Regional Association V (South-West Pacific)

Sixteenth session

Jakarta
2–8 May 2014

Abridged final report with resolutions

World Meteorological Organization
Weather • Climate • Water

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GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION (agenda item 1)

1.1 At the kind invitation of the Government of the Republic of Indonesia, the sixteenth session of Regional Association V (South-West Pacific) was held in Jakarta, Indonesia, from 2 to 8 May 2014. It was opened at 10 a.m. on 2 May 2014 by the Honorable His Excellency Mr Evert Ernest Mangindaan, Minister for Transportation of the Republic of Indonesia.

1.2 Mr 'Ofa Fa'anunu, acting president of RA V welcomed the participants to the session. Mr 'Ofa Fa'anunu also welcomed Tuvalu to the WMO which had become a Member of WMO on 22 November 2012. The acting president of RA V expressed his appreciation to Dr Andi Eka Sakya, Director-General of BMKG of the Republic of Indonesia and Permanent Representative of Indonesia with WMO and the staff of BMKG, the Local Organizing Committee and the WMO Secretariat for their efforts for the organization of the session.

1.3 The acting president of RA V reminded the participants that Region V is unique in that Member countries are scattered over vast oceans. He reminded the participants that the session is convened in Jakarta due to Typhoon *Haiyan* which devastated the Philippines in November 2013. He further highlighted the devastating effects of floods in Queensland, Australia in December 2010 and January 2011, in Fiji in January and March 2012; the deadly tsunami in the Solomon Islands in February 2012; the loss of life and economy in Samoa during Tropical Cyclone *Evan* in December 2012 and in more recent times the horrific devastation caused by severe Tropical Cyclone *Ian* in Tonga in January 2014.

1.4 The acting president of RA V noted some of WMO accomplishments during the intersessional period including assistance to Members of RA V especially developing countries, Small Island Developing States (SIDS) and Least Developed Countries (LDCs) on quality management, aviation meteorological services, post-disaster rehabilitation, weather forecasting, preparation and delivery of weather information to end users, and drafting of legislation for National Meteorological Services (NMSs). He also noted the first-ever extraordinary session of the World Meteorological Congress in October 2012 and the Regional Consultation on Climate Services in Pacific Island States held in Cook Islands in March–April 2014.

1.5 The acting president of RA V reminded the session of a few important global events including the UNISDR consultations process on the Post-2015 Disaster Risk Reduction and the preparation for the Third International Conference on SIDS to be held in Apia, Samoa, from 1 to 4 September 2014.

1.6 The acting president of RA V informed the session that the sixth Regional Conference on the Management of National Meteorological and Hydrological Services (REC0-6) was held in Jakarta, Indonesia, from 30 April to 1 May 2014 and provided an opportunity to discuss challenges and priorities of RA V. Noting the need to improve user-interface platforms, address gaps in monitoring and early warning systems and establish Regional Climate Centers (RCCs). The president encouraged the formation of genuine partnerships at the global, regional and national level.

1.7 Mr Michel Jarraud, Secretary-General of WMO joined the acting president in welcoming representatives of WMO Members to the session. He too noted Tuvalu as the newest RA V Member and the 190th Member of WMO. He expressed his hope that the Marshall Islands, Palau, and Nauru would become Members of WMO in the near future.

1.8 On behalf of WMO and the Members of RA V, Mr Jarraud thanked the Government of the Republic of Indonesia for hosting the session after Typhoon *Haiyan* devastated the Philippines, where the session was originally scheduled to take place. He expressed his sympathy to the people and Government of the Philippines, Tonga, and the Solomon Islands for the devastation

caused by Typhoon *Haiyan*, Tropical Cyclone *Ian*, and recent flooding. He extended the sympathy to other Members who have during the past years have been affected by extreme weather events.

1.9 Mr Jarraud thanked the acting president and the former president of RA V, Dr Sri Woro B. Harijono for the leadership during the intersessional period. He also thanked the Leads, Chairperson, theme leaders and members of the working groups and task teams for their valuable services to RA V. Mr Jarraud expressed WMO special gratitude to Dr Andi Eka Sakya, Director-General of BMKG of the Republic of Indonesia and Permanent Representative of the Republic of Indonesia and his staff for the excellent arrangements made for the session and RECO-6. He recalled that a number of meetings were hosted by the Government of the Republic of Indonesia including the RA V Workshop on the Implementation of WIGOS and the fifteen session of the Commission for Basic System, in 2012 and the International Workshop on Global Atmospheric Watch (GAW) in the Tropics in 2013.

1.10 Dr Andi Eka Sakya, Director-General of BMKG of the Republic of Indonesia and Permanent Representative of the Republic of Indonesia with WMO expressed his delight that nearly all Members of RA V are participating in the session. He expressed his gratitude to the acting president of RA V, Members of RA V, the Secretary-General of WMO, the WMO Secretariat staff, representatives of international and regional organizations, BMKG staff, and representatives of national partners' agencies and institutions, for their presence at the session. He warmly welcomed all participants to Jakarta.

1.11 Dr Sakya reflected on achievements since the fifteenth session of RA V (Bali, Indonesia, May 2010) and made some recommendations for consideration during the session. He joined the acting president of RA V informing the session of RECO-6 discussions on issues including aviation meteorological services, the World Meteorological Information System (WIS), the World Meteorological Integrated Observing System (WIGOS), climate services, disaster reduction, and more importantly the future priorities, strategic and operating planning for WMO and RA V for the period of 2016 to 2019.

1.12 In concluding his opening speech, Dr Sakya invited His Excellency Mr Evert Ernest Mangindaan, the Honorable Minister for Transportation of the Republic of Indonesia, to deliver his opening statement and officially open the session.

1.13 His Excellency Mr Mangindaan extended a very warm welcome to all participants to the session. On behalf of the people and the Government of the Republic of Indonesia, he expressed a sincere gratitude to the President of WMO and the Secretary-General for their participation in the session. He also extended a sincere appreciation to the staff of BMKG for working with the WMO Secretariat to organize the session.

1.14 His Excellency Mr Mangindaan informed the session that like other countries the Republic of Indonesia is vulnerable to climate change, and his country is one of the 15 countries establishing the GFCS in anticipation of global warming and to bridge climate change adaptation initiatives and that the Government of the Republic of Indonesia is committed to reduce Green House Gas (GHG) to 26 per cent by 2020.

1.15 His Excellency Mr Mangindaan also informed the session that the Government of the Republic of Indonesia is carrying out several concrete steps through Government Regulation No. 6/2011 on the National Plan of Action to Reduce GHG, and the transportation and energy sectors are targeted to reduce GHG to as low as 0.038 gigatons of carbon dioxide against the 26 per cent of national emission reduction target from business as usual levels, or 41 per cent with international support. The transportation sector is using 51 per cent of the total fuel consumption.

1.16 His Excellency Mr Mangindaan reminded the participants that several strategic issues would require their attention including aviation meteorological services, WIS, WIGOS, climate services. He emphasized the importance of aviation meteorology noting the upsurge in the aviation industry in recent years along with changes in aviation navigation systems and technologies,

resulting in changes in aviation meteorological services including, operational management and personal standards of competency.

1.17 In ending his statement, His Excellency Mr Mangindaan encouraged the session to discuss strategic issues to strengthen cooperation among Members of WMO, particularly in South-East Asia and the Pacific. His Excellency concluded by declaring the sixteenth session of RA V officially opened.

2. ORGANIZATION OF THE SESSION (agenda item 2)

2.1 Consideration of the report on credentials (agenda Item 2.1)

In accordance with General Regulation 23 a list of participants and the capacities in which they were attending the session was prepared on the basis of an examination of the credentials provided. The session was attended by 58 participants from 17 Member countries of the Association, 4 participants from 3 countries non-members of the Association, 6 observers from International Organizations and 4 invited experts. The list of participants is given in the appendix to the present report.

2.2 Adoption of the agenda (agenda Item 2.2)

The Association adopted the provisional annotated agenda, as contained in RA V-16/ Doc. 2.2(2).

2.3 Establishment of committees (agenda Item 2.3)

2.3.1 The Commission worked in Plenary throughout the session. In accordance with WMO General Regulations 23 and 25, the Association established the following committees for the duration of the session:

Nomination Committee

2.3.2 In order to facilitate the election of officers of the Association, in accordance with General Regulation 27, a Nomination Committee was established to review nominations received for the president and vice president of the Regional Association.

2.3.3 Based on consultations with principal delegates concerned, the Nomination Committee was composed of the delegates of Fiji, New Zealand and Singapore.

Drafting Committee

2.3.4 In accordance with WMO General Regulation 28, the Association decided not to establish a Drafting Committee.

Coordination Committee

2.3.5 In accordance with WMO General Regulation 29, a Coordination Committee was set up. As specified by the General Regulation 29, the Coordination Committee consisted of the acting president of the Association, the representative of the Secretary-General, the chairpersons of Plenaries A and B, and the secretaries of the plenary sessions.

Selection Committee

2.3.6 The Association noted the changes being made to its structure in which the membership of the various teams will be determined by the Management Group and decided not to establish a Selection Committee.

2.4 Other organizational matters (agenda Item 2.4)

2.4.1 The working hours from 9:00 a.m. to 12:00 noon and from 2:00 p.m. to 5:00 p.m. were adopted.

2.4.2 The plenary session was chaired by Mr 'Ofa Fa'anunu, acting president of the Association, plenary A by Mr R. Vertessy and Mr P. Lennox and plenary B by Ms Chin Ling Wong and Mr A. Waqaicelua.

2.4.3 Mr R. Masters, Director of the Development and Regional Activities Department and Dr C.-K. Park, Director of the Regional Office for Asia and South-West Pacific from the WMO Secretariat acted as secretaries to the plenary sessions; other WMO staff assisted with presentation of different documents and related discussions directly or remotely by video conference.

2.4.4 According to the decision by the Executive Council at its fiftieth session (Geneva, June 1988), no minutes of the plenary meeting at sessions of regional associations should be prepared unless otherwise decided for special items. The Association accepted the decision of the Executive Council.

2.4.5 The Association agreed to waive, during the duration of the session, the Regulation 110, which indicates that any document intended for consideration in a plenary meeting should be distributed to participants in the session at least eighteen hours before the opening of the plenary session.

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

3.1 The Association noted with appreciation the report of the president of RA V which provided an overall review and assessment of the major activities of the Association since its fifteenth session and expressed satisfaction at the effective manner in which the activities of the Association were being undertaken. The president also highlighted the issues that the Association would have to continue to address, such as the implementation of the RA V Strategic Operating Plan (SOP) 2012–2015 and the development of the RA V Operating Plan (OP) 2016–2019; the working mechanism of the Association; and other current and future priority activities, including the implementation in the Region of the high priority activities decided by the Sixteenth Congress (2011) in the areas of: GFCS; WIGOS; WIS; aeronautical meteorology; capacity development; and disaster risk reduction.

