/QA
Project Coordinator	JMA (Japan)
Co-coordinator	CMA (China)

**Project No. V**

Project Title	Develop a Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) in Asia Node
Type	Regional Implementation Project (RA II)
Timescale	2017-2020
Background	<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.). The most recent outcomes from the 4<sup>th</sup> and 5<sup>th</sup> meetings of the WMO SDS-WAS Regional Steering Group for Asia in 2015-2016 are:</p> <ol style="list-style-type: none"> <li>1. Agreed to recommend the Asian-RC, hosted by CMA, to apply for the future RSMC-ASDF representing Asian Node, as suggested by all Member countries.</li> <li>2. Agreed with the assessment of Asian-RC technique report, in which was shown that the existing SDS forecasting models possess the skills to forecast dust episode in Asia, and also encouraged the member countries in Asian node to further refine the report, especially add more descriptions of modelling systems, validation of their forecast, SDS monitoring, and future plan in model intercomparison and data sharing for improving the modelling capabilities.</li> <li>3. Welcomed the decision of each Member country in Asian node to share the NRT output of model forecast immediately, after getting permission from each administration or agency, in order to have a joint visualization and evaluation initiative in Asian-RC.</li> <li>4. Noted the importance of observational data sharing in validations of NRT forecasting results and improvement of models through model inter-comparison. The SDS observational data can also be divided into two parts: (1) NRT SDS related data, such as routine observational SDS data, PM10, satellite SDS index data; and (2) data for further validation in SDS forecasting results, such as AOD and Lidar data etc.</li> <li>5. Expressed appreciation for the new Regional Node Centre Web Portal which now has an updated and general structure for joint visualization and evaluation initiative, and further validation, model intercomparison and data sharing and agreed that the web portal should serve as the major platform for Asian-RC to support the activities of regional node centre to be designated as RSMC-ASDF Beijing in the future.</li> <li>6. Welcomed the interest of Members to continue work with model intercomparisons in order to improve the models' forecast capability under the support of the future, which may expand cooperation into the area of environmental prediction of such elements as haze, fog and air quality in the future.</li> </ol>
Plan/Activities	<ol style="list-style-type: none"> <li>1. To push the Asian-RC, hosted by CMA, to apply for the future RSMC-ASDF representing Asian node, as suggested by all member countries.</li> <li>2. Data Sharing of NRT Output of SDS Model Forecasts from worldwide agencies.</li> </ol>

	<p>3. Observational Data Sharing during the Asian members.</p> <p>4. SDS models forecasts sharing with RA II Members.</p>
Aim(s)	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 storms.
Benefits	The systematic NRT monitoring of sand and dust storms will provide the Asia Node countries with useful information for sand and dust storm risk mitigation.
Achievements in the previous period (2013-2016)	<p>SDS-WAS in Asia Node has carried out the following functions:</p> <ol style="list-style-type: none"> <li>1) Has been preparing regional forecast fields by using CUACE/Dust continuously throughout the year on a daily basis. The model consists of a numerical weather prediction model incorporating online parameterizations of all the major phases of the atmospheric dust cycle.</li> <li>2) Has been generating forecasts, with an appropriate uncertainty information statement, of the following minimum set of variables: <ol style="list-style-type: none"> <li>a) Dust load (<math>\text{kg}/\text{m}^2</math>),</li> <li>b) Dust concentration at the surface (<math>\mu\text{g}/\text{m}^3</math>),</li> <li>c) Dust optical depth at 550 nm (-),</li> <li>d) 3-hour accumulated dry and wet deposition (<math>\text{kg}/\text{m}^2</math>).</li> </ol> </li> </ol> <p>All those forecasts cover the period from the starting time (00 and/or 12 UTC) up to a valid time of 72 hours, with an output frequency of 3 hours. They cover the whole designated area with a horizontal resolution of about <math>0.5 \times 0.5</math> degrees. KMA, NCEP and ECMWF have shared its output of SDS model forecast since 2016 in NRT. The SDS-WAS in Asia Node Web Portal (<a href="http://eng.weather.gov.cn/dust/">http://eng.weather.gov.cn/dust/</a>) has been designed to allow users to access to SDS forecast products as well as sources of basic information. Non-real-time functions according to RSMC-ASDF' request have been fulfilled by SDS-WAS in the Asia Node since 2014 as well.</p>
Player(s)	China, Japan, Republic of Korea
Global and Regional Partnership	Countries/Agencies in SDS-WAS Asia Node (China, Japan, Kazakhstan, Republic of Korea and Mongolia) and in European Node.
Relationship with existing framework/project(s)	
Expected Key Deliverables	The systematic NRT monitoring of sand and dust storms in SDS-WAS Asia Node
Major risk(s)	Lack of resources (funds/expertise)
Website	SDS-WAS Asia Node portal <a href="http://eng.nmc.cn/sds_was.asian_rc/">http://eng.nmc.cn/sds_was.asian_rc/</a>
Project Coordinator	<p>Mr ZHOU Qingliang  National Meteorological Centre  China Meteorological Administration (CMA)  China  Tel.: +86 10 68406184  Fax: +86 10 68408454  E-mail: zhouql@cma.gov.cn</p>
Co-coordinator	



**Project No. VI**

Project Title	Develop Support for NMHSs in Satellite Data, Products and Training
Type	Regional Implementation Project (RA II)
Timescale	2017-2020
Background	<p>The unique meteorological and geophysical nature of the Asia region is characterized by frequent high-impact phenomena such as typhoons, severe convective weather and volcanic eruptions. The National Meteorological and Hydrological Services (NMHSs) play the essential role in support of Disaster Risk Reduction (DRR) to protect lives and property in this densely populated Region.</p> <p>In 2008 the 14th session of WMO Regional Association II (RA II) adopted a resolution to establish a pilot project for the development of support for NMHSs in the areas of satellite data, products and training. At the 15th session of RA II in 2012, it was decided that the pilot project should continue and become the RA II WIGOS Project from 2013 in light of its importance in improving dialogue between satellite providers and users in the Region.</p>
Plan/Activities	<p>This project will include following activities:</p> <ul style="list-style-type: none"> <li>(a) To facilitate the timely provision of satellite-related information by satellite operator to NMHSs in RA II including developing countries via the project web page, newsletters, user's conference, etc., aligning with VLab activities to optimize assistance to NMHSs in RA II and coordinating training activities on use of satellite data/products;</li> <li>(b) To identify requirements and current and planned utilization capabilities of NMHSs in RA II regarding data and products of Earth observation satellites including new generation geostationary meteorological satellites in support of their weather services, including forecasts and warnings, providing a gap analysis in which the capabilities are matched against the requirements so as to develop an action plan to close the gap;</li> <li>(c) To strengthen capabilities of NMHSs in RA II to use the routine images and derived products from the Earth observation satellites including new generation geostationary meteorological satellites, Himawari-8/9, FY-4 series and GEO-KOMPSAT-2 satellites, by user training and guidance on upgrading processing software/hardware, information and tools;</li> <li>(d) (i) To develop a protocol for NMHSs of the countries in the Region to request event-driven rapid scan imagery; and (ii) to assist NMHSs to utilize rapid scan data in support of DRR in response to their requests;</li> <li>(e) To continue the issuance of the quarterly newsletters.</li> </ul>
Aim(s)	This project assists NMHSs in RA II to make better use of satellite-related information, in collaboration with all relevant satellite operators. It is necessary to establish close coordination and create synergy between other ongoing projects such as the WMO-CGMS Virtual Laboratory (VLab), and the RA V Task Team on Satellite Utilization, and to provide greater benefits while avoiding duplication of effort.
Benefits	Facilitating the timely provision of satellite-related information by satellite operators to NMHSs in RA II, and capacity-building to use satellite images and derived products.
Achievements in the previous period (2013-2016)	<ul style="list-style-type: none"> <li>- Establishment of the Project website: <a href="http://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html">http://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html</a></li> <li>- RA II WIGOS Project Newsletters (quarterly)</li> <li>- Asia/Oceania Meteorological Satellite Users' Conference (AOMSUC): <ul style="list-style-type: none"> <li>• 4<sup>th</sup> Conference, Melbourne, Australia (Oct. 2013)</li> <li>• 5<sup>th</sup> Conference, Shanghai, China (Nov. 2014)</li> <li>• 6<sup>th</sup> Conference, Tokyo, Japan (Nov. 2015)</li> <li>• 7<sup>th</sup> Conference, Incheon, Republic of Korea (Oct. 2016)</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Russia, India and Indonesia newly joined</li> <li>• Memorandum signed by PR from sponsors (WMO EC-68, 2016)</li> </ul> <ul style="list-style-type: none"> <li>- Coordination Group meetings: <ul style="list-style-type: none"> <li>• 3<sup>rd</sup> meeting, Tokyo, Japan (Nov. 2015)</li> <li>• 4<sup>th</sup> meeting, Incheon, Republic of Korea (Oct. 2016)</li> </ul> </li> <li>- Held training seminars on meteorological satellite data for NMHSs in Asia and Pacific region along with AOMSUC</li> <li>- Inclusion of RA II specific satellite datasets and products in WMO Product Access Guide</li> <li>- Support users for smooth transition to the new generation satellites</li> <li>- Tutor programmes (dispatching experts on satellite data utilization ) for users in Asia and Pacific to facilitate efficient use of Himawari-8</li> <li>- Feasibility study on Himawari-8 event-driven rapid-scan with AuBoM</li> </ul>
Player(s)	<p>Coordinating Group: Japan (Co-coordinator), Republic of Korea (Co-coordinator) and other satellite operators in RA II and, as an observer, EUMETSAT.</p> <p>Participants: All the other RA II Members and members of the RA V Task Team on Satellite Utilization.</p>
Global and Regional Partnership	
Relationship with existing framework/project(s)	<p>To link with the Asia/Oceania Meteorological Satellite Users' Conference (AOMSUC) mechanism to foster cooperation among satellite operators and users as stipulated in the Memorandum signed during a ceremony at the sixty-eighth session of the WMO Executive Council.</p> <p>To establish a close coordination with the RA V Task Team on Satellite Utilization, in particular following-up the Jakarta Declaration adopted in the Joint RA-II/V Workshop on WIGOS for DRR (Oct 2015).</p>
Expected Key Deliverables	<ul style="list-style-type: none"> <li>- Reports on requirements of NMHSs regarding satellite imagery, data products and training.</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> <li>- Protocol for NMHSs of the countries in the Region to request event-driven rapid scan imagery and, to assist NMHSs to utilize rapid scan data in support of DRR in response to their requests.</li> </ul>
Major risk(s)	Lack of resources (funds/expertise)
Website	<a href="http://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html">http://www.jma.go.jp/jma/jma-eng/satellite/ra2wigosproject/ra2wigosproject-intro_en_jma.html</a>
Project Coordinator	JMA (Japan) and KMA (Korea)
Co-coordinator	

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

CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
DAR	Discovery, Access and Retrieval
DCPC	Data Collection or Production Centre (of WIS)
DRR	Disaster Risk Reduction
ET	Expert Team (of WMO Technical Commission)
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
ISO	International Organization for Standardization
ITU	International Telecommunication Union
LDC	Least Developed Country
MOU	Memorandum of Understanding
NMHS	National Meteorological and Hydrological Service
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)
TC	Technical Commission
TOR	Terms of Reference
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
WHOS	World Hydrological Observation System
WWW	World Weather Watch

**Resolution 2 (RA II-16)****REGIONAL BASIC SYNOPTIC NETWORK AND REGIONAL BASIC CLIMATOLOGICAL NETWORK IN REGION II**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 4 (RA II-15) – Regional Basic Synoptic Network and Regional Basic Climatological Network in Region II,
- (2) 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 Regional Basic Synoptic and Climatological Networks,
- (3) The *Manual on Codes* (WMO-No. 306),
- (4) The *Manual on the Global Telecommunication System* (WMO-No. 386),
- (5) Resolution 60 (Cg-17) – WMO Policy for the International Exchange of Climate Data and Products to Support the Implementation of the Global Framework for Climate Services,

**Noting further:**

- (1) That the establishment and maintenance of a Regional Basic Synoptic Network (RBSN) of surface and upper-air synoptic stations, capable of meeting 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 historical climate time series from the Regional Basic Climatological Networks (RBCNs), the Global Climate Observing System (GCOS) Upper-Air Network and GCOS Surface Network, at the temporal and spatial resolution necessary to resolve the statistics of climate, including trends and extremes, are included in the annex to Resolution 60 (Cg-17) as part of the relevant data and products that should be exchanged among Members to support the implementation of the Global Framework for Climate Services (GFCS),
- (3) That the list of RBSN and RBCN stations in RA II can be updated by the respective Members in the Region when needed,

**Decides:**

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

**Urges Members:**

- (1) To secure, at the earliest date possible, full implementation of the network of synoptic and climatological stations and observational programmes set forth in Annexes 1 and 2 to this 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 *Technical Regulations* (WMO-No. 49), 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), to monitor the Members' implementation and to address non-compliance in consultation with the Member concerned and the Secretary-General.

### Annex 1 to Resolution 2 (RA II-16)

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

INDEX	SUB INDEX	STATION NAME	SURFACE	RADIOSONDE	RADIOWIND
<b>AFGHANISTAN, ISLAMIC STATE OF</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	

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
41978	0	CHITTAGONG (PATENGA)	S		
41992	0	COX'S BAZAR	S		
<b>CAMBODIA</b>					
48962	0	BATTAMBANG	S		
48963	0	PAILIN	S		
48964	0	PREAH VIHEAR	S		
48965	0	KOMPONG THOM	S		
48966	0	SIEMREAP	S		
48967	0	KOMPONG CHNANG	S		
48968	0	PURSAT	S		
48969	0	BANTEAY MEANCHEY	S		
48970	0	KRATIE	S		
48971	0	MONDOL KIRI	S		
48972	0	STUNG TRENG	S		
48973	0	RATTANAKIRI	S		
48983	0	SIHANOUK VILLE	S		
48985	0	KAMPOT	S		
48986	0	KOH KONG	S		
48990	0	KANDAL	S		
48991	0	PHNOM-PENH (KHMOUGH)	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		
50527	1	HAILAR		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		
50774	1	YICHUN		R	
50788	0	FUJIN	S		
50915	0	ULIATAI	S		
50949	0	QIAN GORLOS	S		
50953	0	HARBIN	S		
50953	1	HARBIN		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		

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
51243	0	KARAMAY	S		
51288	0	BAYTIK SHAN	S		
51334	0	JINGHE	S		
51431	0	YINING	S	R	
51463	0	WU LU MU QI	S		
51463	1	WU LU MU QI		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	

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
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		
53772	1	TAIYUAN		R	
53798	0	XINGTAI	S		
53845	0	YAN AN	S		
53845	1	YAN AN		R	
53915	0	KONGTONG	S	R	
53959	0	YUNCHENG	S		
54012	0	XI UJIMQIN QI	S		
54026	0	JARUD QI	S		
54027	0	BALINZUQI	S		
54094	0	MUDANJIANG	S		
54102	0	XILIN HOT	S	R	
54135	0	TONGLIAO	S	R	
54161	0	CHANGCHUN	S	R	
54208	0	DUOLUNXIAN	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	



<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
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		
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	

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
57131	0	JINGHE	S	R	
57178	0	NANYANG	S	R	
57245	0	ANKANG	S		
57265	0	LAOHEKOU	S		
57297	0	XINYANG	S		
57328	0	DACHUAN	S		
57411	0	GAOPING	S		
57447	0	ENSHI	S	R	
57461	0	YICHANG	S	R	
57494	0	WUHAN	S	R	
57516	0	SHAPINGBA	S		
57516	1	CHONGQING		R	
57633	0	YOUYANG	S		
57662	0	CHANGDE	S		
57679	0	MAPOLING		R	
57687	0	CHANGSHA	S		
57745	0	ZHIJIANG	S		
57749	0	HUAIHUA		R	
57799	0	JI'ANXIAN	S		
57816	0	GUIYANG	S		
57816	1	GUIYANG		R	
57866	0	YONGZHOU	S		
57902	0	XINGREN	S		
57957	0	GUILIN	S	R	
57972	0	CHENZHOU	S	R	
57993	0	GANXIAN	S		
57993	1	GANZHOU		R	
58027	0	XUZHOU	S	R	
58040	0	GANYU	S		
58102	0	BOZHOU	S		
58141	0	HUAI'AN	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	SHENCSI	S		
58477	0	DINGHAI	S		
58527	0	JINGDEZHEN	S		
58606	0	NANCHANG	S	R	
58633	0	QUZHOU	S	R	
58665	0	HONGJIA		R	

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
58666	0	DACHEN	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	SHAN HU	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		

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
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		
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

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
42623	0	IMPHAL/TULIHAL	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		
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/WALTAIR	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	

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
43295	0	BANGALORE	S	R	
43311	0	AMINIDIVI	S	R	
43314	0	KOZHIKODE	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		
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	SEM NAN	S		
40762	0	TORBAT-HEYDARIEH	S		
40763	0	KASHMAR	S		
40766	0	KERMANSHAH	S	R	
40768	0	HAMEDAN	S		
40769	0	ARAK	S		

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
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		
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		

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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	



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47800	0	IZUHARA	S		
47807	0	FUKUOKA	S	R	
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</b>					
28676	0	PETROPAVLOVSK	S		
28766	0	BLAGOVESHCHENKA	S		
28867	0	SARYKOL	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		

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35532	0	MUGODZARSKAJA	S		
35576	0	KYZYLZHAR	S		
35671	0	ZHEZKAZGAN	S	R	
35699	0	BEKTAUATA	S		
35700	0	ATYRAU	S	R	
35746	0	ARAL TENIZI	S		
35796	0	BALHASH	S		
35849	0	KAZALY	S		
35925	0	SAM	S		
35953	0	ZHOSALY	S		
35969	0	ZLIKHA	S		
36003	0	PAVLODAR	S	R	
36152	0	SEMIJARKA	S		
36177	0	SEMIPALATINSK	S		
36208	0	LENINOGORSK	S		
36397	0	ZHALGYZTOBE	S		
36428	0	ULKEN NARYN	S		
36535	0	KOKPEKTY	S		
36639	0	URZHAR	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	SHIELI	S		
38196	0	ASHCHYSAI	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	SHARDARA	S		
<b>KUWAIT</b>					
40550	0	ABDALY	S		
40551	0	MITRI BAH	S		
40552	0	JAL ALIYAH	S		
40553	0	SABRIYAH	S		
40568	0	BUBIAN ISLAND	S		
40569	0	BEACON N6	S		
40570	0	SALMY	S		
40572	0	SOUTH DOLPHIN	S		
40573	0	ABRAGUE ALMAZRAA	S		
40580	0	RABYAH	S		

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40582	0	KUWAIT INTERNATIONAL AIRPORT	S	R	
40582	1	KUWAIT INTERNATIONAL AIRPORT		R	
40583	0	AHMADI OIL PIER	S		
40585	0	SALMIYAH	S		
40586	0	JAHRA	S		
40587	0	SULAIBIYA	S		
40588	0	FAILAKA ISLAND	S		
40589	0	SEA ISLAND BOUY	S		
40590	0	MANAGISH	S		
40592	0	WAFRA	S		
40593	0	JULAIA PORT	S		
40594	0	NUWASIB	S		
40596	0	UMM ALMARADIM	S		
40571	0	BEACON M28	S		
40573	0	ABRAGUE ALHABARI	S		
<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	HOUEI-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
43577	0	KADHDHOO	S		
43588	0	KAADEDHDHOO	S		
43599	0	GAN	S	R	

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<b>MONGOLIA</b>					
44203	0	RINCHINLHUMBE	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		
44225	0	TOSONTSENGEL	S		
44230	0	TARIALAN	S		
44231	0	MUREN	S	R	
44232	0	HUTAG	S		
44237	0	ERDENEMANDAL	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		
44275	0	BAYANBULAG	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	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		
44317	0	ERDENETSAGAAN	S		
44336	0	SAIKHAN-OVOO	S		
44341	0	MANDALGOBI	S		
44347	0	TSOGT-OVOO	S		
44352	0	BAYANDELGER	S		
44354	0	SAINSHAND	S		
44358	0	ZAMIN-UUD	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		

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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		
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		

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41256	0	MUSCAT 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 AIRPORT	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 AIRPORT	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		
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		

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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		
<b>REPUBLIC OF KOREA</b>					
47095	0	CHEORWON	S		
47098	0	DONGDUCHEON	S		
47099	0	PAJU	S		
47100	0	DAEGWALLYEONG	S		
47101	0	CHUNCHEON	S		
47102	0	BAENGYEONGDO	S	R	
47104	0	BUKGANGNEUNG	S	R	
47105	0	GANGNEUNG	S		
47106	0	DONGHAE	S		
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		

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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	R	
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		
47186	0	NATIONAL TYPHOON CENTRE	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	MGMS IM.G.F. USHAKOVA	S		
20292	0	GMO IM.E.K. FEDOROVA	S	R	
20471	0	IZVESTIJ TSIK	S		
20476	0	MYS 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		
20946	0	IM. E.K. FEDOROVA	S		
20967	0	SEYAHA	S		
20978	0	KARAU	S		
20982	0	VOLOCHANKA	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		



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21721	0	IM.YU.A. HABAROVA	S		
21802	0	SASKYLAH	S		
21813	0	TYUMYATI	S		
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	ANTIPAJUTA	S		
23078	0	NORIL'SK	S	R	
23112	0	VARANDEJ	S		
23114	0	MYS KONSTANTINOVSKIJ	S		
23174	0	POTAPOVO	S		
23179	0	SNEZHNOGORSK	S		
23205	0	NAR'JAN-MAR	S	R	
23220	0	ELETSKAYA	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	

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23503	0	IZHMA	S		
23518	0	UST'-SUGOR	S		
23527	0	SARAN-PAUL'	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		
23701	0	VESLJANA	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		
23802	0	SYKTYVKAR		R	
23803	0	UST'-KULOM	S		
23804	0	SYKTYVKAR	S		
23812	0	YAKSHA	S		
23823	0	VONEGAN	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	SAIM	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'-KYNAC	S		

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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	
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		

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24725	0	TUOJ-HAYA	S		
24726	0	MIRNVY	S	R	
24737	0	KRESTYAH	S		
24738	0	SUNTAR	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		
24982	0	UEGA	S		
24988	0	ARKA	S		
25017	0	ANDRYUSHKINO	S		
25034	0	BUHTA AMBARCIK	S		
25042	0	AJON	S		
25044	0	RAUCHUA	S		
25051	0	PEVEK	S		
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		
25206	0	SREDNEKOLYMSK	S		
25248	0	ILIRNEJ	S		

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25282	0	MYS VANKAREM	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		
25627	0	LABAZNAYA	S		
25648	0	SLAUTNOE	S		
25700	0	EL' GEN (SOVHOZ)	S		
25703	0	SEJMCHAN	S	R	
25705	0	SREDNIKAN	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		
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	KUMINSKAYA	S		
28214	0	GLAZOV	S		
28224	0	PERM'	S		
28225	1	PERM'		R	
28240	0	NIZHNYJ TAGIL	S		

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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	YALTUROVOSK	S		
28481	0	VIKULOVO	S		
28491	0	BOL'SIE UKI	S		
28493	0	TARA	S		
28502	0	VJATSKIE POLJANY	S		
28506	0	ELABUGA	S		
28517	0	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	0	MUSLJUMOVO	S		
28621	0	BIRSK	S		
28645	0	CHELYABINSK-GOROD	S		
28661	1	KURGAN	S	R	
28666	0	MAKUSINO	S		
28698	0	OMSK	S		
28698	1	OMSK		R	
28704	0	CULPANOVO	S		
28705	0	CELNO-VERSINY	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		
28825	0	STERLITAMAK	S		
28838	0	MAGNITOGORSK	S		
28900	0	SAMARA (OGMS)	S		
28908	0	AVANGARD ZERNOSOVHOZ	S		
28916	0	SARLYK	S		

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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		
29231	0	KOLPASEVO	S	R	
29253	0	LOSINOBORSKOE	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	TJUHTET	S		
29464	0	BOL'SOJ 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		
29571	0	MININO	S		
29572	0	EMEL' YANOVO		R	
29576	0	UJAR	S		
29578	0	SHALINSKOE	S		
29580	0	SOLYANKA	S		
29581	0	KANSK	S		

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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	SVETLOLYUBOVO	S		
29674	0	ANASTASINO	S		
29676	0	AGINSKOE	S		
29698	0	NIZHNEUDINSK	S	R	
29706	0	KUPINO	S		
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	LEBYAZH' E	S		
29771	0	SHCHETINKINO	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	
29842	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		



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30028	0	IKA	S		
30054	0	VITIM	S	R	
30074	0	MACHA	S		
30089	0	DZHIKIMDA	S		
30127	0	TOKMA	S		
30157	0	MAMA	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		
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	
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		
30673	0	MOGOCHA	S	R	
30683	0	EROFEJ PAVLOVIC	S		
30695	0	DZALINDA	S		
30703	0	INGA	S		
30710	0	IRKUTSK	S		
30714	0	DABADY	S		
30715	1	ANGARSK		R	
30731	0	GORJACINSK	S		
30739	0	HORINSK	S		
30741	0	ZAMAKTA	S		

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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	BABUSKIN	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		
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		
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		

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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	BLAGOVESCETNSK	S	R	
31521	0	BRATOLJUBOVKA	S		
31527	0	ZAVITAJA	S		
31532	0	CEKUNDA	S		
31534	0	SEKTAGLI	S		
31538	0	SUTUR	S	R	
31561	0	KOMSOMOLSK-NA-AMURE	S		
31587	0	POJARKOVO	S		
31594	0	ARHARA	S		
31624	0	URMI	S		
31632	0	KUR	S		
31655	0	TROICKOE	S		
31683	0	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	1	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	1	VLADIVOSTOK (SAD GOROD)		R	

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31981	0	ANUCINO	S		
31987	0	PARTIZANSK	S		
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	
32252	0	UST'-VOYAMPOLKA	S		
32287	0	UST'-HAJRJUZOVO	S		
32333	0	OZERNOJ (MYS)	S		
32389	0	KLJUCHI	S	R	
32408	0	UST'-KAMCHATSK	S		
32411	0	ICA	S		
32477	0	SOBOLEVO	S	R	
32509	0	SEMYACHIK	S		
32519	0	KRONOKI	S		
32540	1	PETROPAVLOVSK-KAMCHATSKIJ		R	
32562	0	BOL' SHERETZK	S		
32583	0	PETROPAVLOVSK-KAMCHATSKIJ	S		
32594	0	OZERNAJA	S		
32618	0	OSTROV BERINGA	S	R	
35001	0	BOL'SAJA GLUSCICA	S		
35007	0	PERELJUB	S		
35011	0	SOROCHINSK	S		
35026	0	ZILAIR	S		
35037	0	AK'JAR	S		
35121	0	ORENBURG	S	R	
35127	0	AK-BULAK	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	YAJLJU	S		
36078	0	TELI	S		
36083	0	UST' -USA	S		
36090	0	HOVU-AKSY	S		

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36091	0	NIZHNEUSINSKOE	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		
<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		
40373	0	AL-QAISUMAH	S	R	
40375	0	TABUK	S	R	
40377	0	HAFR AL-BATIN	S		
40394	0	HAIL	S	R	
40400	0	AL-WEJH	S		
40405	0	GASSIM	S		
40417	0	K.F.I.A. (KING FAHAD INT. AIRPORT) DAMMAM		R	
40420	0	AL-AHSA	S		
40430	0	AL-MADINAH	S	R	
40435	0	AL-DAWADAMI	S		
40437	0	KING KHALED INT. AIRPORT	S	R	
40439	0	YENBO	S		
41024	0	JEDDAH (KING ABDUL AZIZ INT. AIRPORT)	S	R	
41030	0	MAKKAH	S		
41036	0	AL-TAIF	S		
41055	0	AL-BAHA	S		
41061	0	WADI AL-DAWASSER AIRPORT	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		

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43495	0	GALLE	S		
43497	0	HAMBANTOTA	S		
<b>TAJKISTAN</b>					
38598	0	KAJRAKKUMSKOE VODOHRANILISHCHE	S		
38599	0	KHUDJANT	S		
38705	0	PENDZHIKENT	S		
38713	0	ISTARVSHAN	S		
38715	0	SHAHRISTANSKIJ PEREVAL	S		
38718	0	ISKANDERKUL'	S		
38719	0	ANZOBSKIJ PEREVAL	S		
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		
48302	0	DOI ANG KHANG	S		
48303	0	CHIANG RAI	S		
48304	0	CHIANG RAI AGROMET	S		
48307	0	THUNG CHANG	S		
48310	0	PHAYAO	S		
48315	0	THA WANG PHA	S		
48324	0	THOEN	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		
48333	0	NAN AGROMET	S		
48334	0	LAMPANG AGROMET	S		

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
48350	0	LOEI AGROMET	S		
48351	0	UTTARADIT	S		
48352	0	NONG KHAI	S		
48353	0	LOEI	S		
48354	0	UDON THANI	S		
48355	0	SAKON NAKHON AGROMET	S		
48356	0	SAKON NAKHON	S		
48357	0	NAKHON PHANOM	S		
48358	0	NAKHON PHANOM AGROMET	S		
48360	0	NONGBUALAMPHU	S		
48372	0	SUKHOTHAI	S		
48373	0	SI SAMRONG AGROMET	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		
48384	0	THA PHRA AGROMET	S		
48385	0	UMPHANG	S		
48386	0	PICHIT AGROMET	S		
48387	0	DOI MU SOE	S		
48390	0	KAMALASAI	S		
48400	0	NAKHON SAWAN	S		
48401	0	TAKFA AGROMET	S		
48402	0	CHAI NAT AGROMET	S		
48403	0	CHAIYAPHUM	S		
48404	0	ROI ET AGROMET	S		
48405	0	ROI ET	S		
48407	0	UBON RATCHATHANI	S	R	
48408	0	UBON RATCHATHANI AGROMET	S		
48409	0	SISAKET AGROMET	S		
48410	0	UTHAITHANI AGROMET	S		
48413	0	WICHIAN BURI	S		
48415	0	AYUTTHAYA AGROMET	S		
48416	0	THA TUM	S		
48418	0	BUA CHUM	S		
48419	0	PATHUMTHANI AGROMET	S		
48420	0	SAMUTPRAKAN	S		
48421	0	THONG PHA PHUM	S		
48425	0	SUPHAN BURI	S		
48426	0	LOP BURI	S		
48427	0	U THONG AGROMET	S		

<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
48429	0	SUVARNABHUMI INTERNATIONAL AIRPORT	S		
48430	0	PRACHIN BURI	S		
48431	0	NAKHON RATCHASIMA	S		
48432	0	SURIN	S		
48433	0	SURIN AGROMET	S		
48434	0	CHOK CHAI	S		
48435	0	PAKCHONG AGROMET	S		
48436	0	NANG RONG	S		
48437	0	BURIRAM	S		
48438	0	SAMUT SONGKRAM	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	
48454	0	BANGKOK PORT	S		
48455	0	BANGKOK METROPOLIS	S		
48456	0	DON MUEANG AIRPORT	S		
48457	0	BANGKOK PILOT	S		
48458	0	CHACHOENGSARO AGROMET	S		
48459	0	CHON BURI	S		
48460	0	KO SICHANG	S		
48461	0	PHATTHAYA	S		
48462	0	ARANYAPRATHET	S		
48463	0	LAEM CHABANG PORT	S		
48464	0	PATCHA BURI AGROMET	S		
48465	0	PHETCHABURI	S		
48474	0	NONG PHLUB AGROMET	S		
48475	0	HUA HIN	S		
48477	0	SATTAHIP	S		
48478	0	RAYONG	S		
48479	0	HUAI PONG AGROMET	S		
48480	0	CHANTHA BURI	S		W
48481	0	PLEW AGROMET	S		
48500	0	PRACHUAP KHIRIKHAN	S		
48501	0	KHLONG YAI	S		
48517	0	CHUMPHON	S		
48520	0	SAWI AGROMET	S		
48532	0	RANONG	S		
48550	0	KO SAMUI	S		
48551	0	SURAT THANI	S		W
48552	0	NAKHONSI THAMMARAT	S		
48554	0	NAKHONSI THAMMARAT AGROMET	S		
48555	0	SURAT THANI AGROMET	S		
48556	0	PHRASANG	S		
48557	0	CHAWANG	S		



<i>INDEX</i>	<i>SUB INDEX</i>	<i>STATION NAME</i>	<i>SURFACE</i>	<i>RADIOSONDE</i>	<i>RADIOWIND</i>
48560	0	PHATTHALUNG AGROMET	S		
48561	0	TAKUA PA	S		
48563	0	KRABI	S		
48564	0	PHUKET	S		
48565	0	PHUKET AIRPORT	S	R	
48566	0	KO LANTA	S		
48567	0	TRANG	S		
48568	0	SONGKHLA	S	R	
48569	0	HAT YAI AIRPORT	S		
48570	0	SATUN	S		
48571	0	KHO HONG AGROMET	S		
48574	0	SA DAO	S		
48580	0	PATTANI	S		
48581	0	YALA AGROMET	S		
48583	0	NARATHIWAT	S		
<b>UNITED ARAB EMIRATES</b>					
41184	0	RAS AL KHAIMAH INTERNATIONAL AIRPORT	S		
41194	0	DUBAI INTERNATIONAL AIRPORT	S		
41196	0	SHARJAH INTERNATIONAL AIRPORT	S		
41198	0	FUJAIRAH	S		
41200	0	DUBAI WORLD CENTRAL-DWC	S		
41217	0	ABU DHABI INTERNATIONAL AIRPORT	S	R	
41218	0	AL AIN INTERNATIONAL AIRPORT	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		

INDEX	SUB INDEX	STATION NAME	SURFACE	RADIOSONDE	RADIOWIND
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		
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		
48894	0	NHA BE	S		
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		
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		
41452	0	IBB	S		
41466	0	TAIZ	S		
41477	0	MOKHA	S		
41480	0	ADEN	S		
41482	0	SAHAREEG	S		
41494	0	SOCOTRA	S		

LEGEND: S = Surface; R= Radiosonde; W= Radiowind

## Annex 2 to Resolution 2 (RA II-16)

LIST OF STATIONS COMPRISING THE REGIONAL  
BASIC CLIMATOLOGICAL NETWORK (RBCN) IN REGION II

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
<b>AFGHANISTAN, ISLAMIC STATE OF</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		
41978	0	CHITTAGONG (PATENGA)	X		
41992	0	COX'S BAZAR	X		
<b>CAMBODIA</b>					
48966	0	SIEMREAP	X		
48991	0	PHNOM-PENH (KHMOUGH)	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		
51777	0	RUOQIANG	X	X	
51828	0	HOTAN	X	X	
52203	0	HAMI	X	X	

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

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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
53068	1	ERENHOT			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		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
57516	0	SHAPINGBA	X		
57687	0	CHANGSHA	X		
57745	0	ZHIJIANG	X	X	
57816	0	GUIYANG	X		
57993	0	GANXIAN	X	X	
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	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		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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	
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/WALTAIR	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	KOZHIKODE	X		
43333	0	PORT BLAIR	X	X	
43339	0	KODAIKANAL	X	X	
43363	0	PAMBAN	X	X	
43369	0	MINICOY	X	X	
43371	0	THIRUVANANTHAPURAM	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	KERMANSHAH	X	X	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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		
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		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		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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
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	DZHAMBEJTY	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		



INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
35532	0	MUGODZARSKAJA	X		
35576	0	KYZYLZHAR	X		
35700	0	ATYRAU	X		
35746	0	ARAL TENIZI	X		
35796	0	BALHASH	X	X	
35849	0	KAZALY	X	X	
35925	0	SAM	X	X	
35953	0	ZHOSALY	X		
36003	0	PAVLODAR	X		
36177	0	SEMIPALATINSK	X	X	
36208	0	LENINOGORSK	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	SHIELI	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	SHARDARA	X		
<b>KUWAIT</b>					
40550	0	ABDALY	X		
40551	0	MITRI BAH	X		
40552	0	JAL ALIYAH	X		
40553	0	SABRIYAH	X		
40568	0	BUBIAN ISLAND	X		
40569	0	BEACON N6	X		
40570	0	SALMY	X		
40572	0	SOUTH DOLPHIN	X		
40573	0	ABRAGUE ALMAZRAA	X		
40580	0	RABY AH	X		
40581	0	KUWAIT CITY	X		
40582	0	KUWAIT INTERNATIONAL AIRPORT	X	X	
40583	0	AHMADI OIL PIER	X		
40585	0	SALMIYAH	X		
40586	0	JAHRA	X		
40587	0	SULAIBIYA	X		
40588	0	FAILAKA ISLAND	X		
40589	0	SEA ISLAND BOUY	X		
40590	0	MANAGISH	X		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
40592	0	WAFRA	X		
40593	0	JULAIA PORT	X		
40594	0	NUWASIB	X		
40596	0	UMM ALMARADIM	X		
40571	0	BEACON M28	X		
40573	0	ABRAGUE ALHABARI	X		
<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	RINCHINLHUMBE	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	
44225	0	TOSONTSENGEL	X		
44230	0	TARIALAN	X		
44231	0	MUREN	X	X	
44232	0	HUTAG	X		
44237	0	ERDENEMANDAL	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	
44275	0	BAYANBULAG	X		
44277	0	ALTAI	X		
44282	0	TSETSERLEG	X		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
44284	0	GALUUT	X		
44285	0	HUJIRT	X		
44287	0	BAYANHONGOR	X		
44288	0	ARVAIHEER	X	X	
44292	0	ULAANBAATAR	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	
44336	0	SAIKHAN-OVOO	X		
44341	0	MANDALGOBI	X	X	
44347	0	TSOGT-OVOO	X		
44352	0	BAYANDELGER	X		
44354	0	SAINSHAND	X		
44358	0	ZAMIN-UDD	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	MUSCAT INT'L AIRPORT	X		
41262	0	FAHUD	X		
41264	0	ADAM AIRPORT	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 AIRPORT	X	X	
<b>PAKISTAN</b>					
41515	0	DROSH	X		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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	
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 (IN ASIA)</b>					
20046	0	POLARGMO IM. E.T. KRENKELJA	X	X	
20069	0	OSTROV VIZE	X	X	
20087	0	MGMS IM.G.F. USHAKOVA	X	X	
20292	0	GMO IM.E.K. FEDOROVA	X	X	
20476	0	MYS STERLEGOVA	X		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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		
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		
23078	0	NORIL'SK	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		
23463	0	YANOV-STAN	X		
23472	0	TURUHANSK	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	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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		
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	
25705	0	SREDNIKAN	X	X	
25745	0	KAMENSKOE	X	X	
25927	0	BROHOVO	X	X	
28009	0	KIRS	X	X	
28064	0	LEUSI	X	X	
28138	0	BISER	X	X	
28224	0	PERM'	X	X	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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	TROIJK	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		
29571	0	MININO	X	X	
29594	0	TAJSKET	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	
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	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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-KURIL'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	1	PETROPAVLOVSK-KAMCHATSKIJ			X
32618	0	OSTROV BERINGA	X	X	
35011	0	SOROCHINSK	X	X	
35121	0	ORENBURG			X
36038	0	ZMEINOGORSK	X		



INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
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	TURAIIF	X		
40357	0	ARAR	X		
40360	0	GURIAT	X		
40361	0	AL-JOUF	X	X	
40362	0	RAFHA	X		
40369	0	HAQL	X		
40373	0	AL-QAISUMAH	X		
40375	0	TABUK	X		
40377	0	HAFR AL-SATIN	X		
40386	0	AL-HULAIFAH	X		
40394	0	HAIL	X	X	
40400	0	AL-WEJH	X		
40405	0	GASSIM	X		
40417	0	K.F.I.A. (KING FAHADINT. AIRPORT)DAMMAM	X		
40420	0	AL-AHSA	X		
40430	0	AL-MADINAH	X	X	
40432	0	UQLAT AL-SUQOR	X		
40435	0	AL-DAWADAMI	X		
40437	0	KING KHALED INT. AIRPORT	X		
40439	0	YENBO	X		
41006	0	MUWAIH	X		
41010	0	LAYLA	X		
41024	0	JEDDAH (KING ABDUL AZIZ INT. AIRPORT)	X	X	
41030	0	MAKKAH	X		
41036	0	AL-TAIF	X		
41055	0	AL-BAHA	X		
41061	0	WADI AL-DAWASSER AIRPORT	X		
41080	0	AL-QUNFUDAH	X		
41084	0	BISHA	X		
41112	0	ABHA	X		X
41114	0	KHAMIS MUSHAIT	X		
41128	0	NAJRAN	X		
41136	0	SHARORAH	X		
41140	0	GIZAN	X	X	
<b>SRI LANKA</b>					
43418	0	TRINCOMALEE	X		
43424	0	PUTTALAM	X		
43436	0	BATTICALOA	X	X	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
43466	0	COLOMBO	X	X	
43473	0	NUWARA ELIYA	X	X	
43497	0	HAMBANTOTA	X	X	
<b>TAJIKISTAN</b>					
38599	0	KHUDJANT	X		
38715	0	SHAHRISTANSKIY 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	DASHOGUZ	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	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS <sup>1</sup>	
				GSN	GUAN
38974	0	SARAKHS	X		
<b>UNITED ARAB EMIRATES</b>					
41196	0	SHARJAH INTERNATIONAL AIRPORT	X	X	
41217	0	ABU DHABI INTERNATIONAL 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		
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		

**Resolution 3 (RA II-16)****REGIONAL ASSOCIATION II MANAGEMENT GROUP**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *Abridged Final Report with Resolutions of the Seventeenth World Meteorological Congress* (WMO-No. 1157),
- (2) The *Abridged Final Report with Resolutions of the Fifteenth Session of Regional Association II (Asia)* (WMO-No. 1106),
- (3) The reports of the sessions of the RA II Management Group,
- (4) The *WMO Strategic Plan 2016–2019* (WMO-No. 1161),
- (5) The Regional Association II Operating Plan 2016–2019,

**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 working groups,

**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 action during the intersessional period;
  - (b) To collaborate with the Secretariat on resource mobilization and advise on the alignment of resources with regional priorities and implementation of the RA II Operating Plan;
  - (c) To address ways and means of developing the capacity of National Meteorological and Hydrological Services (NMHSs) of Members in the Region for the implementation of WMO Programmes and activities;
  - (d) To prioritize, plan, coordinate and manage the work of the Association and its subsidiary bodies;
  - (e) To review the structure and work of the subsidiary bodies of the Association and to advise on the implementation of their recommendations, taking into account financial and other resources needed in the work of these bodies, and to terminate or reorganize these bodies as necessary;
  - (f) To select members of the working groups from among candidates nominated by Members of the Association, and to propose to the president of the Association the replacement of a member should the member not contribute at the expected level, or in case of total silence;
  - (g) To coordinate and monitor the implementation of the Regional Association II Operating Plan, and to provide the Region's contribution to the WMO Strategic Plan;

- (h) To assess and evaluate the implementation of activities of Regional Association II as per the WMO Strategic Plan;
  - (i) To review the requirements and priorities of training and other events to be organized in the Region;
  - (j) To oversee the activities of the regional centres, such as Regional Specialized Meteorological Centres, Regional Climate Centres, Regional Instrument Centres, WMO Information System centres and Regional Training Centres;
  - (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 chairperson of the Management Group, which is composed of the president, the vice-president, other Executive Council members who are 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 chairpersons of RA II working groups to each session, subject to the availability of financial resources;

**Authorizes** the president to take the 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;
- (2) 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 4 (RA II-16)**

#### **REGIONAL ASSOCIATION II WORKING GROUP ON WEATHER SERVICES**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *WMO Strategic Plan 2016–2019* (WMO-No. 1161),
- (2) The Regional Association II Operating Plan 2016–2019,
- (3) Resolution 3 (Cg-17) – Aeronautical Meteorology Programme,
- (4) Resolution 5 (Cg-17) – Public Weather Services Programme,
- (5) Resolution 7 (Cg-17) – WMO Quality Management Framework,

- (6) Resolution 10 (Cg-17) – Sendai Framework for Disaster Risk Reduction 2015–2030 and WMO participation in the International Network for Multi-Hazard Early Warning Systems, in which Congress requested the regional associations to assist with the development of the International Network for Multi-Hazard Early Warning Systems (IN-MHEWS), to cooperate with regional bodies of international organizations as well as regional organizations, to strengthen partnerships and to support WMO regional centres in order to promote the implementation of the Sendai Framework, in particular MHEWS,
- (7) Resolution 13 (Cg-17) – Report of the extraordinary session (2014) of the Commission for Basic Systems concerning the Global Data-processing and Forecasting System and emergency response activities,
- (8) Decision 3 (EC-68) – WMO Disaster Risk Reduction governance, user-interface mechanisms and Disaster Risk Reduction Roadmap,
- (9) Resolution 8 (EC-64) – Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements, which endorsed the establishment of four WMO Disaster Risk Reduction (DRR) User-Interface Expert Advisory Groups: on hazard and risk analysis, MHEWS, humanitarian assistance and disaster risk financing,

**Recalling** that the Seventeenth World Meteorological Congress noted the establishment of the DRR Focal Points of technical commissions and technical programmes, and requested to include focal points of the RAs as a mechanism to support the WMO-wide coordination of DRR activities among these bodies, including their presidents and DRR-related working groups and expert teams,

**Considering** that Regional Association II should continue to play an important and active role in the implementation of WMO regional activities for the delivery of aeronautical meteorological services, operational forecast services and public weather services (PWSs); that civil aviation as a key enabler of economic growth and development in the Region requires increased efforts from all service providers, and that the Seventeenth Congress designated the Aeronautical Meteorology Programme as a priority area for the seventeenth financial period,

**Decides:**

- (1) To re-establish the Regional Association II Working Group on Weather Services 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 Global Data-processing and Forecasting System (GDPPFS), including emergency response activities, and PWS in the Region in cooperation with the Commission for Basic Systems;
- (2) That the working group should be composed of three expert groups, as follows:
  - (a) Expert Group on Aeronautical Meteorological Service Delivery with the following terms of reference:
    - (i) To coordinate and support the improvement of SIGMET provision – promotion of the cross-flight information region (FIR) SIGMET coordination;
    - (ii) To coordinate and support the implementation of quality management systems (QMSs): to support the migration to ISO 2001:2015 for those Members that have already implemented QMSs and provide focussed support to those Members that have not yet completed the implementation;

- (iii) To coordinate and support the competency and qualification of aeronautical meteorological personnel through continued monitoring and identification of needs for capacity development;
  - (iv) To support the migration to IWXXM together with the Commission for Basic Systems and regional groups of the International Civil Aviation Organization (ICAO);
  - (v) To promote awareness of the ICAO Global Air Navigation Plan (GANP) and aviation system block upgrade (ASBU), and support related national planning, through further awareness events for the Region, as appropriate, and sharing of information on national implementation programmes and achievements to build collective capacity for the enhancement of the regional Air Traffic Management (ATM);
- (b) Expert Group on Operational Forecasting with the following terms of reference:
- (i) To inform RA II Members of technical and scientific developments relating to the forecasting process, to advise them 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, if necessary, support GDPFS centres to meet 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, including for education and training materials;
  - (iv) To promote the integrated use of Ensemble Prediction Systems, high-resolution NWP, radar and satellite-based products in core operational forecasting, and the exchange, use and interpretation of meteorological products;
  - (v) To encourage studies in verification of the Ensemble Prediction System with a view to further promoting its use for operational forecasting;
  - (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 Service Delivery, including Disaster Risk Reduction, with the following terms of reference:
- (i) To coordinate all activities related to PWSs in the Region, in cooperation with the Commission for Basic Systems, and to monitor progress in the implementation of the current WMO Strategic Plan with regard to PWS matters in the Region;
  - (ii) To coordinate the contribution of PWSs to such high-priority areas as the Global Framework for Climate Services with particular focus on the User

Interface Platform, the WMO Integrated Global Observing System, the WMO Information System, DRR and capacity development;

- (iii) To mainstream service delivery as contained in the *WMO Strategy for Service Delivery and Its Implementation Plan* (WMO-No. 1129), as a main priority in the work of the PWS Programme and in guiding its future development in the Region, and to facilitate stronger dialogue among National Meteorological and Hydrological Services (NMHSs), development partners and user sectors (for example, the media, health services, emergency management agencies) relevant to PWSs and DRR;
  - (iv) To facilitate the development of a Region II implementation plan of the Disaster Risk Reduction Roadmap;
  - (v) To encourage Members to contribute to socioeconomic benefit studies and evaluations, and to the design and implementation of pilot and demonstration projects related to PWS delivery;
  - (vi) To assist NMHSs in strengthening their capabilities to ensure efficient and effective preparation and delivery of warning services through national PWS Programmes and channels, by embedding early warning systems within an operational end-to-end service delivery framework; and to improve procedures for the exchange of severe weather warnings between neighbouring countries;
  - (vii) To encourage and provide guidance to Members in asserting the authority of NMHSs as the sole providers of official high-impact weather warnings as opposed to commercial service providers;
  - (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 others in the use and interpretation of forecasts and products and services related to warnings, including uncertainty information; and to establish education and training requirements related to PWS delivery, in accordance with the competency requirements established by the Commission for Basic Systems;
- (3) That the Expert Group on Aeronautical Meteorological Service Delivery should be composed of the following core members:
- (a) The coordinator of the Expert Group;
  - (b) A leader in QMS and competency assessment implementation and maintenance;
  - (c) A leader in meteorological support to air-traffic management and provision of SIGMETs;
  - (d) A leader in migration to a system-wide information management environment and in ICAO GANP/ASBU awareness and national planning.

The 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 leaders to be determined by the Expert Group;

- (4) That the Expert Group on Operational Forecasting should be composed of the following core members:



- (a) The coordinator of the Expert Group;
- (b) A leader in operational weather forecasting process and support;
- (c) A leader in Emergency Response Activities.

The 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 leaders to be determined by the Expert Group;

- (5) That the Expert Group on Public Weather Service Delivery, including Disaster Risk Reduction, should be composed of the following core members:
  - (a) The coordinator of the Expert Group;
  - (b) A leader in socioeconomic benefits of meteorological and hydrological services;
  - (c) A 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) A leader in education and public outreach related to PWS.

The 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 leaders to be designated by the Expert Group;

- (6) To designate, in accordance with Regulation 33 of the WMO General Regulations, an expert to be chosen by the Management Group, as chairperson of the Working Group; and to designate also Mr Boon-leung Choy (Hong Kong, China) as coordinator of the Expert Group on Aeronautical Meteorological Service Delivery, Mr Yuki Honda (Japan) as coordinator of the Expert Group on Operational Forecasting, and Mr Lap-shun Lee (Hong Kong, China) as coordinator of the Expert Group on Public Weather Service Delivery, including Disaster Risk Reduction;
- (7) To invite leaders and other voluntary experts, to be selected by the Management Group of RA II in consultation with the chairperson of the Working Group and the coordinators of the Expert Groups, to serve as members of the Expert Groups;
- (8) To request the chairperson of the Working Group to develop a Working Group workplan, in collaboration with the coordinators of the Expert Groups and in consultation with the president and Management Group of the Association, with reference to the Regional Association II Operating Plan; to undertake work on the various thematic areas under the responsibility of the Expert Groups; and 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 seventeenth session of the Association, both copied to the WMO Secretariat, with inputs from the coordinators and leaders in the Working Group;
- (9) To request the coordinator of each Expert Group to submit to the chairperson of the Working Group annual reports and a final report no later than three months before the seventeenth session of the Association;
- (10) To request the leaders to submit annual reports to the coordinator of their respective Expert Groups;

**Requests** the designated Regional Specialized Meteorological Centres in RA II, the Regional Subproject Management Team of the Severe Weather Forecasting Demonstration Project, and the Asia Node of the Sand and Dust Storm Warning Advisory and Assessment System to

support the efforts of the Working Group, Expert Groups and leaders in response to requests from experts;

**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 efforts of the Working Group, Expert Groups and leaders.

## Resolution 5 (RA II-16)

### REGIONAL ASSOCIATION II WORKING GROUP ON CLIMATE SERVICES

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *Abridged Final Report with Resolutions of the Seventeenth World Meteorological Congress* (WMO-No. 1157), including Resolution 15 (Cg-17) – World Climate Programme, and Resolution 64 (Cg-17) – Development of a results-based framework for WMO support to the implementation of the Global Framework for Climate Services,
- (2) The *Abridged Final Report with Resolutions of the Fifteenth Session of Regional Association II (Asia)* (WMO-No. 1106), including Resolution 9 (RA II-15) – Regional Association II Working Group on Climate Services,
- (3) The *WMO Strategic Plan 2016–2019* (WMO-No. 1161),
- (4) The Regional Association II Operating Plan 2016–2019,
- (5) The *Abridged Final Report with Resolutions and Decisions of the Sixty-eighth Session of the Executive Council* (WMO-No. 1168), in particular Decision 16 – Country-focused results-based framework and mechanism for WMO contributions to the Global Framework for Climate Services,

**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 (GFCS) in the Region,

**Decides:**

- (1) To re-establish the Regional Association II Working Group on Climate Services 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 implement the country-focused results-based framework and mechanism for WMO contributions to the GFCS in the Region;
  - (b) To track what is happening in the Region, particularly with regard to country priorities for climate services, priorities and needs of National Meteorological and Hydrological Services (NMHSs), relevant partners' activities and programmes, and

progress in implementation of the country-focused results-based framework and mechanism for WMO contributions to the GFCS;

- (c) To cooperate with the Commission for Climatology and the Commission for Agricultural Meteorology and other WMO bodies on activities related to climate services and, in particular, to implement the country-focused results-based framework and mechanism for WMO contributions to the GFCS in the Region, specifically:
    - (i) To align and coordinate the workplans and schedules related to the GFCS of the above-mentioned WMO commissions and bodies;
    - (ii) To collect and elaborate coordinated requirements for the development of well-targeted and, to the extent possible, integrated GFCS projects, and to ensure coordination of the WMO contribution to those projects;
    - (iii) To collect and elaborate requirements for the development of information, products and services related to the GFCS across the identified priority sectors and ensure coordination of the WMO contribution to them;
    - (iv) To ensure the engagement of the Regional Climate Centres (RCCs) in the Region;
  - (d) To undertake and coordinate activities relating to climate services as listed in 2 (a) and (b) below;
  - (e) To report, through the chairperson of the Working Group on Climate Services, to the president of RA II on an annual basis on activities related 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 with the following terms of reference:
    - (i) To foster, promote and advise on the implementation of the GFCS, particularly its Climate Services Information System and User Interface Platform, in the Region, in close alignment with the country-focused results-based framework and mechanism for WMO contributions to the GFCS;
    - (ii) To assist and advise the president of RA II on all matters relevant to implementation and operation of RCCs in the Region;
    - (iii) To monitor the progress made in the recovery and digitization of climate data and in the implementation of Climate Data Management Systems (CDMSs) and promote the use of *Climate Data Management System Specifications* (WMO-No. 1131) when designing and implementing new CDMSs;
    - (iv) To promote the use of best practices for data homogenization by NMHSs and RCCs;
    - (v) To promote access to and use of products disseminated by Global Producing Centres for Long-range Forecasts, RCCs and Regional Climate Outlook Forums (RCOFs) in climate services at the national level;
    - (vi) To seek cooperation with relevant regional bodies and organizations on issues related to implementation of user-targeted climate services for key sectors (for example, agriculture, water resources and health), including fostering and promoting best practices in establishing national frameworks for climate

services and in implementing National Climate Outlook Forums and National Climate Forums;

- (vii) To identify the optimal means of meeting regional and national needs for climate information, products and services for climate risk management and adaptation;
- (viii) To promote best practices in and to advise on implementation of new RCOFs;
- (ix) To promote best practices in climate system monitoring and operational climate watch initiatives;
- (x) To promote regionally coordinated capacity development activities in support of climate services;
- (xi) To promote and advise on research initiatives required to improve operational production of climate products;
- (xii) To share knowledge and information on implementation of climate services across Members in the Region;
- (xiii) To report, through the coordinator of the Expert Group on Climate Services, to the chairperson of the Working Group on Climate Services annually;

(b) Expert Group on Agrometeorology with the following terms of reference:

- (i) To survey RA II Members in order to identify needs in terms of agrometeorological experts/staff, improved services and training in the Region;
- (ii) To make recommendations on the establishment of Agromet Advisory Services in RA II;
- (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 applications of seasonal to interannual climate forecasts 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 socioeconomic impact of agrometeorological information on agriculture, livestock management, forestry, rangelands and fisheries in the Region;
- (vii) To report, through the coordinator of the Expert Group on Agrometeorology, to the chairperson of the Working Group on Climate Services annually;

(3) That the Expert Group on Climate Services should be composed of the following core members:

- (a) The coordinator of the Expert Group;
- (b) A leader in user liaison and applications of climate information and products for climate risk management and adaptation to climate change;

- (c) A leader in implementation and operation of RCCs and RCOFs;
- (d) A leader in implementation of the country-focused results-based framework and mechanism for WMO contributions to the GFCS;
- (e) A leader in climate monitoring and climate watch;
- (f) A leader in climate data management system, data rescue and homogenization.

The 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 leaders to be designated by the Expert Group;

- (4) That the Expert Group on Agrometeorology should be composed of the following core members:
  - (a) The coordinator of the Expert Group;
  - (b) A leader in RA II agrometeorological training needs;
  - (c) A leader in soil moisture monitoring;
  - (d) A leader in drought preparedness and management strategies;
  - (e) A leader in seasonal climate forecast applications for agriculture;
  - (f) A leader in socioeconomic impact of agrometeorological information.

The 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 leaders to be designated by the Expert Group;

- (5) To designate, in accordance with Regulation 33 of the WMO General Regulations, an expert to be selected by the Management Group as chairperson of the Working Group; and to designate also Mr Kiyotoshi Takahashi (Japan) and Mr Dildar Hussain Kazmi (Pakistan) as coordinators of the Expert Group on Climate Services, and Dr Kamallesh Kumar Singh (India) as coordinator of the Expert Group on Agrometeorology;
- (6) To invite leaders and other voluntary experts, to be designated by the Management Group of RA II in consultation with the chairperson of the Working Group and coordinators of Expert Groups, to serve as members of the Expert Groups;
- (7) To request the chairperson of the Working Group to develop a Working Group workplan, in collaboration with the coordinators of Expert Groups and in consultation with the president and Management Group of the Association, with reference to the Regional Association II Operating Plan; to undertake work on the various thematic areas under the responsibility 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 seventeenth session of the Association, both copied to the WMO Secretariat, with inputs from the coordinators and leaders in the Working Group;
- (8) To request the coordinator of each Expert Group to submit to the chairperson of the Working Group annual reports and a final report no later than three months before the seventeenth session of the Association;
- (9) To request the leaders to submit annual reports to the coordinator of their 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 efforts of the Working Group, Expert Groups and leaders.

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### Resolution 6 (RA II-16)

#### REGIONAL ASSOCIATION II WORKING GROUP ON HYDROLOGICAL SERVICES

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 18 (Cg-17) – Hydrology and Water Resources Programme,
- (2) Resolution 21 (Cg-XV) – Strategy for the enhancement of cooperation between National Meteorological and National Hydrological Services for improved flood forecasting,
- (3) Resolution 25 (Cg-XIII) – Exchange of hydrological data and products,
- (4) Resolution 10 (RA II-15) – Regional Association II Working Group on Hydrological Services,
- (5) *The Report of the Third Meeting of the Working Group on Hydrological Services* (Seoul, 25–27 October 2016),
- (6) The Regional Association II Operating Plan 2016–2019,

**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 re-establish the Regional Association II Working Group on Hydrological Services with the following terms of reference:
  - (a) To assist and advise 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 the Commission for Hydrology, other RA II Working Groups, and 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 areas of work during the next intersessional period 2016–2019;
  - (g) To undertake activities related to the transfer of technology through the Communities of Practice, as being implemented by the Commission for Hydrology, as part of its strategy for capacity-building;
  - (h) To develop and use an online RA II Virtual Hydrology Forum designed to facilitate broad engagement of experts throughout the Region in the activities of the Working Group and to help advance collaboration on its activities;
- (2) That the Working Group should be composed of two expert groups, as follows:
- (a) Expert Group on Measurements, Monitoring and Infosystems with the following terms of reference:
    - (i) To develop and provide guidance on the use of appropriate instrumentation and methods of observation in diverse conditions, including undertaking activities that lead to improvements in the quality and accuracy of hydrometric measurements;
    - (ii) To collect, develop and promote material on best practices for assessing rainfall/flood-induced mass movement hazards (landslide/debris flow) and forecast methodologies;
    - (iii) To review national and regional capacity-building programmes and related training activities for provision of hydrological services, making recommendations on their enhancement;
  - (b) Expert Group on Hydrological Applications with the following terms of reference:
    - (i) To improve water resources assessment techniques making use of information on climate variability and change thus enabling managers of water resources systems to take action to adapt to changing climate;
    - (ii) To develop material on best practices for advancing national and regional use of hydrological forecasting for management of hydrological extremes, including floods, droughts and sediment-related disasters;
    - (iii) To develop material and provide guidance on modelling of cryosphere components within hydrological modelling with an emphasis on their contributions to streamflow discharge and ground water;
    - (iv) To improve national and regional hydrological forecasting and warning capabilities by making use of the WMO Flood Forecasting Initiative as a platform, including implementation of the Flash Flood Guidance System, with a global implementation project for issuance of riverine flood, flash flood and urban flash flood warnings;
    - (v) To improve national and regional drought forecasting and prediction capabilities for disaster risk management;
- (3) That the Expert Group on Measurements, Monitoring and Infosystems should be composed of the following core members:
- (a) The coordinators of the Expert Group;
  - (b) A leader in hydrometric measurements;
  - (c) A leader in mass movements (sediment disasters and debris flows);

- (d) A leader in provision of hydrological services.

The 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 leaders to be designated by the Expert Group;

- (4) That the Expert Group on Hydrological Applications should be composed of the following core members:
  - (a) The coordinators of the Expert Group;
  - (b) A leader in water resources assessment reflecting climate change and variability;
  - (c) A leader in water-related disaster risk management;
  - (d) A leader in cryosphere modelling;
  - (e) A leader in flood forecasting;
  - (f) A leader in hydrological drought forecasting and prediction.

The 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 leaders to be designated by the Expert Group;

- (5) To invite all Members of the Region to designate hydrological experts to serve on the Working Group and attend its meetings on the following thematic areas identified for the work of the Group:
  - (a) Improving the accuracy of hydrometric and sediment observations;
  - (b) Strengthening the provision of hydrological services;
  - (c) Assessing rainfall/flood-induced mass movement hazards and their forecasting;
  - (d) Strengthening the capability of Members to assess their water resources, as well as their variability and use, including their response to climate variability and change, and promoting the use of water resources assessment techniques by water managers;
  - (e) Advancing water-related disaster risk management;
  - (f) Reviewing the suitability of and recommending improvements to the mathematical representation of cryospheric processes in operational hydrological forecasting models;
  - (g) Improving accuracy and timeliness in forecasting floods of different causes and origins through enhanced cooperation between National Meteorological Services and National Hydrological Services, within the context of the WMO Flood Forecasting Initiative;
  - (h) Hydrological aspects of drought, including drought monitoring, forecasting and prediction for assessing water scarcity and deficits;
- (6) 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, as chairperson of the Working Group and as coordinator of the Expert Group on Measurements, Monitoring and Infosystems, and Mr Muhammad Riaz (Pakistan) as coordinator of the Expert Group on Hydrological Applications;



**Requests** the chairperson 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 relevant expected results of the RA II Operating Plan, and to undertake work on the various thematic areas under the responsibility of the Working Group;
- (3) To participate in Executive Council sessions, when invited, to represent the regional interests in relation to hydrology and water resources, and to coordinate the activities of the Working Group on Hydrological Services with the Commission for Hydrology and other RA II Working Groups, regional bodies and organizations, and 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 seventeenth session of the Association, both copied to the WMO Secretariat, with inputs from coordinators and leaders in the Working Group;

**Requests** coordinators and leaders to submit annual reports to the chairperson;

**Urges** the Members concerned to provide full support to the Working Group on Hydrological Services in order to ensure that the Working Group is able to fulfil the tasks assigned to it;

**Requests** the Secretary-General to support the efforts of the Working Group, coordinators and leaders.

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### Resolution 7 (RA II-16)

#### REGIONAL ASSOCIATION II WORKING GROUP ON THE WMO INTEGRATED GLOBAL OBSERVING SYSTEM AND WMO INFORMATION SYSTEM

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *WMO Strategic Plan 2016–2019* (WMO-No. 1161),
- (2) The Regional Association II Operating Plan 2016–2019,
- (3) Resolution 20 (Cg-17) – World Weather Watch Programme,
- (4) Resolution 22 (Cg-17) – Global Observing System,
- (5) Resolution 23 (Cg-17) – Pre-operational phase of the WMO Integrated Global Observing System,
- (6) Resolution 27 (Cg-17) – Instruments and Methods of Observation Programme,
- (7) Resolution 43 (Cg-17) – Global Cryosphere Watch,

- (8) Resolution 45 (Cg-17) – World Weather Research Programme,
- (9) Resolution 47 (Cg-17) – Global Atmosphere Watch Programme,
- (10) Recommendation 6 (CBS-15) – Implementation Plan for the Evolution of Global Observing Systems,
- (11) Resolution 3 (RA II-15) – Regional WMO Integrated Global Observing System Implementation Plan,
- (12) Resolution 5 (RA II-15) – WMO Information System,

**Considering:**

- (1) That data from WMO observing systems and co-sponsored systems 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 service: (a) routine collection and dissemination of time-critical and operation-critical data and products; (b) data discovery, access and retrieval; and (c) timely delivery of 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 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 the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) with the following terms of reference:
  - (a) To monitor and coordinate the implementation of WIGOS and WIS in the Region; to propose measures for improvements, especially for overcoming gaps, deficiencies and inconsistencies in the implementation of these systems; and to promote active involvement of Members of the Region in the implementation of WIGOS and WIS;
  - (b) To advise 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 presentations 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 with the following terms of reference:
- (i) To coordinate the planning and implementation of WIGOS in the Region in accordance with the Regional WIGOS Implementation Plan (R-WIP-II), the decisions and guidance from the Seventeenth World Meteorological Congress, the follow-up to sessions of the Executive Council, the RA II Management Group, and the RA II Strategic and Operating Plans;
  - (ii) To provide support and assistance to RA II Members in accordance with the R-WIP-II and in response to their requests (subject to availability of resources);
  - (iii) To assist RA II Members in developing their National WIGOS Implementation Plans (N-WIPs);
  - (iv) To monitor progress in the implementation and operation of WIGOS in the Region; to advise on possible improvements and priorities for appropriate action and on the need for external support, where required, according to the technical guidance from the technical commissions, specified in the implementation plans of the Global Framework for Climate Services, the Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP), the Global Climate Observing System and other observing system implementation plans, in order to develop and implement WIGOS in the Region;
  - (v) To support the implementation and improvement of the Observing Systems Capability Analysis and Review tool (OSCAR)/Surface in the Region;
  - (vi) To collaborate with related bodies on the implementation of WIGOS Data Quality Monitoring System in the Region;
  - (vii) To collaborate with Regional WIGOS Centre candidates, the RA II Management Group and the WIGOS Project Office on the establishment of Regional WIGOS Centres in the Region;
  - (viii) To coordinate relevant activities with the regional groupings involved in observations to ensure consistency of approach and synergy;
  - (ix) To advise the president of the Association and the chairperson of the RA II Working Group on WIGOS and WIS on the proposed composition and changes to the Regional Basic Synoptic Network and Regional Basic Climatological Network;
  - (x) To collaborate with the RA II Task Team on the Regional Basic Observing Network on implementation of the Network in the Region;
  - (xi) To advise the RA II Management Group on WIGOS implementation in the Region;
- (b) Expert Group on WMO Information System 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; to 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 the improvement of WIS;
  - (v) To liaise with the Commission for Basic Systems to ensure that regional requirements are included in WIS 2.0 strategy and plan;
- (3) To establish two task teams under the Expert Group on WIGOS, as follows:
- (a) Task Team on Aircraft-based Observations with the following terms of reference:
    - (i) To develop a regional implementation plan for aircraft-based observations (ABO) and aircraft meteorological data relay (AMDAR) as a component of the Regional WIGOS Implementation Plan, in collaboration with regional Members and the Commission for Basic Systems Expert Team on Aircraft-based Observing Systems;
    - (ii) To collaborate with regional airlines and national air traffic management centres on the establishment of programmes to deliver aircraft-based observations through the WMO Global Telecommunication System;
    - (iii) To assist designated regional centres in the process of developing and maintaining quality monitoring systems for ABO;
    - (iv) To undertake and assist in technical training, workshops, promotion and outreach on ABO, targeting both regional Members and the aviation transport industry;
    - (v) To consult with data users and operators in application areas to determine and promote regional requirements for ABO;
  - (b) RA II Task Team on the Regional Basic Observing Network with the following terms of reference:
    - (i) To develop the proposal for the Regional Basic Observing Network (RBON) in RA II;
    - (ii) To define RA II specific criteria for the selection of RBON stations/platforms;
    - (iii) To select the RBON stations/platforms in accordance with the RBON concept and RA II criteria;
    - (iv) To identify gaps and develop a draft action plan to deal with them;
    - (v) To develop a roadmap for RBON and coordinate activities for its implementation in the Region;
- (4) That the Expert Group on WIGOS should be composed of the following core members:

- (a) The coordinator of the Expert Group;
- (b) A leader in monitoring and review of the EGOS-IP in RA II;
- (c) A leader in web interface for sharing experience and status of standardization, and monitoring synoptic observations in RA II;
- (d) A leader in capacity-building in radar techniques in South-East Asia;
- (e) A leader in enhancing the availability of quality management support to National Meteorological and Hydrological Services in surface, climate and upper-air observations;
- (f) A leader in development of a Sand and Dust Storm Warning Advisory and Assessment System in the Asia Node;
- (g) The leader of the Task Team on Aircraft-based Observations;
- (h) The leader of the Task Team on the Regional Basic Observing Network.

The 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 leaders to be designated by the Expert Group;

- (5) That the Expert Group on WIS should be composed of the following core members:
  - (a) The coordinators of the Expert Group;
  - (b) A leader in WIS infrastructure and implementation;
  - (c) A leader in data representation and metadata;
  - (d) A leader in capacity development;
  - (e) A leader in information management and emerging data issues.