3.2 The Association commended its president, Dr Sri Woro B. Harijono (Indonesia) for her leadership, dedication, and initiative with which she has conducted the affairs of the Association, thus contributing to the further development of weather, climate and water services in the Region. The Association also commended the vice-president, Mr 'Ofa Fa'anunu (Tonga), for his valuable contribution to the Association and its subsidiary bodies as well as the work of the Region. It also expressed its appreciation to the Chairpersons, Leads and members of the subsidiary bodies who had effectively collaborated in carrying out the activities of the Association.

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

3.4 The Association reaffirmed the importance of the establishment and enhancement of multi-hazard early warning systems in the Region in light of disastrous tropical cyclones/typhoons, floods, earthquakes and tsunamis, such as Typhoon *Haiyan* (Yolanda) in the Philippines in November 2012; Tropical Cyclone *Ian* in Tonga in January 2014; Tropical Cyclone *Evan* which devastated Fiji and Samoa in December 2012; the two flood incidents in Fiji in January and March 2012; and the tsunami event in the Solomon Islands in February 2012. In this regard, the Association requested the Secretary-General to continue to provide assistance to RA V Members,

in particular, developing countries, Least Developed Countries (LDCs) and Small Island Developing States (SIDS).

3.5 The Association noted with satisfaction the successful implementation of regional components of WMO Programmes and projects in the Region, such as the Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP) and the Fiji Coastal Inundation Forecasting Demonstration Project (CIFDP-F), and Indonesia Coastal Inundation Forecasting Demonstration Project Stakeholder Workshop (CIFDP-ISW) in the Region. In view of recent disastrous events, such as a vessel capsizing in high winds, rough seas and heavy swells and 200 loss of lives in Papua New Guinea in 2011, and the 2012 floods which caused damages to economy and infrastructure of Fiji, the Association requested the Secretary-General to provide assistance to Members for the continuous implementation of these projects and their extension to other Members.

3.6 The Association acknowledged and commended the activities of the working groups in RA V especially those aimed at establishing a Regional Climate Centre (RCC) network and implementation of Regional/Subregional Climate Outlook Forums (RCOFs), including the ASEAN Climate Outlook Forum (ASEANCOF) which started by a successful Training CLIPS in 2011 in Indonesia. The Association welcomed the establishment of a Regional Training Center in Indonesia that already hosted several activities including the WMO Regional Training Seminar for National Trainers for RA II and RA V in 2013, Training Course on Satellite and Radar Interpretation in 2012 and SEA HYCOS meeting in 2012.

3.7 The Association expressed its appreciation and commended the activities of the Working Group on Weather Services which had been aimed at assisting NMHSs in the Region to meet ICAO requirements for quality management and competency for aviation weather services. The Association requested the Secretary-General and Members to continue to provide assistance to help RA V Members especially LDCs and SIDS NMHSs become compliant with ICAO requirements.

3.8 The Association recognized the major achievements and progress in the Region including, among others:

(a) Development of a Regional WIGOS Implementation Plan for RA V (R-WIP-V) and a Regional WIS Implementation Plan for RA V;

(b) Establishment of a WMO RTC in Indonesia;

(c) Increased number and stabilization of meteorologists/tropical cyclone forecasters at RSMC Nadi;

(d) Further enhancement of the partnership with SPREP through the Pacific Meteorological Desk Partnership (PMDP) and the Pacific Meteorological Council (PMC).

3.9 The Association reaffirmed the importance and its commitment to the implementation of the RA V SOP 2012–2015 and the development of the RA V OP 2016–2019 as its contribution to the development and implementation of the WMO SP and OP 2016–2019.

3.10 The Association expressed its appreciation to the Secretary-General and its Members for the continued support for the development of human resources and building institutional capacity in the Region. The Association requested the Secretary-General and its Members to continue providing support and assistance to RA V Members especially developing countries, LDCs and SIDS.

3.11 The Association was pleased to note that the Regional Office for Asia and the South-West Pacific in Geneva and the WMO Office for the South-West Pacific in Samoa have played an important role in various regional capacity development activities, facilitating implementation of WMO regional events, maintaining close contact with Members, providing support to meet

Members' requirements; and participating in various WMO activities, in close collaboration with Members and partner organizations in the Region.

3.12 The Association expressed a warm welcome to Tuvalu, a new Member of WMO and the 23rd Member of RA V as from 22 September 2012. It encouraged Marshall Islands, Nauru and Palau to consider becoming Members of WMO.

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

4.1 Service quality and service delivery (agenda item 4.1)

Public Weather Services

The WMO Strategy for Service Delivery

4.1.1 The Association recalled that the Sixteenth World Meteorological Congress (Cg-XVI, Geneva, May–June 2011) had adopted the "The WMO Strategy for Service Delivery (the Strategy)", and had consequently requested regional associations (RAs) to facilitate its adoption by Members. The Association further noted that the sixty-fifth session of the WMO Executive Council (EC-65, Geneva, May 2013) had adopted Resolution 4 (EC-65) – Implementation Plan for the "WMO Strategy for Service Delivery". The Association expressed its appreciation that the Public Weather Services (PWS) Programme had provided support in the development of the Strategy and its Implementation Plan (IP) through facilitating wide consultations with the presidents of regional associations, presidents of technical commissions, experts from a number of National Meteorological and Hydrological Services (NMHSs), as well as all the WMO Programmes whose roles include service delivery. It welcomed the fact that the Strategy and its IP were in the process of being published in all official WMO languages. The Strategy and the IP can be freely accessed through the following web link: http://www.wmo.int/pages/prog/amp/pwsp/documents/WMO-SSD-1129_en.pdf. The Association therefore adopted Resolution 1 (RA V-16) – Implementation of the WMO Strategy for Service Delivery in Regional Association V (South-West Pacific), in which the Association requested its appropriate working group to ensure a harmonized and synchronized implementation of the Strategy by Members of RA V.

4.1.2 The Association noted that the "Seminar on Social and Economic Benefits (SEB) and Delivery of Meteorological and Hydrological Services for the Association of South-East Asia Nations (ASEAN) region" was held in Bandar Seri Begawan, Brunei Darussalam in October 2013 and that Brunei Darussalam, Indonesia, Malaysia, Singapore and Philippines participated. It expressed satisfaction with the fact that, during the Seminar, the WMO Strategy for Service Delivery and its Implementation Plan were introduced to the participants and that the participants tested the application of the Service Delivery Progress Model (SDPM) to assess the current status of their NMHSs in service delivery and means of strengthening their delivery of services. The Association welcomed this action and noted that the SDPM would greatly assist NMHSs to kick-start the implementation of the Strategy.

Social and Economic-Benefits (SEBs) of Meteorological and Hydrological Services

4.1.3 The Association noted that EC-65 had strongly supported the idea of assisting NMHSs acquire capacities to communicate the social and economic benefits of their services to their respective governments and to other decision-makers and welcomed the PWS Programme to lead the initiative of collaboration with the World Bank (WB), in the preparation of an authoritative publication on methodologies for the assessment of Socio-Economic Benefits of Meteorological and Hydrological Services. It noted with appreciation that the PWS Programme had organized the SEB Seminar in Brunei Darussalam, to demonstrate to the participants how to determine and show the benefits of the services they provide to various user sectors, as well as to introduce the WMO/ World Bank publication for inputs from the participating countries. The Association underlined the importance of such a publication, and urged its Members to use it as a practical guide in the design of assessment methodologies and the implementation of SEB activities in RA V. It also welcomed

plans to develop a few demonstration projects on the assessment of SEB in various Regions and requested to be considered for such projects.

PWS component of the Severe Weather Forecasting and Disaster risk reduction Demonstration Project (SWFDDP)

4.1.4 The Association expressed its satisfaction with the successful implementation of the Severe Weather Forecasting and Disaster risk reduction Demonstration Project (SWFDDP) in the Cook Islands, Fiji, Kiribati, Niue, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu, under the coordination of the Regional Specialized Meteorological Centre (RSMC) of Wellington, New Zealand. It noted that, through the implementation of the PWS component of SWFDDP, the NMHSs were improving their capacities in the delivery of severe weather warnings through building partnerships with their national disaster management and media organizations, and that they were engaged in: evaluation of the needs of users; linking service development and delivery to user needs; evaluation and monitoring of service performance; developing communication skills and employing multiple communication channels in order to improve service delivery to users.

4.1.5 The Association encouraged its Members participating in the SWFDDP to address the PWS-related gaps that had been detected and are contained in the Project Progress Report for the Full Demonstration Phase (1 November 2010–28 February 2013). The gaps include: (i) the insufficient interaction with the Disaster Management and Civil Protection Authorities (DMCPAs), media and the public outside of the cyclone season; and (ii) insufficient delivery and verification of non-tropical cyclone warnings.

Improving Forecast and Warning Services

Impact-based forecasts and risk-based warnings

4.1.6 The Association strongly supported the outcome of EC-65 in which the Executive Council urged NMHSs to evolve their warning services from hazards-based to impact-based services through establishing formal collaborative and coordination mechanisms between NMHSs and national agencies responsible for civil protection, and the collection by NMHSs of statistical data on natural hazards including severe weather events. The Association supported the preparation of guidance material for NMHSs on developing multi-hazard impact-based information and warning services, by the Commission for Basic Systems Open Programme Area Group on Public Weather Services Expert Team on Meeting User Needs in Reducing the Impacts of Hydrometeorological Hazards (CBS/OPAG-PWS ET-DPM), in collaboration with the relevant CBS OPAGs, as approved by the fifteenth session of CBS (CBS-15, Jakarta, Indonesia, September 2012). The guidance material, which will be published by the end of 2014, will highlight the challenges of impact-based forecast services in view of national circumstances as regards the responsibilities of NMHSs and existing task sharing in national risk management and will be enriched with existing examples and best practices of impact-based forecast and warning services. The Association urged Members to make use of the guidance materials once they were made available to NMHSs, in order to increase the effectiveness of their Services.

4.1.7 Noting the global trend to move towards forecasting the impacts of severe weather events, the Association requested the Secretary-General to organize training activities in RA V to ensure that staff of NMHSs acquire the necessary skills in impact forecasting and in the development and use of the colour-coded risk matrix for the identification of the likelihood of an event and its potential impact.

Implementing the Common Alert Protocol (CAP) standard

4.1.8 The Association welcomed the initiatives that the PWS Programme had taken in recent years towards promotion of the implementation of the Common Alerting Protocol (CAP) standard for communicating alerts, in line with the decision of the Fifteenth World Meteorological Congress (Cg-XV, Geneva, May 2007). It appreciated the value of the CAP standard in the communication of all types of alerts through all media. It noted that the PWS Programme had organized a number of

regional “CAP Jump-Start Workshops”. In addition, the PWS Programme had organized both a “CAP Implementation Workshop” and a “CAP Jump-Start Workshop” in Geneva, Switzerland, in April 2013, in an effort to develop the capabilities of Members to adopt the CAP standard. It recognized that the concept of CAP was not yet widely understood, and that NMHSs needed assistance, through initiatives such as the CAP Jump-Start workshops, in becoming familiar with this technology and its utility. It therefore urged its Members to take up the CAP Jump-Start Offer, as described at the following web page: http://www.wmo.int/pages/prog/amp/pwsp/CAPJumpStart_en.html, and to visit the PWS CAP web pages, for more information and guidelines at: http://www.wmo.int/pages/prog/amp/pwsp/CommonAlertingProtocol_en.html.

4.1.9 The Association acknowledged the importance of the “International Register of Alerting Authorities” in promoting the “single official voice” status for NMHSs in issuing weather warnings. It noted that 18 out of the 23 Members had assigned editors for the Register. The Association encouraged the remaining five (5) Members who had not yet joined the initiative to actively participate in the Register initiative by nominating editors to populate the web pages of the Register, with government departments and other institutions authorized to issue warnings in their respective countries. It encouraged Members to make full use of the PWS Technical Document entitled, “Administrative Procedure for Registering WMO Alerting Identifiers” (PWS-20, WMO/TD-No. 1556). This publication is freely accessible at the following web link: http://library.wmo.int/opac/index.php?lvl=etagere_see&id=41.

The World Weather Information Service (WWIS)

4.1.10 The Association appreciated the continued operational success of the World Weather Information Service (WWIS) website, now available in ten language versions, namely: Arabic; Chinese; English; French; German; Italian; Polish; Portuguese; Russian; and Spanish, providing forecasts for over 1,700 cities and with cumulative page visits surpassing the 1 billion mark. Plans are currently under development to incorporate the Korean language into WWIS. The Association was pleased with the recent launch of the “MyWorldWeather” iPhone and Android applications and encouraged Members to continue to increase the number of cities for which they provided forecasts, the lead time, as well as the frequency of updating the forecasts. It also urged Members to make use of the recently issued PWS *Guidelines on Participation of National Meteorological and Hydrological Services in the WMO World Weather Information Service* (PWS-25, WMO-No. 1096), to assist NMHSs enhance their participation in WWIS. This publication can be accessed at: http://library.wmo.int/opac/index.php?lvl=etagere_see&id=41.

4.1.11 The Association reiterated the value of the Severe Weather Information Centre (SWIC) website in providing global severe weather information and warnings covering typhoons, heavy rain and snow, thunderstorms, gale and fog, as well as official observations on cloudiness and rain. It expressed the need to provide warnings in the CAP standard format so as to increase the reach of the warnings and alerts in the Region.

Provision of operational meteorological assistance to the work of humanitarian agencies

4.1.12 The Association noted the outcome of the Meeting of the Commission for Basic Systems Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies that was held at the WMO headquarters, in July 2013 (full report available at http://www.wmo.int/pages/prog/www/CBS-Reports/documents/Final-Report_TT-Humanitarian-July2013.pdf). Among the items addressed was the dissemination of products and services to humanitarian agencies. In this context, the Association supported the proposal by the Task Team to provide access to the WMO SWIC website to the Global Disaster Alert and Coordination System (GDACS) as a way of facilitating service delivery to Humanitarian Agencies (HAs).

4.1.13 The Association welcomed the decision of the Task Team to provide translation of the Global Seasonal Climate Update (GSCU) into user-friendly language, easily understandable by users such as HAs. In this regard, the Met Office (United Kingdom of Great Britain and Northern Ireland) experts were assisting in the development of a "template" of what could be provided to HAs based on the information in the GSCU, which includes the Early Warning/Early Action report

produced by a group of humanitarian agencies for HAs at the global level. The regional aspects will be supported by the Regional Climate Centres (RCCs).

Capacity development and training

4.1.14 The Association stressed the need for organizing capacity-building activities for improvement of service delivery; implementation of SEB studies and analyses by NMHSs; and improvement of warning services such as through the CAP standard. In this regard, the Association expressed pleasure with the various guidelines that the PWS Programme had produced during the intersessional period and which were freely available online at the following web link: http://library.wmo.int/opac/index.php?lvl=etagere_see&id=41.

Competency requirements for PWS forecasters

4.1.15 With regard to the recommendation of Cg-XVI that all technical commissions define competency requirements for their core job-tasks, the Association was pleased that CBS, through its OPAG on PWS, was developing competency requirements for PWS forecasters, together with an additional competency framework for more specialized roles such as forecasters working in the media, with emergency management, and on the development of focused products for users. It noted that these competency frameworks would not have regulatory force as is the case with competency standards in aviation, but would serve to provide guidance to Members in establishing and demonstrating appropriate levels of competency among their forecast staff. The Association was informed that following the review of the requirements by CBS-15, they were being further developed within CBS and the EC Panel of Experts on Education and Training before being presented to the 2014 extraordinary session of CBS (CBS-Ext.(14)) for approval.

Aeronautical meteorology

General

4.1.16 The Association noted that aeronautical meteorology was a high priority service area for all Members in the Region. Concerns were expressed about some persisting deficiencies in the provision of meteorological service to international air navigation by some Members in the South-West Pacific, which have been included in the ICAO regional list of air navigation deficiencies, including: provision of MET observations and reports, SIGMET and Meteorological Watch Office (MWO) services, information on volcanic activity, and availability and use of World Area Forecast System (WAFS) products. Although some improvements have been achieved recently, the Association considered that the resolution of the safety-related deficiencies in the provision of aeronautical meteorological services by the SIDS in the Region should be accorded high priority. Therefore, the Association requested the Secretary-General to work closely with ICAO, IATA and other partners, including regional organizations like the Pacific Air Safety Office (PASO), and the developed countries in the Region, towards developing a coordinated action plan for resolving of the long standing safety-related deficiencies in the provision of meteorological service to international air navigation in the South-West Pacific.

4.1.17 The Association noted further the existing arrangements for the delegation of certain meteorological services, e.g., the issuance of TAF and SIGMET for some airports and flight information regions by the NMHSs of Fiji and Papua New Guinea. The Association considered such delegation of service as an efficient subregional approach; however, it stressed that the capacities for the provision of the requisite basic services should continue to be developed and enhanced at national level. Development of an appropriate cost-recovery mechanism for the SIDS, with due consideration of the specifics of the flight operations, should be considered. In this regard, the Association urged the Members to strengthen the cooperation between the MET authorities and MET service providers and the respective Civil Aviation Administrations (CAA) to ensure that requisite services, such as meteorological observations and reports at aerodromes, are adequately resourced for continuous operations. Maintaining the quality of observational data through regular calibration and maintenance and ensuring reliable telecommunication means for international exchange need also be addressed at regional level.

Quality Management System (QMS)

4.1.18 The Association appreciated the national and regional efforts for the implementation of quality management for the meteorological service for aviation. The Association expressed in particular its appreciation to the governments of Australia and Finland for the valuable support through focused projects on the implementation of QMS. As a result, the majority of RA V Members have already completed or are in an advanced stage of QMS implementation as required by ICAO and WMO regulations. Currently, about 50% of the Members have obtained an ISO 9000 certification for their MET service providers. However, the Association was concerned that some of its SIDS Members could not yet achieve such certification which has a negative impact on their safety audit results. Therefore, the Association requested its developed Members and relevant development partners to continue their assistance to the SIDS to obtain and maintain a certified ISO 9000 QMS.

Competence of Aeronautical Meteorological Personnel (AMP)

4.1.19 The Association noted that, as of 1 December 2013, the Aeronautical Meteorological Services (AMS) shall ensure that their aeronautical metrological personnel (AMP), both forecasters and observers, meet WMO competence standards for aviation meteorological forecasting and observing personnel. To meet these requirements, Members will be expected to provide evidence of their aeronautical personnel's competence as part of their Quality Management System. Members will also need to show that their AMP are continuing their professional development.

4.1.20 The Association welcomed the holding of the first workshop on competency requirements for aeronautical meteorology personnel (AMP) hosted by Samoa (July 2013) and facilitated by the Secretariat of the Pacific Regional Environmental Programme (SPREP) as part of the Finnish Pacific (FINPAC) project. This event provided training to 13 Pacific island countries and territories on the basics of competency assessment. In addition, training events in other regions (e.g., Hong Kong, China and Israel) have also been made available to RA V Members. However, the Association expressed concern of the fact that many of RA V Members have not yet started the practical implementation of the competence standards at their AMSs.

4.1.21 In view of the urgency of achieving compliance with the WMO competency standards, the Association requested the Management Group to task an appropriate subsidiary body to follow the national developments and provide assistance in establishing national programmes for competency assessment and continuous professional development of the AMP. In this regard, the Association appreciated the CAeM Competence Assessment Toolkit, developed by relevant CAeM task and expert teams, and supported a cost-effective approach through mapping of required competencies to web-based and other training material, with a view to addressing any competency deficits detected by the assessments. The Association strongly recommended Members to make best use of the http://www.caem.wmo.int/moodle/ website for full information.

Qualifications requirements

4.1.22 The Association further noted that the qualifications requirements included in the WMO *Technical Regulations* (WMO-No. 49, Vol. 1) will become a standard practice on 1 December 2016. This will imply an obligation to Members to provide evidence of compliance for their aviation meteorological forecasters (AMF). Noting that the implementation deadline is in the next intersessional period, the Association strongly encouraged its Members to initiate respective action as soon as possible. Members were also reminded that the required qualifications for work areas and job functions of an AMF have to include the relevant elements of the Basic Instruction Package – Meteorology (BIP-M) at university degree level.

4.1.23 To facilitate the implementation of the qualification requirements, Members were strongly encouraged to advise the Regional Training Centres on their needs for remedial or additional training as soon as possible to allow sufficient time to develop options for meeting these requirements.

4.1.24 The Association strongly encouraged all Members to provide the Secretariat with regularly updated information on their compliance with the relevant technical regulations, in particular, those related to QMS, competences and qualification requirements, as major implementation areas in the next intersessional period. Having up-to-date information on attained compliance would allow the Secretariat to advise the RA V president and the Management Group on the necessary capacity development actions to resolve any deficiencies and enhance the compliance status.

Volcanic ash

4.1.25 The Association recalled that Region V was among the most volcanic active regions in the world and that volcanic ash (VA) was a serious aviation safety hazard. The Association expressed appreciation to its Members hosting Volcanic Ash Advisory Centres (VAAC), Australia and New Zealand for their constant effort in providing VA advisories and for their assistance to Meteorological Watch Offices (MWO) responsible for the issuance of VA SIGMET. Furthermore, the Association strongly supported the work of the Volcanic Ash Scientific Advisory Group (VASAG), co-sponsored by WMO and the International Union of Geodesy and Geophysics (IUGG) and commended Australia for playing a lead role in VASAG in advancing the scientific understanding of volcanic ash detection and forecasting in support of continued safe and efficient civil aviation operations.

4.1.26 The Association noted some improvements in the provision of VA SIGMET by its Members situated in regions with high volcanic activities. Further improvement of the coordination between the VAACs, MWOs, volcano observatories and air traffic services (ATS) was necessary to ensure prompt SIGMET issuance immediately following a volcanic eruption. In this regard, the Association noted that a joint circular letter by the Secretary-General of WMO and the Secretary-General of ICAO had strongly requested all Members to support and enhance the observation programmes that would allow to objectively determine the location, height and density of volcanic ash clouds. EC-65 supported the notion that, as part of the WMO Integrated Global Observing System (WIGOS), an integrated observing system with both ground- and space-based segments would fulfil the requirements for resolution, coverage and reliability of observations of volcanic ash (as a specific form of litho-aerosols). To ensure an effective follow-up of these recommendations and initial actions, the Association emphasized that a relevant RA V subsidiary body should coordinate Members' actions aimed at enhancing volcanic ash monitoring capabilities as part of the RA V WIGOS Implementation Plan.