The 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 leaders to be designated by the Expert Group;

- (6) To designate, in accordance with Regulation 33 of the WMO General Regulations, an expert, to be selected by the Management Group, as chairperson of the Working Group; and to designate also Mr Yongqing Chen (China) as coordinator of the Expert Group on WIGOS, and Ms Xiang Li (China) and Mr Kenji Tsunoda (Japan) as coordinators of the Expert Group on WIS;
- (7) To invite leaders and other voluntary experts, to be designated by the Management Group of RA II in consultation with the chairperson of the Working Group and coordinators of the Expert Groups, to serve as members of the Expert Groups;
- (8) To request the chairperson of the Working Group to develop a Working Group workplan, in collaboration with the coordinators of Expert Groups and in consultation with the president and Management Group of the Association, with reference to the Regional Association II Operating Plan; to undertake work on the various thematic areas under the responsibility of the Expert Groups; and 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 seventeenth session of the Association, both copied to the WMO Secretariat, with inputs from the coordinators and leaders in the Working Group;

- (9) To request the coordinator(s) of each Expert Group to submit to the chairperson of the Working Group annual reports and a final report no later than three months before the seventeenth session of the Association;
- (10) To request the leaders to submit annual reports to the coordinator of their 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 efforts of the Working Group, Expert Groups and leaders.

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### Resolution 8 (RA II-16)

#### PILOT PROJECT TO DEVELOP SUPPORT FOR NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN NUMERICAL WEATHER PREDICTION

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The Regional Association II Operating Plan for 2016–2019,
- (2) The *Abridged Final Report with Resolutions of the Fifteenth Session of Regional Association II (Asia)* (WMO-No. 1106), particularly Resolution 14 (RA II-15) – 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 National Meteorological and Hydrological Services (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 in participating as users of applications of the community NWP models,
- (4) That a Web-based portal called Asian Consortium for NWP Forecasts (ACNF) is being developed by the Hong Kong Observatory to provide online resources and information to access the existing NWP products from RA II Members, including, Hong Kong, China and the Republic of Korea, and the source code and documentation of the community NWP models,

**Noting further:**

- (1) That a training workshop on the use and interpretation of NWP products and the two community NWP models was successfully organized on the ACNF website by Hong Kong, China, in December 2012, under the Voluntary Cooperation Programme,

- (2) That feedback from participants in the training workshop held in Hong Kong, China, has been sought on the first phase of the pilot project and on NWP research and development activities to be covered in the next phase of the pilot project,
- (3) That the coordinating group agrees to pursue the second phase of the pilot project in the next few years with emphasis 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 the enhancement of weather service delivery, disaster risk reduction and capacity development efforts of NMHSs in RA II,
- (2) The plan of the coordinating group to continue to develop, in the second phase of the pilot project, the ACNF portal to enhance the resources and support for 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 the pilot project to develop support for NMHSs in NWP on the basis of the plan of the coordinating group;
- (2) That the work of the coordinating group should continue with the following terms of reference:
  - (a) To establish the requirements of NMHSs in 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, on areas such 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 for recipient Members in accessing and using NWP products as a priority, and in the 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;

**Invites** Members desiring to participate in the pilot project to designate experts to serve as members of the coordinating group;

**Requests** 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 seventeenth session of the Association;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

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**Resolution 9 (RA II-16)****PILOT PROJECT TO SUSTAIN AND ENHANCE THE CAPACITY OF NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN THE PROVISION OF OFFICIAL MEDIUM-RANGE WEATHER FORECASTS**

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 in RA II (Asia) 2012–2015,
- (3) The *Abridged Final Report with Resolutions of the Fifteenth Session of Regional Association II (Asia)* (WMO-No. 1106), particularly 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,

**Considering** that Numerical Weather Prediction (NWP) products are becoming indispensable in the provision of weather forecasts by National Meteorological and Hydrological Services (NMHSs) especially medium-range forecasts,

**Recognizing:**

- (1) That a coordinating group was established at RA II-15 to take forward the pilot project,
- (2) That the coordinating group also comprises the coordinators of the Project on the Provision of City-Specific NWP Products to Developing Countries via the Internet as well as providers of NWP products,
- (3) That the coordinating group successfully conducted a survey from 2015 to mid-2016 to collect information from RA II Members about the current status and requirements in the use of NWP model products for medium-range weather forecasts, and that Members indicated interest in implementing appropriate NWP forecast outputs and/or post-processed products,
- (4) That the Korea Meteorological Administration (KMA) organized a couple of training courses in 2016 on NWP model and post-processing techniques for capacity-building on the use and interpretation of NWP products,

**Noting further:**

- (1) That NMHSs, particularly those in developing countries, still face difficulties in providing official weather forecasts for their cities and longer medium-range forecasts ,
- (2) That the World Weather Information Service (WWIS) is currently providing official weather forecasts for about 2 000 cities and that there is room for more official city weather forecasts from NMHSs,
- (3) The increasing challenges posed by the growing popularity of unofficial automatically-generated weather forecasts for extended periods for a growing number of cities (and even small districts within cities) around the world, which are made available free of charge on the Internet and mobile platforms (e.g. mobile app) in response to public demand, and that these unofficial forecasts marginalize the role of the NMHSs and present information inconsistent with the official and safety-critical weather information and warnings to the public,



**Recognizing further:**

- (1) That KMA has enhanced its NWP products to provide forecasts for a total of about 300 cities in 21 Asian countries, including Ensemble Prediction System Meteograms (EPSgrams) of up to 10-day forecasts from its global ensemble prediction system,
- (2) That other notable global weather forecast centres are producing reliable NWP products with increasing spatial and temporal resolutions, which also 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 and enable it 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 as providing reliable and user-friendly weather forecasts and warning services to reduce the risk of natural disasters due to inclement weather,

**Decides:**

- (1) To continue the pilot project to develop support for NMHSs in the provision of official medium-range weather forecasts;
- (2) That the work of the coordinating group should continue with the following terms of reference:
  - (a) To assist NMHSs in RA II in enhancing their provision of weather forecasts in the medium range;
  - (b) To solicit NWP products that assist NMHSs in the provision of weather forecasts in the medium range;
  - (c) To provide support to Members in appropriate post-processing methods of NWP products that can help NMHSs provide weather forecasts in the medium range;
  - (d) To encourage Members to provide more observation data with increased temporal resolution for verification and validation of NWP products, with a view to ensuring the quality of the NWP-based weather forecasts in the medium range, in agreement with the heads of NMHSs to be supported;
  - (e) To share experience in the post-processing, verification and validation of NWP products with Members in RA II especially developing countries;
  - (f) To explore means to disseminate model-based official weather forecasts via the WWIS;

**Invites** Members desiring to participate in the pilot project to designate experts to serve as members of the coordinating group;

**Requests** 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 seventeenth session of the Association;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

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**Resolution 10 (RA II-16)****PILOT PROJECT TO DEVELOP SUPPORT FOR NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN THE COLLECTION AND APPLICATION OF DATA FROM AIRCRAFT METEOROLOGICAL DATA RELAY**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 24 (Cg-17) – Report of the extraordinary session (2014) of the Commission for Basic Systems relevant to WMO Technical Regulations concerning the WMO Integrated Global Observing System, which approved Recommendation 17 (CBS-Ext.(2014)) – Enhancement and expansion of aircraft-based observations,
- (2) The Regional Association II Operating Plan 2016–2019,

**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 34 000 AMDAR observations from 8 airlines to the WMO Information System (WIS) daily, out of around 700 000 AMDAR observations daily from 40 airlines worldwide, which indicates a substantial room for potential growth in the AMDAR programmes in RA II,
- (3) That evolving technologies enable new ways of collecting atmospheric parameters from ADS-B with Mode-S interrogation,

**Recognizing:**

- (1) That several National Meteorological and Hydrological Services (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 that are planning to implement 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,
- (5) That the benefit of using ADS-B or Mode S downlink data to derive upper-air wind and temperature has been demonstrated in Europe,

**Decides:**

- (1) To continue the pilot project to develop support for NMHSs in the collection and application of AMDAR data with the following terms of reference:
  - (a) To promote the sharing of experience among NMHSs in setting up and operating AMDAR programmes;

- (b) To assist NMHSs in RA II in establishing their own AMDAR programme;
  - (c) To promote sharing of AMDAR data from different AMDAR programmes;
  - (d) To identify and explore means of optimizing the collection of AMDAR data;
  - (e) To assist NMHSs in RA II in decoding, processing and visualization of AMDAR data;
  - (f) To facilitate the use of ADS-B and Mode S interrogation to downlink additional aircraft data in RA II for the derivation and visualization of high spatio-temporal resolution atmospheric parameters;
  - (g) To assist NMHSs in RA II in the assimilation of aircraft-based data in NWP models, and in the development of new products and applications of aircraft-based data to enhance the provision of weather forecasting and warning services;
  - (h) To share experience in the collection and application of aircraft-based data with Members in RA II especially developing countries;
  - (i) To liaise with the Expert Team on Aircraft-based Observing Systems of the Commission for Basic Systems and the Expert Team on Aircraft-based Observations of the Commission for Instruments and Methods of Observation for assistance, as necessary;
- (2) To have 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;

**Requests** 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 seventeenth 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 11 (RA II-16)

#### PILOT PROJECT ON IMPACT-BASED FORECASTING

REGIONAL ASSOCIATION II (ASIA),

**Mindful** that even with accurate and timely weather forecasts, many people around the world still lose their lives due to lack of understanding of the consequences of severe weather events;

**Noting:**

- (1) Decision 5 (EC-68) – Provision of multi-hazard impact-based forecasts and risk-based warning services to the public,

- (2) Decision 58 (EC-68) – Operational implications and requirements for impact-based forecasting,
- (3) Resolution 2 (Cg-17) – Implementation of the WMO Strategy for Service Delivery,
- (4) Resolution 4 (EC-65) – Implementation plan of the WMO Strategy for Service Delivery,

**Noting further** that WMO is planning to conduct the Multi-Hazard Early Warning Conference in May 2017 whose outcome and deliberations are expected to guide investments by countries and international organizations for effective, impact-based, multi-hazard early warning systems which will ultimately enable them to implement disaster risk reduction,

**Recognizing:**

- (1) That forecasting impact can be more critical than pure meteorological forecasts in terms of mitigating the consequences for those at risk, and that governments and the public need to know about the impact of meteorological hazards on lives, property and the economy,
- (2) That providing information on the impacts of forecasts and warnings is fairly complex and requires extensive knowledge of vulnerability and exposure, which meteorologists often find difficult,
- (3) That it is necessary to make every effort to assist Members in enhancing their capabilities in impact-based forecasting and warnings and in multi-hazard configuration,
- (4) That it is essential that National Meteorological and Hydrological Services (NMHSs) share experiences and good practices for the successful implementation of multi-hazard impact-based forecasts and risk-based warning services,

**Decides:**

- (1) To establish a pilot project on impact-based forecasting to promote the concept of multi-hazard impact-based forecasts, with the aim of sharing relevant information on such services provided or planned to be provided by NMHSs, including the role of future forecasters, in order to identify associated training needs in the Region;
- (2) To designate the Korea Meteorological Administration (KMA) to lead the project, with the following terms of reference:
  - (a) To annually host a regional seminar which will serve as a venue to share the progress and future plans for impact-based forecasts and risk-based warnings of each NMHS in the Region;
  - (b) To publish an annual report by compiling relevant information on high-impact weather and its forecasts issued by the NMHSs in the Region;

**Invites Members:**

- (1) To actively participate in the pilot project:
  - (a) By attending the seminars hosted by KMA starting from 2017 in order to share their knowledge and experience, and lessons learnt while addressing impact-based forecasting in their NMHSs;
  - (b) By describing in writing their experience in the project, particularly with regard to impact-based forecasting, so that Members' experience can be included in the annual report;

- (2) To designate a focal point who can communicate on impact-based forecasting;

**Requests** the Secretary-General to support Members in the implementation of the pilot project.

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### Resolution 12 (RA II-16)

#### PILOT PROJECT TO ENHANCE METEOROLOGICAL DISASTER RISK REDUCTION CAPABILITY IN REGIONAL ASSOCIATION II

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *WMO Strategic Plan 2016–2019* (WMO- No. 1161) and the RA II Operating Plan 2016–2019,
- (2) Resolution 10 (Cg-17) – Sendai Framework for Disaster Risk Reduction 2015–2030 and WMO participation in the International Network for Multi-hazard Early Warning Systems,

**Noting further:**

- (1) China's efforts in promoting regional cooperation in disaster risk reduction under the One Belt, One Road initiative, particularly through the Nanning Initiative on China-ASEAN Cooperation in Meteorology (adopted at the first China-ASEAN Meteorological Forum in September 2016) and the Urumqi initiative on meteorological disaster prevention and mitigation, and response to climate change in Central Asia (adopted at the Symposium on Meteorological Science and Technology in Central Asia, in October 2015),
- (2) The progress in implementation of the Severe Weather Forecasting Demonstration Project in three subregions in RA II, namely: South-East Asia (Philippines, Viet Nam, Cambodia, Lao People's Democratic Republic, Thailand), Bay of Bengal (Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand) and Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan),
- (3) The outcomes and recommendations of the Joint Meeting of Presidents of Regional Associations and Technical Commissions, held in Geneva in January 2017, relating to the integration of existing regional meteo-alarm systems and the start-up of the Global Meteo-Alarm System,
- (4) That the enhancement of regional capability in meteorological disaster risk reduction through the establishment of regional/subregional meteo-alarm systems will contribute to the establishment of the Global Meteo-Alarm System,

**Decides:**

- (1) To establish a pilot project to enhance the regional capability in meteorological disaster risk reduction with the following terms of reference:
  - (a) To develop an effective workplan, taking into account relevant existing activities in RA II;
  - (b) To establish a regional meteo-alarm system, based on the implementation of the Common Alerting Protocol and the experience of the Hong Kong

Observatory (HKO) in hosting the websites of the World Weather Information Service and the Severe Weather Information Centre of WMO;

- (c) To promote experience sharing among National Meteorological and Hydrological Services (NMHSs) in RA II in disaster risk reduction through forums, workshops and training and other relevant activities;
  - (d) To organize training courses on subjects related to this pilot project;
  - (e) To assist relevant Members in RA II in improving their operational capability in meteorological disaster risk reduction;
  - (f) To monitor the progress of the project and assess its effectiveness;
  - (g) To liaise with the RA II Working Group on Weather Services, as necessary;
- (2) To establish a coordinating group to implement this pilot project and designate the China Meteorological Administration and the HKO 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 seventeenth session of the Association;

**Invites** interested Members:

- (1) To nominate an expert to participate in the work of the coordinating group;
- (2) To participate in and contribute to the pilot project activities and use the information available on the project website to implement their activities in disaster risk reduction as necessary;

**Requests** the Secretary-General to assist Members in the implementation of the pilot project.

### **Resolution 13 (RA II-16)**

#### **REGIONAL ASSOCIATION II OPERATING PLAN 2016–2019**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) The *Abridged Final Report with Resolutions of the Fifteenth Session of Regional Association II (Asia)* (WMO-No.1106), particularly Resolution 19 (RA II-15) – Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association II (Asia) (2012–2015),
- (2) The *Abridged Final Report with Resolutions of the Seventeenth World Meteorological Congress* (WMO-No.1157), especially Resolution 69 (Cg-17) – WMO Strategic Plan (2016–2019) and related discussion,
- (3) The *WMO Strategic Plan 2016–2019* (WMO-No. 1161),

**Noting with satisfaction:**

- (1) The usefulness of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association II (Asia) (2012–2015) 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 implementation of the above regional Strategic Plan by Members of RA II during the period 2012–2015,

**Recognizing:**

- (1) That the WMO Strategic Plan 2016–2019 provides a high-level statement of the future direction and priorities of WMO,
- (2) That the above framework provides a direction in establishing an overall strategic operating plan for the Region,

**Adopts** the Regional Association II Operating Plan for 2016–2019 as given in the annex to this resolution;

**Authorizes** the president to make the necessary adjustments to the 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 Operating Plan, 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;

**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 Operating Plan;
- (2) To keep the Operating Plan under regular review and to monitor and evaluate the progress in implementation of the Plan;

**Requests** the Secretary-General:

- (1) To assist Members in mobilizing resources for development cooperation activities in line with the Operating Plan;
  - (2) To arrange for dissemination of the Plan 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 seventeenth session on the progress made on implementation of the Operating Plan.
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## Annex to Resolution 13 (RA II-16)

## THE REGIONAL ASSOCIATION II OPERATING PLAN 2016–2019

(available in English only)

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
1	1.1	1.1.1	Monitoring of and improvement in the provision measures for the ERA products and services	WWW, ERA	CBS	RA II	Continue e-mail / fax tests to improve reachability for the registered NMHSs	X	X	X	X
1	1.1.	1.1.1	Enhanced communication with ET-ERA though the provision of Members' requirements	WWW, ERA	CBS	RA II	(a) Carry out a user request survey (b) Convey appropriate requests from Members to CBS ET- ERA	X	X		
1	1.1	1.1.1	Enhanced Members' understanding on ERA	WWW, ERA	CBS	RA II	Provide Members with a concise guidance for the transition to the new GDPFS manual regarding EER			X	X
1	1.2	1.2.1	Improvement or delegation of responsibilities on issuance of SIGMET	WWW, AeMP	CBS, CAeM	RA II	(a) Provide support and/or conduct expert visit to Members in need, as necessary (b) Carry out a survey on the status of implementation and planning in each Member	X			X
1	1.2	1.2.1	Provision of improved aeronautical meteorological services to Air Traffic Management (ATM)	AeMP	CAeM	RA II	(a) Encourage Members' dialogue with ATM users and implementation of MET services in support of ATM operations (b) Provision of guidance material and advice to Members (c) Carry out an annual survey on current status of the implementation and planning of MET support to ATM in each Member (d) Conjoint work with relevant ICAO and WMO groups, such as ICAO APAC MET/R TF, WMO ET-ISA (e) Introduce examples of best practices and present regional status and practices of MET support to ATM	X	X	X	X
1	1.2	1.2.1	Implementation of WMO-No. 49 requirements for aeronautical meteorological personnel (Enhanced awareness of Members on Competency Assessment)	WWW, AeMP, ETRP	CBS, CAeM	RA II	(a) Facilitate assistance from regional resource persons through twinning, etc. (b) Include a topic on AeM in Regional Seminar or emerging issues of RA II-15 to discuss the issue in depth	X	X		



ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
1	1.2	1.2.1	Implementation of QMS for AeM Service Providers (AEMSP)	WWW, AeMP	CBS, CAeM	RA II	(a) Share the experience and lessons learned with focal points for QMS (from IR of Iran, Oman and Qatar) (b) Promote and coordinate twinning assistance between Members in RA II in cooperation with CAeM TT-QMS	X	X	X	X
1	1.2	1.2.1	Increased accuracy, timeliness and usefulness of tropical cyclone forecasts and warnings	WWW, DPFS, TCP	CBS	RA II	(a) Training on operational tropical cyclone forecasts and warnings (b) Training on medium-range forecasts and warnings (c) Training on the use of Ensemble Prediction System (EPS) and consensus technique for tropical cyclone forecasting	X	X	X	X
1	1.2	1.2.1	Promotion of the implementation of the "Competency Framework for PWS Forecasters and Advisors" in the Region	ETRP, PWSP	CBS	RA II	(a) Implement the "Competency Framework for PWS Forecasters and Advisors" in the Region (b) Provide training and technical support to flash flood and urban flood forecasting for operational nowcasting (0-6 hours ahead) service on high-impact weather (c) Training on short-range forecasts and warnings (6-24 hours ahead)		X	X	X
1	1.2	1.2.1	Participation in PWS capacity development activities	ETRP, PWSP	CBS	RA II	(a) Conduct a training on PWS (b) Conduct a training in Communications (c) Conduct a training on interpretation of radar/satellite information for improved nowcasting		X	X	X
2	2.1	2.1.1	Implemented WMO Guidelines on Multi-hazard Impact-Based Forecast and Warning Services in the preparation in moving towards impact-based forecasts practices in the NMHSs	ETRP, PWSP	CBS	RA II	Conduct a workshop-on impact-based forecast and warning for NMHSs and users		X	X	X
2	2.1	2.1.1	Enhanced communication with Members	PWSP	CBS	RA II	Annually update the list of PWS focal point, PWS technical contact and alerting authorities of Members, as well as their progress on PWS activities such as CAP implementation status		X	X	X
2	2.1	2.1.1	Enhanced capability of socio-economic benefit study	ETRP, PWSP	CBS	RA II	Organize workshop on socioeconomic benefit study for Members in RA II or subregions		X	X	X

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
2	2.1	2.1.1	Enhanced capability of severe weather forecasting and warning services through SWFDP	WWW, DPFS	CBS, CAS	RA II	(a) Implement regional and national components of Severe Weather Forecasting Demonstration Project, in particular SWFDP-Southeast Asia, SWFDP-Central Asia and SWFDP-Bay of Bengal (b) Increase awareness of SWFDP and utilization by NMHSS	X	X	X	X
3	3.1	3.1.1	Enhanced capability of the use of NWP, including EPS, products provided by RSMCs and advanced NWP centres	WWW, DPFS	CBS	RA II	(a) Identify the focal point of GDPFS and update annually (b) Encourage NMCs to submit WMO Technical Progress Report on GDPFS and NWP research and analyze GDPFS status in RA II from these reports (c) Collect Members' needs on NWP, including EPS, products (d) Collect and share information on available resources and services provided by Members	X	X	X	X
5	5.4	5.4.1	Enhanced capability on sand and dust monitoring and forecasting	WWRP, GAW, DPFS	CAS, CBS	RA II	(a) Enhance the ability of partner research experts to deliver timely and quality forecasts of sand and dust storms under the WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) (b) Organize training on interpretation of sand and dust storm output from the SDS-WAS Asian Node (hosted by China), including how to access data and information (c) Examine data policies and exchange observational sand and dust data (d) Enhance the quality check and conduct intercomparisons	X	X	X	X

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
1	1.2	1.2.1	Enhanced capability in using climate services operationally for farmers	WCP, AgMP	CAgM	RA II	Conduct workshops and training courses for Members in developing countries or least developed countries	X	X	X	X
3	3.2	3.2.2	Enhanced capability in providing climate prediction services to meet users' requirements	WCP, DPFS	CCI, CBS	RA II	(a) Further establish sub-regional Regional Climate Outlook Forums (RCOFs) (b) Enhance exchange and training on monthly/seasonal climate prediction including ENSO, IOD, monsoon and MJO predictions	X	X	X	X
3	3.2	3.2.4	Enhanced services of the Regional Climate Centres (RCCs)	WCP, DPFS	CCI, CBS	RA II	(a) Improve RCC products to meet Members' requirements (b) Facilitate candidate RCCs to demonstrate the capabilities and move on to designation process	X	X	X	X
4	4.4	4.4.1	Improved observations for climate services	WCP, GCOS, WWW	CCI, CBS	RA II	(a) Enhance training on the maintenance of metadata records based on Climate Data Management System (CDMS) (b) Render assistance to NMHSs for Data Rescue (DARE) projects	X	X	X	X
1	1.2	1.2.1	Enhanced capability of socioeconomic impacts of weather and climate extremes on agriculture	WCP, AgMP	CAgM	RA II	Organize Workshop on Socioeconomic Impacts of Weather and Climate Extremes for Members in RA II or subregions	X	X	X	X

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
2	2.2	2.2.1	Improvement in hydrological warnings capability through enhanced and effective cooperation with other NMHSs	WWW, HWRP, DRR	CBS, CHy	RA II	(a) Prepare recommendations on the use of NWP outputs in flood forecasts (b) Document approaches to ascertain the deterministic error of each ensemble element of NWP products (c) Use WMO Flood Forecasting Initiative as platform		X	X	X
3	3.3	3.3.1	Improvement in adaptation capacity of water resources systems in a changing climate	WWW, HWRP, WCP	CBS, CHy, CCI	RA II	(a) Assess changes in climate extremes - Data and method of climate extreme study: data inventory, climate index - Trend of some climate extremes: temperature, rainfall and others (b) Translate climate and climate change information into actions in water resources development and management	X	X	X	X
3	2.1	2.1.1	Improvement in capacity for water-related disaster management (hydrological extremes)	WWW, HWRP, DRR	CBS, CHy	RA II	(a) Organize a workshop on the provision of input and support to disaster management (b) Attend seminars on sediment disasters in order to communicate and cooperate among member countries		X	X	X
3	3.3	3.3.1	Improvement in hydrometric measurements with quality and accuracy	WWW, HWRP	CBS, CHy, CIMO	RA II	Provide guidance on the use of appropriate instrumentation and methods of observation in diverse conditions		X	X	X
2	2.2	2.2.1	Issuance of flood, flash and urban flood warnings and constantly improving upon them	WWW, HWRP, DRR	CBS, CHy	RA II	(a) Document experiences in the use of the Central Asia Region Flash Flood Guidance System (FFGS) in participating countries by reviewing its use (b) Facilitate FFGS understanding by operational hydrologists in the Region (c) Develop recommendations on the use of hydrological forecasts in flood management	X	X	X	X
2	2.1	2.1.1	Issuance of landslide/debris flow warnings and constantly improving upon them	WWW, HWRP, DRR	CBS, CHy	RA II	Collect and disseminate guidance materials and manuals on the assessment of rainfall/flood induced mass movement hazards and potential forecast methodologies		X	X	X
3	3.3	3.3.1	Development of national and regional capacity-building programmes and related training activities for hydrological services	HWRP	CHy	RA II	Synthesize report from individual reports from participating countries in RA II on national and regional capacity development activities in hydrology and make recommendations on their enhancement		X	X	X

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
4	4.1	4.1.1	Update of Regional WIGOS Implementation Plan (RWIP)	WWW	CBS	RA II	Encourage the Task Team on Regional WIP for updating RWIP			X	X
4	4.1	4.1.1	Pre-operation of WIGOS in region II	WWW	CBS	RA II	(a) Establish a task team to analyze the main requirement of pre-operation of WIGOS and challenges for pre-operation of WIGOS in RA II (b) Develop a guidance to pre-operation of WIGOS in Region II for Members (c) Encourage Members to finalize the national WIGOS implementation plan	X	X	X	X
4	4.1	4.1.2	Regular maintenance and calibration of observation instruments, and implementation of reliability measures on quality management routines and procedures of weather observations	IMOP, WWW	CIMO, CBS	RA II	Implement the RA II WIGOS Project to enhance the availability and quality management support for NMHSs in surface, climate and upper-air observations	X	X	X	X
4	4.1	4.1.2	Maintenance and enhancement of the measuring stations in the Region	WWW, WCP, MMOP	CBS, CCI, JCOM M	RA II	(a) Collect and share standard and best practices documents from RA II Members (b) Encourage the collection of metadata on observing systems (c) Support standard of Regional Instrument Centre (RIC)	X	X	X	X
4	4.1	4.1.2	Implementation of Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP)	WWW	CBS	RA II	(a) Encourage Members to develop national reports on progress of Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP) (b) Make gap analysis of observing network in RA II on the basis of users' requirements and existing observing network	X	X	X	X
4	4.1	4.1.2	Development of Regional Basic Observing Network of RA II (RBON-II)	WWW	CBS	RA II	(a) Survey the comprehensive review of all existing observing systems in the Region (b) Hold a workshop to develop a concept of RBON-II (c) Develop the RBON-II by a task team and submit to the RA II session.	X	X	X	X
4	4.1	4.1.2	Development and implementation of the WIGOS data quality monitoring system	IMOP, WWW	CIMO, CBS	RA II	(a) Implement the WIGOS Project to enhance the availability and quality management support for NMHSs (b) Organize RIC training workshops to ensure the accuracy of the instruments	X	X	X	X

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
4	4.1	4.1.2	Integration of Observing Systems for supporting Disaster Risk Reduction and aviation services	WWW	CBS	RA II	(a) Develop integrated weather radar product for severe weather monitoring at the sub-regional level (b) Develop integrated surface-based and space-based operational products	X	X	X	X
4	4.1	4.1.2	Maintenance/enhancement of operational weather radar stations in the Region	WWW	CBS	RA II (joint with RA V)	(a) Improvement of data quality of existing radars (b) Development and expansion of national radar networks (c) Near-real-time international exchange of radar data (d) Development of "sub-regional" radar data centre(s)	X	X	X	X
4	4.1	4.1.2	Maintenance/enhancement of ground station(s) in the Region to receive high-resolution images from geostationary meteorological satellites	WWW, SP	CBS	RA II	(a) Continue implementation of the RA II WIGOS Project to develop support for NMHSs in satellite data, products and training (b) Encourage and facilitate exchange and training on relevant know-how	X	X	X	X
4	4.1	4.1.2	Growth in spatial and temporal coverage of hydrological observation networks	HWR, WWW	CHY, CBS	RA II	Encourage Members to maintain stations with long hydrological records for climate services.	X	X	X	X
4	4.2	4.2.1	Update Regional WIS implementation plan	WWW	CBS	RA II	(a) Mobilize experts of "Local Secondment" for updating of Regional WIS Implementation Plan (b) Continue identification of WIS requirements of Members (c) Organize training, WIS experts' visit for WIS implementation	X	X	X	X
4	4.2	4.2.1	Implementation of GISCs, DCPCs and NCs	WWW	CBS	RA II	(a) Demonstrate capabilities of GISCs and DCPCs (b) Produce regional information documents on WIS (c) Organize a regional and national workshop for potential DCPCs and NCs	X	X	X	X
4	4.2	4.2.1	Assessment of the implementation of WIS	WWW	CBS	RA II	Carry out a survey to monitor the status of WIS Centres and Area Meteorological Data Communication Networks (AMDCN) development/ implementation	X	X	X	X
4	4.2	4.2.1	Development WIS application Pilot Project	WWW	CBS	RA II	(a) Develop and evaluate new WIS applications (b) Provide evaluated techniques and applications to operational WIS centers	X	X	X	X
4	4.2	4.2.1	Solution of isolated NMCs from the GTS	WWW	CBS	RA II	(a) Encourage and facilitate exchange on relevant know-how (b) Render assistance to NMCs Baghdad and Kabul	X	X	X	X

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
4	4.2	4.2.2	Connection to the Internet by broadband VPN	WWW	CBS	RA II	Provide assistance to NMCs.	X	X	X	X
4	4.2	4.2.2	Shift from the costly radiofacsimile broadcast of meteorological and oceanographic information in chart form to more economical modern communication means	WWW	CBS	RA II	(a) Encourage and facilitate exchange on relevant know-how (b) Render assistance if needed to Members who wish to involve the operators and users in modernizing the service	X	X	X	X
4	4.2	4.2.2	Improvement of the Regional Meteorological Telecommunication Network (RMTN) to meet the minimum required bandwidth of 128 kbps	WWW	CBS	RA II	(a) Encourage the migration from analogue to digital circuits in the Middle-East and Central Asia (b) Continue annual survey in the RMTN status	X	X	X	X
4	4.2	4.2.2	Data catalogue implementation by DCPCs and NCs	WWW	CBS	RA II	(a) Review and complement the initial catalogue for DCPCs and NCs (b) Develop a system to update data catalogue with relevant centres	X	X	X	X
4	4.2	4.2.2	Validation checking and Maintaining Data catalogue in the area of responsibility by the related GISC(s)	WWW	CBS	RA II	Review and check the updated data catalogue to maintain its reliability in the area of responsibility	X	X	X	X

ER	KEY OUTCOME	KEY PERFORMANCE INDICATOR	DELIVERABLE	PROGRAMME	TC	REGION	ACTIVITY	Y2016	Y2017	Y2018	Y2019
1	1.2	1.2.1	Enhancement of socioeconomic benefits (SEB) of weather, climate and water services (Assessment of SEB of weather, climate and water services)	WWW, PWSP	CBS	RA II	(a) Implement the socioeconomic studies and evaluations at regional level based on the recommendation of the book on methodologies for assessing SEB being prepared by WMO in collaboration with the World Bank	X	X	X	
							(b) Develop a web-based SEB guidance platform	X	X		
							(c) Examine and facilitate the exchange of data between the regional Members	X	X		
7	7.1	7.1.3	Enhancement of joint activities with partner organizations for utilization of meteorological information to be used as the guidance for decision-making in national level	WCP, RP	CCI	RA II	Joint Workshop in the field of health, water, food, energy, etc., with partner organizations			X	
7	7.2	7.2.1	Enhancement of visibility of activities and priorities of NMHS and communication with stakeholders and with regional organizations	PWSP	CBS	RA II	(a) Implementation of recommendations at regional level given by the guideline on communication with stakeholders including academia and regional organizations being prepared by WMO CBS/OPAG-PWS ET/COPE		X	X	
							(b) Training on relevant know-how		X		X



**Resolution 14 (RA II-16)****REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION**

REGIONAL ASSOCIATION II (ASIA),

**Noting** paragraph 3.7.1 of the general summary of the *Abridged Report with Resolutions of the Ninth Session of the Executive Committee* (WMO-No. 67. RC.14),

**Noting further:**

- (1) That a number of its resolutions adopted before its sixteenth session have been revised and incorporated into resolutions of the sixteenth session,
- (2) That other previous resolutions have been incorporated in appropriate WMO publications or have become obsolete,

**Having examined** the previous resolutions which were still in force at the time of the sixteenth session,

**Decides:**

- (1) To keep in force Resolutions 9 (VII-RA II), 11 (VII-RA II), 12 (X-RA II), 14 (XII-RA II), and 1 (RA II-15);
- (2) Not to keep in force the other resolutions adopted before its sixteenth session;
- (3) To publish the text of the resolutions kept in force in the annex to the present resolution.

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Note: This resolution replaces Resolution 20 (RA II-15), which is no longer in force.

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**Annex to Resolution 14 (RA II-16)****REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION****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.

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**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 offshore platforms such sea parameters as waves, sea-surface temperature, sea ice, ice accretion, etc. and by establishing data buoy stations.
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**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.

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**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.

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NOTE: This resolution replaces Resolution 13 (XI-RA II) which is no longer in force.

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### **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.

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## APPENDIX 3. DECISIONS ADOPTED BY THE SESSION

### Decision 1 (RA II-16)

#### ORGANIZATION OF THE SESSION

REGIONAL ASSOCIATION II (ASIA),

**Having considered** the provisional agenda proposed by the president of Regional Association II (RA II) on the recommendations of the RA II Management Group,

**Approves** the provisional agenda;

**Approves** the report of the representative of the Secretary-General on credentials in accordance with General Regulations 21 to 24;

**Adopts** the establishment of committees for the duration of the session as:

(1) Coordination Committee:

Chairperson: president

Members: vice-president, chairperson of plenaries, Secretary-General's representative, Secretariat staff, representative of local organizing committee;

(2) Nomination Committee:

Chairperson: Mr Xinwen YU, China

Members: Mr Marat KYNATOV, Kazakhstan and Mr Eldev-ochir ERDENEBAT, Mongolia

(3) Subsidiary Body Composition and Membership Committee:

Chairperson: Dr Ghulam Rasul, Pakistan

Members: China, Hong Kong China, India, Japan, Republic of Korea, Pakistan, Saudi Arabia and Viet Nam

(4) Subgroup for Regional Priorities 2020-2023:

Chairperson: Dr Kanduri J. Ramesh, India

Members: Afghanistan, Bahrain, China, India, Iraq, Japan, Nepal, Sri Lanka, Tajikistan and Uzbekistan

**Agrees** to the programme of work of the session:

(1) Working hours of the meetings: 09:30–12:30 and 14:30–17:30;

(2) Arrangement and allocation of agenda items for the session;

**Decides** that in conformance with General Regulation 112 summarized minutes are not required for the session;

**Adopts** for the duration of the session the practice to correct by editorial action, and not by debate in session, documents whose contents are determined solely by administrative procedures.

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## Decision 2 (RA II-16)

### IMPLEMENTATION OF THE WMO DISASTER RISK REDUCTION ROADMAP IN REGIONAL ASSOCIATION II

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Decision 3 (EC-68) – WMO Disaster Risk Reduction (DRR) governance, user-interface mechanisms and WMO Disaster Risk Reduction Roadmap,
- (2) Resolution 10 (Cg-17) – Sendai Framework for Disaster Risk Reduction 2015–2030 and WMO participation in the International Network for Multi-hazard Early Warning Systems (IN-MHEWS), in which Congress requested the regional associations (RAs) to assist with the development of IN-MHEWS and to cooperate with regional bodies of international organizations as well as regional organizations to strengthen partnerships and support WMO Regional Centres in order to promote the implementation of the Sendai Framework, in particular MHEWS,
- (3) Resolution 5 (EC-67) – Executive Council Working Group on Disaster Risk Reduction, through which the EC established the EC WG/DRR,
- (4) Resolution 8 (EC-64) – Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements and its Annex – DRR Programme Work Plan, which endorsed the establishment of four WMO DRR User-Interface Expert Advisory Groups (UI-EAGs) on hazard and risk analysis (HRA), MHEWS, humanitarian assistance (HUM) and disaster risk financing (DRF),

**Recalling further** that Cg-17 reconfirmed the establishment of the DRR Focal Points of the technical commissions and technical programmes (DRR FP TC-TP) and requested to include focal points of the RAs (now DRR FP RA-TC-TP) as a mechanism to support the WMO-wide coordination of DRR activities among these bodies, including their presidents and DRR-related working groups and expert teams,

**Having considered** the recommendations of the [First Session of the EC WG/DRR](#) in April 2016 to oversee the work of the WMO DRR FP RA-TC-TP and to change the name of the thematic UI-EAGs to WMO User-Interface Working Groups (UI-WGs) to reflect that they work on specific outcomes (rather than only advise);

**Having also considered** the decisions of EC-68 in relation to the DRR governance structure to place more emphasis on delivery rather than advisory groups and to adjust the Terms of Reference (ToR) of the thematic WMO DRR UI-WGs to enable them to be tasked to undertake work;

**Recognizing** the importance of the WMO DRR FP RA-TC-TP mechanism, given that there is no TC overseeing the crosscutting DRR Programme and that DRR is a key priority of the WMO Strategic Plan 2016–2019, that their [second meeting](#) took place in November 2015 at which



they also developed their ToR and that their [third meeting](#) took place from 14 to 16 December 2016,

**Recognizing further** that:

- (1) DRR is a cross-cutting issue requiring the expertise and collaboration of weather, climate and hydrological professionals, disaster risk management (DRM) practitioners, social and economic specialists and sectoral experts,
- (2) The WMO DRR Roadmap outlines the role and contribution of the National Meteorological and Hydrological Services (NMHSs) in the entire DRM process,
- (3) That the Sendai Framework for DRR 2015–2030 addresses risks from all hazards, both natural and man-made, with many provisions highly relevant to NMHSs,

**Noting** the outcomes of the first meetings of the [UI-EAG HRA](#) and the [UI-EAG MHEWS](#) in December 2015 and in April 2016, respectively,

**Further noting** the outcomes and recommendations of the Joint Meeting of Presidents of Regional Associations and Technical Commissions in Geneva, January 2017 relating to the initiative of the integration of existing regional meteo-alarm systems and the start-up of the global meteo-alarm system,

**Further noting** that Severe Weather Information Centre (SWIC) being operated by Hong Kong, China on behalf of WMO could be a logical base for the final service of global meteo-alarm system. It is noted that Hong Kong, China is ready to further develop the SWIC as well as the WWIS to enable them to receive, process and display CAP-formulated warnings so as to support the service of the global meteo-alarm system.

**Agrees to:**

- (1) Include actions to implement the Sendai Framework into the RA II regional workplan considering also the WMO DRR Roadmap and its Implementation Plan as relevant;
- (2) Support the WMO DRR Roadmap Implementation Plan through concrete projects and actions in RA II;
- (3) Engage with regional DRR-related mechanisms (such as IN-MHEWS) and coordinate with other international organizations (such as UNISDR and ESCAP) as well as regional organizations (such as RIMES, ASEAN, ESCAP/WMO Typhoon Committee, WMO/ESCAP Panel on Tropical Cyclones) on DRR matters and to take a leading role in MHEWS and in identifying/cataloguing extreme weather, water and climate events and their impacts;
- (4) Encourage Members to contribute to the concept development of a sub-regional and regional meteo-alarm system that can be incorporated into a global portal;

**Requests** the Secretary-General:

- (1) To consider the RA II planning documents when developing the Implementation Plan of the DRR Roadmap;
- (2) To support the concept development of a regional meteo-alarm system that will be compatible with, and can be incorporated into a global portal;
- (3) To support the participation of NMHS representatives from RA II Members in the various groups that constitute the WMO DRR governance structure at physical and virtual meetings within the available budgetary resources;

**Invites** RA II Members (through their NMHSs):

- (1) To cooperate with relevant agencies and organizations at the national level to promote the implementation of the Sendai Framework, proactively engaging in their national DRM and taking a leading role in early warning and/or MHEWS;
- (2) If they have not already done so, to nominate a WMO DRR Focal Point that will be recorded in the WMO Country Profile Database;

**Urges** representatives of the WMO co-sponsored programmes, joint initiatives and partner organizations to actively engage in and support the work of RA II and the WMO DRR FP RA-TC-TP and convey the work and views of their DRR-related working groups and task teams to this group;

**Urges further** the working structures of WMO RAs, TCs and TPs to better collaborate with the GFCS's implementation mechanisms in the planning and provision of technical advice and coordination support for DRR measures in selected countries.

### **Decision 3 (RA II-16)**

#### **PUBLIC WEATHER SERVICES AND PROVISION OF MULTI-HAZARD IMPACT-BASED FORECAST AND WARNING SERVICES**

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Resolution 2 (Cg-17) - Implementation of the WMO Strategy for Service Delivery,
- (2) Resolution 5 (Cg-17) - Public Weather Services Programme,
- (3) Resolution 21 (Cg-XV) – Strategy for the Enhancement of Cooperation between National Meteorological and National Hydrological Services for Improved Flood Forecasting,
- (4) Decision 5 (EC-68), through which EC requested CBS in coordination with other technical commissions, to initiate at CBS-16 (November 2016) through the Open Programme Area Group on Public Weather Service Delivery (OPAG/PWSD), the preparation of practical guidance materials, building on the “WMO Guidelines on Multi-hazard Impact-based Forecast and Warning Services” and the experience gained from the in-country activities,
- (5) Decision 30 (CBS-16) in response to the request by EC, to initiate the development of practical guidance to complement the existing WMO Guidelines with input from relevant technical commissions, regional associations, and WMO Programmes, as well as stakeholders and development partners who share the interests and concerns of Members in impact-based forecasts and warning services to guide the regional activities in this area,

**Acknowledging** that while much has been done by WMO to build infrastructure and improve modelling capabilities to enhance forecast products, developments in understanding the impacts of hazards have not always matched the improvement in technical capabilities,

**Recognizing** that due to the complex nature of the subject, the best way to demonstrate the steps needed to progress towards impact-based forecasts and warning services is through pilot projects and training for implementation by Members,

**Considers** the key components in the success of impact-based forecasts and warning services as: (i) engagement of stakeholders to establish concrete requirements; (ii) integration of social sciences throughout the end-to-end service delivery process; (iii) two-way collaboration between research, technology and science communities and NMHSs to ensure that user requirements are conveyed and acted upon; and (iv) recognition of the fundamental role of partnerships in success of this new way of service delivery;

**Decides:**

- (1) That efforts need to be enhanced for more rapid realization of impact-based forecast and warning services in RA II;
- (2) That Members in RA II be encouraged to use existing tools such as the Common Alerting Protocol (CAP) in the development of impact-based forecast and warning services, and to support the further development of the World Weather Information Service (WWIS) and the Severe Weather Information Centre (SWIC) as sources of authoritative warnings and forecasts and WMO inter-regional early warning system;

**Requests** its Management Group to make the necessary arrangements within its working structure, for the development of impact-based forecast and warning services in response to the requirements of the Members in the Region;

**Requests** the Secretary-General:

- (1) To continue efforts to assist Members in RA II with the introduction of methodologies and principles for the implementation of multi-hazard impact-based forecasts and warning services; and through practical implementation to scale up the projects that have already been initiated to other countries;
- (2) To facilitate the timely preparation of practical guidance for the implementation of impact-based forecast and warning services to assist the Members in RA II in this area.

#### **Decision 4 (RA II-16)**

#### **FLOOD FORECASTING**

REGIONAL ASSOCIATION II (ASIA),

**Noting** the increased frequency of major flood-related disasters in recent years and the general international agreement about the effectiveness in shifting the emphasis from a policy of response to a policy of prevention including the advancement of early warning systems in flooding,

**Recalling:**

- (1) [Resolution 10 \(RA II-15\)](#) – Regional Association II Working Group on Hydrological Services,
- (2) [Resolution 21 \(Cg-XV\)](#) – Strategy for the Enhancement of Cooperation between National Meteorological and National Hydrological Services for improved flood forecasting,

- (3) [Resolution 15 \(Cg-XVI\)](#) – Establishment of an Advisory Group for the WMO Flood Forecasting Initiative,
- (4) [Resolution 18 \(Cg-17\)](#) – Hydrology and Water Resources Programme,
- (5) [Decision 7 \(EC-68\)](#) – Flood Forecasting Initiative, particularly the decision for the Flood Forecasting Initiative Advisory Group to establish a team to develop assessment guidelines for End-to-End Early Warning Systems (E2E EWS) for flood forecasting and assist Members in their assessment of flood forecasting capabilities,

**Recognizing** that the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association II 2012-2015 included activities to use the WMO Flood Forecasting Initiative as a platform to improve early warning capability and to issue flood, flash and urban flood warnings,

**Recognizing further** that the Commission for Hydrology, in its fifteenth session in December 2016, took several decisions that might have an impact on the RA II activities related to flood forecasting, captured under Resolution 8 (CHy15) Annex 1, 1.4(e), such as the implementation of a strategy under the WMO Flash Flood Forecasting Initiative (FFI) to advance the use of End-to-End Early Warning Systems for flood forecasting, using a Community of Practice approach and to undertake activities to develop assessment guidelines consistent with Decision 7 (EC-68),

**Acknowledging:**

- (1) Progress made in a number of Member countries in advancing their ability to issue flash flood warnings through three separate projects that are in different levels of implementation in Regional Association II (Asia) under the Flash Flood Guidance System (FFGS) with global coverage, namely the South Asia FFGS (under implementation), the Mekong River Commission FFGS (operational), and the Central Asia Region FFGS (under implementation) and that one other project, Myanmar FFGS, is under consideration,
- (2) That additional RA II Members could benefit from the application of the Flash Flood Guidance System,
- (3) That RA II Members could benefit from being involved with the CHy Community of Practice on End-to-End Early Warning Systems for flood forecasting,
- (4) That the partners supporting the Flash Flood Guidance System, namely US National Weather Service, US Hydrologic Research Center, USAID/Office of US Federal Disaster Assistance and WMO, are working diligently to expand the functionality of the Flash Flood Guidance System to allow flash flood urban forecasting, riverine flood forecasting, and landslide susceptibility,
- (5) That the Regional Association II Working Group on Hydrological Services has assisted in the design and implementation of the FFGS in the Central Asia Region FFGS and that it has also developed “Guidelines for verification of hydrological forecasts”,

**Invites** the president of the Commission for Hydrology to review and assess the global utility of the guidance material prepared by the Regional Association II Working Group on Hydrological Services entitled “Guidelines for verification of hydrological forecasts” as a potential contribution to the WMO Flood Forecasting Initiative;

**Requests** the Secretary-General, as appropriate and within the available budgetary resources:

- (1) To assist Members in Regional Association II in the Flood Forecasting Initiative Advisory Group-led initiative to assess their flood forecasting capabilities by, for example, undertaking an initial pilot application of the developed assessment guidelines;

- (2) To promote and support within Regional Association II the adoption of appropriate technologies and recommended practices and procedures to advance Member capabilities to provide early warning of hydrometeorological hazards through, for example, the implementation of projects such as the Flash Flood Guidance System with global coverage and involvement with the CHy Community of Practice on End-to-End Warning Systems for flood forecasting.

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### Decision 5 (RA II-16)

#### SEVERE WEATHER FORECASTING DEMONSTRATION PROJECT – REPORTING AND IDENTIFICATION OF REGIONAL ENTITY

REGIONAL ASSOCIATION II (ASIA),

**Recalling** that the Severe Weather Forecasting Demonstration Project (SWFDP) has been implemented in three sub-regions in RA II, namely, South-East Asia, (Philippines, Viet Nam, Cambodia, Lao PDR, Thailand), Bay of Bengal (Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand), and Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan),

**Recalling further** the decision by Cg-XVI that SWFDP should be an end-to-end cross-programme collaborative activity that engages with all WMO Programmes that concern the real-time prediction of hydrometeorological hazards, through their respective technical commissions: from observations, to information exchange, to delivery of services to the public and a range of targeted applications/user sectors, education and training, capacity development and support to LDCs, and to the transfer of relevant promising research outputs into operations,

**Recalling further** the decision by EC-68 (Annex to Decision 9 (EC-68)) on the Critical Elements for Consolidating the Severe Weather Forecasting Demonstration Project into Global Sustainable Operational Services, which consists of a Regional Management Team (RMT), a regional entity, global centres, a regional centre and national centres;

**Noting** that the growing success of the initiative with an increasing number of projects running currently in Southern Africa, Southwest Pacific, Eastern Africa, South-East Asia, Bay of Bengal and Central Asia, and planned for Western Africa, Caribbean SIDS, Southern-south America, Southeast Europe, and Oceania,

**Noting with satisfaction** the significant contribution of Global Producing Centres (JMA, CMA, KMA, IMD, UKMO, NCEP/NOAA, Roshydromet, ECMWF, DWD); Regional Specialized Meteorological Centres (Tokyo, New Delhi, Tashkent) and the Regional Forecast Support Centre (RFSC Hanoi),

**Considering** that regular reporting on the performance of participating NMHSs is essential for the continuous improvement of the cascading forecasting process and that regular reporting from participating countries in the SWFDP in RA II needs to be improved and that a reporting SWFDP database has been developed by the Secretariat,

**Considering** that the SWFDP regional subproject in South-East Asia is now in demonstration phase with the potential to move quickly to operational phase and that regional subprojects in the Bay of Bengal and Central Asia are ready to start demonstration phase,

**Considering further** the requirement to identify regional entities to take on the responsibility from the Secretariat for running the regional subprojects when the subprojects move to operational phase,

**Invites** RA II participating countries to ensure that they report regularly through the SWFDP database;

**Invites** Regional Subproject Management Teams (RSMTs) of the SWFDP subprojects in RA II to report annually activities of each subproject to the RA II Management Group, through the Expert Group on Operational Forecasting (EG-OF);

**Requests** the RA II Management Group to assist Regional Subproject Management Teams (RSMTs) of the three SWFDP in developing feasible plans towards operational phases, including identification of a regional entity or entities to oversee and coordinate support activities such as training, organizing meetings and resource mobilization.

### Decision 6 (RA II-16)

#### ENHANCING CAPACITY AND COMPETENCIES OF NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN TROPICAL CYCLONE FORECASTING AND WARNINGS

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 23 (Cg-XVI) – Tropical Cyclone Programme,
- (2) Decision 10 (EC-68) – Enhancing capability of the National Meteorological and Hydrological Services in tropical cyclone impact-based forecasting and warning services with multi-hazard approach,
- (3) The Statute of the ESCAP/WMO Typhoon Committee, and the Statute of the WMO/ESCAP Panel on Tropical Cyclones, respectively, defining the inter-governmental nature of the two bodies,

**Recalling** the view of Cg-17 (paragraph 3.1.67 of the Abridged Final Report) on the urgent need of improving the tropical cyclone forecasting skills and competencies required for effective operational capacity in the developing countries, especially Small Island Developing States (SIDS) and the Least Developed Countries (LDCs); and that Cg-17 requested the Secretary-General to continue to give high priority to capacity development in tropical cyclone forecasting and related disaster risk reduction (DRR), and make the necessary arrangements to extend training activities to cover all the five regional tropical cyclone bodies,

**Recognizing** that Members of the Association prone to experience tropical cyclones are mainly developing and least developed countries, and that they have been grouped into the ESCAP/ WMO Typhoon Committee, and the WMO/ESCAP Panel on Tropical Cyclones, respectively; and that the highest priorities among the NMHSs of those Members are capacity development and improving the competencies and skills of forecasters on tropical cyclone forecasting and warnings with a multi-hazard approach,

**Noting further:**

- (1) The Jakarta Declaration adopted by the participants in the Joint RA II/RA V Workshop on WIGOS for Disaster Risk Reduction, BMKG, Jakarta, Indonesia, October 12-14 2015,

which recommended that satellite operators provide necessary support to the joint RA II/RA V WIGOS project on satellite data,

- (2) The Memorandum on the Asia-Oceania Meteorological Satellite Users Conference (AOMSUC) which provides a forum to facilitate the meteorological community in Asia and Oceania in enhancing utilization of satellite data and products for better weather, climate and disaster risk reduction services,

**Recognizing** that it is essential to enhance the exchange, and to improve availability and quality, of most relevant observations across the Region for reducing risks of disasters associated with tropical cyclones,

**Requests** the Secretary-General to make the necessary arrangements for mobilizing resources to provide training opportunities to forecasters from those Members through the existing training programmes under the WMO Tropical Cyclone Programme and Education and Training Programme;

**Calls** for Members of the Association to strengthen operational weather discussions between/among them and requests those leading centres and RTCs to contribute to the tropical cyclone training activities;

**Invites** those RSMCs with activity specialization in tropical cyclones and relevant WMO Regional Training Centres to be proactive in pursuing support from their national governments to organize, and provide necessary resources to conduct training activities on tropical cyclone forecasting and warnings;

**Calls further** for satellite operators protocol under which Members can request event-driven rapid-scanning satellite data covering their national area of interest for Disaster Risk Reduction in accordance with the concept of the Jakarta Declaration;

**Requests** the Members who signed the Memorandum on AOMSUC to foster cooperation among satellite operators and users in the Region to improve regional capacity in exploiting satellite data for Disaster Risk Reduction.

### Decision 7 (RA II-16)

#### WMO SUPPORT TO IMPLEMENTATION OF THE PARIS AGREEMENT

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Resolution 9 (Cg-17) - Identifiers for cataloguing extreme weather, water and climate events,
- (2) Resolution 23 (Cg-17) – Pre-operational phase of the WMO Integrated Global Observing System,
- (3) Resolution 39 (Cg-17) - Global Climate Observing System,
- (4) Resolution 46 (Cg-17) - Integrated Global Greenhouse Gas Information System,
- (5) Resolution 63 (Cg-17) - Energy as an additional priority area of the Global Framework for Climate Services,

- (6) Resolution 64 (Cg-17) - Development of a results-based framework for WMO support to the implementation of the Global Framework for Climate Services,
- (7) Resolution 1 (EC-68) – WMO support to the Paris Agreement,

**Also recalling** that the Paris Agreement entered into force on 4 November 2016, and that the twenty-second session of the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP 22) held in conjunction with the twelfth session of the Parties to the Kyoto Protocol and the first session of the Conference of the Parties serving as the Meeting of the Paris Agreement (CMA 1), was held in Marrakech, Morocco from 7-18 November 2016,

**Further recalling** that COP 22 adopted Decision 19/CP.22 entitled “Implementation of the Global Observing System for Climate”,

**Noting** the text of the Paris Agreement, in particular with respect to:

- (1) Recognizing the need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge,
- (2) Calling for Parties to strengthen their cooperation on enhancing action on adaptation, taking into account the Cancun Adaptation Framework, particularly item (c) paragraph 7 of Article 7, “Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making”,

**Observes** that:

- (1) Enhanced observation of Essential Climate Variables (ECVs) is critical for the global stocktake, since the climate data records based on ECVs are used to close budgets of energy, carbon and water and to study changes in the growth rate of the atmospheric composition of greenhouse gases (GHGs), or interaction between land and atmosphere, in a more integrated way;
- (2) The Integrated Global Greenhouse Gas Information System (IG3IS) will promote the success of post-COP 21 actions of nations, sub-national governments including cities, and the private sector to reduce climate-disrupting GHG emissions through a sound scientific, measurement-and-modelling-based approach;
- (3) The support of climate services to the energy, water, public health, transport and industry, agriculture and land use sectors can play a vital role in reaching a low-carbon and climate-resilient economy through the Global Framework for Climate Services;
- (4) The forty-fifth session of the Subsidiary Body for Scientific and Technical Advice (SBSTA-45) held in November 2016 welcomed the submissions from WMO: The Global Climate in 2011–2015 and the WMO Greenhouse Gas Bulletin, and invited WMO to provide submissions on the state of the global climate on a regular basis, as appropriate, at subsequent sessions of the SBSTA;

**Invites** Members of the Association:

- (1) To work at national level to fully engage NMHSs as critical actors in cataloguing of extreme events, adaptation programmes, mitigation, and other areas that fall within the competency of their respective Services, and to contribute to Nationally Determined Contributions (NDCs), GHG monitoring systems and other observing systems;
- (2) To engage at national level in the design and implementation of projects submitted to the Green Climate Fund, through National Designated Authorities (NDAs), and in the process of developing and implementing National Adaptation Plans (NAPs), and in



generating relevant climate information and services, particularly through implementation of the Global Framework for Climate Services;

- (3) To engage in or, where necessary, establish institutional frameworks for climate services at national level that will serve as key coordination mechanisms to bring together stakeholders needed for the successful generation, tailoring, communication and use of climate services for enhanced decision-making;
- (4) To promote the value and relevance of scientific information and data in global stocktaking for the Paris Agreement through national delegations participating at COP sessions;
- (5) To actively participate in major UNFCCC meetings, such as COPs, SBSTA, and the Subsidiary Body for Implementation, including the participation of Directors of NMHSs as members of country delegations;
- (6) To work towards the full implementation of the Global Climate Observing System implementation plan and to consider what actions they can take to contribute towards its implementation;
- (7) To encourage active contributions by scientists in the region to the Intergovernmental Plan on Climate Change Special Report on global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, expected to be published in September 2018, by pursuing research efforts to limit the global average temperature increase to 1.5 °C above pre-industrial levels and, thereby, to contribute to the production of sufficient relevant scientific information;

**Requests** the Secretary-General:

- (1) To include information on high-level climate policy issues at all relevant events for NMHS Directors, to enhance their access to information on the role of NMHSs in contributing to the high-level climate policy agenda and implementation of the Paris Agreement;
- (2) To continue communicating to Members through Ministries of Foreign Affairs to sensitize them on the need to invite NMHSs to contribute to periodic updates on adaptation communication, referenced in Article 7, paragraphs 10 and 11, of the Paris Agreement, including concerning their support to NAPs and NDCs;
- (3) To continue communicating with Members through Ministries of Foreign Affairs to encourage involvement of NMHSs in national COP delegations.

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### **Decision 8 (RA II-16)**

#### **IMPLEMENTATION OF THE COUNTRY-FOCUSED RESULTS-BASED FRAMEWORK AND MECHANISM FOR WMO CONTRIBUTIONS TO THE GLOBAL FRAMEWORK FOR CLIMATE SERVICES IN REGIONAL ASSOCIATION II**

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Resolution 60 (Cg-17) – WMO policy for the international exchange of climate data and products to support the implementation of the Global Framework for Climate Services,

- (2) Resolution 64 (Cg-17) – Development of a results-based framework for WMO support to the implementation of the Global Framework for Climate Services,
- (3) Resolution 6 (EC-67) – A mechanism to advance WMO contributions to the Global Framework for Climate Services,
- (4) Decision 16 (EC-68) – Country-focused results-based framework and mechanism for WMO contributions to the Global Framework for Climate Services,
- (5) Decision 27 (EC-68) – Exchange of data and products for the implementation of the Climate Services Information System,
- (6) Decision 41 (EC-68) – Implementation of Resolution 60 (Cg-17) on the exchange of climate data and products and Resolution 65 (Cg-17) on emerging data issues,

**Welcoming** the progress made by Members in the implementation of climate services,

**Recognizing** that climate services and the Global Framework for Climate Services (GFCS) constitute an essential contribution to the implementation of the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction, Small Island Developing States (SIDS) Accelerated Modalities of Action (SAMOA) Pathway and especially the United Nations Framework Convention on Climate Change Paris Agreement,

**Noting** the increased investment in climate change adaptation, climate resilience and climate services arising from the prominence of climate on the international development agenda,

**Decides** to implement the country-focused results-based framework and mechanism for WMO contributions to the GFCS, described in the annex to Decision 16 (EC-68), in the Region;

**Invites** Members:

- (1) To pursue implementation at country level and report on results achieved and support needs, as appropriate, to an RA II subsidiary body in charge of climate services;
- (2) To actively seek extra-budgetary resources, where necessary, including through active collaboration with partner organization members of the GFCS Partners Advisory Committee;

**Invites** the World Data Centres, Global Producing Centres for Long-Range Forecasts, Regional Climate Centres, National Meteorological and Hydrological Services and other entities defined and designated under the Global Data-processing and Forecasting System to contribute GFCS-relevant data and products to support the implementation of climate services at country level;

**Requests:**

- (1) Technical commissions to develop relevant regulatory material and guidance to assist Members in the implementation of GFCS activities and contribute to the development and implementation of WMO and partner projects and programmes in response to identified needs;
  - (2) The Secretary-General to facilitate implementation through support to the mechanism for WMO contributions to the GFCS, and through relevant WMO Programmes and activities, and to assist with mobilizing the necessary resources.
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**Decision 9 (RA II-16)****ANALYSIS OF WMO MULTI-YEAR CLIMATE REPORTS**

REGIONAL ASSOCIATION II (ASIA),

**Recalling** Decision 25 (EC-68) – Strengthening WMO climate monitoring and assessment, requesting that an analysis be conducted on the release of the five-year and ten-year WMO global climate statement reports, including the Members' contribution to, and use of, these reports, and the interest generated by these reports,

**Noting:**

- (1) The release of the five-year climate statement covering the period 2011-2015 during the Conference of the Parties (COP 22) to the United Nations Framework Convention on Climate Change (UNFCCC),
- (2) That the forty-fifth session of the UNFCCC Subsidiary Body on Scientific and Technological Advice (SBSTA-45) welcomed the submissions from WMO: The Global Climate in 2011–2015, as well as the WMO Greenhouse Gas Bulletin, and invited WMO to provide submissions on the state of the global climate on a regular basis, as appropriate, at subsequent SBSTA sessions,

**Noting with concern:**

- (1) That, globally, the five-year period 2011–2015 experienced record breaking temperatures, continued shrinking of sea ice and sea level rise, and an accelerated pace of warming, driven by long term climate change and spiked by the strong El Niño event in 2015/2016,
- (2) That the five-year statement contained information on alarming conditions affecting Region II, record high temperatures at continental scale and in several countries, and high impact extreme events, including heat waves, tropical cyclones, and flooding, which resulted in several thousand lives lost and several US\$ billion in damages,

**Decides** to participate in the analysis regarding WMO multi-year climate reports, to find out how many Members in RA II contribute to the reports, whether they use them and benefit from them, and how much interest these publications generate in the region,

**Invites** Members:

- (1) To contribute to the analysis regarding WMO multi-year climate reports including the provision of the relevant information;
  - (2) To further support NMHSs' capabilities which underpin robust climate assessment in the region, including accelerating the recovery and digitization of historic climate records, improving climate data management, and leveraging remote sensed data and products for supporting NMHSs' climate monitoring activities to complement in situ derived data and products.
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**Decision 10 (RA II-16)**

**ACCELERATING DATA RESCUE AND COLLABORATION ON REGIONAL AND INTERNATIONAL DATA RESCUE INITIATIVES**

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) The Global Framework for Climate Services (GFCS) implementation plan, which prioritizes large-scale data recovery and digitization, to strengthen the climate data sets contributing to the Climate Services Information System (CSIS) with the required quantity, quality, and coverage to support the provision of climate services, in particular at national and local levels,
- (2) Resolution 60 (Cg-17) – WMO policy for the international exchange of climate data and products to support the implementation of the GFCS,

**Noting** the importance of sharing knowledge and best practices as a mechanism to accelerate data rescue activities, including locating, inventorying, preserving and digitizing historical climate records, and taking all necessary measures to ensure these records are not facing risks of loss or degradation,

**Acknowledging** the efforts by Members, the WMO Commission for Climatology (CCI) and the Secretariat to accelerate data rescue worldwide and in the Regions,

**Noting with satisfaction** the start-up of an Indian Ocean Data Rescue Initiative (INDARE) involving Member collaboration in RA I, RA II and RA V to locate and accelerate the recovery and digitization of historical climate records from both land and ocean domains and collaborate on sharing relevant information, data, infrastructure and knowledge,

**Welcoming** the ongoing efforts by Indonesia and India to establish a mirrored climate data service portal for INDARE, providing information on data inventories and access to relevant data-derived products, such as climate indices,

**Welcoming further** the entry in operation of the International Data Rescue (I-DARE) Portal, on which guidance for registering data rescue information is available,

**Decides:**

- (1) To endorse the Indian Ocean Data Rescue Initiative (INDARE);
- (2) To collaborate enthusiastically in the international data rescue initiative I-DARE, and the global integrated portal for registering and discovering information on data rescue projects, best practices, tools, methods and guidance on the recovery and digitization of climate records worldwide;

**Invites:**

- (1) Members to enhance their support to data rescue by allocating the necessary human and financial resources for NMHSs to further accelerate the recovery and digitization of climate records;
- (2) NMHSs and other institutions holding historical climate archives to register their data rescue needs as well as ongoing data rescue activities under I-DARE;

**Requests:**

- (1) The RA II subsidiary body responsible for data rescue and management to promote Members' collaboration on data rescue, including sharing relevant information through I-DARE, the further development of the INDARE approach, and evaluate the potential for initiating similar initiatives covering other geographical areas of Region II;
- (2) The Secretary-General to enhance WMO extra-budgetary resource mobilization to support data rescue in Region II.

**Decision 11 (RA II-16)****IMPLEMENTATION AND COORDINATION OF REGIONAL CLIMATE CENTRE OPERATIONS IN REGIONAL ASSOCIATION II**

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Decision 52 (EC-68) on Polar Regional Climate Centres (PRCC) endorsing the development of Arctic PRCC-Network as a joint initiative of RAs II, IV, and VI and the follow-up progress in the development of an implementation plan,
- (2) Resolution 5 (RA V-16) on Implementation of Regional Climate Centre (RCC) Networks in Regional Association V (South-West Pacific), urging close collaboration between RA II and RA V on the implementation of the RCC-Network for the Southeast Asian sub-region straddling both RA II and RA V, and the consequent efforts by RA V to establish an RCC-Network to serve its Members in Southeast Asia,

**Noting:**

- (1) That three designated multi-functional RCCs are in operation in RA II: RCC Beijing (China), RCC Tokyo (Japan), and RCC Moscow (Russian Federation), and that RCC Pune (India) was recommended for designation by CBS-16,
- (2) The recommendations of the Regional Consultation on Climate Services for the Third Pole Region (Jaipur, India, 9–11 March 2016) on establishing an RCC-Network and a Regional Climate Outlook Forum (RCOF) focused on the special needs of the Third Pole Region,
- (3) The efforts of the Executive Council Panel of Experts on Polar and High-mountain Observations, Research and Services (EC-PHORS) in promoting the Polar RCC concept for the Arctic, Antarctic as well as the Third Pole Region,
- (4) The ongoing operations of the Association of South East Asian Nations Climate Outlook Forum (ASEANCOF), involving Members of both RA II and RA V within the Southeast Asian subregion,

**Noting further** the key role of regional associations in initiating the establishment and facilitating the development and operations of RCCs,

**Noting with appreciation** that the designated RCCs in RA II have been making continuous efforts to provide their products and services to RA II Members,

**Recognizing:**

- (1) That the products and services provided by the RCCs in RA II are expected to be more effectively utilized by Members and that each RCC collects and uses feedback from Members to improve these products and services,
- (2) The need for enhanced coordination between the neighbouring regional associations in implementing cross-regional RCCs and RCOFs,

**Decides:**

- (1) To establish collaboration and coordination mechanisms to ensure the consistency and harmonization of operations of RCCs in RA II, through regular coordination efforts facilitated by the RA II subsidiary body in charge of climate services;
- (2) To collectively assess the use of the products and services by the Members through establishing feedback mechanisms using RCOFs, to share the assessment among RCCs, and to revisit the implementation plan to further improve functions and operations, based on the feedback;
- (3) To support the development and implementation of the Arctic PRCC-Network and of Polar Climate Outlook Forums in close collaboration with RAs IV and VI;
- (4) To endorse the proposal to establish a WMO RCC-Network for the Third Pole Region;
- (5) To support the development and implementation of an RCC-Network for Southeast Asia in close collaboration with RA V;

**Invites:**

- (1) RCCs in RA II to closely work together to provide well-coordinated and complementary regional climate services in support of NMHSs in RA II;
- (2) Members in the Third Pole Region with adequate capacities to contribute to and actively support planning and demonstration of the operations of the proposed Third Pole RCC-Network;
- (3) RA II Members in the Southeast Asian region to actively contribute to the RCC Network for Southeast Asia and the associated inter-regional climate activities for the subregion;
- (4) RA IV and RA VI to collaborate on the development and implementation of the Arctic PRCC-Network and of Polar Climate Outlook Forums;
- (5) RA V to collaborate on the development and implementation of an RCC-Network for Southeast Asia;

**Requests:**

- (1) The RA II subsidiary body responsible for climate services to coordinate and facilitate RCC/RCC-Network operations in RA II and also to actively support the development of implementation plans for the RCC-Networks in the Arctic and the Third Pole in close collaboration with the concerned entities of CCI and CBS;
- (2) The Secretary-General to facilitate the coordination and provide the necessary secretariat support for implementing RCCs and RCC-Networks as stipulated in the decision above, including though support for resource mobilization efforts;

**Recommends** to the Executive Council, particularly through EC-PHORS, to continue its full support to the development and implementation of RCC-Networks and RCOFs for the Arctic and the Third Pole Regions.