Issues to be raised at the Conjoint ICAO/WMO Divisional Meeting and the fifteenth session of CAeM

4.1.27 The Association noted that the Conjoint ICAO/WMO Meteorology Divisional Meeting and the fifteenth session of the Commission for Aeronautical Meteorology (CAeM) which will be held at ICAO Headquarters in Montreal, Canada, from 7 to 18 July 2014 (including a WMO Technical Conference "Aviation Meteorology – Building Blocks for the Future" on 7 and 8 July 2014), will discuss and outline major changes in the future aeronautical meteorology services including service delivery models and related procedures. Supporting the ICAO "One Sky" concept through the enhancement of meteorological service for international air navigation will be the main focus of the Conjoint meeting. The "One Sky" concept will be realized through a Global Air Navigation Plan (GANP) and the Aviation System Block Upgrade (ASBU) methodology, intended to bring sector-wide operational improvements needed to cope with the high demand for capacity and efficiency, while maintain and improving the level of safety. The ASBU consists of 5-year blocks of planned Air Traffic Management (ATM) improvements with a horizon 2028 and beyond. Among the envisaged changes in the meteorological service provision is the transition from "product-centric" to "data-centric" services through the System-Wide Information Management (SWIM) approach. These changes will affect the traditional way of production and dissemination by the MET service providers and further regionalization of the service provision, with significant impacts on existing national and regional arrangements, including cost-recovery. As part of these changes, the requirement to exchange aviation Operational Meteorological (OPMET) information (e.g. METAR, TAF, SIGMET) in digital (XML/GML) format, which was introduced in November

2013 as an optional practice, will evolve in a global ICAO recommendation in 2016 and in a standard in 2019. Therefore, the Association requested CAeM and CBS, supported by the Secretariat, to provide guidance and capacity development actions for the RA V Members to ensure full compliance with OPMET coding as a prerequisite for the use of the standard Aviation XML Schema.

4.1.28 The Association noted with satisfaction that the CAeM-CBS Inter-Commission Task Team on Space Weather had been developing, in close cooperation with ICAO, a concept of operations on the potentially harmful effects of solar storms on communications and navigation systems, as well as the health impacts on passengers and crews. Similar efforts have been undertaken to provide meteorological support to aviation in the event of the release of chemical and/or nuclear hazardous substances. This work is again carried out as a multi-disciplinary effort with other UN partners such as WHO, IAEA, ICAO and other stakeholders. The effectiveness of this partnership has been demonstrated in dealing with the recent nuclear incident in Fukushima, Japan.

4.1.29 The ICAO Council, following excellent cooperation with WMO, had requested that the Conjoint MET Divisional Meeting in 2014 should address the emerging issues of how climate change and variability could affect the safety and economy of aviation operations, and how the application of aeronautical meteorology could contribute to further reducing the GHG emission from aviation through improved operations. The Association supported the need to address these questions in the context of the GFCS.

4.1.30 Noting the above emerging issues affecting the meteorological service for aviation, the Association recommended that a relevant RA V subsidiary body should monitor all relevant activities of RA V Members and keep the Management Group abreast of the developments. The Association also expressed concern of the possible significant implications of the numerous and complex ATM developments currently being planned at the global and regional level on future aviation MET service provision, in particular the transition from product-centric to data-centric services. Therefore, the Association agreed on the need to gain a greater understanding of these issues to better inform future discussions on the required aeronautical meteorology capacities and capabilities of RA V Members. It requested the WMO Secretariat to organize, in coordination with relevant international and regional partners, an appropriate regional event that would build on the outcomes of the Conjoint MET Divisional Meeting in July 2014 and support Members in meeting their needs specific to the requirements or strategies that will emerge from the Conjoint meeting. The Association adopted Resolution 2 (RA V-16) – Enhancement of meteorological service provision to civil aviation in Region V (South-West Pacific).

Marine Meteorology and Oceanography

Marine Meteorology and Oceanography Programme

4.1.31 The Association recalled the report of the fourth session of the Joint WMO-Intergovernmental Oceanographic Commission (WMO-IOC) Technical Commission for Oceanography and Marine Meteorology (JCOMM-4), held in Yeosu, Republic of Korea, from 23 to 31 May 2012, including the resolutions and recommendations that were approved by the WMO Executive Council at its sixty-fourth session through Resolution 2 (EC-64).

4.1.32 The Association noted that the JCOMM intersessional workplan (2012–2017), agreed through JCOMM-4, addresses and contributes to all five WMO Strategic Thrusts. It advised that further efforts should be made to fill the regional and technological gaps in ocean observations, data management and services through closer interaction between the RA Working Groups and JCOMM Expert Teams/Groups. The Association recommended that its Members identify regional and national plans and activities aligned with the JCOMM intersessional workplan, and maximize synergies through direct coordination of those with common goals and regional interest. While not excluding other activities, the Association identified the following issues as potential items for enhanced coordination by the RA Members with JCOMM Expert Teams and Groups:

(a) A World-Wide Met-Ocean Information and Warning Service (WWMIWS) has been implemented in collaboration with WMO and the International Maritime Organization (IMO) (see http://weather.gmdss.org) through technical advice by the JCOMM Expert Team on Maritime Safety Services (ETMSS). In the RA V Region, meteorological Maritime Safety Information (meteorological MSI) is provided in METAREAs X, XI, XII and XVI through their Coordinators including Australia, Japan, New Zealand and the United States of America. The RA V Members are encouraged to actively link with the respective Coordinators of the Region to ensure the quality and timeliness of the information. Notable milestones include: (1) encouragement of user surveys for ship masters that are regularly conducted by JCOMM/ETMSS; and (2) enhanced coordination among NMHSs in the same METAREA to ensure seamless service of the meteorological MSI. The Association noted the planned meeting of the joint METAREA-NAVAREA Coordinators, to be held from 18 to 22 August 2014 in Wellington, New Zealand, which is co-organized by the WMO and the International Hydrographic Organization (IHO) at the kind invitation of the government of New Zealand;

(b) During the current intersessional period, the JCOMM Expert Teams have been reviewing the overall structure for the *Manual on Marine Meteorological Services* (WMO-No. 558) and the *Guide to Marine Meteorological Services* (WMO-No. 471). The Association invited its Members to provide feedback to the WMO Secretariat regarding the applicability and clarity of the contents for these publications, in particular, for Volume II – Regional Aspects of WMO-No. 558.

4.1.33 The Association took note of the ongoing development by JCOMM, in the context of a WMO-wide effort for quality management approach for improved services, for globally acceptable requirements for marine meteorological and oceanographic services. It noted that the final draft for marine weather competency framework would be submitted to Cg-17 in 2015 after review by experts and then by Members, as a minimum baseline standard of competence to perform the duties of a marine weather forecaster (MWF). The Association noted with satisfaction that the ongoing process has taken into account considerable variation in the legitimate functions of Marine Weather Offices worldwide, therefore, the WMF competencies proposed for adoption for the respective regional/national functions and priorities reflected this variety of functions. The Association stressed the importance of this process, and on the need for its Members to be engaged in the final review of the draft prior to Cg-17 in 2015. The Association thanked Mr Bryan Boase (Australia), leader of the JCOMM Task Team on Marine Competency Requirements (TT MCR) for his leadership and substantial input to the process.

4.1.34 The Association noted with appreciation the joint effort by JCOMM and the Commission for Agricultural Meteorology (CAgM), through the Joint JCOMM-CAgM Task Team on Weather, Climate and Fisheries (TT-WCF: http://www.jcomm.info/TT-WCF), to enhance understanding and capabilities in marine climatology/oceanography and their impacts on ocean fisheries, particularly in the Pacific Island Countries (PICs). Upon the agreed workplan of the Task Team at its first formal meeting (February 2013, Noumea, New Caledonia; http://www.jcomm.info/TT-WCF-1), it is intended that this work might also lead to enhanced observations and data transmission by fisheries vessels in the Pacific region. The Association expressed its particular thanks to the Australian Bureau of Meteorology for its substantial input to the work of TT-WCF. Noting the direct linkage and benefit of this Task Team's activities to the Region, the Association urged the Secretariat to take steps to promote activities of the Team across the Region, in close coordination with the regional organizations such as the Secretariat of the Pacific Community (SPC).

4.1.35 The Association recalled that the UN Conference on Small Island Developing States (SIDS), to be held from 1 to 4 September 2014 in Apia, Samoa, identifies priority areas for partnerships to benefit SIDS, including climate change and sustainable energy, oceans and seas, and disaster resilience. It recognized the close relevance of the work of WMO's Marine Meteorology and Oceanography Programme (MMOP) to the priorities of SIDS and to this Conference, and therefore welcomed the active WMO contribution to the SIDS Conference, in particular, on the subjects of sustainable use of oceans including fisheries management as well as the coastal area management including the coastal disaster risk reduction.

Coastal Inundation Forecasting Demonstration Project

4.1.36 The Association recalled the joint efforts of JCOMM and the Commission for Hydrology (CHy) through the Coastal Inundation Forecasting Demonstration Project (CIFDP: http://www.jcomm.info/CIFDP), to demonstrate how integrated coastal inundation forecasting and warnings can be improved and effectively coordinated by the National Meteorological and Hydrological Services (NMHSs). The Association reaffirmed the importance and benefit of CIFDP to enhance the capacity of NMHSs for coastal disaster risk reduction, and to improve interaction with users of the NMHSs' information services.

4.1.37 The Association recognized the improved concept and general framework of CIFDP, as detailed in the CIFDP Implementation Plan (JCOMM Technical Report No.64), and agreed that the revised framework would provide sound guidance for those countries which plan to develop an integrated coastal inundation forecasting and warning system embedded in the national disaster management. Noting that even the most efficient warning system could leave a large potential for fatalities, and that the institutional collaboration is one major requirement for effective and efficient warnings, the Association encouraged all Members concerned to consider developing and improving an integrated forecasting/warning system for coastal inundation by using the established framework and guidelines through CIFDP.

4.1.38 The Association noted the progress in ongoing National Sub-Projects of CIFDP: in RA V, Fiji (CIFDP-F) successfully completed its Phase 1 in October 2013 by finalizing the Definitive National Agreement (DNA), National Capacity Assessment (NCA), and User Requirement Plan (URP), and demonstrated its readiness to implement Phase 2 by completing the initial System Design for Coastal Inundation Forecasting (CIF) System for Fiji, Indonesia (CIFDP-I) formally launched Phase 1 through the National Stakeholders Workshop (December 2013, Jakarta, Indonesia), after the nation-wide consultation process for CIFDP implementation. The Association congratulated Fiji and Indonesia for their proactive role in advancing the project at the national level, and expressed its appreciation to the countries contributing to/providing support for the implementation of sub-projects, both financially and through in-kind technical advice.