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### Decision 12 (RA II-16)

#### ESTABLISHING REGIONAL WMO INTEGRATED GLOBAL OBSERVING SYSTEM CENTRES IN REGIONAL ASSOCIATION II IN THE PILOT PHASE

REGIONAL ASSOCIATION II (ASIA),

**Recognizing** the critical role that Regional WIGOS Centres (RWCs) will play in advancing operation of WIGOS and providing regional coordination, technical guidance, assistance and advice to Members and the Region,

**Recognizing further** that the subregions of RA II differ greatly and that such differences will need to be taken into account in establishing and operating RWCs that address the specific Members' needs and circumstances of the respective subregion,

**Recalling:**

- (1) Resolution 23 (Cg-17) – Pre-operational phase of the WMO Integrated Global Observing System,
- (2) Resolution 2 (EC-68) – Plan for the WMO Integrated Global Observing System (WIGOS) pre-operational phase 2016-2019,
- (3) Decision 30 (EC-68) – WMO Integrated Global Observing System Regional Centres,

**Having examined** the guidance on establishing a WMO Regional WIGOS Centre in pilot phase developed by ICG-WIGOS,

**Noting** interest of China and Japan for hosting a WMO Regional WIGOS Centre in RA II;

**Decides** to endorse the guidance on establishing a WMO Regional WIGOS Centre in RA II in pilot phase (thereafter referred to as "RWC guidance") as provided in the Annex to this decision as technical guidance to RA II;

**Requests** the Management Group to support the establishment of RWC(s) in the Region and to consider establishing RWCs with optional functions, such as weather radar data and AMDAR data coordination in one or more subregions of RA II;

**Urges** Members:

- (1) To familiarize themselves with the RWC guidance;
- (2) To actively participate in the implementation of RWCs in RA II;

**Requests** the Secretary-General to provide the necessary assistance and Secretariat support for the establishment of RWCs in RA II;

**Authorizes** the president of RA II to approve the pilot RWC(s) with applications from RA II Members on behalf of the Association, in consultation with the RA II Management Group;

**Invites** the partners to participate in establishing RWCs in the Region.

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**Annex to Decision 12 (RA II-16)**

**ESTABLISHING REGIONAL WMO INTEGRATED GLOBAL OBSERVING SYSTEM  
CENTRES IN REGIONAL ASSOCIATION II IN THE PILOT PHASE**

WORLD METEOROLOGICAL ORGANIZATION

**WMO INTEGRATED GLOBAL OBSERVING SYSTEM  
(WIGOS)**

**ESTABLISHING A REGIONAL WIGOS CENTRE  
IN PILOT MODE  
DURING THE WIGOS PRE-OPERATIONAL PHASE 2016-2019**

*(Technical Guidance)*





### **EXECUTIVE SUMMARY**

According to the decision of the seventeenth World Meteorological Congress (Cg-17, 2015), the concept development and initial establishment of Regional WIGOS Centres (RWCs) is one of five priority areas for the WIGOS pre-operational phase 2016-2019. The RWCs will play a critical role in advancing the implementation of WIGOS within their region (or sub-region) and will be providing regional coordination and technical support to Members.

RWCs will be working closely with data providers to facilitate primarily: (i) regional WIGOS metadata management (OSCAR/Surface); (ii) regional WIGOS performance monitoring and incident management (WIGOS Data Quality Monitoring System).

This document provides (i) the justification of the Project; (ii) its alignment with WMO strategic priorities and Member's priorities; (iii) compliance with WMO regulations and rules; (iv) description of the Project; and (v) its implementation arrangements.

## CONTENT

1. INTRODUCTION
  2. RATIONALE FOR THE PROJECT AND ITS RELEVANCE TO WMO
  3. PROJECT DESCRIPTION
  4. RESOURCING
  5. IMPLEMENTATION STAGES
  6. RISK ASSESSMENT/MANAGEMENT
  7. GOVERNANCE, MANAGEMENT AND EXECUTION
  8. MONITORING AND EVALUATION
- ANNEX 1 CONCEPT NOTE ON ESTABLISHMENT OF WMO REGIONAL WIGOS CENTRES
- ANNEX 2 APPLICATION TEMPLATE FOR A RWC CANDIDATE

## **1. INTRODUCTION**

This document describes how to establish a Regional WIGOS Centre in Pilot mode to support and coordinate the WIGOS implementation activities in a given WMO Region or sub-Region.

## **2. RATIONALE**

Congress-17 decided that WIGOS, supported by WIS, is one of the WMO strategic priorities for 2016-2019. Subsequently, the concept development and initial establishment of Regional WIGOS Centres (RWCs) was identified as one of five priority areas for the WIGOS pre-operational phase 2016-2019.

EC-68 recognized the critical role that Regional WIGOS Centres (RWCs) will play in advancing the implementation of WIGOS at the regional level by providing regional coordination, technical guidance, assistance and advice to Members and regional associations in accordance with *Technical Regulations* (WMO-No. 49), Volume I – General Standards and Recommended Practices, and its Annex VIII, *Manual on the WMO Integrated Global Observing System* (WMO-No. 1160).

The WMO Regions differ in terms of WIGOS readiness, economic strength, cultural and linguistic characteristics, and these differences need to be taken into account in establishing and operating their respective RWCs.

EC-68 endorsed the “Concept Note on establishment of WMO Regional WIGOS Centres” (thereafter referred to as “RWC Concept”, and included as Annex 1 to this document) as general guidance to regional associations outlining the basic principles and providing a clear specification of mandatory and optional functions.

## **3. PROJECT DESCRIPTION**

### **3.1 Objectives**

Expected results of establishing a RWC in pilot phase include an assessment of the feasibility of subsequently establishing a fully operational RWC, and, based on the final project evaluation, a set of recommendations on key aspects of such a centre, including institutional set-up, concept of operations and strategy for long-term sustainability.

### **3.2 Terms of Reference**

The Terms of Reference (to include the main WIGOS functionalities offered by the Centre) must be defined; as a minimum, they must include the mandatory functions as specified in the RWC Concept (see Annex 1); however, depending on available resources and the willingness of the Member with primary responsibility for the RWC, one or more optional functions may be considered, e.g. assistance with regional and national observing network management, calibration support, education and training.

### **3.3 Infrastructure**

#### **3.3.1 Basic Infrastructure**

In order to ensure a rapid start-up for the Centre, it would be desirable for the host country to make available to the Centre, either permanently or on a temporary basis, adequate, secure, fully-equipped, and easily accessible premises. These premises must be supplied with water and electricity and be equipped with a reliable telecommunications system.

#### **3.3.2 Technical Infrastructure**

The Centre must have adequate IT facilities and infrastructure (work stations, high speed

internet access, data processing and storage capabilities) needed for RWC mandatory functions.

#### **4. RESOURCING**

There is no funding for RWC operations in the regular WMO budget. The responsibility for funding the establishment and operations of an RWC thus rests with the Member(s) involved. Suitable resources for establishment and sustained operations of the Centre must be identified. The amount and nature of resources required will depend on the intended functionalities of the Centre.

In order to ensure the long-term sustainability of the RWC, the Pilot phase should include the development of a long-term funding strategy based on effective resource mobilization where appropriate.

##### **4.1 Human resources**

The necessary human resources (management staff, scientific staff, technical staff and administrative staff) should be specified in terms of competencies and number of staff (expressed in Full-time equivalents) allocated to the RWC development and operations. The staff may be permanent NMHS employees or may be temporarily hired project staff. Where appropriate, some of the responsibilities of the RWC may be fulfilled through secondment of staff from other WMO Members in the Region.

##### **4.2 Funding resources**

The responsibility for funding the RWC operations rests with the Member(s) involved, and it is expected that efficiencies facilitated by the RWC in designing, procuring and operating the observing systems will offset most of these costs. Nonetheless, there will be less well-resourced Members that will have difficulties in identifying the required resources at the national level. In these cases the RWC partner(s) will have to develop effective resource mobilization strategies with a view to deriving maximum benefit from the various multilateral funding mechanisms, and regional development institutions, etc. The WMO Secretariat is prepared to support all stages of such resource mobilization efforts.

#### **5. IMPLEMENTATION STAGES**

To be designated as a WMO RWC, after the launch period (start-up phase), there must be a successful pilot phase, after which the Centre may enter an operational phase.

##### **5.1 Start-up phase**

The RWC candidate will contact the president of the respective WMO Regional Association (P/RA) in writing through, and with the endorsement of, the Permanent Representative(s) of the Member(s) with WMO in which the RWC candidate is situated, expressing its intent to be designated as a WMO RWC in Pilot Mode. The Application template for a RWC candidate is reproduced in Annex 2.

P/RA, in close collaboration with the management group and related expert group of the RA, ICG-WIGOS, and the WIGOS Project Office in the WMO Secretariat, will consider the proposal. The candidate(s) will follow recommendations and guidance for further elaboration of the proposal.

During this phase, which may last several months, the framework for Pilot phase operations is created, the infrastructure and human resources are made available, the functionalities assigned to the Centre are specified and clarified, partners are mobilized and consortia of technical, scientific and financial partners, if needed, are developed.

## 5.2 Pilot Phase

The aims of this phase are (i) to begin helping a group of Members within the domain<sup>1</sup> of the RWC to benefit from WIGOS and (ii) to prepare the solid basis for a transition to a subsequent Operational phase, depending on final assessment. The functionality and services provided during this phase are evaluated on a regular basis by the RWC Project Manager<sup>2</sup>, with methods readjusted as necessary.

In the beginning of the Pilot phase, the RWC Project Manager will ensure that the required preparatory work is conducted and implementation arrangements are put in place according to the Project document.

At the end of the Pilot phase, the RWC Project Manager will prepare and submit a Project Final Report to P/RA, evaluating the performance of the Project, sustainability of results and documenting the experience. For this purpose, the RWC Project Manager will:

- Assess the Centre performance in terms of achievements as compared to the targets, as well as their sustainability; the assistance and benefits received by Members of the (sub)Region should be documented;
- Assess the Project financial management including allocation of funds (final status as compared to the initial budget);
- Draw lessons from the overall project management experience including stakeholders' engagement, monitoring and reporting system to feed into subsequent implementation project;
- Describe the measures put in place to ensure continuity of the Centre in operational mode, as appropriate.

Upon successful completion of the Pilot phase and based on the respective positive assessment of the management group of the RA, P/RA will contact the Secretary General of WMO with a request for formal designation of the candidate as WMO RWC, providing documentation on the assessment of the capability to meet requirements of the designation criteria.

## 6. RISK ASSESSMENT/MANAGEMENT

The main risks, how they might affect the RWC operations and WIGOS as a whole, and possible mitigation measures should be considered. The level of risk should be assessed (low, medium, high) for each type of risk. Typical risk factors include:

- (a) Political/institutional risks, such as low political commitment to the Project, interest from stakeholders, change in government, etc.;
- (b) Financial/resources risks, e.g. inadequacy of the financial management system, availability of project resources;
- (c) Human resources/capacity risks, e.g. skills and/or expertise availability; adequacy between existing and required experience and specialized skills;

The Risk Management Plan will be developed for each implementation activity/sub project, including risk mitigation.

## 7. GOVERNANCE, MANAGEMENT AND EXECUTION

The Project management (i.e. RWC Project Manager, Project Executive) should work closely with the P/RA, management group and relevant WIGOS working body of the RA, WMO Secretariat (OBS Department), and other WMO related entities.

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<sup>1</sup> Geographical/economical/linguistic region for which the RWC functionalities are offered

<sup>2</sup> RWC Project Manager is the expert proposed by the RWC candidate

## **8. MONITORING AND EVALUATION**

The RWC Project Manager has the routine responsibility for management, coordination, monitoring and evaluating the Project, and for reporting to Executive Management of the organization under which the RWC is framed.

He is also responsible for updating the procedures and practices if and when needed. The monitoring and evaluation process should demonstrate the progress achieved as well as identify risks, encountered problems and difficulties, and the need for adjustment of the Project accordingly.

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### **Annex 1**

#### **Annex to Decision 30 (EC-68)**

##### **CONCEPT NOTE ON ESTABLISHMENT OF WMO REGIONAL WIGOS CENTRES**

###### **Background**

Many WMO Members are already now requesting guidance and support for their WIGOS implementation efforts. It is clear that such support can be provided more efficiently and effectively via a regional support structure rather than through direct interaction between the WMO Secretariat and individual Members. A network of Regional WIGOS Centres (RWCs) is needed to assist WMO Members in their endeavour to successfully implement WIGOS at the national and regional levels.

There is a clear understanding that the Regions differ and that the generic concept described below will have to be adjusted further in order to address specific needs, priorities, challenges and available technical and human resources of the respective Region.

###### **Purpose**

Under the governance and guidance of the management group of the respective regional association and with the support of relevant regional working bodies, the overall purpose of the RWCs is to provide support and assistance to WMO Members and Regions for their national and regional WIGOS implementation efforts.

###### **Basic Principles**

WMO should, wherever possible, encourage the existing WMO regional centres to carry out the new activities, thus ensuring optimization of technical and human resources. Already existing structures and mechanisms should be considered when implementing WIGOS at the regional and national levels, including their potential roles in RWCs. Every effort must be made to avoid any duplication with responsibilities and functionalities of already existing WMO Regional Centres; instead, possible synergies with them must be exploited.

Existing geographic, cultural and linguistic differences within each WMO Region must be taken into account in determining the appropriate establishment and models of operation of RWCs. Therefore, the respective regional association must decide on its own mechanism for how to establish its RWCs with clearly specified Terms of Reference in line with guidance by ICG-WIGOS, reflecting its needs, priorities and existing capabilities and facilities. The relevant WIGOS working body in the Region (generally the Regional Task Team on WIGOS) should be involved in the process of establishing the RWC and have general oversight once it has become operational.

###### **Links to other WMO entities**

The RWCs will work closely both with the WMO Secretariat (including Regional Offices) and with their respective regional working bodies to ensure efficient and effective implementation of WIGOS. The RWCs will liaise with relevant existing WMO Centres, in particular with the Regional Instrument Centres (RICs), Regional Climate Centres (RCCs) and Regional Training Centres (RTCs) regarding all WIGOS related activities in the Region.

## Functionalities

Basic functions of the RWC must be regional coordination, guidance, oversight and support of WIGOS implementation and operational activities at the regional and national levels (day-to-day level of activities). A number of mandatory and optional functions are specified.

### Mandatory functions

The proposed mandatory functions are directly linked with two of the priority areas of the WIGOS Pre-operational phase (2016-2019):

1. Regional WIGOS metadata management (work with data providers to facilitate collecting, updating and providing quality control of WIGOS metadata in OSCAR/Surface);
2. Regional WIGOS performance monitoring and incident management (WIGOS Data Quality Monitoring System) and follow-up with data providers in case of data availability or data quality issues.

### Optional functions

Depending on available resources and regional needs, one or more optional functions may be adopted, e.g.: (a) assistance with the coordination of regional/sub-regional and national WIGOS projects; (b) assistance with regional and national observing network management; and (c) support for regional capacity development activities.

### Implementation options and roadmap

In principle, each Member of any given Region should be covered by an RWC which will be responsible for providing WIGOS support. The RWCs may be implemented either centrally, at an overall regional level where a Member or a consortium of Members provide support for the entire Region, or at sub-regional level, e.g. aligned with the natural geographic or linguistic boundaries existing within the Region.

RWCs may be implemented either as monolithic entities, with a single Member taking on the responsibility for the entire set of required functionalities, or as virtual Centres, in which a consortium of Members share these responsibilities between them under the overall coordination of a lead organization.

The following key items with milestones are proposed in the Plan for the WIGOS Pre-operational phase:

- (a) Establishment of one or more Regional WIGOS Centres in pilot mode from 2017,
- (b) Operational phase of initial Regional WIGOS Centres beginning mid-2018,
- (c) Establishment of Regional WIGOS Centres covering all WMO Regions by 2019.

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## Annex 2

### APPLICATION TEMPLATE FOR A RWC CANDIDATE

An agency or organization that wishes to be considered for WMO designation as an RWC will make this known to the president of the respective WMO Regional Association in writing through, and with the endorsement of, the Permanent Representative with WMO of the country in which the candidate RWC is situated.

The written communication should comprise a **letter of intent** that clearly states candidate's willingness and ability to provide RWC functionalities with an **annex** providing the following information (applies also to individual members of a virtual RWC which will collectively fulfil the RWC functions):

1. Name of the Country, WMO Regional Association, name of the Organization and full address.

2. Affiliation (sponsors, stakeholders, partnering agencies, etc.) at the global, regional and national levels.
3. Mandate of the Centre relevant to WIGOS activities (mandatory and optional functions).
4. Liaison with relevant existing WMO centres, particularly regional centres.
5. Website relevant to the Centre with WIGOS relevant activities.
6. Current operational activities relevant to the RWC application (structured along the mandatory and optional RWC functions).
7. Staff deployment/human resources relevant to RWC-related activities (management, scientific, technical and administrative categories).
8. Description of current facilities, the necessary basics, physical infrastructure and communication systems relevant to RWC mandatory and optional functions.
9. Funding strategy to ensure the long-term sustainability of the RWC.
10. Geographical/economical/linguistic region for which the RWC functionalities are offered.
11. Type of RWC (a single multifunctional RWC or as a virtual/distributed RWC (RWC-network) provided by a group of Members).
12. Proposed RWC Project Manager (name, position, contacts; CV).
13. Stakeholders engaged in the current and planned RWC operations.
14. Relevant National Focal point(s).
15. Project proposal:
  - Prepared by (name, position),
  - Approved by (name, position),
  - Project Executive (name, position),
  - RWC Terms of reference,
  - Implementation period,
  - Project budget,
  - Funding sources,
  - List of activities, deliverables, outcomes, milestones, resources required and associated risks,
  - Additional documentation demonstrating the experience and the capacity of the candidate organization to fulfil the described functions.
16. Additional information as appropriate.

**References:**

- 1) Seventeenth World Meteorological Congress: Abridged final report with resolutions (WMO-No. 1157; <http://library.wmo.int/>)
  - 2) Executive Council - Sixty-eighth session: Abridged final report with resolutions (Resolution 2 and Decision 30; WMO-No. 1168; <http://library.wmo.int/>)
  - 3) Project Management Guidelines and Handbook: Part I – Project Management Guidelines, Part II – Project Management Handbook ([http://library.wmo.int/pmb\\_ged/2016\\_wmo\\_project-management-guidelines-handbook\\_en.pdf](http://library.wmo.int/pmb_ged/2016_wmo_project-management-guidelines-handbook_en.pdf))
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**Decision 13 (RA II-16)****PILOT REGIONAL BASIC OBSERVING NETWORK IN REGIONAL ASSOCIATION II**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 4 (RA II-15) – Regional Basic Synoptic Network and Regional Basic Climatological Network in Region II,
- (2) 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,
- (3) Decision 21 (CBS-16) – Regional Basic Observing Network concept,
- (4) Resolution 2 (EC-68) – Plan for the WMO Integrated Global Observing System pre-operational phase 2016-2019,

**Recognizing:**

- (1) The need to integrate the Regional Basic Synoptic Network (RBSN) and the Regional Basic Climatological Network (RBCN) into the future Regional Basic Observing Network (RBON) and include additional observing stations into the RBON in order to reflect its multi-disciplinary nature in support of all WMO application areas,
- (2) That standards and recommendations for implementation of the RBON will be incorporated into a new edition of the *Manual on the WMO Integrated Global Observing System* (WMO-No. 1160) in 2019,
- (3) That the RBON will lead to improved services by delivering more and improved observations to stakeholders, and enable the full benefit of regional observing capabilities to be realized,

**Having considered:**

- (1) That the stations/platforms currently comprising the RBSN and RBCN are the primary candidates for the RBON, and are expected to constitute the backbone of the RBON,
- (2) The need to facilitate a transition from RBSN and RBCN to the future RBON through a pilot project,

**Decides** to establish a pilot RBON for RA II, comprised initially of the merging of all RBSN and RBCN stations of RA II;

**Invites** Members of RA II to consider proposing inclusion of additional surface-based observing stations in the pilot RBON for RA II, such as weather radars, wind profiler systems, lightning detection systems, data buoys, voluntary observing ships and aircraft;

**Requests** the RA II Working Group on WIS and WIGOS to review the candidate RBON stations proposed by Members, taking into account the criteria for the additional selection of surface-based stations/platforms into RBON, together with those defined in the Regional Basic Observing Networks Concept Paper, and to make recommendation to the president of the Association for including them in the pilot RBON for RA II;

**Authorizes** the president of the Association to approve, in consultation with the Secretary-General, amendments to the list of the pilot RBON stations for RA II proposed by the RA II Working Group on WIS and WIGOS, in accordance with the RBON Concept, and to monitor the Members' implementation of the network in compliance with the RBON Concept.

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### Decision 14 (RA II-16)

#### RADIO-FREQUENCY MATTERS IN REGIONAL ASSOCIATION II

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 29 (Cg-17) - Radio frequencies for meteorological and related environmental activities,
- (2) Decision 36 (EC-68) - Preserving the radio-frequency spectrum for meteorological and related environmental activities at the World Radiocommunication Conference 2019,
- (3) Decision 22 (CBS-16) - Preserving the radio-frequency spectrum for meteorological and related environmental activities at the World Radiocommunication Conference 2019,

**Recognizing:**

- (1) That RA II incorporates three ITU regional bodies that coordinate radio frequency regulatory material and national applications of radio frequency matters, in particular, the Regional Commonwealth in the Field of Communications (RCC), Asia-Pacific Telecommunity (APT) and the Arab Spectrum Management Group (ASMG),
- (2) That the CBS Steering Group on Radio Frequency Coordination (SG-RFC) is the main WMO body working within the International Telecommunication Union (ITU) infrastructure and other organizations such as the Space Frequency Coordination Group (SFCG) and Coordination Group on Meteorological Satellites (CGMS),
- (3) That although RA II is represented in SG-RFC, RCC and APT, there has been little representation from the Arab region of RA II, specifically no representation from RA II Members who can represent the ASMG,

**Decides** to support the work of CBS SG-RFC in order to ensure all RA II spectrum issues related to observation and communication systems are addressed by SG-RFC;

**Invites** Members of RA II to consider proposing experts to represent WMO as a part of the SG-RFC in ITU regional groups APT, ASMG and RCC;

**Requests** the RA II Working Group on WIS and WIGOS to monitor radio frequency matters, in particular those relating to the upcoming World Radiocommunications Conference 2019 (WRC-19);

**Requests** the Secretary-General to facilitate the participation and representation of RA II NMHS experts in radio frequency coordination matters, including the SG-RFC.

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**Decision 15 (RA II-16)****THE WMO INFORMATION SYSTEM**

REGIONAL ASSOCIATION II (ASIA),

**Recalling** Resolution 27 (Cg-XV) that called for all NMHSs to have implemented WMO Information System (WIS) functionality by 2015,

**Recognizing** the initiatives of GISCs Beijing, Jeddah, Seoul, Tehran and Tokyo in conducting training on WIS for RA II Members including on using GISC interfaces,

**Acknowledging** that access to operational and time critical information through the WIS is a fundamental necessity for all NMHS basic functions; and supports Priorities 1 and 4 of the Sendai Framework relating to “Invest in, develop, maintain and strengthen people-centred multi-hazard, multisectoral forecasting and early warning systems, disaster risk and emergency communications mechanisms, social technologies and hazard-monitoring telecommunications systems”,

**Having examined** the RA II WIS Implementation Plan (V1.1 of 2015),

**Noting** that:

- (1) A NMHS can be considered to have implemented WIS once it has taken on management of its Discovery Metadata and the metadata are published in the WIS metadata catalogue,
- (2) The 2016 survey of National WIS focal points showed positive progress in implementing WIS nationally with 70 per cent of RA II responses reporting that at least some WIS functionality had been implemented and 75 per cent of responses indicated some corporate knowledge of WIS,
- (3) Developing and sustaining WIS competencies in NMHSs is essential for enabling both completion of WIS implementation and WIS operations at the national level,
- (4) The *Guide to WMO Information System* (WMO-No. 1061) paragraph 6.2.3 states that “Each GISC should develop and provide training courses with reference to the WIS competencies and the WIS Training and Learning Guide to meet the capacity-development requirements of the countries in the centres area of responsibility”,
- (5) Appendix B of Volume I (WMO-No. 49) *General Meteorological Standards and Recommended Practices* describes Regional Training Centres as “Providing education and training opportunities for WMO Members, particularly staff of National Meteorological and Hydrological Services (NMHSs)”,
- (6) Resolution 33 (Cg-17) requested CBS to lead in developing guidance and standards to support good information management practice,

**Decides** that the completion of WIS implementation at all NMHSs is a regional priority under Expected Result 4;

**Endorses** the initial training programme as listed in the Annex to this decision;

**Requests** GISCs and RTCs serving Members in the Region to support the development of WIS competencies through the provision of WIS-related training, including “train the trainer” competencies to allow trainees to pass on their WIS knowledge and skills to their colleagues;

**Requests** the RA II Expert Group on WIS:

- (1) To update the RA II WIS Implementation Plan and to monitor progress on WIS implementation by NMHS including issues of certification of WIS national centres;
- (2) To update the training programme as part of the RA II WIS Implementation Plan, to facilitate the implementation, monitoring and planning of training activities;
- (3) To liaise with CBS on the regional needs and aspects of information management relevant to the development and implementation of WIS Part C;

**Requests** the Secretary-General to support the work of RA II management group and expert group on WIS in their activities;

**Urges** Members:

- (1) To complete WIS implementation and to work with each other and their Principal GISC to assist those NMHSs that have not been able to do so to implement WIS;
- (2) To review their nominated focal points as listed in the Country Profile Data Base or at <http://wis.wmo.int/page=RA2-WIS> relating to WIS in the light of the terms of reference provided in the annex to Decision 3.4(1)/1 (CBS-16);
- (3) To encourage the participation of their national WIS focal points in the development of WIS Part C in line with Decision 38 (EC-68) to ensure national and regional requirements are incorporated;

**Reminds** Members that their systems and processes have to work with Table Driven Code Forms (TDCF) and that some operational weather information will only be available in TDCF.

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## Annex to Decision 15 (RA II-16)

## THE WMO INFORMATION SYSTEM

## Proposed WIS training activities for 2017 to 2020

Title	Proposed Quarter and Year	Centre(s) providing Training	Targeted WIS competencies	Targeted participants and expected pre-existing capabilities	Supported languages	Justification and expected outcome	Required sponsorship
Information and Communication Technologies for Meteorological Services	Q4/Every Year	RTC Korea GISC Seoul	3 ,4	Junior or mid-level Meteorologists or Meteorological Technicians engaged in ICT sector  General knowledge of ICT area	En.	Developing WIS knowledge and helping WIS implementation in national level  *WIS training course (1-2day) is included as a part of 'ICT for meteorological services' curriculum.	Republic of Korea will fund whole expenses for all trainees.
Managing Discovery Metadata	Q3/2019	GISC Moscow	4, Training Fundamentals	WIS trainers from Centres in GISC Moscow area of responsibility (10 country)  Participants will be expected to have a broad knowledge of information processes in their organization.	Ru.	GISC Moscow infrastructure is available but centres need to know how to use and benefit from this interface. Participants will be trained in training techniques necessary to train other staff in their centre. The course will have some pre-course activities and follow up assessment	The country will provide trainers, equipment, teaching aids and training venue. Additional funds will be needed for one trainee from each country for travel, accommodation and meals.
Trainings on using WIS and CMACast integrated system	2017 / 2018 / 2019 / 2020	GISC Beijing	3, 4; Manage and use CMACast integrated system.	Users of CMACast systems	En.	During 2017-2020, CMA will send experts to 3-5 countries each year to provide on-site trainings on using the services of GISC Beijing, as well as on maintenance and using CMACast integrated system.	CMA will fund the on-site trainings.

Title	Proposed Quarter and Year	Centre(s) providing Training	Targeted WIS competencies	Targeted participants and expected pre-existing capabilities	Supported languages	Justification and expected outcome	Required sponsorship
International Training Course on Satellite Applications, with a focus on FY-4	Q2/2018	GISC Beijing and CMA DCPCs		Members of RA II and V	En.	Help CMACast users to use FY-4 satellite products, and discuss how to use FY4 satellite products better to improve the ability of weather forecasting.	
Managing Data Flow and Discovery Metadata  (tentative)	Q3/2018	RTC China,  GISC Beijing	3,4	WIS trainers from Centres within GISC Beijing's area of responsibility	En.	GISC Beijing infrastructure is available but centres need to know how to use and benefit from this interface. Participants will be trained in training techniques necessary to train other staff in their centre.	
5th WIS Workshop  6th WIS Workshop	Q4/2018  Q4/2020	GISC Tokyo	1, 2, 3, 4, 5	Trainees from countries in GISC Tokyo AoR. Participants will be expected to have a broad knowledge of information processes in their organization.	En.	GISC Tokyo's infrastructure is available but centres need to know how to use and benefit from this interface.  Participants will be able to improve their service level to provide its users with stable data provision; also participants will be trained in training techniques necessary to train other staff in their centre.	Japan will fund the training, including two trainees from each country and guest lecturers.
Onsite training and technical support	Every year  (3-4 countries in a year)	GISC Tokyo	1, 2, 3, 4, 5	Experts and operation staffs of the centre in GISC Tokyo AoR.  Participants will be expected to have a knowledge of system and network configuration	En.	Each country has different level of skill and knowledge, and faces different challenges. This will help them with tailored technical support.	Japan will fund the training and JMA will send experts to each country.

**Decision 16 (RA II-16)****FURTHER IMPLEMENTATION OF THE WMO STRATEGY FOR SERVICES DELIVERY AND HARMONIZATION OF SERVICE DELIVERY IN REGIONAL ASSOCIATION II**

REGIONAL ASSOCIATION II (ASIA),

**Mindful** that delivering essential meteorological, climatological, and hydrological services, saves lives and livelihoods, improves the quality of life and enhances national economies, and that effective service delivery increases the credibility and support of NMHSs by governments;

**Recalling:**

- (1) Resolution 2 (Cg-17) - Implementation of the WMO Strategy for Service Delivery,
- (2) Resolution 1 (RA II-15)-Implementation of the WMO Strategy for Service Delivery in Regional Association II (Asia),
- (3) Decision 42 (EC-68)- Implementation of the WMO Strategy for Service Delivery, through which EC requested the Commission for Basic Systems (CBS) to identify a mechanism to coordinate and guide the implementation of the Strategy as requested by Congress (Resolution 2, Cg-17) and make proposals in this regard to EC-69,

**Acknowledging** the urgent need for WMO to focus on and assist Members to raise the levels of service delivery by their NMHSs,

**Recognizing** that while there may be differences in the particular areas of focus of different types of services, a harmonized approach to the accepted principles of high-quality service delivery needs to be adopted, and that in order to provide the required assistance to Members, service delivery as a discipline should be mainstreamed into the activities of WMO,

**Recognizing further** that there is a need to deliberate on how best to address requirements related to service delivery identified by WMO Programmes in order to provide guidance and support to Members on issues related to consistent delivery of operational services,

**Agrees** that the PWS and underpinning observing capabilities of Members need to be upgraded and strengthened on a continuous basis to cope with the optimum delivery of new services, ranging from day-to-day operations to providing guidance informing decision-makers and policymakers on longer timescales;

**Considers** that collaboration among Members of RA II on establishing mechanisms and structures that promote the fundamentals of good service delivery across all aspects of their work would greatly assist progress in this area;

**Decides:**

- (1) To endorse the critical areas of focus in implementing the WMO Strategy for Service Delivery as provided in the Annex;
- (2) To develop collaborative arrangements among Members in the Region and across other Regions to further build on the experiences and tools developed within the PWS Programme over the last decade, such as the World Weather Information Service (WWIS), Severe Weather Information Centre (SWIC), Common Alerting Protocol (CAP) and impact-based forecast and warning services, for enhanced delivery of services to Members;

**Urges** Members in RA II, with the support of the Secretariat, to implement the Strategy as a cross-cutting framework to significantly improve the delivery of weather, climate and hydrological services, thus contributing to more effective outcomes of their key national activities such as Public Weather Services (PWS), Global Framework for Climate Services (GFCS), Disaster Risk Reduction (DRR) and Quality Management Framework (QMF);

**Requests** the Secretary-General:

- (1) To facilitate and support the achievement of a WMO-wide approach to service delivery;
- (2) In view of the enthusiastic response by those Members who have received in-country training piloted by the PWS Programme, to support Members, especially in developing countries and LDCs, to improve their service delivery levels as defined in the Strategy, through a similar in-country training approach as well as through RTCs by encouraging them to actively engage in providing the trainings to meet the needs of those members.

### **Annex to Decision 16 (RA II-16)**

#### **IMPLEMENTING CRITICAL AREAS OF FOCUS IN THE WMO STRATEGY FOR SERVICE DELIVERY**

The Association recognizes the following as areas of particular focus in the implementation of the Strategy as identified by Cg-17:

1. Function-based areas:
  - (a) Impact-based forecasting and risk-based warning (Resolution 2 (Cg-17));
  - (b) Quality Management Framework (QMF);
  - (c) Competency framework for PWS forecasters and advisors;
  - (d) Provider-user partnership framework;
  - (e) Capacity-building; and
  - (f) Big data sourcing and application for service delivery.
2. Thematic areas:
  - (a) Megacities and large urban complexes;
  - (b) The agricultural sector for food security;
  - (c) The health sector, building on experience of past projects by the Public Weather Services Programme;
  - (d) The energy sector for the efficient operation, energy management, and generation of renewable energies;
  - (e) The water sector in the context of hydrological services;
  - (f) Climate services through the Climate Services Information System (CSIS) implemented by the Commission for Climatology (CCI) in close collaboration with CBS;



- (g) Meteorological services for aviation;
  - (h) Land transport; and
  - (i) Marine meteorological services for safety of life at sea and vulnerable populations on coasts.
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### Decision 17 (RA II-16)

#### REGIONAL ACTIVITIES IN AERONAUTICAL METEOROLOGY

REGIONAL ASSOCIATION II (ASIA),

**Recalling** the advice and directives given by Congress to Members and regional associations in Resolution 3 (Cg-17) - Aeronautical Meteorology Programme, and Resolution 66 (Cg-17) - WMO support to evolving Aeronautical Meteorological Services,

**Recalling further** Decision 43 (EC-68) - Action Plan - Meteorological Services for Aviation, outlining priority activity areas aimed at enhancing Members' compliance with ICAO and WMO requirements,

**Recognizing** the role of the regional associations in monitoring the status of compliance of their Members and identifying their needs for implementation support and assistance,

**Recognizing further** the significance of the on-going developments in the air transport sector, including those envisaged in the ICAO Global Air Navigation Plan (GANP) and its Aviation System Block Upgrades (ASBU) methodology, and the need to assess their impacts on Members' aeronautical meteorology service provision arrangements,

**Acknowledging** that a structured and coordinated regional cooperation effort is needed for finding sustainable solutions to existing shortcomings and deficiencies in the provision of meteorological services to the aviation stakeholders (airlines, airports, air traffic management, etc.),

**Agrees** that the activities in aeronautical meteorology of the RA II Members during the current WMO financial period should be focused on the following implementation areas:

- (1) Enhanced SIGMET information provision through regional cooperation;
- (2) Compliance with the requirements for QMS in the provision of aeronautical meteorological services;
- (3) Compliance with competency and qualification requirements for aeronautical meteorological personnel;
- (4) Planning for migration to the ICAO Meteorological Information Exchange Model (IWXXM) for the exchange of operational aeronautical meteorological information;
- (5) GANP and ASBU awareness and related national and regional planning;
- (6) Focused assistance to individual Members, or groups of Members, in strengthening their institutional arrangements and business models, including cost recovery mechanisms;

**Endorses** the Guidelines for conducting regional activities in aeronautical meteorology during the financial period 2016–2019 provided in the Annex;

**Endorses** the proactive role of all Members and experts of RA II in improving aviation meteorology according to WMO Strategic Plan and ICAO GANP and ASBU;

**Endorsing further** important subregional activities (including per linguistic groups) and demonstration projects on development of aviation meteorology in different perspective aspects on the basis of initiatives proposed by countries such as Hong Kong, China and Russian Federation;

**Requests** the Management Group of RA II to utilize the Guidelines in including appropriate tasks on aeronautical meteorology in the regional operating plan;

**Requests** the president of the Commission for Aeronautical Meteorology (CAeM) to ensure expert support to aeronautical meteorology regional activities aimed at capacity development in the above implementation focus areas;

**Urges** RA II Members:

- (1) To provide regular updates on the status of their compliance with the ICAO and WMO requirements for the provision of aeronautical meteorological services, including any implementation difficulties thereof;
- (2) To utilize cooperative mechanisms, such as twinning, mentoring and sharing of expertise, in order to support those Members in need to resolve existing deficiencies in the provision of aeronautical meteorological services;
- (3) To strengthen the national institutional arrangements and business models, including the cost recovery mechanisms, through enhanced cooperation with civil aviation authorities and other concerned aviation stakeholders.

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## Annex to Decision 17 (RA II-16)

### GUIDELINES FOR CONDUCTING REGIONAL ACTIVITIES IN AERONAUTICAL METEOROLOGY DURING THE FINANCIAL PERIOD 2016–2019

#### 1. Introduction

1.1 The [WMO Strategic Plan 2016-2019](#) (WMO-No. 1161) includes a key priority on aviation meteorological service:

***Aviation meteorological services:*** *Improve the ability of Members to provide sustainable high quality services in support of safety, efficiency and regularity of the air transport worldwide, with due account to environmental factors by:*

- (a) accelerating the implementation of ICAO / WMO competency and qualification standards and Quality Management System (QMS);*
- (b) addressing the emerging institutional and technological challenges associated with the ICAO Global Air Navigation Plan; and*
- (c) strengthening the sustainability and competitiveness of aeronautical meteorological service provision through improved cost recovery mechanisms and suitable business models for service delivery frameworks.*

1.2 The ICAO Meteorology Divisional Meeting (MET/14) which was held conjointly with the fifteenth session of the Commission for Aeronautical Meteorology (CAeM) in July 2014 provided directives for the future of the aeronautical meteorological service provision aligned with the GANP and its ASBU methodology. Currently, a number of concepts of operations, roadmaps and other related plans are being developed in close cooperation between ICAO and WMO in order to ensure the integration of the aeronautical meteorological information into the future globally interoperable, harmonized air traffic management (ATM) environment. At the same time, an enhanced culture of compliance by WMO Members, including the resolution of some long-standing deficiencies, is called for in order to meet the users' requirements for quality meteorological information in support of their operations (decision-making).

1.3 Regional associations, in coordination with CAeM, could support and promote the on-going efforts for enhanced meteorological services to aviation by streamlining the Members' activities in line with the agreed priority areas and promoting bilateral and multilateral regional cooperation mechanisms and actions among their Members. Resolving the existing deficiencies and raising the collective capacity of Members in aeronautical meteorological service provision are the desired outcomes of the regional cooperative approach.

## **2. Effective and efficient regional activities to support the aviation meteorology priority area**

### *2.1 Enhanced SIGMET information provision through regional cooperation*

- Promote cooperation among RA II Members on a bilateral and multilateral basis to ensure consistency of the SIGMET information across the boundaries of the flight information regions (FIR). Utilize the experience gained through SIGMET coordination initiatives and projects in other WMO Regions;
- Address existing deficiencies in SIGMET provision through appropriate twinning or other such arrangements between Members including the allowance given by ICAO Annex 3/WMO-No. 49, *Technical Regulations, Volume II* for the delegation of meteorological watch office responsibilities from one Member State to another Member State.

### *2.2 Compliance with the requirements for QMS in the provision of aeronautical meteorological service*

- Facilitate smooth migration from the ISO 9001:2008 to the ISO 9001:2015 QMS standard for those Members that have already implemented QMS; promote information and expertise sharing among Members and consider training needs;
- For those Members that have not completed the implementation of QMS in the provision of aeronautical meteorological service, provide further capacity development support (e.g., through projects, twinning, training).

### *2.3 Compliance with competency and qualification requirements for aeronautical meteorological personnel*

- Ensure that all Members have established their competency and qualification assessment programmes;
- Undertake continuous compliance monitoring and identification of needs for assistance in developing Members' capacity for competency and qualification assessment.

### *2.4 Planning for migration to the ICAO Meteorological Information Exchange Model (IWXXM) for the exchange of operational aeronautical meteorological information*

- Monitor the preparedness of Members and the needs for implementation support actions, in coordination with CAeM, CBS and relevant ICAO regional bodies.

2.5 *GANP and ASBU awareness and related national and regional planning*

- Support appropriate awareness activities for the Region on ICAO's GANP and its ASBU methodology, in liaison with relevant aviation stakeholders and partner organizations;
- Stimulate information sharing on national implementation programmes and achievements to build collective capacity for MET support to the planned air traffic management (ATM) enhancements.

2.6 *Focused assistance to individual Members, or groups of Members, in strengthening their institutional arrangements and business models, including cost recovery mechanisms*

- Identify and prioritize "hot spots" (Members, sub-regions) where immediate assistance is required;
- Assist Members to formulate their needs for fact-finding missions, projects and other capacity development actions;
- Facilitate collection and sharing of information on the existing best-practice institutional arrangements, business models and cost-recovery mechanisms.

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### Decision 18 (RA II-16)

#### STRENGTHENING OPERATIONAL AGROMETEOROLOGICAL ADVISORY SERVICES

REGIONAL ASSOCIATION II (ASIA),

**Recalling** Resolution 2 (CAgM-16) on the priorities (2014–2018) of the Commission for Agricultural Meteorology,

**Having considered** the report on the RA II Expert Group on Agrometeorology (EG-AGM) which is part of the RA II Working Group on Climate Services,

**Noting** also the importance of interaction among agricultural and meteorological stakeholders to identify needs and co-produce services, and the need for guidance in this respect, particularly as regards services involving crop yield forecasting and forest meteorology,

**Endorses** the recommendations from the report of the RA II Expert Group on Agrometeorology (EG-AgM), on strengthening operational agrometeorological services in Regional Association II;

**Requests** Members to contact the Secretary-General to assist them in strengthening their operational agrometeorological services and in developing any project proposals.

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### Annex to Decision 18 (RA II-16)

#### RECOMMENDATIONS FROM THE REGIONAL ASSOCIATION II EXPERT GROUP ON AGROMETEOROLOGY ON STRENGTHENING OPERATIONAL AGROMETEOROLOGICAL SERVICES

The following recommendations are made to strengthen operational agrometeorological services in Regional Association II:

- Developing agrometeorological forecasting centres;
- Developing forest meteorology, predicting yield/biomass before planting;
- Studying sand movement or desertification elements;
- Using AMS for measuring climatic elements and soil moisture;
- Measuring evapotranspiration;
- Establishing the domestic infrastructure of a flux measurement network;
- Developing agrometeorological models for crop growth and development and evaluate the agrometeorological environment using the agrometeorological advice model "AMBER";
- Integrating agrometeorological information services;
- Collaborating with the World Agrometeorological Information System (WAMIS);
- Cooperating with the International Society of Agricultural Meteorology (INSAM);
- Strengthening agrometeorology networks including station density, fine equipment, and capacity-building;
- Providing more detailed agrometeorology information;
- Developing the infrastructure of the information network to transfer agrometeorological information to farmers more easily and faster.

### Decision 19 (RA II-16)

#### ENHANCING NATIONAL AND REGIONAL DROUGHT MONITORING SYSTEMS

REGIONAL ASSOCIATION II (ASIA),

**Recalling** Resolution 1 (CAgM-16) on the Integrated Drought Management Programme (IDMP),

**Noting** the need to move from a reactive to proactive approach to drought management, based on risk management principles as stated in the Final Declaration of the High-level Meeting on National Drought Policy (HMNDP),

**Noting also** the development of the Global Drought Information System which aims to promote regional drought monitoring products,

**Having considered** the report on the RA II Expert Group on Agrometeorology (EG-AgM) which is part of the RA II Working Group on Climate Services,

**Encourages** Members to liaise and inform the WMO Secretariat on their national or regional drought monitoring and early warning systems;

**Requests** the Secretary-General to liaise with Members on further developing national and regional drought monitoring systems.

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## Decision 20 (RA II-16)

### REGIONAL ACTIVITIES IN MARINE METEOROLOGY

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Resolution 2 (Cg-17) – Implementation of the WMO Strategy for Service Delivery,
- (2) Decision 12 (EC-68) – Met-Ocean forecasting and warnings, outlining priority actions for Members in the implementation of WWMIWS, the implementation of competency standards for marine forecasting and the further strengthening of Met-Ocean forecasting services in alignment with the WMO services delivery strategy,

**Recalling further:**

- (1) The discussions at Cg-17 for marine activities to be more prominent in the WMO Strategic Plan, based on the fact that many coastal Members lack a sufficient marine meteorological forecasting service, without which human lives are unnecessarily lost,
- (2) The delivery of the World Wide Met-Ocean Information & Warnings Service (WWMIWS) and the introduction of METAREAS and METAREA Coordinators as a function of the Global Maritime Distress & Safety System (GMDSS),

**Recognizing** that the overall technical guidance and governance for MMOP is provided by the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), jointly sponsored by WMO and the Intergovernmental Oceanographic Commission (IOC) of UNESCO,

**Recognizing further:**

- (1) The requirement by Cg-17 to introduce impact-based services into the marine sector, whilst ensuring that services continue to meet requirements outlined in the International Convention for the Safety of Life at Sea (SOLAS),
- (2) The role of the regional associations in monitoring the status of compliance of their Members and identifying their needs for implementation support and assistance,

**Agrees** that the activities in marine meteorology of the RA II Members during the current WMO financial period should be focused on the following implementation areas:

- (1) Strengthening Met-Ocean forecasting services including the delivery of WWMIWS including ensuring, as appropriate;

- (a) The identification of METAREA Coordinators;
  - (b) The nomination of Marine Focal Points for Members' domestic coastal services;
- (2) Supporting the introduction of competency standards into marine forecasting and supporting compliance to these standards within their NMHS;
  - (3) Supporting the development of multi-hazard, impact-based services in the marine sector by working with the Coastal Inundation Forecasting Demonstration Project (CIFDP) and to account for inundation, Tsunami and storm surge and impact assessment due to sea-level rise and saline ingress and coastal zones including shoreline changes;

**Requests** the Management Group of RA II:

- (1) To utilize the Guidelines in establishing appropriate tasks on marine meteorology in the regional operating plan;
- (2) To reconsider the roles of the various Marine-related structures and programmes under the auspices of WMO in supporting provision of services in coastal areas;
- (3) To advance the establishment of an Expert Group on Marine Meteorological Services;

**Requests** the presidents of the Joint Commission for Oceanography and Marine Meteorology (JCOMM) to ensure expert support to marine meteorology regional activities aimed at capacity development in the above implementation focus areas;

**Urges** Members:

- (1) To provide regular updates on the status of their compliance with the WWMIS and WMO requirements for the provision of marine meteorological services, including any implementation difficulties thereof;
- (2) To utilize cooperative mechanisms, such as mentoring and sharing of expertise, in order to support those Members in need to resolve existing deficiencies in the provision of marine meteorological services;
- (3) To provide a list of Marine Focal Points for their domestic and coastal services.

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### Decision 21 (RA II-16)

#### DEVELOPMENT OF THE ASIA HIGH-MOUNTAIN GLOBAL CRYOSPHERE WATCH OBSERVING NETWORK

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Decision 50 (EC-68) - Development of the Global Cryosphere Watch,
- (2) Decision 51 (EC-68) - High-mountain activities,
- (3) Resolution 40 (Cg-17) - WMO polar and high mountain activities,
- (4) Resolution 43 (Cg-17) - Global Cryosphere Watch,

- (5) Recommendation 40 (CBS-16) – Development of the Global Cryosphere Watch,
- (6) The final report of the fourth Session of the Executive Council Panel of Experts on Polar Observations, Research and Services (EC-PORS-4), Lanzhou, China, 13-16 March 2013;
- (7) The final reports of the first and second sessions of the GCW CryoNet Asia Workshops, Beijing, China, 3-5 December 2013, and Salekhard, Russian Federation, 2-5 February 2016 respectively,

**Recognizing:**

- (1) The growing demand by society and especially by scientific communities for sustained observations from high-mountain regions, Cg-17 identified the activities in polar and high mountain regions as one of the seven WMO priorities,
- (2) That the cryosphere is an integrative element within the climate system and provides one of the most useful indicators of climate change, yet, it is arguably the most under-sampled domain,
- (3) That changes in the high-mountain cryosphere has direct impact on runoff and on water resources downstream, as a result, inter alia, of the shrinking of glaciers, changes in precipitation, and melting of snow and ice,
- (4) That the primary purpose of EC-PORS-4 was to acquire a better perspective on institutions engaged in cryospheric monitoring and research in the Hindu Kush - Himalayas and Tibetan Plateau;
- (5) That the Asia high mountain regions, the Hindu Kush-Himalayan and Tibetan plateau region, sometimes called the “Third Pole”, are increasingly affected by changes in climate, interrelated with changes in the cryosphere, increasing the risk of natural disasters such as glacier burst floods and mudslides,

**Acknowledging:**

- (1) That Resolution 40 (Cg-17) established the Executive Panel of Experts on Polar and High Mountain Observations, Research, and Services (EC-PHORS), and requested the regional associations and technical commissions to support the WMO polar and high-mountain activities,
- (2) That Resolutions 40 and 43 (Cg-17) and Resolution 51 (EC 68) requested EC to ensure close collaboration with partners concerning the mainstreaming and implementation of the Global Cryosphere Watch (GCW), as a cross cutting activity, including regarding the high mountain cryosphere,
- (3) That the GCW is a significant component of the WMO Integrated Global Observing System (WIGOS) and the WMO Information System (WIS), promoting interoperable and reference observations, and near real-time data and information exchange,
- (4) That Decision 51 (EC-68) endorsed the need to organize regional workshops on high mountain activities with the view of identifying sites for potential inclusion into the GCW observing network, and its core component, CryoNet, with attention to sites over 4000 m,

**Having considered:**

- (1) Recommendation 40 (CBS-16), requesting that Members contribute to the development of the CryoNet network, and that the regional associations consider relevant CryoNet stations for the Regional Basic Observing Networks (RBON);



- (2) The outcome and recommendations of EC-PORS-4, and of the two GCW workshops focusing on the high mountain areas of Asia (CryoNet Asia), and which recognized the need for increased density and quality of cryosphere observations:
- (a) EC-PORS-4 recognized the importance of the Third Pole region regarding availability of water resources in Asia;
  - (b) The first session of the CryoNet Asia Workshop focused on identifying goals and benefits for increasing observations in the high mountain regions of Central Asia;
  - (c) The second session of the CryoNet Asia Workshop identified a framework for establishing CryoNet stations in the high mountain regions of Central Asia, in particular at elevations over 4000 m, in cooperation with Members, other organizations and international agencies;

**Agrees** to endorse the urgent development of the GCW observing network, including CryoNet stations, in the high mountain regions of Asia, building upon existing observing networks;

**Approves** the proposed concept note regarding to the pilot project "Cryosphere monitoring to understand the trend of glacial hydrology of high Asia Mountains" as provided in the Annex to this decision;

**Requests** Members of RA II to:

- (1) Become actively engaged in the development and implementation of the GCW observing network, including identifying potential CryoNet stations in the high mountain areas of Asia;
- (2) Contribute to the development of the CryoNet network by archiving the data on their Data Centers, and making these interoperable with the GCW Data Portal;
- (3) Contribute to the development of the GCW Best Practices Guide and Manual, by sharing existing national practices for observing cryosphere components (e.g. snow, solid precipitation, glaciers, ice, permafrost), to ensure an accurate reflection and representativeness of regional practices;
- (4) Identify at least one GCW focal point for each Member not having nominated focal points yet for providing liaison with the GCW initiatives;

**Invites** Members of RA II to:

- (1) Actively participate, with cooperation of the research community if necessary, in the Year of Polar Prediction (YOPP) activities and particularly in its Special Observing Period (SOP) starting in 2018;
- (2) Establish partnerships in the Region with organizations having similar interests regarding the monitoring of the cryosphere in the high mountain regions of Asia;

**Invites** the WMO Commission for Hydrology, Commission for Basic Systems and Commission for Instruments and Methods of Observation to collaborate with GCW in defining the requirements for observations in the high mountain regions of Asia, and preparing the GCW Best Practices Guide and Manual;

**Recommends** to the Executive Council to continue its full support to the development and implementation of GCW, and the implementation of CryoNet Asia;

**Requests** the Secretary-General to provide adequately support to facilitate the execution of this Decision.

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**Annex to Decision 21 (RA II-16)****CONCEPT NOTE FOR THE PILOT PROJECT ON CRYOSPHERE MONITORING TO UNDERSTAND THE TREND OF GLACIAL HYDROLOGY OF HIGH ASIAN MOUNTAINS**

Project Title	<b>Cryosphere Monitoring to understand Trends of Glacial hydrology of High Asia Mountains</b>
Type	Regional Implementation Project (RA II)
Timescale	2017-2020
Background	Himalayas-Karakoram-Hindukush together possessed third largest ice mass after the polar regions. Six major Asian Rivers originate from HKH and feed about one billion human beings. Global warming has disturbed the precipitation pattern and accelerated the recession of glaciers ultimately making the river flows highly variable on one hand and increasing the risk of glacial outbursts on the other hand. Incursion of strong monsoon currents to the high mountains have made the understanding of the melting process even more complex. Flood forecasting models, in operation, are not tuned to this changing trend. There is a dire need to investigate the cryosphere dynamics backed by scientific evidence to incorporate in flood forecasting models.
Plan/Activities	This project will include following activities: <ol style="list-style-type: none"> <li>Monitoring the thermal and hydrological regimes to understand the melting process in diverse characteristic glaciated basins</li> <li>Studying the mass balance, shift in snowline, effect of debris cover, thinning of glaciers as well as ablation and accumulation zonal dynamics</li> <li>Horizontal and Vertical Profiling of solid and liquid precipitation as well as temperature</li> <li>Deposition of black carbon and impact on melting process</li> <li>Establishment of stakefarms, digging snow pits and measurement of velocity and extent of crevasses</li> <li>Investigating the formation of glacial lakes and their outburst mechanism</li> </ol>
Aim(s)	To incorporate the contribution of permafrost, snow and glacier melt contribution to the river discharges
Benefits	<ol style="list-style-type: none"> <li>Improvement of flood forecasting models</li> <li>Better assessment of seasonal water availability</li> <li>Provide sound basis for debris flow modelling, flow sediments to reservoirs, early warning system for Glacial Lake Outburst Floods (GLOF)</li> </ol>
Achievements in the previous period	Under UNDP project, PMD Pakistan has established Early Warning system for GLOF at three sites in HKH which is working successfully. However, no project has yet been launched for assessment of the changing cryospheric contribution to the river flows.
Player(s)	Coordinating Group: Pakistan Meteorological Department Participants: Afghanistan Met Department, CMA, Nepal Met Department
Global and Regional Partnership	Afghanistan, China, Nepal, and other interested countries and organizations (global, regional)
Relationship with existing	Global Cryosphere Watch (GCW)

framework/project (s)	
Expected Key Deliverables	Snow/glacier melt contribution will be incorporated in hydrological models to improve the flood forecasting system and assessment of the seasonal water availability
Major risk(s)	Lack of resources (funds/expertise)
Website	TBD
Project Coordinator	PMD (Pakistan)

## Decision 22 (RA II-16)

### INTERNATIONAL EXCHANGE OF SNOW DATA

REGIONAL ASSOCIATION II (ASIA),

#### Recalling:

- (1) Resolution 60 (Cg-17) –WMO policy for the international exchange of climate data and products to support the implementation of the Global Framework for Climate Services, that includes climate relevant cryospheric data, in particular snow cover and snow depth,
- (2) Decision 50 (EC-68), urging Members to exchange in situ snow measurements in real-time,

#### Recognizing:

- (1) The positive impact of snow depth data collected in Europe on NWP, using the BUFR template 3 07 101 (Snow observation), adopted by CBS-Ext.(2014),
- (2) That the cryosphere is an integrative element within the climate system and provides one of the most useful indicators of climate change, yet, it is arguably the most under-sampled domain,

#### Acknowledging:

- (1) The need for real-time access to in situ snow measurements to support future Polar and High Mountain Regional Climate Centres, as a tool of GFCS services provision,
- (2) That the Global Cryosphere Watch (GCW) is a significant component of the WMO Integrated Global Observing Systems (WIGOS) and the WMO Information System (WIS), promoting interoperable and reference long-term observations, and near real-time data and information exchange,

#### Having considered:

- (1) Recommendation 41 (CBS-16), recommending to the Executive Council to approve the amendment to the *Manual on the Global Observing System*, Volume I: Global Aspects (WMO–No. 544) by adding new provisions for the reporting of snow cover and snow depth from all stations where snow is experienced, and requesting Members to exchange in situ snow measurements in real-time in BUFR through GTS/WIS in accordance with the *Manual on the GOS* (WMO-No. 544),

- (2) The recommendations of the GCW Steering Group (GSG) at its fourth session (Cambridge, United Kingdom, 16-19 January 2017) to engage with the regional associations with the view to promote the exchange of snow data at the regional level,

**Requests** Members of RA II to:

- (1) Report snow cover and snow depth in accordance with the new provisions of the *Manual on the Global Observing System*, Volume I: Global Aspects (WMO–No. 544);
- (2) Assess for each station reporting internationally the period during which snow can be expected, and make sure that such information is recorded in OSCAR/Surface;

Requests the Secretary-General to provide adequate support to facilitate the execution of this Decision.

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### Decision 23 (RA II-16)

#### SEAMLESS DATA-PROCESSING AND FORECASTING SYSTEM

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Resolution 11 (Cg-17), to initiate a process for the gradual establishment of an enhanced integrated and seamless WMO Data-processing and Forecasting System, in light of the conclusions of the first World Weather Open Science Conference (WWOSC-2014, Montreal, Canada, August 2014),
- (2) That Cg-17 requested the Executive Council to formulate Terms of Reference for this process, and a description of the set of products the system should produce, for consideration by the eighteenth session of the World Meteorological Congress (Cg-18) in 2019,
- (3) Decision 55 (EC-68) to establish a Steering Group on Seamless Data-processing and Forecasting (following the request by Cg-17), chaired by the president of CBS and comprising representatives of technical commissions and regional associations, and the chairperson and co-chairperson of the CBS OPAG on Data-processing and Forecasting Systems (DPFS), with the main task to develop and table the implementation plan for consideration by EC-69,

**Noting with satisfaction** that to advance this initiative two expert meetings were held in Geneva in February and November 2016 with the latter attended by two representatives of RA II and which resulted in the development of a draft white paper and the outline of an implementation plan (see Annex),

**Acknowledging** that EC-68 (Decision 55) endorsed the vision for the Seamless Data-processing and Forecasting System (see Annex), and decided on the creation of a Steering Group on Seamless DPFS chaired by the president of CBS and comprising representatives of technical commissions and regional associations, and the chairperson and co-chairperson of the CBS OPAG on Data-processing and Forecasting System (DPFS), and that the Steering Group's main task is to complete the implementation plan for the process, for consideration by EC-69,

**Acknowledging further** that seamless spans over several dimensions including:

- (1) Time: (nowcasting, through weather forecasts for days and weeks ahead to long-range forecasts on seasonal and multi-annual scales),
- (2) Disciplines: (hydrology: flood, inundation, and water management; marine and coastal: wave and storm surge; air quality and sand and dust storm; natural resources, energy, tourism, transport, etc.),
- (3) Prediction: of non-weather-related elements, including the assessment of likelihood and probabilities of impacts and risks associated with hazards taking into account vulnerability and exposure information to support risk-based decision-making,

**Noting** the president of RA II has nominated experts to the Steering Group including Mr Yuki Honda and Mr Jaiho Oh, Republic of Korea. Additional interest of China by submitting Dr ZENG Qing as a candidate was recommended since Mr Honda was already included in the Steering Group as Chair of OPAC DPFS/CBS,

**Noting** that the revised *Manual on the GDPFS* (WMO-No. 485) was adopted by CBS-16 and is awaiting the decision of EC-69 for publication,

**Mindful** of the need for regional contribution for successful implementation of Seamless GDPFS and that the Region has a number of advanced GDPFS centres which would contribute significantly to the implementation of Seamless DPFS;

**Decides:**

- (1) To provide full support to Steering Group on Seamless DPFS for the further development and implementation of this initiative;
- (2) That the Region include the seamless DPFS in its work programme for the next intersessional period, following the guidance of the EC Steering Group;

**Invites** Members:

- (1) To identify their national focal points for Seamless DPFS to liaise with the RA II representatives on the Steering Group on Seamless DPFS to facilitate its implementation;
- (2) To review and provide comments on the draft White Paper on Seamless GDPFS and the outline of the Implementation Plan;

**Encourages** advanced GDPFS Centres in the Region to pilot a seamless Data-processing and Forecasting System at national and regional levels and share with all Members the results and lessons learnt in order to improve the process.

### Annex to Decision 23 (RA II-16)

#### OUTLINE OF THE IMPLEMENTATION PLAN FOR THE SEAMLESS DATA-PROCESSING AND FORECASTING SYSTEM

##### 1. Vision

*(Approved by EC-68)*

- The GDPFS will be an effective and adaptable monitoring and prediction system to enable Members and partners to make better-informed decisions;

- The GDPFS will facilitate the provision of impact-based forecasts and risk-based warnings through partnership and collaboration;
- The GDPFS will do so through the sharing of weather, water, climate and related environmental data, products and services in a cost-effective, timely and agile way, with the effect of benefiting all WMO Members, while also reducing the gaps between developed and developing Members.

## 2. Scope

The WMO Strategic Plan 2016-2019 will largely determine the scope of the evolution of the GDPFS. It will be driven by the need to support the role of NMHSs in their response to global societal needs facing the world population at large. This expansion or broadening of the role of the GDPFS will be made possible by a number of factors, a key one being the seamless and integrated modelling approach, which allows the delivery of new environmental services in support of sustainable development across all timescales.

## 3. Current state of the GDPFS, what is it, what works, success stories

- Success Stories:
  - i. SWFDP and cascading forecasting process;
  - ii. Manual on GDPFS;
  - iii. ERA Centres;
  - iv. Designation of GDPFS Centres;
  - v. LCs for verification;
  - vi. LRFMME (link with CCI).

## 4. Role of Members

## 5. Role of stakeholders and partners (existing and potential)

- Constituent bodies (TCs, RAs, EC);
- GFCS/CSIS;
- Humanitarian Agencies;
- IAEA/CTBTO;
- ICAO;
- GEO;
- European Commission.

## 6. Areas for improvements

- Interoperability between legacy GDPFS and users/partners;
- Services to Humanitarian Agencies;
- Limited recognition of capability of GDPFS among some users (e.g. Hydrology):
  - i. Hydrology cascade;
  - ii. EFAS/GLOFAS (internal WMO structure);
- Medium- and long-range (sub-seasonal gap in the Manual);
- Global centre for climate monitoring (ocean & atmosphere);
- Lack of global coverage from the cascading process (cascading applied to limited areas);
- Extension to other TCs:
  - i. Lack of designation criteria for some specialized centres (e.g. agriculture, hydrology);
- Sustaining linkage of GDPFS goals to other relevant research bodies like WWRP TIGGE (including TIGGE-LAM) and international HEPEX, and other water and environmental research groups (e.g. European JRC);
- Implementation of QM cycle and auditing.

**7. Communication & outreach strategy**

- Aligned with i.e. WIS, WIGOS GFCS, etc.

**8. Capacity development & training**

- Aligned with i.e. WIS, WIGOS, GFCS, and the WMO Strategy for Capacity Development, etc.

**9. Current and foreseeable trends (external drivers of change) – (users driven and technology driven)**

- Science;
- Earth system modelling;
- Internet bandwidth in developing countries;
- Technologies (big data, cloud storage and data mining tools, cloud computing, next generation satellite systems, crowdsourcing of everything, the Internet of things);
- Emerging service needs – downscaling;
- Socioeconomic trends;
- Climate change and global security considerations;
- Urbanization (Mega cities), transports, energy, etc.;
- Open data;
- Private sector;
- Demand for accessible data and services (e.g. humanitarian agencies);
- Sendai Framework for DRR;
- Cyber security;
- Financial constraints.

**10. Success indicators**

- Harmonization of regulatory materials;
- Centre designation criteria & responsibilities established;
- Inclusion of all WMO domains (agriculture, hydrology, marine, etc.);
- QMS including recurrent review of requirements and users satisfaction in place;
- Procedures for continuing evolution in place;
- Cascading process implemented across all Regions;
- Key external stakeholders are engaged;
- Members have access to sufficient information to support the issue of multi-hazard early warnings;
- Engagement with all TCs and RAs;
- GDPFS and NMHSs remain recognized authoritative voices;
- Contributions to Sendai Framework for DRR.

**11. Methodology/Principles**

- Engagement of TCs, RAs and Programmes;
- Clarity of responsibility between WIS, WIGOS and GDPFS;
- Evolution of existing system;
- Cost neutral;
- Don't break anything;
- Non duplication;
- Leverage existing system;
- Synergy between research and operation;
- Clear linkages to Strategic Plan;
- Focus on operational arrangement and coordination;
- Consolidation where appropriate;
- Simplification and integration;
- Regional engagement and empowerment;
- Strengthening application activities;

- Service oriented;
- Customers (NMHSs & international organizations).

**12. Policy considerations required to facilitate, enable the achievement of the vision**

- Clarity of the role between WIS/WIGOS and GDPFS;
- Open data;
- Open source;
- Mandates and legal aspects of NMHSs and partners (e.g. flood forecasting and civil protection);
- UN ISDR (e.g. Sendai Framework for DRR);
- Evolving WMO governance to enable our vision;
- Role of the private sector and academia;
- Training and capacity-building;
- GDPFS products quality assessment and external independent review;
- Issues related to formats, validation, quality control and international standards (e.g. OGC).

**13. How do we get there? Required partnerships, role of the private sector in supporting-enabling the vision**

- Harmonization of regulatory materials.

**14. Roadmap, timelines, resources (high level implementation plan)**

- CBS (and other sessions of TCs and RAs);
- Consultation with Members;
- EC-69 and EC-70;
- Cg-18, in 2019;
- CBS-17, in 2020;
- Cg-19, in 2023;
- Cg-20, in 2027.

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**Decision 24 (RA II-16)**

**IMPLEMENTATION OF FORECAST VERIFICATION ACTIVITIES, HIGH-RESOLUTION NUMERICAL WEATHER PREDICTION AND IMPACT-BASED FORECASTING AND WARNING**

REGIONAL ASSOCIATION II (ASIA),

**Recalling** the request by Cg-XVI (2011) to the Secretary-General and the Commission for Basic Systems (CBS) to develop a strategy to assist Members in the implementation of improved high-resolution regional Numerical Weather Prediction (NWP), including data assimilation and boundary condition aspects,

**Recalling further** the following EC-68 decisions:

- (1) Decision 56 — Operational implementation of forecast verification activities,
- (2) Decision 57 — Strategy to assist Members in the implementation of high-resolution Numerical Weather Prediction (NWP),



- (3) Decision 58 — Operational implications and requirements for impact-based forecasting,
- (4) Decision 5 – Provision of multi-hazard impact-based forecast and risk-based warning services to the public,

**Recognizing** that NWP forecast verification activities are critical to quality assurance and management of the outputs of the GDPFS, and therefore they can strengthen the confidence level of forecasters in issuing forecasts and warnings, thereby contributing to increasing the NMHS visibility and the confidence of users, including government authorities, in its performance,

**Recognizing further** that, In addition to NWP forecast verification, verification of the performance of nowcasting system is also considered essential and noting with appreciation that Hong Kong, China is willing to share knowledge and experience with Members in this regard,

**Recognizing further** that the capacity of Members to run high-resolution NWP models varies enormously, and that many NMHSs in developing and least developed countries lack the human and technological capacities to provide even a basic level of services, and make insufficient use of ever advancing forecasting techniques,

**Noting with satisfaction** the progress made by OPAG-DPFS in the development of guidelines for nowcasting techniques and for implementation of high resolution Numerical Weather Prediction (NWP) and their planned publication in 2017,

**Acknowledging** that it is no longer sufficient to provide a good weather and flood forecast or warning – the population now demands information about what to do to ensure their safety and protect their property – and that the utility of warnings and forecast services is based on the ability of people to use the information and take protective action,

**Acknowledging further** that impact-based forecasting and warnings is primarily an area of service delivery by NMHSs, and therefore supported by the Public Weather Services (PWS) programme,

**Recognizing**, however, that the implementation of impact-based forecasting and warnings may have implications in NMHSs' operational data-processing and forecasting systems (e.g. use of non-conventional data, development new products, etc.),

**Noting** the request of EC-68 to the Commission for Basic Systems (CBS) to assess the operational impacts and requirements for impact-based forecasting and prepare guidance materials on the system aspects, and compile lessons learnt, to assist NMHSs in the implementation of impact-based forecast and warning services,

**Invites** Members:

- (1) With experience in NWP forecast verification to join their efforts with the Secretariat to share their knowledge and experience with those Members who wish to initiate verification activities, through twinning, mentoring and training;
  - (2) To use, once available, the guidelines on nowcasting techniques and for the implementation of high resolution NWP in their training and operational programmes;
  - (3) To closely collaborate with CBS for the assessment of operational impacts and requirements for impact-based forecasting and the development of guidance materials to effect the implementation of impact-based forecast and warning services.
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### Decision 25 (RA II-16)

#### REVISED MANUAL ON THE GLOBAL DATA-PROCESSING AND FORECASTING SYSTEM

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Recommendation 19 (CBS-16) - Revised Manual on the Global Data-Processing and Forecasting System (WMO-No. 485)
- (2) Recommendation 20 (CBS-16) - Introduction of New Type of Centres into the Revised Manual on the GDPFS (WMO-No. 485)
- (3) Recommendation 21 (CBS-16) - Mapping of existing GDPFS Centres onto the corresponding designations described in the revised Manual on the GDPFS (WMO-No. 485)
- (4) Recommendation 22 (CBS-16) - Designation of New GDPFS Centres Against the Existing Criteria/Functions and their Inclusion in the Revised Manual on the Global Data-Processing and Forecasting System (WMO-No. 485)
- (5) Decision 11 (CBS-16) - Designation of GDPFS Centres against the New Criteria/Functions and their Inclusion in the Revised Manual on the Global Data-Processing and Forecasting System (WMO-No. 485)

**Noting with great pride** the designation by CBS-16 of new centres within the Region, namely:

- (1) RSMC for Atmospheric Sand and Dust Storm Forecasts (RSMC-ASDF) (Beijing, China),
- (2) RCC (Pune, India),

**Considering** the requirement of the revised *Manual on the GDPFS* (WMO-No. 485) to assess the status of existing centres in terms of compliance with their new designations,

**Considering further** that by the letter WDS-DPFS/Revised Manual on GDPFS-2017 dated 16 January 2017, the Secretary-General is requesting Members currently hosting a World Meteorological Centre (WMC) and/or Regional Specialized Meteorological Centre (RSMC) to confirm the mapping of their centres onto the new designations, and requesting All WMO Members that fulfil the criteria/functions described in the revised *Manual on the GDPFS* (WMO-No. 485) to submit their candidature for designation,

**Considering further** that the revised *Manual on the GDPFS* (WMO-No. 485) requires the Regional Association's endorsement as part of the process for new designations of RSMCs and RSMC Networks,

**Authorises** its President on behalf of the Association to endorse the designation of RSMCs and RSMC Networks in consultation with its Management Group and with the condition that Members who express their interest to have designated as these Centres complete the designation process defined by the revised *Manual on the GDPFS* (WMO-No. 485),

**Requests** the Secretary-General to consolidate a candidate list of RSMCs and RSMC Networks as which RA II Members express their interest to have designated and to provide it with the President for his/her endorsement,

**Requests** Members who have expressed their interest to have designated as the new RSMCs and RSMC Networks to complete the designation process defined by the revised *Manual on the GDPFS* (WMO-No. 485),

**Requests** the Management Group to include in its work programme, the assessment of the status of existing GDPFS centres in the Region, as a contribution to the auditing process required in the revised *Manual on the GDPFS* (WMO-No. 485).