4.1.39 The Association emphasized that the experience and lessons learnt and expertise gained from the implementation of various CIFDP National Sub-Projects could contribute to the national efforts of other countries in addressing similar concerns to enhance capabilities for coastal inundation forecasting and warning, and requested the Secretariat to continue to explore and coordinate activities to maximize the benefit and synergies of CIFDP implementation, particularly for those Members in need of technical assistance at the face of severe coastal hazards.

4.1.40 The Association further recognized that the JCOMM-led CIFDP efforts have demonstrated service provisions to coastal communities under the Global Framework for Climate Services (GFCS), linked with the GFCS priority areas of Water and Disaster Risk Reduction. It encouraged the Secretariat and the countries implementing CIFDP National Sub-Projects to actively share their experience and lessons with national agencies and with other countries through the intergovernmental process of GFCS, as well as to support national collaboration and regional coordination for data exchange, which is crucial for the success of the Project.

4.1.41 The Association noted with appreciation the solid support for technical advice provided by JCOMM and CHy to the implementation of CIFDP National Sub-Projects, through the JCOMM Expert Team on Waves and Coastal Hazard Forecasting Systems (ETWCH) and working groups of CHy. It also noted linkages with related programmes and projects with CIFDP, including the regional Storm Surge Watch Scheme (SSWS), the Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP), the eSurge project of the European Space Agency (ESA), the WMO Working Group on Societal and Economic Research Applications (WG-SERA), IOC Working Group on Tsunamis and Other hazards related to sea level Warning and mitigation Systems (TOWS-WG) and many others. The Association requested JCOMM and CHy, with support from the Secretariat, to ensure continuing and close coordination with these activities, for synergies in strengthening national capacities under the respective sub-projects.

Agricultural Meteorology

4.1.42 The Association noted the new workplan of the sixteenth session of the Commission for Agricultural Meteorology (CAgM) with the revised working structure consisting of four Open Panels of CAgM Experts (OPCAMEs) with the focus areas: Operational Agricultural Meteorology, Science and Technology in Agricultural Meteorology, Natural Hazards and Climate Variability/Change in Agriculture, and Capacity Development in Agricultural Meteorology (http://cagm-16.wmo.int). The Association encouraged its Members to nominate experts to these focus areas in order to provide the knowledge and expertise from the South-West Pacific Region in the use and promotion of weather and climate information for their agricultural communities.

4.1.43 The Association noted that the World AgroMeteorological Information Service (WAMIS) (http://www.wamis.org) has products from over 55 countries and provides tools and resources to help countries improve their bulletins and services. Considering the benefits of WAMIS to Members, the Association urged Members to actively participate in WAMIS and disseminate their products to the global community. The Association recognized the importance of developing new technologies such as agrometeorological forecasts and applications based on NWP output, remote sensing data and products and GIS technologies and welcomed the efforts of Members to assist the WMO Secretariat in developing pilot projects on these concepts.

4.1.44 The Association noted with appreciation the organization of the International Workshop on Climate and Oceanic Fisheries held in the Cook Islands in October 2011 and that the workshop papers were published in a special issue on Climate and Oceanic Fisheries in the journal Climatic Change (Volume 119, Issue 1 July 2013). The Association thanked all the co-sponsors who supported WMO's efforts in organizing this workshop.

4.1.45 The Association agreed with workshop conclusions for the need to provide improved National Meteorological and Hydrological Services to fisheries agencies, enterprises and communities and to continue collaborative efforts between meteorological, oceanographic, biological and fisheries researchers and management agencies to better monitor and understand the impacts of short-term variability and longer-term change on oceanic fisheries.

4.1.46 The Association noted that the meeting of the Joint CAgM-JCOMM Task Team on Weather, Climate and Fisheries (TT-WCF) was held in conjunction with the 2nd Climate Impacts on Oceanic Top Predators (CLIOTOP) Symposium in New Caledonia in February 2013. Several of the TT-WCF members made presentations at this symposium. The Association noted the work of the TT-WCF (see also 4.1.34) and appreciated that CAgM-16 proposed to keep the terms of reference unchanged for TT-WCF.

4.1.47 The Association noted that many Roving Seminars on Weather, Climate and Farmers have been held in several regions of the world. The Association urged its Members to support similar seminars in the Region and requested the Secretariat to facilitate the efforts for mobilization of financial resources to support such Roving Seminars in RA V.

4.1.48 The Association noted that Indonesia, the Philippines and Vanuatu have conducted a Climate Field School programme in order to improve the understanding of weather and climate phenomena by farmers and extension workers through a training process. The Association noted that the 'learning by doing' process serves as an effective process for transferring climate knowledge and climate information to farmers. The Association also noted that the Climate Field School programme represents real engagement with users and thus could contribute to the User Interface Platform, one of the GFCS components. The Association requested the Secretariat to facilitate efforts for mobilization of financial resources to support the operation of the Climate Field School programme in RA V.

4.1.49 The Association appreciated the ongoing efforts for capacity development of human resources in agricultural meteorology through a number of regional training events. The Association urged the Secretariat to explore opportunities for training events in agricultural meteorology in RA V, particularly on topics such as GIS for Agroclimatic Zoning. The Association

noted that Indonesia will conduct a Training of Trainers for the Climate Field School Programme to Agricultural Meteorological Section officers from ASEAN Countries in August 2014 as part of the Ina RTC training program. The Association requested the Secretariat to support this event as part of the training programme in the Ina RTC and therefore broaden participation from other Members of the region.

Tropical Cyclone Programme

General

4.1.50 The Association was informed that the primary objective of the Tropical Cyclone Programme (TCP) is to reduce the loss of life and damage caused by tropical cyclones to a minimum through establishment of national and regionally coordinated systems leading to delivery of forecasting, warnings services to users with multi-hazard approach. The TCP is implemented in the Region through the RA V Tropical Cyclone Committee.

4.1.51 The Association recognized the important role of the RA V Tropical Cyclone Committee in improving regional coordination and collaboration of Members to deliver their improved tropical cyclone forecasting and warning services through the Committee's Operational Plan which is updated and approved by the Association every two years. In this connection, the Association expressed its appreciation to the RA V Tropical Cyclone Committee for the excellent work being done through their Tropical Cyclone Operational Plan and Coordinated Technical Plan, respectively, to promote the strengthening of the tropical cyclone, storm surge and flood warning services and related disaster risk reduction in the Region. Furthermore, the Association highly commended the RSMC Nadi Tropical Cyclone Centre and other Tropical Cyclone Warning Centres in the Region for their round-the-clock surveillance and timely forecasting and warnings of tropical cyclones for the Members during cyclone seasons. The Association adopted Resolution 3 – Tropical Cyclone Operational Plan for the South Pacific and South-East Indian Ocean.

4.1.52 The Association was briefed about WMO Emergency Response to the Typhoon *Haiyan*, and related recommendations on follow-up actions by the recently held Meeting of the Presidents of Technical Commissions (PTC-2014, Geneva, January 2014). The Association was further informed that the Executive Council Working Group on Service Delivery (ECWG-SD) endorsed the recommendations by the PTC-2014, and considered to recommend them to the sixty-sixth session of the WMO Executive Council (EC-66, Geneva, June 2014) for its consideration and endorsement. These follow-up actions may be highlighted as follows:

(a) To develop a standardized and Synergistic Operating Procedure (SOP) within the WMO Secretariat in cooperation with WMO TC RSMCs/TCWCs and Members;

(b) To develop a clear, concise checklist technical guide to be included in the SOP as recommendations to Members for urgent actions. This guide should link hazard information to actions to be taken by people;

(c) To establish a network of emergency contacts, including Members and partner organizations;

(d) To develop and include impacts-based and risk-mapped tropical cyclone forecasting and warning information into the tropical cyclone advisories provided by RSMCs with activity specialization in tropical cyclones, and provides training accordingly;

(e) To develop guidance and technical tools to support Members' activities in disaster risk assessment and post-disaster analysis.

The Association considered that these follow-up actions after materialization would benefit the Members enormously, and requested the RA V Tropical Cyclone Committee Members and RSMC Nadi and TCWCs, in particular, to follow and implement the above-listed actions once they were endorsed at EC-66.

4.1.53 The Association noted that implementation of the Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP) had been successful and that the Storm Surge Watch Scheme (SSWS) was still in progress. It highly commended the RA V Tropical Cyclone Committee and recognized such performance as one of the essential aspects of the Committee leading to improved capability in tropical cyclone forecasting and warning and related service delivery and disaster risk reduction. The Association requested the Committee to be instrumental in the further implementation of SWFDDP and SSWS in the Region and work closely with the Regional Subproject Management Team (RSMT) for SWFDDP and the SSWS Action Team in order to ensure that both projects achieve their expected outcomes. As a continuation, the Association also requested to take a necessary action to continuing the plan to extend the area of activities of SWFDDP to the west (Western window).

4.1.54 The Association recognized that ensemble prediction techniques had achieved a high level of accuracy in tropical cyclone track forecasting. It recommended that greater emphasis should be given to the use of ensemble techniques and probabilistic forecasting in tropical cyclone warning operations in order to improve their utility. The Association encouraged the RSMC/TCWCs and National Meteorological and Hydrological Services (NMHSs) to further exploit the use of ensemble techniques in tropical cyclone forecasting and probabilistic forecasts, and requested the Secretary-General to organize necessary training activities in this regard for the forecasters engaged in tropical cyclone forecasting and warning services in the Region.

4.1.55 The Association noted with appreciation that the biennial Southern Hemisphere Training Course on Tropical Cyclone and Public Weather Services had made a significant contribution to a sustained augmentation of the tropical cyclone forecasting and warning services provided by NMHSs in the Region. The Training Course is usually organized at the Bureau of Meteorology Training Centre, Australia. The latest training course was organized in Fiji in 2013. The Association also noted with satisfaction that the training course provided training topics addressing regional challenges in tropical cyclone forecasting and warning services, and is therefore in high demand among the Members of the RA V Topical Cyclone Committee. The Association stressed that such a training event should continue, and requested the Secretary-General to continue to provide necessary resources and any other support to the training activity.

4.1.56 The Association recognized challenges to many NMHSs in operational tropical cyclone forecasting, in particular, intensity forecasting, and stressed that technology transfer and transition from research to operational forecasting is essential. Noting that the International Workshop on Tropical Cyclones (IWTC) serves as a key forum to bring together forecasters and researchers to interact and maximize opportunities for transferring research results into operational application, the Association encouraged its Members to send as many tropical cyclone forecasters and researchers as possible to the IWTC VIII, which will be held in Jeju, Republic of Korea, from 2 to 10 December 2014.

4.1.57 The Association noted with pleasure that the TC Forecaster Website (TCFW) (http://severe.worldweather.wmo.int/TCFW) was launched in April 2013. This site has been continuously updated since its launch. The TCFW is hosted by the Hong Kong Observatory (HKO) of Hong Kong, China, and serves as a vehicle to disseminate and transfer knowledge into operational application. It is easily accessible, and became an official WMO website open to the public. The Association expressed its appreciation to the HKO for their dedicated work in developing and maintaining the website, and encouraged forecasters in the Region to utilize it to improve their knowledge, skill and competency leading to better delivery of tropical cyclone forecasting and warning services.