## Decision 26 (RA II-16)

### HYDROLOGY AND WATER MANAGEMENT

REGIONAL ASSOCIATION II (ASIA),

**Noting** the increased importance being placed on the availability of water resources within a country, basin and region for sustainable development, as linked to the Sustainable Development Goals, and the need to have clear and accurate indications of existing and future availability of water resources for planning purposes,

**Recalling:**

- (1) [Resolution 10 \(RA II-15\)](#) – Regional Association II Working Group on Hydrological Services, particularly regarding the strengthening of the capability of Members to assess their water resources and in improving the accuracy of hydrometric and sediment observations,
- (2) [The Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services \(NMHSs\) in Regional Association II \(Asia\) 2012-2015](#),
- (3) [Resolution 18 \(Cg-17\)](#) – Hydrology and Water Resources Programme,
- (4) [Resolution 19 \(Cg-17\)](#) – World Hydrological Cycle Observing System Office,
- (5) [Resolution 6 \(EC-68\)](#) – Global Hydrometry Support Facility (GHSF),
- (6) Resolution 10 (CHy-15) – Work Programme and Structure of the Commission for Hydrology, particularly its Annex 1 Thematic Area: Measurement, Monitoring and Infosystems and Thematic Area Hydrological Applications, Products and Services,
- (7) The report of the third session of the RA II Working Group on Hydrological Services, Seoul, Republic of Korea, 25-27 October, 2016,

**Recognizing** that advances made in the area of water resources assessment and in improving the accuracy and reliability of discharge and sediment measurements will have impacts on water resources planning and in hydrological applications within and beyond Regional Association II,

**Noting** that the Commission for Hydrology, in its fifteenth session in December 2016, took several decisions that might have an impact on the RA II activities related to Water Management, such as: the implementation of the HydroHub (Resolution 4 (Chy-15)), the establishment of a new Community of Practice on Droughts to prepare guidelines for assessing hydrological drought severity and impacts for water resources management (Resolution 10 (CHy-15), Annex 1, 1.4 (a)), and the establishment of a Global Hydrological Status and Outlook project, with a view to developing a WMO capability to assess an indication of the

current global hydrological and hydrogeological status of water availability(Resolution 8 (CHY-15)),

**Noting further:**

- (1) The Global Hydrometry Support Facility – newly called WMO [HydroHub](#) - will support the data aspect within the entire value chain from data acquisition to decision-making by enabling innovative approaches with respect to water monitoring and data access, delivering technical assistance and fostering international cooperation,
- (2) Its components are: [WHYCOS](#) (provide hydrological data), [WHOS](#) (WMO Hydrological Observing System, show and share data); a hydrological information platform (information on water monitoring organizations), a help desk (technical support to National Hydrological Services activities related to water monitoring and data access); and the Innovation Hub, a worldwide incubator of inventive technical solutions for water monitoring, in compliance with WMO quality management practices,

**Recognizing** the importance of Members to contribute to, and receive benefit from the HydroHub and related innovative activities, as a possible support to the Seamless Data-Processing And Forecasting System,

**Welcoming** the progress made by the Commission for Hydrology in preparing the WMO Manual on Water Resources Assessment,

**Acknowledging:**

- (1) That significant progress has been made by the RA II Working Group on Hydrological Services in the dynamic assessment of basin-wide water resources availability including through the use of climate projections, as well as in the development and implementation of new approaches, including making the new approaches available through a software tool,
- (2) That significant progress has also been made by the RA II Working Group on Hydrological Services in assessing the performance of measurement of stream flow discharge and sediment data in diverse conditions and in the development of rating curves particularly through the use of index-velocity approaches, and facilitating its use through the development of a software tool,
- (3) That hydrometric networks of several Members could be strengthened and could benefit by adopting advances in monitoring and communication technologies,
- (4) That RA II Members, as well as Members from other Regions, could greatly benefit from the developments undertaken on the dynamic assessment of water resources and in the application of the index-velocity approach for measuring streamflow discharge and sediment data,

**Invites** the Commission for Hydrology:

- (1) To assess the dynamic water resources assessment software tool and to provide guidance to the RA II Working Group on Hydrological Services on its further development for the benefit of Members;
- (2) To assess the utility and applicability of the software tool and its methods for measuring stream flow discharge under backwater and tidal influence using the index-velocity method and the software tool developed by the RA II Working Group on Hydrological Services;

**Requests** the Secretary-General, as appropriate and within the available budgetary resources and subject to the positive assessment by Commission for Hydrology, to assist Members in

RA II in the application of the dynamic assessment of water resources software tool and the application of the software tool allowing use of the index velocity method, including training associated with their use;

**Urges** Members to explore the application of the dynamic assessment of water resources software tool allowing use of the index velocity method, providing feedback to the RA II Working Group on Hydrological Services on their utility and further development;

**Invites** Members:

- (1) To explore the utility and benefits of launching HYCOS projects or new phases of existing HYCOS projects and to communicate these requirements to the regional association;
- (2) To identify and communicate to the HydroHub Advisory Council needs and gaps in hydrological data collection, measuring technology, data interpretation tools and hydrological information systems that could be addressed by the HydroHub and its Innovation Hub;
- (3) To take steps to ensure closer cooperation between meteorological and hydrological communities allowing the consequent design and implementation of end-to-end systems (measured data, models, forecasts, warning dissemination) for water resource management and flood forecast;
- (4) To make all their hydrological data available through WHOS for use within the GDPFS;

**Requests** the chairperson of the RA II Working Group on Hydrological Services to ensure that the feedback provided by the Commission for Hydrology on the above two software tools and associated methodologies is taken into account in their further development.

### Decision 27 (RA II-16)

#### SUPPORT OF THE SAND AND DUST STORM WARNING ADVISORY AND ASSESSMENT SYSTEM

REGIONAL ASSOCIATION II (ASIA),

**Recalling** the endorsement for launching the Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) by Cg-XV and Resolution 13 (EC-66) which requested the formation of a Steering Committee as a global coordination mechanism to facilitate information exchange among the SDS-WAS regional nodes and the establishment of a SDS-WAS trust fund, and also the adoption of the Science and Implementation Plan 2015-2020 by Cg-17,

**Recalling** the United Nations General Assembly (December 2015) resolution, entitled "Combating sand and dust storms" (A/RES/70/195) which recognized that sand and dust storms can pose a great challenge to the sustainable development of affected countries, acknowledged the role of WMO in this important work and invited all affected Member States to contribute in its realization and promote regional cooperation,

**Recognizing** the increasing demand from Members, in particular those in, around and downwind from, arid and semi-arid regions, especially in Asia, to develop and provide a basis for distributing to the global community, products that are useful in reducing the adverse impacts of SDS and to assess the impacts of the SDS process on society and nature,

**Recognizing** also the progress that has been made within SDS-WAS, in particular within the SDS-WAS Asian Regional Node, establishing the dust operational centre hosted by CMA, as well as in the West Asia region,

**Noting** that the CBS-16 meeting has recommended the formal designation of Regional Specialized Meteorological Centre (RSMC) for Atmospheric Sand and Dust Storm Forecasts (ASDF) — RSMC-ASDF Beijing (RA II) (the website of RSMF-ASDF Beijing is as follows: [http://eng.nmc.cn/sds\\_was.asian\\_rc/](http://eng.nmc.cn/sds_was.asian_rc/)),

**Having considered** the SDS-WAS Steering Committee responsible for coordinating SDS-WAS activities between regional nodes, overseeing the progress of activities and providing guidance,

**Having considered** the establishment of the SDS-WAS trust fund,

**Requests** Members to provide adequate voluntary resources to the SDS-WAS trust fund to support the work of the Steering Committee and to review research progress and priorities;

**Requests** Members in the West Asia region to further their efforts in establishing the regional SDS-WAS.

## Decision 28 (RA II-16)

### CAPACITY DEVELOPMENT PRIORITIES FOR 2017–2019 INCLUDING THE COUNTRY PROFILE DATABASE

REGIONAL ASSOCIATION II (ASIA),

**Acknowledging** that capacity development is one of the priority areas established by the Seventeenth World Meteorological Congress (Annex to Resolution 69 (Cg-17)),

**Recalling** that capacity development is an ongoing continuous improvement process, rather than a short-term intervention, aiming to augment capacity in a manner conducive to sustained growth (Annex to Resolution 49 (Cg-XVI)),

**Recalling also** that the Executive Council, at its sixty-eighth session in 2016, requested the Secretary-General, regional associations, technical commissions and Members to support the capacity development implementation priorities identified by its Panel of Experts on Capacity Development (EC-PCD) for the WMO Capacity Development Strategy (CDS) ([http://library.wmo.int/opac/index.php?lvl=notice\\_display&id=17224#.WliGxVUrJhF](http://library.wmo.int/opac/index.php?lvl=notice_display&id=17224#.WliGxVUrJhF)) as outlined in Annex 1 to Decision 63 (EC-68) and Annex to this document,

**Welcoming** the information on training and fellowships, provided in Decision 30 (RA II-16) – Regional priorities for education and training, and on development projects provided in Decision 32 (RA II-16) – Resource Mobilization,

**Having examined** the priorities recommended by EC-PCD and endorsed by EC-68,

**Decides** to adopt the capacity development priorities provided in the Annex to this decision as regional priorities;

**Observes** that the ongoing development of knowledge management tools for capacity development such as the Country Profile Database (CPDB) and the Guidelines on the Role and Operation and Management of NMSs are essential pillars in WMO capacity development efforts;

**Requests** the Secretary-General, technical commissions and Members to support the capacity development priorities identified, pursuing innovative and creative approaches for their implementation in the Region;

**Further requests** the Secretary-General, in collaboration with relevant WMO bodies and development partners, to further continue to develop and improve the Country Profile Data Base (CPDB) giving priority to the development of features that facilitate Members' providing and updating information to the CPDB, such as features for online update of focal points and working group members, and online status reports of various activities.

### Annex to Decision 28 (RA II-16)

#### RECOMMENDED WMO CAPACITY DEVELOPMENT PRIORITIES (2016–2019)

(Based on Annex 1 to Decision 63 (EC-68))

Strategic objectives	Strategic approaches	Key activities
Objective 1: Define required capacities and identify deficiencies	Priorities for 2016–2019	<ul style="list-style-type: none"> <li>• Enhance the Country Profile Database (CPDB) to include a tool to compile, map and monitor reports on NMHSs compliance with WMO Standards</li> <li>• Categorize NMHSs according to the levels of service they provide (Basic, Essential, Full or Advanced)</li> <li>• Focus assistance to address the deficiencies of NMHSs in main areas such as Aeronautical and Marine Meteorology, Polar and High Mountain Regions, Global Framework for Climate Services (GFCS), WMO Integrated Global Observing System (WIGOS) and Disaster Risk Reduction (DRR), especially for the Least Developed Countries (LDCs)</li> <li>• Support the completion by NMHSs of their Quality Management System (QMS) to become ISO certifiable</li> <li>• Continue to assist NMHSs in building stakeholder confidence through compliance with WMO standards and a common national service delivery vision</li> <li>• Develop and maintain a roster of experts to assist in the evaluation of NMHSs, and to assist NMHSs and development partners with punctual needs and modernization efforts</li> </ul>
	1A: Emphasize compliance with WMO technical requirements to address priorities	<ul style="list-style-type: none"> <li>• Clarify WMO standards, technical requirements, practices and priorities</li> <li>• Compile compliance reports</li> <li>• Organize training activities</li> </ul>
	1B: Assist countries in identifying deficiencies of NMHSs	<ul style="list-style-type: none"> <li>• Assist NMHSs to organize stakeholder forums to build a service delivery vision, build stakeholder confidence and to guide the national requirement processes and highlight to show the NMHS's connection to the global resource of WMO</li> <li>• Develop guidance material on the role and operation of NMHSs</li> <li>• Conduct country assessments and independent</li> </ul>

		<p>analyses and prepare reports of country assessments to establish baselines for monitoring and evaluation purposes</p> <ul style="list-style-type: none"> <li>Promote transparency through information sharing leading to the development of requirement-driven strategies</li> </ul>
	1C: Encourage development of services to address specific user needs	<ul style="list-style-type: none"> <li>Develop communication plans</li> <li>Define new services and products to be delivered by NMHSs in accordance with the WMO Strategy for Service Delivery</li> </ul>
	1D: Establish modalities for engaging partners and stakeholders	<ul style="list-style-type: none"> <li>Work with national partners and government entities to build a common vision for the use of environmental information to address societal needs</li> <li>Organize meetings of national development partners and stakeholders</li> <li>Share projects and requirements</li> </ul>
Objective 2: Increase visibility and national ownership	Priorities for 2016–2019	<ul style="list-style-type: none"> <li>Use information from various sources (Mapping and Categorization of NMHSs according to the levels of service provided, CPDB, surveys and assessment missions) to seek national support based on the gaps identified</li> <li>Promote advocacy during WMO's presence as to increase awareness of the role and relevance of, and to build national support for NMHSs</li> <li>Focus on the relevance of NMHS services to disaster risk reduction, risk mitigation, and socioeconomic benefits to build national partner support</li> <li>Assist NMHSs with management and entrepreneurial skills and strategic planning</li> </ul>
	2A: Explain to decision-makers the socioeconomic benefits of services provided by NMHSs	<ul style="list-style-type: none"> <li>Develop an advocacy, outreach and communication strategy to approach governments</li> <li>Advocate inclusion of NMHSs in the national development planning process to secure buy-in and national funds for the development of NMHSs</li> </ul>
	2B: Assist NMHSs in incorporating national and international requirements into national policy, legislative frameworks and national development plans	<ul style="list-style-type: none"> <li>Collect and disseminate examples of clear legislative and policy frameworks, best practices and case studies</li> <li>Assist developing countries in clarifying national laws and procedures through consultation and training</li> <li>Research and collect information on socioeconomic benefits</li> <li>Assist NMHSs in the elaboration of their strategic plans to include the four dimensions of NMHSs capacity development</li> <li>Clarify national mandates and legislation concerning NMHSs for improved service delivery</li> </ul>
	2C: Enhance outreach to end users and decision-makers	<ul style="list-style-type: none"> <li>Assist NMHSs, through workshops, training events and consultancies, in the development of services designed to meet user needs, with particular emphasis on public weather services, for increased visibility of NMHSs</li> </ul>
	2D: Develop	<ul style="list-style-type: none"> <li>Enhance training to nurture leaders at various</li> </ul>



	leadership and management capacities	<p>organizational levels of NMHSs</p> <ul style="list-style-type: none"> <li>• Develop a network of experts to assist NMHSs with management skills and strategic planning</li> <li>• Facilitate twinning arrangements</li> </ul>
	2E: Reinforce national support to meet societal needs for weather, climate and hydrology services	<ul style="list-style-type: none"> <li>• Categorize NMHSs according to the level of services provided and use these categories to guide assistance</li> <li>• Link the categories to the human, institutional, infrastructural and procedural capacities needed to provide the required levels of service (for information on NMHS categories, see Annex 5: of the WMO Capacity Development Strategy and Implementation Plan Categorization of National Meteorological and Hydrological Services)</li> <li>• Tailor fellowships and training activities as well as technical assistance to tackle identified deficiencies and WMO priority areas</li> </ul>
Objective 3: Optimize knowledge management	Priorities for 2016–2019	<ul style="list-style-type: none"> <li>• Improve the mechanisms and tools for monitoring and gathering data on the development of NMHSs (including: Mapping and Categorization of NMHSs, CPDB community platform tools, surveys and consolidation of country assessments)</li> </ul>
	3A: Enhance mechanisms for collecting and sharing up-to-date information relating to the development of NMHSs	<ul style="list-style-type: none"> <li>• Complete the development of a CPDB</li> <li>• Develop coordinated information collection mechanisms, including surveys and online submissions from Members</li> <li>• Relevant monitoring and evaluation data on capacity development of NMHSs will be made available to stakeholders including partners and investors</li> </ul>
	3B: Share best practices and success stories relating to the development of NMHSs	<ul style="list-style-type: none"> <li>• Establish web-based and other mechanisms</li> <li>• Encourage Members to prepare specific examples of successes and challenges in developing the capacities of their NMHSs</li> <li>• Highlight lessons learned and principles that could be applied in other countries</li> </ul>
	3C: Enhance communities of practice dealing with the development of NMHSs	<ul style="list-style-type: none"> <li>• Coordinate the work of informal groupings through communities of practice to provide assistance and insight, experience and knowledge with regard to global and regional initiatives for the development of NMHSs</li> </ul>
Objective 4: Reinforce resource mobilization and project management	Priorities for 2016–2019	<ul style="list-style-type: none"> <li>• Help Members prepare Strategic Plans for their NMHSs to address identified national requirements, gaps in compliance with WMO technical regulations, to improve their skills in project and organizational management</li> <li>• Further strengthen the Project Coordination Unit and Project Management Board to better support WMO managed projects</li> <li>• Conduct Development Partner Roundtables to improve investment in hydrometeorology and climate services</li> <li>• Develop models for the investment in NMHSs (Twinning with ODA support and other bilateral assistance models, national modernization, PPP,</li> </ul>

		<p>etc.)</p> <ul style="list-style-type: none"> <li>• [See Decision 69 (EC-68) – Resource Mobilization Strategy]</li> </ul>
	4A: Enhance coordination, actively explore new funding opportunities and develop proposals through dialogue with stakeholders and development partners	Develop mechanisms for sharing information on funding opportunities and facilitating access to donors
	4B: Enhance capacity to develop, implement, monitor and evaluate projects	<ul style="list-style-type: none"> <li>• Develop good practices and case studies to assist NMHSs in the development and coordination of large-scale projects</li> <li>• Develop a monitoring and evaluation toolkit and provide assistance and guidance in gathering data and information</li> <li>• Organize workshops and courses on project management</li> <li>• Organize seminars and workshops to facilitate South-South Cooperation</li> <li>• Promote cooperation between NMHSs and their official development assistance (ODA) agencies</li> <li>• Strengthen and expand the Voluntary Cooperation Programme</li> <li>• Encourage communities of interest such as informal planning meetings</li> </ul>
<b>Objective 5: Strengthen global, regional and sub-regional mechanisms</b>	<b>Priorities for 2016–2019</b>	<ul style="list-style-type: none"> <li>• Regional associations and WMO Regional Offices to advise on matters relating to NMHS compliance with WMO requirements</li> <li>• Assist Members in reporting on their compliance (assessments, reporting tools, etc.)</li> <li>• Relocation of the RAF and RAP Offices to the Region to enhance advocacy, partnerships with regional/subregional bodies and support the further development of regional mechanisms to improve regional collaboration, coordination and synergy with WMO Secretariat Programmes to minimize duplication of effort</li> <li>• Further elaborate the regional and subregional efforts to support the capacity development of NMHSs, through existing and planned regional centres and recent successes in the organization of regional ministerial conferences, as well as the recent regional emphasis of development partners</li> <li>• Support the new Programme for WMO Small Island Developing States (SIDS) and Member Island Territories (MITs)</li> </ul>
	5A: Strengthen the work of global and regional centres	<ul style="list-style-type: none"> <li>• Deliver regional and subregional pilot projects and demonstrations with emphasis on the services that support regional issues and their link with WMO priorities and global systems</li> <li>• Assist NMHSs in reducing the high cost of observing system expendables and maintenance</li> </ul>
	5B: Strengthen	<ul style="list-style-type: none"> <li>• Work with regional associations to build political</li> </ul>

	global, regional and subregional mechanisms to provide support for weather, climate and hydrological services	<p>support in the Regions for the services provided by NMHSs</p> <ul style="list-style-type: none"> <li>• Build partnerships with subregional bodies and economic groupings</li> <li>• Strengthen the Regional Climate Outlook Forums (RCOFs) by providing training and workshops</li> <li>• Build on the successful African Ministerial Conference on Meteorology and other Region-wide conferences for ministerial level officials to draw attention to the socioeconomic benefits of investing in NMHSs and the expanding services required of them</li> <li>• Enhance WMO advocacy of and support for NMHSs through collaborative arrangements with entities in the Region whose mandates complement those of WMO</li> </ul>
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Objective 6: Increase education and research opportunities	Priorities for 2016-2019	<ul style="list-style-type: none"> <li>• Maintain and expand education and fellowship opportunities through initiatives such as the WMO Global Campus, especially in priority areas (climate services, aeronautical and marine meteorology, and disaster risk reduction) management and entrepreneurial skills<sup>1</sup></li> <li>• Expand opportunities for developing countries to participate in research</li> <li>• RTCs to provide education and training in the WMO high priority areas</li> </ul>
	6A: Improve access to and provision of fellowships	<ul style="list-style-type: none"> <li>• Provide fellowships and enhance fellowship opportunities by building partnerships with academic institutions and societies</li> <li>• Provide education and training guidance to Regional Training Centres (RTCs)</li> </ul>
	6B: Strengthen application of research findings	<ul style="list-style-type: none"> <li>• Organize workshops and seminars to share information and findings</li> <li>• Organize training workshops on the application of new research findings for operational use</li> </ul>

<sup>1</sup> Including training in areas such as the role and functions of the NMS, institutional and legal aspects, planning and policy development, financial management, resource mobilization, project development/management, stakeholder relations (government, end-users, partners, staff), human resources, leadership, communications and information technology, media relations, international obligations, development goals/initiatives, risk management, as well as training on areas more specific to working with the WMO and scientific organizations (see also <https://www.wmo.int/pages/prog/dra/eguides/index.php/en/guidelines-on-the-role-operations-and-management-of-the-national-meteorological-or-hydrometeorological-services-nmss>).

### Decision 29 (RA II-16)

#### ENHANCING SUPPORT TO WMO EDUCATION AND TRAINING ACTIVITIES AND FACILITATING BILATERAL AND MULTILATERAL ASSISTANCE FROM MEMBERS

REGIONAL ASSOCIATION II (ASIA),

**Recalls** Decision 63 (EC-68) – Capacity development priorities for 2016-2019;

**Acknowledges further** the outcome of the Seventh Regional Conference of Management of NMHSs in RA II;

**Acknowledges** that the WMO Education and Training Programme (ETRP) is an important part of the Organization's capacity development endeavors and that the ETRP has over the years made important contributions to the development of capacity of human resources in the fields of meteorology, hydrology and allied disciplines;

**Notes** that despite the contributions of the ETRP to capacity development at the global level, many Members in the Region still face acute shortage of adequate human resources in their NMHSs;

**Noting further** that lack of adequate education and training opportunities may be having a considerable negative effect on capacity of several NMHSs for: (a) service delivery; (b) optimum contribution to scientific knowledge; (c) support to national socioeconomic and development policy; (d) broader partnerships at national and international levels; (e) development and implementation of relevant international agreements; and (f) resource mobilization,

**Recognizing** the importance of regional and national initiatives such as "Nanning Initiative on China-ASEAN Cooperation in Meteorology", China Study Tour and the provision of scholarships for long-term fellowships by China, India, Japan, Republic of Korea and the Russian Federation,

**Urges** Members to develop bilateral and multilateral cooperation on education and training initiatives aimed at enhancing the capacity to develop weather-, climate-, and water-related services to a full range of socioeconomic and development activities;

**Encourage** Members to take full advantage of the long-term and short-term scholarship opportunities offered by RTCs in RA II, such as China, Republic of Korea and Russian Federation and other institutes such as the WMO Virtual Laboratory Centre of Excellence (CoE) in Training for Satellite Meteorology for Southwestern RA II Members hosted by Oman;

**Calls on** Members to update WMO on their Education and Training National Focal Points (ET-NFPs), a network already established to ensure an effective and a rapid communication on education and training matters;

**Requests** Members to consider putting in place initiatives such as Study Tours and provision of bilateral and multilateral cooperation in support of fellowship provision by institutions and developments partners;

**Requests also** the Secretary-General to:

- (1) Put in place training and related initiatives aimed at enhancing the management capacity of officials of NMHSs in key areas such as strategic planning, human resource management, policy development, resource mobilization, management of infrastructure, intergovernmental coordination, international relations and communications as given in the Annex to the Decision;

- (2) Render training assistance to NMHSs on how to take account of weather-, climate-, and water-related information in the implementation of international agreements, socioeconomic and development related initiatives.
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### **Annex to Decision 29 (RA II-16)**

#### **Management Skills**

##### Summary and Recommendations RECO 7

Effective management of an NMHS ensures that the functions of the institution are oriented towards ensuring its optimum possible contribution to sustainable development, reduction in loss of life and property, scientific development and technological advancement.

Hence, in order to build an effective management capability for a typical NMHS, it is important that its manager:

- (1) Should ensure that the NMHSs operates in tandem with the goals, aspirations and operations of other national institutions, particularly those with close sectoral objectives such as water resources, agriculture, energy, environmental management, transport and aviation, oceanography, seismology, tourism and so on.
  - (2) Work within / puts into place appropriate national legislative and institutional frameworks and considers the relevancy of the role and activities of the NMHS to national and international policy environment;
  - (3) Ensure that a comprehensive forward looking and long term development / business plan is in place;
  - (4) Ensure availability of adequate financial resources as much as is possible;
  - (5) Take into account the changing user requirements as well as political and socio-economic situations;
  - (6) Maintain a mutually beneficial relationships with all stakeholders at national and international levels;
  - (7) Put in place appropriate mechanism to ensure effective internal and external communications and public outreach;
  - (8) Ensure that a comprehensive human resource capacity development and transition strategy is in place in key areas such as strategic planning, human resource management, policy development, resource mobilization, maintenance of adequate infrastructure, intergovernmental coordination, international relations and communications;
  - (9) Undertake regular staff and customer satisfaction reviews.
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### Decision 30 (RA II-16)

#### REGIONAL PRIORITIES FOR EDUCATION AND TRAINING

REGIONAL ASSOCIATION II (ASIA),

**Recalls** Decision 63 (EC-68) - Capacity development priorities for 2016-2019;

**Notes** that there are various challenges facing NMHSs in the Region;

**Notes further** that education and training play a pivotal role in building enabling capacity for dealing with those challenges;

**Having considered** the need to identify the priority needs that are relevant to these endeavors,

**Agrees** on the following as the priorities for education and training, within the framework of priority areas which are expressed in the Strategic Plan of WMO:

- (1) Development and implementation of appropriate competency frameworks and augmentation of existing curricula and learning outcomes with advances in science and technology;
- (2) Continuous education and enhancement of research capabilities to keep pace with developments in science and technology research;
- (3) Broadening of partnerships with organizations and agencies for initial and continuous education;
- (4) Fellowships for education of the future generation of meteorologists and hydrologists;
- (5) Embedding of education and training as critical elements in the management and modernization of NMHSs;
- (6) Promotion of research and operational capacity through stronger connections to WMO research programmes, graduate level fellowships and personnel exchanges;
- (7) Exchange of experience and competencies through exchange of human resources and dissemination of good practices;
- (8) Enhancing the capacity of RTCs to deliver learning opportunities to meet the regional education and training needs;
- (9) Resource mobilization in support of national needs and institutional development;

**Urges** Members to take these priorities into consideration in their national and international activities on education and training;

**Requests** the Secretary-General to assist in formulation of appropriate response actions to the regional priorities on education and training in the Region, particularly through RTCs and allied institutions.

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**Decision 31 (RA II-16)****REPORT ON THE STATUS OF WMO REGIONAL TRAINING CENTRES IN THE REGION**

REGIONAL ASSOCIATION II (ASIA),

**Recalls** Decision 63 (EC-68) - Capacity development priorities for 2016-2019;

**Acknowledges** the report on education and training activities in RA II;

**Appreciates** the contributions of Regional Training Centers in RA II which are located in China, India, Islamic Republic of Iran, Republic of Korea, Russian Federation, Qatar and Uzbekistan; and also those who provide support from outside the Region;

**Aware** of the fact that the performance of the RTCs in the Region depends on: (a) the primary goal of their parent institutions; (b) level of support they receive from their governing body; (c) cost of procuring training by potential beneficiaries; (d) catchment population; (e) language; (f) outreach activities; and (g) their relationship with international organizations and development partners;

**Considering** the strategic importance of the WMO RTCs, their continued relevance and the need to have a more concerted approach to their management, to enable them to make more effective contributions to socioeconomic and development issues,

**Agrees** to:

- (1) Recommend to EC to confirm the RTC Islamic Republic of Iran based on the report of the EC Panel of Experts on Education and Training conducted in August 2016;
- (2) Recommend to EC to reconfirm the RTCs in China, India, Republic of Korea, Qatar, Russian Federation and Uzbekistan, through the next external review by the EC Panel of Experts on Education and Training or the next RA II Session, whichever occurs first;
- (3) Recommend to EC to postpone the external review of RTC Iraq, until a suitable arrangement is made for assessment;
- (4) Advise the RTC in Uzbekistan work to increase its service to the Region through short courses in WMO priority areas and degree programmes;
- (5) Commend RTCs in China, India, Republic of Korea, Qatar and Russian Federation for their continued service to the Region;
- (6) Encourage RTCs to begin documenting how they meet RTC criteria for reconfirmation prior to their next planned external reviews, and to report this in their annual reports to the ETR Office;
- (7) Encourage RTCs to cooperate with WMO in the promotion of the Global Campus initiative, inter alia, by way of offering to share their educational resources;

**Urges** Members hosting RTCs to increase their support to RTCs, and all Members to give maximum possible cooperation to RTCs in the Region, to enable them to serve more effectively in line with their mandate;

**Requests** Members hosting RTCs to update WMO of the status, particularly regarding management and organizational changes that could affect their relationship with WMO and counterpart RTCs;

**Requests** RTCs to ensure that they all:

- (1) Align their courses along the lines recommended in the *Manual on the Implementation of Education and Training Standards in Meteorology and Hydrology* (WMO-No. 1083);
- (2) Send their annual major reports and plans for their course offerings on a regular basis;
- (3) Broaden the focus of their activities in the areas of management and application of meteorological and hydrological knowledge to socioeconomic development;
- (4) Work more closely with other WMO centers such as the Regional Climate Centres (RCCs) and Regional Instrument Centres (RICs), and with scientific and research institutions in the areas of education and training;
- (5) Aim at continuous improvement of their approach to delivery of education and training activities, especially by taking into account relevant information provided by WMO;

**Requests** the Secretary-General to assist RTCs in repositioning their programmes and activities to enable them to deliver more appropriate support to NMHSs as they respond to various challenges facing their Services;

**Requests further** the Secretary-General to facilitate exchange of manpower between RTCs in and outside the Region.

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## Decision 32 (RA II-16)

### RESOURCE MOBILIZATION

REGIONAL ASSOCIATION II (ASIA),

**Recalling** EC-68 Decision 69 on resource mobilization, requesting the Secretary-General to monitor progress and evaluate the effectiveness of resource mobilization efforts, and including the WMO Resource Mobilization Strategy for the seventeenth financial period 2016-2019 ([http://library.wmo.int/opac/doc\\_num.php?explnum\\_id=3166](http://library.wmo.int/opac/doc_num.php?explnum_id=3166) – from page 210),

**Acknowledging** the WMO resource mobilization objectives to seek to mobilize an adequate level of extrabudgetary and in-kind resources to support the WMO Secretariat and Members for the effective implementation of the WMO Strategic Plan (2016-2019),

**Welcoming** WMO's existing and planned projects for RA II and that the WMO VCP supported projects in Bhutan, Maldives, Mongolia, Myanmar and Uzbekistan during the intersessional period,

**Acknowledging also** the contribution of many RA II Members to the WMO VCP including China, Hong Kong, China, Japan, Maldives, Myanmar, the Republic of Korea and Russian Federation through financial and in-kind support through WMO and bilaterally,

**Reaffirming** the goal of mobilizing resources to enhance the full chain service delivery capacity of NMHSs in LDCs and SIDS,

**Recognizing** the challenges faced by WMO in meeting the financial needs for 2016-2019, in particular with regards to the growing country requests for support through major projects and under the Voluntary Cooperation Programme (VCP) amid the decline of direct contribution to the VCP Trust Fund,



**Recognizing further** the planned activities and the responsibilities of each WMO department in the implementation of the RM Strategy,

**Requests** the Secretary-General to evaluate the effectiveness of resource mobilization efforts made in the RA II region following EC-68 Decision 69, and report back to RA II Management Group;

**Requests** Members to:

- (1) Support the WMO resources mobilization efforts, in particular through engagement with their official development assistance mechanisms;
- (2) Contribute to or increase their financial and in-kind contributions to the Voluntary Contribution Programme and the VCP Trust Fund.

**Requests** the Secretary-General to take appropriate action to increase WMO's ODA Coefficients in the OECD DAC (Development Assistance Committee) listing for UN agencies to better reflect the actual situation in WMO with the aim of assisting donor members in securing relevant budget from their financial authorities with respect to ODA contributors to overall budget.

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### Decision 33 (RA II-16)

#### ORGANIZATION-WIDE AND REGIONAL PRIORITIES 2020-2023

REGIONAL ASSOCIATION II (ASIA),

**Recalling:**

- (1) Resolution 71 (Cg-17) – Preparation of the Strategic and Operating Plans 2020–2023, requesting the Executive Council to organize a planning process and the regional associations to provide regional needs and priorities that should be taken into consideration in developing the WMO Strategic Plan 2020-2023,
- (2) Decision 82 (EC-68) - Preparation of WMO Strategic and Operating Plans 2020-2023, requesting the EC Working Group on Strategic and Operational Planning to proceed with the development of the next Strategic and Operating Plans based on the structure (GSNs→ Priorities →ERs) and the outline of the Strategic Plan, and the process and timelines, and urging the regional associations and technical commissions to contribute to WMO's integrated Strategic and Operating Plans for the period 2020-2023 as requested in Resolution 71 (Cg-17),
- (3) Decision 84 (EC-68) – Governance review, and recommendations of its working group related to the regional associations to set their regional priorities within the priorities established by Congress,

**Recalling further** the Global Societal Needs (GSNs) identified by the Organization based on post-2015 sustainable development goals, and which form the solid basis for the Strategic Plan for the period 2016–2019 and the Expected Results (ERs), represent relevant issues and directions that could still influence the focus of the Organization beyond the period 2016–2019, and should form the basis for the WMO Strategic Plan for the period 2020–2023,

**Recognizing** the importance of the Strategic Plan for the WMO Result-based Management (RBM) as the foundation for the planning of activities and resource allocation in a financial period,

**Recognizing further** the importance of monitoring and evaluation in assessing the progress in achieving results as defined in the Strategic Plan,

**Noting** the low level of responses of Members from the Region to WMO surveys on impacts of achieved results on Members,

**Noting further** that Congress (Cg-17) had requested EC to oversee the implementation of the Capacity Development Strategy (CDS) and the Capacity Development Programme during the 2016–2019 period and to give prominence to a number of areas of the CDS including WMO assistance for national strategic planning,

**Acknowledging** that the Secretariat has developed a WMO Integrated Strategic Planning Handbook and Template that would be helpful to NMHSs to improve or initiate the preparation of their national strategic plans,

**Having considered** the proposed WMO structural reforms as per the summary of discussions at RA II session contained in Annex 1 to this decision,

**Having considered also** the outcomes of the deliberations of the Sub-Committee on Regional Priorities which met 4 times during the session (as detailed in Annex 2 to this decision),

**Requests:**

- (1) The president, in consultation with Management Group members and PRs of RA II Members, to continue to provide inputs and comments to the proposed WMO-wide and Regional Priorities 2020–2023.
- (2) The Secretary General to take into account the regional priorities detailed in Annex II to this decision in formulating the WMO-wide priorities 2020–2023 as a contribution to the WMO Strategic Plan 2020–2023 and initiate the process to develop the Operating Plan 2020–2023 for the Region with clear actions, time limes and indicators for RA, TCs and the Secretariat.

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**Annex 1 to Decision 33 (RA II-16)**

**ORGANIZATION-WIDE AND REGIONAL PRIORITIES 2020-2023**

Summary of discussions on WMO Regional Priorities and WMO Reform Process

The discussion involved the participation of the Secretary General of WMO and the President of WMO. The SG gave a presentation outlining his perspective on the future of the organization and proposed structural reforms.

His desire is that the future focus should be on the highest priorities set by the Members through the Regional Associations through:

- Defining **regional priorities** taking into account the diversity of regions.
- Preparing **regional action plans** containing e.g. resource mobilization, country/high government officials visits by secretariat staff etc.

- Reconsider the **functions of the Regional Offices**.
- Ensuring WMO holds a higher position as **global weather, climate & DRR expertise organization**: (observations, services, scenarios, science)
- Revising **constituent body structure & meeting practices** to optimize use of resources for serving the Members
- Revising **all WMO meeting practices**: action oriented, focused & short and improving the quality & usefulness of WMO documents: reader friendly, short, clear, strategic

Currently WMO work is carried out in four parallel structures which may not be optimal use of financial and human resources;

- 8 Technical Commissions with 204 subgroups and ~3000 experts
- 6 Regional Associations with 85 subgroups and ~1000 experts
- Executive Council with 9 subgroups
- Secretariat with 5 operational departments, 31 programmes, 2 co-funded programmes & IPCC
- Co-sponsored Programmes incl. GCOS, WCRP, GFCS & IPCC have all own governing structures

Proposal for new Technical Commission Structure:

- **Global climate** (climate services, climate observations/climatology requirements, climate modelling, climate information for other international organizations);
- **Weather, disasters and safety** (all weather services, also aviation, hydrological and marine; seamless early warning information for other international organizations);
- **Oceans and water resources**;
- **Data and technology** (basic observing systems and their integration, i.e. WIGOS including climate, hydrological and marine, etc; IT and operational infrastructures and their operation; advanced observing and data management technologies, etc);

Revised Meeting of Constituent Bodies:

- Congress every two years with 3-5 days of common issues;
- Regional Association and Technical Commission meetings held at the same time as Congress for 3-5 days;
- **Possibility to organize natural interest grouping meetings**, like Iberoamerican, Arab League, SIDS, Russian Speaking or Members with global models etc. meetings attached to Congress;
- Annual EC meeting, Annual TC meetings;
- Time-limited task forces in addition the TC;

There is also need to better engage key partners in WMO activities to enhance the impact & to gain additional resources and visibility (World Bank, ICAO, IMO, UNESCO, FAO, WHO, ITU, HMEI, Regional Organizations etc.)

The Secretary General's presentation was followed by active discussions and comments. The information below captures the essence of the discussion.

### **Key points of the discussion**

Overall support for reform process.

There is no formal structure of the working relationship between TCs and RAs. It needs to be taken into account when transforming WMO; we need to continue to reduce duplication of responsibilities and work efforts between RAs and TCs. The meeting of PTC/PRA is already a good step; the existence of parallel structures (RAs, TCs, Secretariat) doesn't favour optimal work;

The obvious lead for implementation is with RAs with support from TCs;

Need to identify our priorities and gaps and be cognizant of what is happening across the regions; WMO Global and regional priorities should be followed with action-oriented implementation plans for Congress/EC approval.

Face-to-face meetings are important. Training by WMO is important. Need to make a differentiation between meetings and training or workshops for Members;

Request the SG to focus attention on developing countries / SIDS which do not meet their users requirements; Need to further improve capacity development in developing countries;

Structure of TCs should include PRs and high level experts;

Operational plans could include key players and budgetary resources from external resources. Clear actions plan is necessary;

If considering natural interest group meetings need to ensure that no one is left behind and consider existing regional / sub regional structure outside the WMO;

Major meetings and workshops should be better prepared and based on priorities, with clear expected outcome and deliverables;

Place more emphasis on focusing our time on what matters most and all components of WMO need to work together towards those ends;

Greater visibility of WMO is required in Developing Countries to help them get support from their governments;

Visits from the senior WMO officers (including presidents of WMO Regional Associations) to meet Members' senior government officers would assist significantly and securing support from the governments for developing countries;

Consider organizing meetings across regions to address identified issues;

Governance structure should be adapted to new realities;

Need to communicate much better with regard to the social-economic benefits through the improved provision of meteorological services.

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**Annex 2 to Decision 33 (RA II-16)****SUMMARY OF REGIONAL PRIORITIES AS PROVIDED BY THE  
RELEVANT SESSION COMMITTEE**

- Risk information and seamless Multi-Hazard Early Warning Systems (MHEWS) for Disaster and Climate Risk Management: meet the increasing demands for timely, accurate, understandable and actionable weather and climate information that enable key stakeholders to make critical weather-related decisions; increase the access to and ability to use multi-hazard early warning systems (natural and man-made disasters) and disaster risk information and assessments by communities, in particular, through the development of impact-based forecasts and risk based warnings, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030; including a regionally harmonized framework and localization of related SOP and CAP with particular emphasis on warnings and advisories for Sand and Dust storms, flooding, heat and cold extremes, drought, tropical cyclones and poor air quality.
- Service Delivery (SD) as a Cross-Cutting Framework: improve the capacity for the provision and delivery of meteorological, climatological and hydrological services for safety of life, minimizing impacts on livelihood and property as well as for economic prosperity and sustainable development; strong partnerships between NMHS and 1<sup>st</sup> responders is critical and robust impact based forecasting to ensure restoration of lifeline infrastructure to the community level. Stronger emphasis on downscaling to local levels, big data, artificial intelligence, real time data, innovative technologies, blended technologies, 3-D virtual reality visualization;
- Implementation of the results-based framework and mechanism for WMO contributions to the GFCS: implementation of GFCS at national and regional levels including identification of GFCS support needs in specific countries, coordination of scientific and technical support, sharing of results, lessons learned and tools; specific emphasis on sector specific climate risk management and emphasis on water resources, public health, agriculture, extreme events (viz. cold and heat waves);
- Implementation of WIGOS and WIS including information management practices: maintain and improve real-time observing systems with particular emphasis on oceans, high mountains and deserts and similar data sparse environments (viz. aviation safety, automatic weather stations, marine met-areas), including metadata, quality and quantity of observations, communication and information sharing, telecommunication and ICT infrastructures and database management; complete the implementation of WIGOS and WIS, including ensuring Members' staff are equipped with the full scope of necessary competencies as laid down in the Manuals on WIGOS and WIS with review of information management practices; Enhanced system integration is critical including calibration and downstream data assimilation especially for high mountain countries. Enhanced integration with systems operated by partner organizations.
- Seamless Data-processing and Forecasting System: evolve the operational monitoring, prediction and forecasting system to enable Members in supporting decision-makers to take better informed decisions and to facilitate the provision of impact-based forecasts and risk-based warnings;
- Aviation meteorological services: address existing deficiencies in the provision of aeronautical meteorological services through focused assistance to Members in need of developing their capacity to achieve required service levels in terms of quality, reliability and sustainability of service; promote cooperative regionalized service delivery models where needed to build collective capacity in an efficient and sustainable manner; enhance the overall compliance with the ICAO and WMO requirements, in particular with respect to QMS, competency and qualification of personnel serving aviation;

facilitate the uptake of research and development achievements into operational practice of Members.

### **Additional priorities to support the above regional priorities**

- Capacity development with emphasis on gender equality to support the implementation of regional priorities in terms of budget and staffing resources with gender balance, education and training needs, twinning of experts with support of WMO Global Campus, RTCs and RCs within and outside the region.
- Scientific research and development focusing on the innovation for urban and highly-dense populated regions including regional and urban air pollution, new tools for high impact weather forecasts and communication, and research advancements in multi-hazard early warning systems including biomass burning and impacts on air-quality and sand/dust storms;
- Partnerships with national stakeholders, regional partners, bilateral donor agencies and private sectors to leverage the synergies and resources in the provision of meteorological and climate services, outreach to the community.

### **General Comments:**

- RA needs to be more forward looking – beyond the next financial period and also focus on emerging issues. Needs to be action oriented and ensure that action plans are in place and implemented through projects. Need to avoid “empty” task teams. Tangible operational aspects and pilot projects are critical.
- RA should increase international cooperation within the region and inter-regional. Need a strong focus on sub-regional mechanisms to improve services including those already in place such as GCC, LAS, CIS, and more involvement of WMO Secretariat in these mechanisms.
- Improved communications among the PRs in the region is critical. Development of Regional Web Portal with the Regional Office would be a potential mechanism for sharing knowledge and information on regional activities.
- Improved visibility of role and services of NMHS. NMHS need to demonstrate to government the socio-economic value of their services. Strong marketing strategies are required. RA II engagement with the WMO Global Meteo-Alarm is an important opportunity for improving RA II NMHSs visibility and capability for securing the NMHSs' authoritative voice of meteo-alarm, and promotion of the Meteorological information for socio-economic benefit.

**Table 1. Regional priorities as they align to WMO thematic areas**

<b>WMO Themes</b>	<b>Weather</b>	<b>Climate</b>	<b>Water</b>	<b>Environment</b>
<b>Cross-cutting areas</b>				
<b>Services &amp; warning</b>	<ul style="list-style-type: none"> <li>- Multi-hazard severe weather impact-based warning (DRR)</li> <li>- Aviation &amp; marine weather services</li> <li>- TC warning</li> <li>- Polar &amp; High mountain weather services</li> <li>- Agricultural Services (incl Drought)</li> <li>- Aviation &amp; marine weather services, DRR service on TC;</li> </ul>	<ul style="list-style-type: none"> <li>- Five areas of GFCS services products: agriculture and food security, health, water resources, energy, DRR</li> <li>- Drought warning</li> </ul>	<ul style="list-style-type: none"> <li>- Fresh water</li> <li>- Ground Water</li> <li>- Coastal Services</li> <li>- Flood early warning (flash floods, urban and riverine)</li> </ul>	<ul style="list-style-type: none"> <li>- Air quality services (partnership with EPA)</li> <li>- ERAs to assist IAEA and national ERA related activities</li> </ul>
<b>Seamless Forecast</b>	<ul style="list-style-type: none"> <li>- Impact-based forecast and Ensemble product generation,</li> <li>- Nowcasting, extended range and long-range prediction</li> </ul>	<ul style="list-style-type: none"> <li>- Seasonal to Subseasonal</li> <li>- Inter-annual to multi-year</li> <li>- Climate change projections</li> </ul>	<ul style="list-style-type: none"> <li>- Flood warning assessment (flash floods and riverine)</li> <li>- Dynamic Water Resources Assessment</li> <li>- Regional scale hydrological cycle changes</li> <li>- Marine weather forecasting</li> </ul>	<ul style="list-style-type: none"> <li>- Atmospheric air quality and environmental prediction including Urban Environmental impacts</li> </ul>
<b>Infrastructure (WIGOS/WIS)</b>	<ul style="list-style-type: none"> <li>- WIGOS Implementation focus on five areas (including RBON implementation)</li> </ul>	<ul style="list-style-type: none"> <li>- WIGOS/WIS implementation addressing Regional climate network &amp; data exchange</li> <li>- Enhance GCW CryoNet</li> </ul>	<ul style="list-style-type: none"> <li>- WIGOS/WIS implementation addressing Regional Hydrological network and data exchange</li> <li>- including CryoNet in high mountains</li> </ul>	<ul style="list-style-type: none"> <li>- WIGOS/WIS implementation including air quality network collaboration &amp; data exchange</li> </ul>
<b>Capacity Development</b>	<ul style="list-style-type: none"> <li>- Competency on weather services</li> <li>- Management Training</li> <li>- SEB Studies</li> <li>- Training on in variety of</li> </ul>	<ul style="list-style-type: none"> <li>- Climate Services Information System implementation at country level, drawing on Member-to-Member</li> </ul>	<ul style="list-style-type: none"> <li>- Capacity support available from WMO HydroHub (WHYCOS and WHOS, help desk, innovation hub</li> </ul>	<ul style="list-style-type: none"> <li>- ERA exercises, cooperated capacity on the provision of ERA at internal, regional and national levels</li> </ul>

<b>WMO Themes</b>	<b>Weather</b>	<b>Climate</b>	<b>Water</b>	<b>Environment</b>
<b>Cross-cutting areas</b>	dimensions for applications	assistance as well as data, products and tools from RCCs and GPCLRFs <ul style="list-style-type: none"> <li>- Training on maintenance and calibration</li> <li>- Sector Specific Product development</li> </ul>	<ul style="list-style-type: none"> <li>- Training on maintenance and calibration</li> <li>- Sector Specific Product development</li> </ul>	
<b>Social &amp; Economic benefit Communication</b>	<ul style="list-style-type: none"> <li>- Strengthening communication of weather services benefits</li> <li>- SEB Studies</li> <li>- Marketing Campaigns</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthening communication of climate services benefits</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthening communication of water services benefits particularly the water/food/energy nexus</li> </ul>	<ul style="list-style-type: none"> <li>- Interface with public health agencies for minimizing impacts</li> </ul>
<b>Collaboration &amp; Partnership</b>	<ul style="list-style-type: none"> <li>- Enhance regional/sub-regional collaboration on specific thematic / sectoral issues</li> <li>- DRR including MHEWS, Humanitarian assistance, Service Delivery including QMF, Seamless DPFS, WWMIWS, Aviation services</li> </ul>	<ul style="list-style-type: none"> <li>- GFCS PAC</li> <li>- RCOFs</li> <li>- Strengthen links between RCCs and NMHS</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthen collaboration with hydrological community and water management authorities</li> </ul>	<ul style="list-style-type: none"> <li>- Collaboration/ Communication with the air quality community and regulatory authorities</li> </ul>



**Decision 34 (RA II-16)****REGIONAL ASSOCIATION II PLANNED INTERSESSIONAL MEETINGS/ACTIVITIES  
2017–2020**

REGIONAL ASSOCIATION II (ASIA),

**Noting** that consolidated information on the future working group meetings and activities for Regional Association II is useful for Members' consideration of potential contributions to the relevant regional meetings and activities,

**Noting further** that such information provides information on whether all the major WMO priorities would be covered in balance during the intersessional period when the future working structure and workplans are discussed,

**Considering** a list of four-year planned meetings and activities in RA II for 2017–2020 proposed by the Secretariat as given in the Annex to this Decision,

**Requests** Members to continue to provide support through in-kind contributions including hosting of the meetings and the implementation of the regional activities.

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**Annex to Decision 34 (RA II-16)****REGIONAL ASSOCIATION II PLANNED INTERSESSIONAL MEETINGS/ACTIVITIES 2017–2020**

(Available in English only)

<b>Year</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
<b>Weather</b>	Stakeholders Workshop to Implement the WMO Strategy for Service Delivery (SSD)	Stakeholders Workshop to Initiate Assessing the Social and Economic Benefits (SEB) of Meteorological and Hydrological Products	CAP Jump-start training	Stakeholders Workshops to Implement the WMO Strategy for Service Delivery (SSD)
	Stakeholder Workshop to Implement Impact-based Forecasts and Warning Services	Meeting of Stakeholders Workshops to Implement the WMO Strategy for Service Delivery (SSD)	Stakeholders Workshops to Implement the WMO Strategy for Service Delivery (SSD)	Stakeholder Workshops to Implement Impact-based Forecasts and Warning Services
	Common alerting protocol (CAP) Jump-start training Workshop	Stakeholder Workshop to Implement Impact-based Forecasts and Warning Services	Stakeholder Workshops to Implement Impact-based Forecasts and Warning Services	RA II Meeting of Working Group on Weather Services (WGWS)
			Meeting of the World Weather Information Service (WWIS) language hosts	
<b>Climate</b>	Meeting of Working Group on Climate Services (WGCS)	Workshop on reporting information on the state of the climate and extremes at regional and national levels		
	Indian Ocean Data Rescue (INDARE) steering committee meeting, venue: September (tbc pending XB funds availability)	WMO/LAS/ESCWA Workshop on Climate Data Management and Data Rescue (tbc)	Training for trainers on Climate Data Management and applications for computing Standard Climatological Normals and climate change indices (March)	

<b>Year</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
	10th Session of South Asian Climate Outlook Forum (SASCOF) Bhutan	South Asian Climate Outlook Forum (SASCOF) (2 sessions)	South Asian Climate Outlook Forum (SASCOF) (2 sessions)	South Asian Climate Outlook Forum (SASCOF) (2 sessions)
	9th NOAA/WMO International Training Workshop on Climate Variability and Prediction, Pune, India			
	FOCRAII	FOCRAII	FOCRAII	FOCRAII
	ASEAN Climate Outlook Forum (ASEANCOF) (2 sessions – online and face-to-face)	ASEAN Climate Outlook Forum (ASEANCOF) (2 sessions – online and face-to-face)	ASEAN Climate Outlook Forum (ASEANCOF) (2 sessions – online and face-to-face)	ASEAN Climate Outlook Forum (ASEANCOF) (2 sessions – online and face-to-face)
	East Asian winter Climate Outlook Forum (EASCOF)	East Asian winter Climate Outlook Forum (EASCOF)	East Asian winter Climate Outlook Forum (EASCOF)	East Asian winter Climate Outlook Forum (EASCOF)
	North Eurasian COF (NEACOF) (2 sessions – online and face-to-face)	North Eurasian COF (NEACOF) (2 sessions – online and face-to-face)	North Eurasian COF (NEACOF) (2 sessions – online and face-to-face)	North Eurasian COF (NEACOF) (2 sessions – online and face-to-face)
<b>Hydrology</b>	South Asia FFG (SAsiaFFG): Regional Operational Workshop, Operational Training at HRC, Steering Committee Meeting 2	RA II Meeting of Working Group on Hydrological Services (WGHS)		
	Black Sea and Middle East FFG (BSMEFFG) Steering Committee Meeting 1& 2			
	Mekong River Commission FFG (MRCFFG) Training Workshop, Steering Committee Meeting 2			
	Central Asia Region FFG (CARFFG) Follow-up Operational Workshop, Steering Committee Meeting 3			

Year	2017	2018	2019	2020
	Afghanistan Meteorological Instruments Maintenance Training, Forecasters Training, Satellite Meteorology Training, Hydrometeorologist Training			
<b>WIGOS</b>	RA II OSCAR/Surface, WIGOS metadata and Station Identifiers for RA II LDCs	RA II RBON implementation	RA-II/EG-WIGOS-2	DBCP Capacity-building Workshop for the North Pacific Ocean and its Marginal Seas (NPOMS-5)- Application of Regional Ocean Observations for Increasing Society's Understanding and Forecasting of Typhoons
	Joint RAs II/V Projects on Radar and on Satellite data	Annual meeting of Asia-Oceania Meteorological Satellite Users' Conference (AOMSUC) (Indonesia to host AOMSUC-9 in Oct/Nov 2018)	DBCP Capacity-building Workshop for the North Pacific Ocean and its Marginal Seas (NPOMS-5)- Application of Regional Ocean Observations for increasing Society's Understanding and Forecasting of Typhoons	
	Annual meeting of Asia-Oceania Meteorological Satellite Users' Conference (AOMSUC) and the meeting of the Coordinating Group of the RA II WIGOS Project (the Russian Federation to host AOMSUC-8 in Vladivostok on 16-21 October 2017)	CMOC-China, Oceanographic and marine meteorological data management and service in Western Pacific region	WIS Training on "Managing Discovery Metadata"	

Year	2017	2018	2019	2020
	Two training events on the use of multi-channel geostationary imagery from MSG over the Indian Ocean region and Central Asia (Training event for Central Asia: June 2017; training event for Indian Ocean region: November 2017)	DBCP Capacity-Building workshop for the North Pacific Ocean and its Marginal Seas (NPOMS-5) Forecasting of Typhoons		
	RA II Regional Pyrheliometer Comparison (23 January to 3 February 2017)	IOC/WESTPAC, IODE		
	Regional Workshop on AMDAR for Central Asia (4th quarter, 2017)			
	DBCP Capacity-Building workshop for the North Pacific Ocean and its Marginal Seas (NPOMS-5)			
	Asia High Elevation Cryospheric Observation (AHECO) workshop (Kyrgyzstan, February 2017)			
	Regional Workshop on AMDAR for Central Asia (23 January-3 February)			
	Regional Workshop on AMDAR for Asia (4Q)			
<b>WIS</b>	Three GISC workshops	Two GISC workshops	Three GISC workshops / RA II EG-WIS	Two GISC workshops
	One RTC to provide training on general WIS competencies including train the trainer competencies	Introduction course on Information Management (WIS Part C).	One RTC to provide training on general WIS competencies including train the trainer competencies	Introduction course on Information Management (WIS Part C)

<b>Year</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
	Secondment of 3 potential WIS experts to an NC where WIS has been implemented	One RTC to provide training on general WIS competencies, including train the trainer competencies	Propose secondment of 3 potential WIS experts each to two NCs where WIS has been implemented	One RTC to provide training on general WIS competencies including train the trainer competencies
		Secondment of 3 potential WIS experts each to two NCs where WIS has been implemented	RA II Workshop on Information management and WIS Part C and update RA II WIS IP to include WIS Part C	Propose secondment of 3 potential WIS experts each to two NCs where WIS has been implemented
<b>Research</b>	Fourth International Workshop on Tropical Cyclone Landfalling Processes 2017, in conjunction with the joint TLFDP/ UPDRAFT workshop (Last week of November or early December 2017)	Asia-Pacific GAW Workshop on Greenhouse Gases (October)	Asia-Pacific GAW Workshop on Greenhouse Gases (October)	Asia-Pacific GAW Workshop on Greenhouse Gases (October)
	Vegetation Fires and Smog Forecasting regional centre meeting (time to be decided)			
	Asia-Pacific GAW Workshop on Greenhouse Gases (October)			

**Decision 35 (RA II-16)****INFORMATION SHARING ON CLIMATE SERVICES**

REGIONAL ASSOCIATION II (ASIA),

**Noting:**

- (1) Resolution 48 (Cg-XVI) – Implementation of the Global Framework for Climate Services,
- (2) The draft Implementation Plan of the Global Framework for Climate Services adopted at the extraordinary session of Congress, especially Initial Priority Project 7 – Strengthening regional systems for providing climate services,
- (3) Resolution 1 (Cg-Ext.(2012)) – Implementation Plan of the Global Framework for Climate Services,
- (4) Resolution 15 (RA II-15) – Pilot Project on Information Sharing on Climate Services,

**Acknowledging** that the Tokyo Climate Center has developed and maintained the dedicated website in order to share information on climate services (product details, frequency of issuance, etc.) provided by NMHSs for the Pilot Project on Information Sharing on Climate Services in collaboration with RA II Members,

**Recognizing:**

- (1) That sharing of such information has been increased through the Pilot Project on Information Sharing on Climate Services among Members, however, there is still room for enhancement of information sharing,
- (2) That, for the successful implementation of the Global Framework for Climate Services (GFCS), 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 there have been hundreds of accesses every month to the dedicated website for the Pilot Project since its establishment and that this has played a role to collect and share information on climate services and good practices of climate information usage among Members,
- (2) The network of Regional Climate Centres is an appropriate mechanism to provide such an opportunity,

**Decides** to continue enhancing information sharing on climate services in RA II through the website established by the Pilot Project on Information Sharing on Climate Services;

**Invites** Members:

- (1) To support this activity by providing the Tokyo Climate Center with information on their climate services and activities related to GFCS, as appropriate;

- (2) To use the information available on the website to develop own activities and project as necessary;

**Requests** the Tokyo Climate Center to continue to maintain the website and include its activities regarding this in its annual progress reports to be submitted to the president of the Association.

### Decision 36 (RA II-16)

#### PUBLIC-PRIVATE SECTOR ENGAGEMENT IN REGIONAL ASSOCIATION II

REGIONAL ASSOCIATION II (ASIA),

**Mindful** that:

- (1) Within the weather enterprise, national, regional and international institutions and business models vary greatly,
- (2) All stakeholders, however, help contribute to the core mission of the enterprise to help protect life and property, to safeguard economic growth, and to improve quality of life,
- (3) Government, private sector, academia and civil society all play important roles,
- (4) In addition, by its Convention and long history as an inter-governmental mechanism and framework for cooperative efforts between stakeholders, WMO occupies a key role in understanding and facilitating the weather enterprise,

**Recalling:**

- (1) Resolution 25 (Cg-XIII) - [Exchange of Hydrological Data and Products](#),
- (2) Resolution 40 (Cg-XII) - [WMO policy and practice for the exchange of meteorological and related data and products including guidelines on the relationships in commercial meteorological activities](#),
- (3) Resolution 60 (Cg-17) – WMO policy for the international exchange of climate data and products to support the implementation of the Global Framework for Climate Services,
- (4) Resolution 67 (Cg-17) – WMO guidance on partnerships with the private sector,
- (5) Annex IV (Cg-XIII) - The Geneva Declaration,
- (6) Decision 73 (EC-68) - Public-private partnerships,

**Noting** the substance of the special dialogue on the complementary and cooperative contributions of public and private sector institutions to meteorology and hydrology with the participation of private sector representatives at EC-68 (<https://drive.google.com/file/d/0B66DdLLUhSOtTjduWINBRHBKU2c/view>),

**Acknowledging** that:

- (1) The “weather enterprise” is a name used to describe the multitude of systems and entities participating in the production and provision of meteorological, climatological, hydrological,



marine and related environmental information and services, and for brevity, the name only refers to “weather”,

- (2) However, the enterprise encompasses all business areas of WMO, including weather, climate and water, and all core activities – observations, modelling, data processing and forecasting, and other services and related research,
- (3) The weather enterprise includes public-sector entities (NMHSs and other governmental agencies), private sector entities (such as equipment manufacturers, service-provider companies and private media companies) and academia, as well as civil society (community-based entities, NGOs, national meteorological societies, scientific associations, etc.),
- (4) The weather enterprise has global, regional, national and local dimensions, and the impacts include transboundary interference from international private weather services,

**Taking into account** the summary from Seventh Regional Conference on Management of Meteorological and Hydrological Services (RECO-7) as given in the Annex to the Decision,

**Welcomes** the efforts of the Secretary General to work with the Members to support effective global, regional and national action by the WMO community to promote better engagement between the public and private sectors and all stakeholders to successfully manage and participate in the global weather enterprise;

**Decides:**

- (1) That regional priorities should include gathering and disseminating information and guidance related to public-private engagement for the Region in order to facilitate better understanding of the interests and needs of Members and other stakeholders;
- (2) That Members in RA-II should be encouraged, with the support of the Secretariat, to seek opportunities for structured dialogue between public- and private sector stakeholders on issues of joint concern;

**Requests** The Management Group to prepare a position paper for submission to EC-69 on the opportunities, risks and priorities for Members within the region related to public-private engagement.

## **Annex to Decision 36 (RA II-16)**

### **PRIVATE-PUBLIC ENGAGEMENT**

#### Summary

The RA II Members shared experiences and views on risks, opportunities, lessons and concerns of public-private engagement in RA II. The meeting emphasized the following key points:

- (1) Private engagement in weather, climate and water enterprise is a rapidly increasing and the Secretariat and Members need to keep abreast of developments and have a realistic understanding of the evolving nature of the weather, climate and water enterprise and the risks and opportunities provided by private sector engagement therein;

- (2) Regulatory role of WMO is fundamental foundation for the entire weather, climate, and water enterprise and to ensure quality of data and services;
  - (3) Private sector in the data provision, data processing and information services could become a major concern and the opportunities and threats need to be better identified;
  - (4) A structured to dialogue at all levels, including global, regional and national is necessary;
    - (a) WMO should engage/organize an ongoing dialogue at the Global level to stay informed of developments in the private sector in the weather climate and water enterprise;
    - (b) RA II members, with the support of the Secretariat, need to reach out proactively and look for opportunities for engagement and at the same time identify the risks/threats;
  - (5) WMO policy on public-private engagement is required. A high-level policy document (e.g., Congress Declaration or Resolution) could be useful to establish roles and responsibilities and promote win-win approaches. Policy Framework (and a Declaration/Resolution) should be adopted by Cg-18;
  - (6) WMO Secretariat should develop guidance material for Members relevant and useful for all weather, climate, and water enterprise stakeholders including the private sector, in particular with relation to free and unrestricted exchange of data and build up a compendium of case studies to illustrate the various current and potential models for public-private partnerships;
  - (7) Governments should consider the value of establishing legislation that clearly defines relative roles in the market space including the authoritative voice of the NMHS in provision of warning services and if possible also defining a regulatory role of the NMHS with respect to third party weather and climate information service providers that provide for validation of accuracy and quality of information and action to be taken if quality standards are not adhered to.
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### Decision 37 (RA II-16)

#### GENDER EQUALITY

REGIONAL ASSOCIATION II (ASIA),

**Recalling** Decision 77 (EC-68) on the WMO Gender Action Plan (thereafter referred to as “the Action Plan”),

**Recalling also** Resolution 59 (Cg-17) on gender equality and empowerment of women and the WMO Gender Equality Policy,

**Acknowledging** the role of WMO in implementing the outcomes of the Conference on the Gender Dimensions of Weather and Climate Services and in facilitating implementation of the gender aspects of the Sendai Framework for Disaster Risk Reduction, the Paris Agreement under the United Nations Framework Convention on Climate Change, and the 2030 Sustainable Development Agenda,

**Reaffirming** the goal of achieving gender equality within WMO and gender sensitive weather, hydrological, climate and related environmental services that will contribute to an improved response to the specific needs and social and economic circumstances of women,

**Recognizing** the priority actions for 2016-2019 of the Action Plan endorsed by EC-68 ([http://ane4bf-datap1.s3-eu-west-1.amazonaws.com/wmocms/s3fs-public/GAP\\_Draft.pdf?VDGolo0GoiMq9aT5FAHzO2uHJdKJTqmZ](http://ane4bf-datap1.s3-eu-west-1.amazonaws.com/wmocms/s3fs-public/GAP_Draft.pdf?VDGolo0GoiMq9aT5FAHzO2uHJdKJTqmZ)),

**Recognizing further** the need to implement the Action Plan in 2016-2019 in RA II,

**Having examined** the progress report of the Secretary-General on gender equality which shows that women continue being under-represented in WMO governance structures,

**Invites** Members to:

- (1) Nominate more females as members of WMO constituent bodies and their working structures;
- (2) Nominate a national focal point on gender;
- (3) Use the Action Plan as guidance and undertake relevant actions at national level;
- (4) Facilitate implementation of the Action Plan through the provision of in-kind and voluntary contributions to the WMO Gender Activities Trust Fund;

**Urges** Members to increase participation and involvement of women in the work of the Association.

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## APPENDIX 4. LIST OF PARTICIPANTS

### 1. Officers of the session

Abdulla Mohamed A. AL-MANNAI	President
Ghulam RASUL	Vice-President

### 2. WMO Members within RA II

#### Bahrain

Adel TERRAR	Principal Delegate
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#### Bangladesh

Mahnaz KHAN (Ms)

#### Bhutan

Pema SYLDON (Ms)	Delegate
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#### China

Xinwen YU	Principal Delegate
Jun LIAO	Alternate
Lei LI	Delegate
Chong PEI (Ms)	Delegate
Guoqing WANG	Delegate
Jiuke WANG	Delegate
Weining XING	Delegate
Xianghua XU	Delegate
Hongzheng ZHANG	Delegate

#### Hong Kong, China

Cho Ming CHENG	Principal Delegate
Lap-shun LEE	Alternate

#### India

Kanduri J. RAMESH	Principal Delegate
Ram Kumar GIRI	Delegate

#### Iraq

Mustafa Allawi Abed AL-TAMEEMI	Acting President
Ali Talib FADHEL	Acting President
Muataz Mohammed Hussien HAMEED	Acting President
Thaer Hussein Mohammed KBAISH	President

#### Japan

Yasuo SEKITA	Principal Delegate
Hiroshi KOIDE	Delegate
Hiroaki MINEMATSU	Delegate
Akihiko SHIMPO	Delegate
Yoshiro TANAKA	Delegate

#### Kazakhstan

Marat KYNATOV	Principal Delegate
Didar ZHANIBEKULY	Delegate

**Kuwait**

Khaled M. AL-SHUAIBI	Principal Delegate
Emad AL-SANOUSI	Alternate
Salah ALANSARI	Delegate

**Macao, China**

Soi Kun FONG	Principal Delegate
Ieng Wai LAO	Alternate

**Maldives**

Abdullahi MAJEED	Principal Delegate
Abdul Mushin RAMIZ	Delegate

**Mongolia**

Sevjid ENKHTUVSHIN	Principal Delegate
Eldev-Ochir ERDENEBAT	Delegate

**Myanmar**

Kyaw Moe OO	Principal Delegate
Hla TUN	Delegate

**Nepal**

Rishi Ram SHARMA	Principal Delegate
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**Pakistan**

GHULAM RASUL	Principal Delegate
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**Qatar**

Abdulla M.A.M. AL MANNAI	Principal Delegate
Haya AL NAUIMI (Ms)	Delegate
Monikumar RAMAKRISHNAN	Delegate

**Republic of Korea**

Heedong YOO	Principal Delegate
Ihncheol SEONG	Alternate
Aram BAEK (Ms)	Delegate
Chulwoon CHOI	Delegate
Hwirin KIM (Ms)	Delegate
Seungbum KIM	Delegate
Sung KIM	Delegate
Jengeun LEE (Ms)	Delegate
Seungkyun PARK	Delegate
Jangyong SUNG	Delegate
Minjeong YOUN (Ms)	Delegate

**Russian Federation**

Alexander NURULLAEV	Alternate
Marina PETROVA (Ms)	Delegate

**Saudi Arabia**

Ayman Salem GHULAM	Principal Delegate
Mohammed BABIDHAN	Delegate

**Tajikistan**

Iftikhor KARIMOV	Principal Delegate
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**Thailand**

Songkran AGSORN	Principal Delegate
Wattana KANBUA	Alternate

**United Arab Emirates**

Abdullah A. ALMANDOUS	Principal Delegate
Omar A. AL YAZEEDI	Alternate
Mohamed A. AL EBRI	Delegate
Mohamed H. AL HARMOODI	Delegate
Yousef N. ALKALBANI	Delegate

**Uzbekistan**

Davron AZIMOV	Principal Delegate
Firuz SAFAROV	Alternate

**Viet Nam**

Van Tue NGUYEN	Principal Delegate
Thanh Hai LE	Delegate

**3. WMO Members outside RA II****Azerbaijan**

Akbar ASGAROV	Observer
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**Morocco**

Mohammed AIT OUALI	Observer
Abdallah NASSIF	

**United States of America**

John NANGLE	Observer
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**4. Presidents of constituent bodies and chairpersons of other bodies**

David GRIMES	President
Ivan CACIC	President of RA VI

**5. Representatives of international organizations and other bodies****Gulf Cooperation Council (GCC)**

Said Hamed ALSARMI	Observer
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**League of Arab States**

Ashraf N.A. SHALABY	Observer
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**The Association of Hydro-Meteorological Equipment Industry (HMEI)**

Ahmed H.M. AL-HARTHY	Observer
Glenn DAVIS	Observer
Paul GRIFFITH	Observer
Herbert LEPPER	Observer
Chris REITH	Observer
Michal WEIS	Observer

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