4.1.58 The Association also noted that the web version of the updated Global Guide to Tropical Cyclone Forecasting was uploaded in the web server hosted by the Bureau of Meteorology, Australia. This Guide is in the final stage of review before it is made accessible to users. The Association expressed its sincere appreciations to the authors, with Mr Chip Guard of Guam, United States of America as Chief Editor, for their valuable voluntary contributions, and to the Bureau of Meteorology, Australia and its staff for their effort in final uploading of the Guide. The

Association also requested the WMO Secretariat to circulate a letter to the Members to announce the availability of the Guide.

4.1.59 Recognizing the need to continue enhancing the capabilities of its Members in producing better and improved tropical cyclone forecasting and warnings, the Association agreed to take up the re-establishment of TCC under agenda 5.3.

4.2 Disaster risk reduction (agenda item 4.2)

Disaster Risk Reduction Work Plan (2012–2015) and Related Mechanisms

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

4.2.1 The Association stressed that protection of lives, property and livelihoods is at the core of the priorities of the WMO Members and the National Meteorological and Hydrological Services (NMHSs). Furthermore, the implementation of the Hyogo Framework for Action 2005–2015 (HFA) through regional and national strategies in Disaster Risk Reduction (DRR) is leading to changes in national DRR policies, legal and institutional frameworks, with implications on the role, responsibilities and new working arrangements for the NMHSs in the Region. These changes provide opportunities such as increased recognition of the NMHSs by their governments and DRR stakeholders, strengthened partnerships and opportunities for increased resources. However, they are also leading to increasing demand and liabilities related to the provision of products and services to a larger and more diverse group of DRR stakeholders (e.g., government authorities, public and private sectors, NGOs, general public and media, etc.) who have direct responsibilities for DRR decision-making. To meet these new challenges, the Association recalled:

(a) The DRR framework for development and delivery of meteorological, hydrological and climate services, underpinned by national governance and institutional framework and needs and requirements of the DRR users at the national level that underpins the DRR workplan 2012–2015 (hereafter referred to as DRR workplan);

(b) The decisions of the Sixteenth World Meteorological Congress (Cg-XVI), the sixty-fourth and sixty-fifth sessions of the Executive Council (EC) pertaining to the adoption of the DRR workplan with clear priorities, deliverables and timelines to support NMHSs in developing their capacities to respond to the needs of DRR users;

(c) The establishment of DRR User-Interface Expert Advisory Groups (UI-EAGs) in three areas: (1) Hazard/Risk Analysis; (2) Multi-Hazard Early Warning System (MHEWS); and (3) Disaster Risk Financing and Insurance; by providing input on the users' needs and requirements for the development of WMO guidelines in these areas of DRR;

(d) The DRR Programme initiatives with the WMO Technical Commissions (TCs) and Technical Programmes (TPs) for development of a more coordinated and integrated approach working with the Regional Associations (RAs), Members and partners for the development of operational meteorological, hydrological and climate products and services.

4.2.2 In recognizing that DRR and climate adaptation are among high priority areas in the Region and considering a number of good practices in the Region, the Association urged:

(a) Its Members to utilize the comprehensive DRR Framework for development and delivery of services to DRR stakeholders underpinned by national DRR priorities;

(b) Its Management Group and other subsidiary bodies in collaboration with the Secretariat to ensure that the Strategic Operating Plan of the Association considers the coordinated DRR Programme Implementation Framework and that the good practices of the Members be documented and shared within the Region and with other WMO Regions.

DRR thematic guidelines, recommended Practices and standards and related training modules

4.2.3 The Association urged its Members to utilize and provide feedback to the Secretariat on the effectives of three guidelines, due for release during the 2013–2014 timeframe to support the NMHSs, including:

(a) "WMO Guidelines for National Meteorological and Hydrological Services on Institutional Partnerships in Multi-Hazard Early Warning Systems and Needs and Requirements for Meteorological, Hydrological and Climate Services to Support Emergency Preparedness, Response and Early Recovery" engaging the DRR Expert Advisory Group on Multi-Hazard Early Warning Systems (EAG-MHEWS);

(b) "Guidelines for Hazard Definition, Classifications, Hazard Databases and Metadata and Modelling to Support Loss and Damage Data Collection and Risk Analysis," engaging the DRR Expert Advisory Group on Hazard/Risk Assessment (EAG-HRA);

(c) "Requirements for Meteorological and Climate Services to Support Disaster Risk Financing and Insurance," engaging the DRR Expert Advisory Group on Disaster Risk Financing and Insurance (EAG-DRFI).

4.2.4 The Association requested support from the WMO Secretariat and the WMO Regional Training Centres (RTCs) for provision of training in DRR, noting that in 2014, the WMO Secretariat in cooperation with the Education and Training Programme, a number of leading RTCs, the United Nations International Strategy for Disaster Reduction (UNISDR) system partners, will develop the first comprehensive set of training modules in DRR targeted at the NMHS executives, their staff and stakeholders, leveraging the above guidelines, training modules in MHEWS developed and delivered in Regions IV and V, and relevant modules developed by partner agencies.

4.2.5 The Association urged its Members to participate in the Second WMO National and Regional DRR Survey to be issued in 2015, as per the request of Cg-XVI to measure the progress made as well as challenging opportunities and gaps at national and regional levels spanning governance, institutional, technical and operational aspects for development and provision of meteorological, hydrological and climate-related products and services through the NMHSs and the WMO global operational network of Global Producing Centres (GPCs), Regional Specialized Meteorological Centres (RSMCs) and Regional Climate Centres (RCCs) and other regional structures related to WMO since the first survey in 2006.

National DRR and Climate Adaptation Capacity Development with a Regional Cooperation Framework Projects Aligned with the GFCS

4.2.6 In light of the development of the regional Strategy for Climate and Disaster Resilient Development in the Pacific, as well as technical cooperation projects such as the Severe Weather Forecasting and Disaster Reduction Demonstration Project (SWFDDP), the Association expressed the need for development of holistic sector-driven DRR and climate adaptation national capacity development projects with a regional cooperation framework, aligned with the user-driven model cooperation projects in the DRR workplan. It stressed that the coordinated approach of the DRR Programme with other WMO programmes and related external projects for implementation of these projects could further achieve objectives including strengthening of institutional partnerships of NMHSs with the DRR user community at national and regional levels, leading to greater synergies of activities. The Association requested its Management Group to explore the development of such projects with support from the WMO Secretariat liaising closely with other relevant projects and organizations.

Global Framework for Climate Services and DRR

4.2.7 The Association noted that a number of deliverables of the DRR workplan directly contributed to the development of all the five components of the Global Framework for Climate Services (GFCS), namely, User Interface Platform (UIP), Climate Services Information System

(CSIS), Observations, Research and Capacity-building and the GFCS DRR Exemplar. In this regard, the Association stressed that its activities pertaining to the implementation of the GFCS for DRR applications could be a critical contribution of the Association and subsequently that of the WMO to the implementation of the GFCS. The Association requested its Management Group, with support from the WMO Secretariat and the GFCS Office, to document the Region's initiatives for implementation of climate services for DRR activities and to formulate concrete recommendations to WMO governing bodies as input to the implementation of the GFCS.

Post-2015 Framework for Disaster Risk Reduction following the end of the Hyogo Framework for Action 2005–2015

4.2.8 The Association was informed that global and regional consultations were underway to identify priorities of action for drafting of the Post-2015 Framework for DRR, as the terms of the Hyogo Framework for Action 2005–2015 (HFA 2005–2015), which underpinned that the development of the WMO DRR Programme is drawing to an end. The Association noted that the Regional DRR Platform for the Pacific would be held from 2 to 4 June 2014 in Suva, Fiji. The Association noted that an extensive programme of activities in this event had been negotiated with the regional office of the UNISDR and the Secretariat of the Pacific Community (SPC) and the Secretariat of the Pacific Regional Environment Programme (SPREP) to engage WMO Members and the Association, through its president and/or vice-president in this event. Recalling the letter from the WMO Secretary-General to all the Permanent Representatives of Members along with a concept note and list of messages as relevant to the elements of the Post-2015 DRR, the Association urged its president, Management Group and Members to realize the opportunities to engage in this event to ensure that critical issues pertaining to the development and delivery of science-based meteorological, hydrological and climate services are integrated in the drafting of the Post-2015 DRR Framework.

4.2.9 The Association agreed on the need for a suitable working mechanism to support DRR-related projects, proposals for further development and scaling up as well as coordination with regional DRR mechanisms related to Post-2015 Framework for DRR and adopted Resolution 4 (RA V-16) – Implementation of the Disaster Risk Reduction Programme in Regional Association V (South-West Pacific).

4.3 Data-processing and forecasting: weather, climate and water (agenda item 4.3)

Weather Issues

Global Data-processing and Forecasting System (GDPFS)

4.3.1 The Association recalled that the GDPFS, including ERA, is a critical component of its end-to-end Basic Systems (from observing to public weather services), whose scope spans across multi-scales (space and time). The GDPFS includes a global operational forecasting infrastructure, operated by Members that supports and contributes to their respective national programmes in Weather, Climate and Water, including the production of meteorological warnings and services. The Association therefore encouraged Members running global, regional or limited-area meteorological prediction models, including those of RSMCs, to continue to make their products available on WIS for the benefit of all countries in RA V, who in turn are urged to contribute verification and feedback on their quality and usefulness, especially in forecasting meteorological hazards. In addition, the Association requested:

(a) Its Members to consider providing within their training courses for forecasters, materials on the use and interpretation of their NWP products, including how to integrate EPS outputs into routine operational forecasting, especially for severe and high-impact weather forecasting;

(b) The WMO Secretariat and the Commission for Basic Systems (CBS) to assist NMHSs in the uptake, including in the interpretation and application, of such products for their national purposes. The Association noted that CBS has completed a set of Guidelines

on EPS and Forecasting to aid forecasters in effective application of EPS. The Guidelines includes links to other sources of guidance and learning, e.g., from the ECMWF User Guide, or the COMET on-line training programme.

Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP)

4.3.2 The Association recalled that significant benefits have been realized from the Severe Weather Forecasting Demonstration Project (SWFDP), either underway or under development in five project regions around the world, including one in its Region, known as the Severe Weather Forecasting Disaster Risk Reduction Demonstration Project (SWFDDP), that includes the participation of nine Island States in the South-West Pacific. The Association appreciated that the successes of SWFDDP relied on effective partnerships in the "Cascading Forecasting Process", which provided improved access to, and effective use by forecasters of existing and newly developed products and tools made available by advanced operational global and regional centres. In this context, the Association acknowledged the importance of the continued project-critical support from advanced global centres that provide NWP/EPS and satellite-based products, and the backbone roles played by the regional centres. It therefore commended all these centres, including the ECMWF, JMA (Japan), Met Office (UK), NCEP and RSMC Honolulu (USA), RSMC Darwin and Bureau of Meteorology (Australia), RSMC Nadi (Fiji), and RSMC Wellington (New Zealand) for their active and enthusiastic participation.

4.3.3 In addition, the Association recognized that advances made in NWP/EPS by advanced global centres required product downscaling and tailoring for practical use by NMHSs. As a lesson from the SWFDDP, it therefore agreed that strengthening and sustaining WMO operational centres, particularly the RSMC(s) within the Region, through their operational linkages to national centres, will increase and sustain the benefits of the development of much needed capabilities at NMHSs of developing and least developed countries (which typically lack the basic human and financial capacity) for delivering weather, climate and hydrological forecasting and warning services.

4.3.4 The Association noted that important progress has been made in the SWFDDP in the South-West Pacific Region, including its evaluation by the Regional Subproject Management Team (RSMT), which met in August 2013 (Nadi, Fiji). The Association agreed with continuing the demonstration to mid-2015, so that the full evaluation could be performed for each participating NMHS, against the following criteria:

(a) An appropriate non-TC warning system has been implemented and operating smoothly;

(b) Severe weather and wave forecasts/warnings are being verified using the specially designed spreadsheet;

(c) At least one comprehensive case study is completed per year;

(d) Demonstrate on a continuing basis that the relationships between NMHSs and Disaster Management and Civil Protection Authorities (DMCPAs), the media and the public are strong and healthy, with regular communications before, during and after severe weather events;

(e) All progress reports are completed in full before the agreed deadlines (6-monthly).

Subject to the outcome of that evaluation, the decision for the SWFDDP to make its transition to routine operations, including the management responsibility transferred to a regional body will then be made as a recommendation from the RSMT to the regional association, in coordination with CBS.

4.3.5 The Association acknowledged with appreciation the full commitment of MetService New Zealand to maintain the operational role and functions of RSMC Wellington in the SWFDDP. It also agreed to explore and seek suitable arrangements for the transfer of the overall coordination

and project management roles to a regional body. These roles include: maintaining the project through coordinating and ensuring that its activities are carried out (e.g. coordinating and synthesizing regular reports from participating countries), resource mobilization, planning and organizing (e.g. training events, meetings); these functions have been so far shared by the WMO Secretariat and the RSMC Wellington.

4.3.6 The Association recalled that it had formally established the RSMT reporting arrangements through its Tropical Cyclone Committee (Bali, 2010).

4.3.7 The Association recalled the operational nature of the Global Producing Centres (GPCs) for Long-Range Forecasts and that Cg-XVI envisaged that some GPCs could play an important role in providing global climate predictions from sub-seasonal to longer time-scales, within the context of the Climate Services Information System (CSIS) component of the GFCS. While the RCC structure is still in development in the Region, the Association acknowledged that GPC Melbourne is prepared to collaborate with the RCC developments with the view to facilitate consolidation and prioritization of regional requirements, provision of data products and predictions, making available verification information and advice, and to assist in their uptake by NMHSs. In addition, recalling the request by Cg-XVI to the LC-LRFMME to extend its role to include the exchange of extended-range (monthly) predictions, and following the guidelines by CBS-15, the Association noted that GPC Melbourne is prepared to provide data from their monthly forecast systems to the LC-LRFMME for display and generation of multi-model extended-range products along the same lines as for seasonal range products.

Emergency Response Activities (ERA)

4.3.8 The Association recalled that a number of major ERA events with significant impacts have occurred around the world since its previous session, including volcanic ash from eruptions, accidental release of hazardous chemicals to the atmosphere, and the catastrophic Fukushima Daiichi NPP accident in Japan triggered by the Great East Japan Earthquake and Tsunami of March 2011. The Association noted the significant operational impact of these events on the operations of the network of RSMCs with activity specialization in the provision of atmospheric transport modelling for environmental emergency response (EER) and/or backtracking, which involved RSMC Melbourne. The Association also noted the need of public education to promote public awareness on emergency response.

4.3.9 In the context of response to a nuclear accident, the Association noted a number of experiences reported not only by RSMCs and relevant international organizations, but also by NMHSs in many regions of the world, including the increasing need for related meteorological information on the spread of radioactivity from the accident for general public interest as well as specialized users. While acknowledging the existence of EER arrangements and standards for guidance products from the RSMCs, as stated in the *Manual on the GDPFS* (WMO-No. 485, Part II, Appendix II-7) and further documented in the WMO Technical Document No. 778 (documentation on RSMC support for EER targeted for meteorologists at NMHSs), the Association noted that there were other products available on the open Internet from other sources, which could cause misinformation. Therefore, the Association requested: (a) RSMC Melbourne to work with RSMC and Members to determine the appropriate global training in the use and interpretation of EER guidance and products; and (b) the Secretary-General and the Commission for Basic Systems (CBS) to promote the use of ERA-related products by NMHSs and assist them in the uptake, including in the interpretation and application of such products for their national purposes.

Climate Issues

4.3.10 The Association noted that, through the decisions of Cg-XVI and EC-65, the World Climate Programme (WCP) has been restructured, in order to more optimally support the Global Framework for Climate Services (GFCS), and now consists of the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP), a new World Climate Services Programme (WCSP) and the Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA) of the United Nations Environment Programme (UNEP). The

Association further recalled that Cg-XVI decided to conclude the Climate Information and Prediction Services (CLIPS) project in 2015, and consolidate the transition of the ongoing CLIPS activities into the initial implementation activities of the GFCS in the coming years. The Association urged its Members to closely align their operational climate service capabilities with the requirements of the GFCS.

4.3.11 The Association noted that the sixteenth session of the Commission for Climatology (CCl-16) is scheduled to be held from 3 to 8 July 2014 at Heidelberg, Germany, preceded by a WMO Technical Conference on Climate Services – Building on CLIPS Legacy from 30 June to 2 July 2014, with a joint CCl-WCRP session. The Association urged its Members to actively participate in both these events and ensure that climate issues relevant to RA V are highlighted, and also that RA V is adequately represented both at CCl-16 and in the future working structures of CCl as appropriate.

4.3.12 The Association noted with appreciation that the publication of the *Guide to Climatological Practices* (WMO-No. 100) was being translated into all WMO official languages. The Association urged its Members to use the Guide in their operational climate activities, and provide feedback to CCl for further improvements and updates.

4.3.13 The Association noted that WMO had actively contributed to the work of the UNFCCC Subsidiary Body for Technological and Scientific Advice (SBSTA) and Subsidiary Body for Implementation (SBI), mainly in the areas of adaptation and capacity-building. It further noted that WMO has established strong linkages with other relevant UNFCCC work streams, including the national adaptation planning process, capacity-building, loss and damage, research and systematic observation. The Association requested the Secretary-General to continue facilitating provision of knowledge products at the regional, national and sub-national levels through, inter alia, knowledge networks and national focal points, particularly in developing countries, to support climate change adaptation.

Climate System Monitoring and Assessment

4.3.14 The Association noted with appreciation the work of the joint CCl/WCRP-CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI), and urged Members to establish and share data sets of relevant climate indices for improving understanding and characterization of climate variability and change. The Association highlighted the need for the development of marine indices, and urged CCl, WCRP and JCOMM to closely collaborate on this issue to meet the climate information needs of the marine sectors.

4.3.15 The Association noted with appreciation the contribution of RA V Members to the WMO annual statements on the status of the global climate system, and urged all Members to sustain and enhance their contributions by providing relevant climate information based on their monitoring activities to enhance the coverage of these annual statements, particularly with respect to extremes.

4.3.16 The Association noted the ongoing efforts of the CCl Task Team on National Climate Monitoring Products (TT-NCMP) to develop a list of national climate monitoring products to be produced by the Members. It welcomed this initiative, which greatly facilitated regional and global climate system monitoring activities by standardizing and operationalizing basic national contributions, and requested its Members to support their implementation.

4.3.17 The Association highlighted the role of NMHSs in the provision of timely weather and climate advisories for warning against extreme weather and climate events, and urged its Members to strengthen their cooperation on the climate watch systems, to ensure their harmonized implementation, interoperability and timely exchange of related data and products. The Association emphasized that these systems should be developed as an integral part of NMHSs' efforts in support of climate risk management and disaster risk reduction.

Climate Services Information System

4.3.18 The Association noted that WMO had already put in place, or identified, several entities to specifically support NMHSs climate operations, including the highly specialized centres designated by WMO based on standards and criteria, namely Global Producing Centres of Long Range Forecasts (GPCs), Regional Climate Centres (RCCs) and WMO Information System (WIS) Centres (GISCs, DCPCs), as well as mechanisms such as the Regional Climate Outlook Forums (RCOFs) and Climate Watch Systems. The Association noted with satisfaction that these entities were appropriately highlighted in the GFCS implementation plan as part of its Climate Services Information System (CSIS) pillar, approved by the first session of the Intergovernmental Board on Climate Services (IBCS-1). The Association urged its Members to enhance the Region's contributions to the GFCS by strengthening the existing CSIS entities and also identifying and filling the gaps, both at regional and national levels.

4.3.19 The Association urged the RA V Members to expedite the establishment of RCCs, identifying the preferred structure and the hosts for the desired RCCs (or RCC-Network Nodes) for appropriate subregional domains. In this context, the Association agreed that two subregions should be considered, namely South-East Asia and the Pacific Island Countries and Territories (PICTs), for pursuing RCC-Network implementation. The Association urged the concerned Members and stakeholders to work with CCl and the WMO Secretariat to initiate the demonstration phase. The Association further noted that, for South-East Asia, there will be a need for defining the RCC domain extending into RA II, and this will need close cooperation between RA V and RA II entities. In this regard, the Association noted with appreciation that RCC Tokyo, managed by the Tokyo Climate Center (TCC) of the Japan Meteorological Agency, has assisted NMHSs in RA V through provision of relevant tailored products and capacity development activities including invitation to TCC's training events and dispatch of TCC experts. The Association welcomed the offer of RCC Tokyo to collaborate with RCC proponents (towards the formal establishment of RCCs and RCC-Networks) in RA V, as appropriate. The Association adopted Resolution 5 (RA V-16) – Implementation of Regional Climate Centre Networks in Regional Association V (South-West Pacific). The Association urged its members to work closely with the Pacific Islands Climate Services (PICS) panel in advancing operational climate service capabilities and RCC development.

4.3.20 The Association noted with appreciation that a new Association of South East Asian Nations Climate Outlook Forum (ASEANCOF) had been established based on the initiative from the RA V Working Group on Climate Services, with strong support from the ASEAN Sub-Committee on Meteorology and Geophysics. The Association noted that this initiative was a follow-up of the proposal made by the president of the Association during Cg-XVI in 2011, and the development of the concept at the CLIPS Training Workshop held in Citeko, Indonesia in 2011, to establish a Climate Outlook Forum in South-East Asia as part of the RA V RCC-Network activities. It appreciated the leading role played by the Centre for Climate Research Singapore (CCRS) in hosting the inaugural session (ASEANCOF-1) and its sustained commitment to the process. The Association urged the implementation of a roving seminar process to enable the ASEANCOF outcomes to be better communicated at the national level in the region. The Association thanked the United States Agency for International Development (USAID) for providing financial support to ASEANCOF-1. The Association recognized the growing benefits of RCOFs in fostering networking amongst climate experts, capacity-building, user engagement and in development of consensus-based forecasts for the subregion.

4.3.21 The Association noted with appreciation the launching of new projects funded by Environment Canada and Australia in support of GFCS implementation, with the PICT subregion included as a key beneficiary, with particular focus on RCC and RCOF development as well as national level GFCS activities. The Association urged the Members in the PICT subregion and the associated stakeholders to optimally utilize these opportunities to establish an RCC-Network, strengthen the Pacific Islands Climate Outlook Forum (PICOF), and also develop National Climate Outlook Forums (NCOFs) to ensure the reach of GFCS implementation to the national scales.

Climate Information for Adaptation and Risk Management

4.3.22 The Association urged its Members (both climate and sectoral communities) to support and to take part in user engagement through RCOFs and NCOFs, by use or sector-driven climate forums (e.g., hydrological-, agricultural- or health-focused forums), interdisciplinary workshops and training, and field activities including roving seminars, a notable success in climate services for the agriculture sector.

4.3.23 The Association noted the needs of key socio-economic sectors for reliable, relevant, actionable climate information for Climate Risk Management (CRM) and for adaptation, and the need to improve the practical application of CRM at local levels, in order to reduce climate impacts, build resilience to climate variability and change and contribute to poverty reduction and development. The Association appreciated CCl guidance on CRM and urged its Members to use the recommended CRM approaches for improving decisions in managing the opportunities and hazards of the climate. The Association urged development of case studies demonstrating good practices in CRM, and that these to be shared with the CCl to help further improve the CRM concepts.

Drought Initiatives

4.3.24 The Association noted the successful organization of the High-Level Meeting on National Drought Policy (HMNDP) by WMO and other partners held in Geneva, Switzerland in March 2013, and the HMNDP declaration. The Association supported the outcomes of HMNDP, and urged its Members to use them as guidance to facilitate development and implementation of national drought management policies.

4.3.25 The Association supported the establishment of the Integrated Drought Management Programme (IDMP) by WMO in collaboration with the Global Water Partnership (GWP). The Association expressed its interest in the work of IDMP and urged its Members to participate in it, especially in developing potential IDMP projects in the Region (http://www.droughtmanagement.info/). The Association noted that IDMP is an important contribution to GFCS.

4.3.26 The Association noted that the UN-Water Decade Programme on Capacity Development (UNW-DPC), WMO, UNCCD and FAO are collaborating on the National Drought Management Policies Initiative which aims to provide capacity development on this issue through four regional workshops during the period March 2013 to December 2014. The Association supported the organization of a Regional Workshop in South-East Asia which will take place in May 2014 in Viet Nam. The Association encouraged the Secretary-General to harmonize as much as possible the efforts of this initiative with the IDMP.

Water Issues

Activities of the RA V Working Group on Hydrological Services

4.3.27 The Association recalled that through XV-RA V it re-established the Working Group on Hydrological Services (WG HYS). The Lead of the Working Group was Dr Arie S. Moerwanto (Indonesia), the Regional Hydrological Advisor. The membership of the working group was open to representatives of all Members of RA V. The Terms of Reference and Work Programme of the RA V WG HYS, along with the proposed structure of the Group, were agreed by the RA V Management Group.

4.3.28 The Association further noted that, at the kind invitation of the Government of New Zealand, the eighth session of the WG HYS was held at the National Institute of Water and Atmospheric Research (NIWA), Christchurch, New Zealand in November 2013. In the absence of Mr Arie S. Moerwanto (Indonesia), Mr John Fenwick (New Zealand) served as chairperson of the meeting. The working group discussed the work programme as set out by the RA V Management Committee and the progress achieved across the work programme areas. They also discussed the

hydrological needs of the Region under a range of selected topics and areas. Some of the issues raised included:

(a) Information and experience sharing across the Region is valuable, especially in regards to equipment, data management and analysis techniques;

(b) Capacity-building remains a strong requirement of the Region;

(c) Impacts of climate change were becoming significant across the Region, including sea level rise, salt water intrusion into groundwater, frequency of typhoons and droughts, etc.;

(d) Flood forecasting was a major requirement, especially flash floods, as in particular, the islands are mostly small with short lead times; urban areas; and low land areas;

(e) Early warning-hazard based systems are becoming more important;

(f) Drought is a major issue for the Region, often overlooked due to the nature of the island setting;

(g) Groundwater quality is becoming an increasing issue, especially in times of drought;

(h) Regional support mechanisms play a significant role in the Region.

4.3.29 The Association further noted that Congress, through Resolution 12 (Cg-XVI), had requested "the regional associations to take into account, while deciding on the structure of their subsidiary bodies, the benefits of regional Working Groups on Hydrology as a platform for hydrologists within a Region to discuss matters of common concern", and recognized that they are instrumental for promoting the recognition of WMO in the field of water in a continuous and not in an ad hoc way.

4.3.30 The Association noted that the WG HYS had strongly recommended that the working group should be re-established in the next intersessional period, especially when considering the current status of hydrological services in the Region. The Association appreciated that the WG HYS had compiled a draft operational plan for 2014–2018 for consideration by the RA V Management Group in establishing its future programme of work.

Commission for Hydrology

4.3.31 The Association was informed of the decisions and outcomes of the fourteenth session of the Commission for Hydrology (CHy-14), held in Geneva in November 2012. In particular it noted that the areas of:

(a) Quality Management Framework – Hydrology;

(b) Water Resources Assessment;

(c) Hydrological Forecasting and Prediction;

(d) Water, Climate and Risk Management;

(e) Data Operations and Management;

had been retained for the focus of the Commission's activities for the intersessional period 2013–2016. Mr Tony Boston (Australia) was appointed as the member of the CHy Advisory Working Group responsible for Data Operations and Management. The Association urged its Members to consider appointing new members to the four Open Panels of CHy Experts (OPACHE) established by the Commission.

4.3.32 The Association noted that Regional Hydrological Advisers (RHAs) had been invited to the meetings of the CHy Advisory Working Group (AWG) immediately preceding the last two CHy sessions to provide inputs on regional priorities to the Commission's planning process. It appreciated that this practice was instrumental in providing regional inputs to the formulation of the Commission's programme of work and encouraged it to continue the practice.

Pacific-HYCOS and SEA-HYCOS

4.3.33 The Association was pleased to note that the completed Phase I of Pacific-HYCOS had provided some additional impetus for other initiatives, including, among others, additional groundwater monitoring in Samoa. Issues of climate change (floods and droughts), health and food security were seen as new factors which will influence the need for additional water resources information. The Association agreed that the Pacific-HYCOS concept remains relevant and that new issues were now of importance, especially climate change, and that these necessitated a combined weather-climate-water approach, including integration of networks. The Association noted that the implementation of Phase II of the Pacific-HYCOS had not progressed due to a lack of donor interest.

4.3.34 The Association noted that the desire to implement South East Asia-HYCOS (SEA-HYCOS), was discussed at XV-RA V, and encouraged those Members involved to actively pursue a firm proposal with the WMO Secretariat.

Integrated Flood Management (including flood forecasting and warning)

4.3.35 The Association was informed of the various activities carried out by the WMO-GWP Associated Programme of Flood Management (APFM). It was pleased to note that two institutions from the Region had signed a Letter of Engagement to become an IFM HelpDesk Support Base Partner (SBP), expected to actively support the operation of the IFM HelpDesk, and encouraged other interested institutions in the Region to join. In the current intersessional period only a small number of requests for capacity development and rapid guidance were received by the IFM HelpDesk from RA V Member countries. The Association urged its Members to take advantage of the services offered through the APFM HelpDesk.

4.3.36 The Association was pleased to note that the Australian Bureau of Meteorology has been cataloguing data requirements and testing the applicability of the Hydrologic Research Centre's Flash Flood Guidance System (FFGS), which is implemented in and being actively developed for different parts of the world. The Association agreed that the Region carefully monitor progress in this regard. It was also pleased to note that activities being undertaken under the WMO Flood Forecasting Initiative (FFI), including the FFGS, were being coordinated through a FFI Advisory Group established by Cg-XVI and that appropriate linkages were being made with the Severe Weather Forecasting Demonstration Project (SWFDP) and the Coastal Inundation Forecasting Demonstration Project (CIFDP).

Water and Climate and UN-Water

4.3.37 The Association noted that climate change is just one of the factors that need to be taken into consideration in water resources management; others include, but are not limited to human activities, land use practices, population growth, urbanization, water resources allocation and pollution. In RA V in particular, climate change related issues include saltwater intrusion into aquifer systems, changes in frequency and severity of events (for example typhoons, cyclones, droughts in some areas), water security, infrastructure design information (hydrological design) and protocols for storage operations. The Association agreed that there are a wide range of projects being implemented amongst a number of different groups and improved coordination of activities will become important in the future. The Global Framework for Climate Services offers some potential in this regard.

4.3.38 The Association was pleased to note that from February 2012 the Secretary-General of WMO had been appointed as the Chairperson of UN-Water, the UN-wide mechanism to

strengthen coordination and coherence among UN entities dealing with issues related to all aspects of freshwater and sanitation, including surface and groundwater resources, and water-related disasters. WMO continues coordinating the UN-Water Thematic Priority Area on Water and Climate Change, which has produced important material, such as a Policy Brief, a Guidance Note on Water-related adaptation to climate change, and various communication tools.

Capacity Development for Water Resources Management

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

4.3.40 The Association noted with appreciation the opportunities for training and capacity development of staff offered through the Regional Training Centre, Jakarta, Indonesia which had been established in 2012 and also through the training course in hydrology offered by the Philippines, which had been taken up by one participant from Fiji, supported by the WMO Secretariat. The Association also noted that 25 participants from the Region had successfully participated in a distance learning course in hydrology – basic hydrological sciences – conducted in September-October 2011. The Association requested the WMO Secretariat to continue to provide such opportunities for capacity development and encouraged more requests for support from the hydrological community.

Integrated Drought Management Program

4.3.41 The Association welcomed the recent establishment of the WMO-GWP Integrated Drought Management Programme (IDMP) and the plans to set up a drought information HelpDesk. The Association also encouraged interested institutions in the Region to contact the WMO Secretariat and register their interest in the IDMP operating plan currently under preparation.

4.4 WMO Integrated Global Observing System and WMO Information System (agenda item 4.4)

WMO Integrated Global Observing System (WIGOS)

The WIGOS Framework Implementation

4.4.1 The Association considered the WIGOS implementation actions to be undertaken by its Members and subsidiary bodies. In this consideration, the Association took into account decisions of Cg-XVI, EC-64, CBS-15, and EC-65 on the WIGOS implementation.

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

4.4.3 The Association expressed its gratitude to Australia in implementing the WIGOS Demonstration Project (for details, see http://www.wmo.int/pages/prog/www/wigos/projects.html)

"Implementing a Composite Observing System" providing a number of lessons learned, experiences and perspectives received on the potential benefits, value and impact of the WIGOS implementation process at the national and regional levels. In this regard, the Association encouraged its Members to share relevant experiences and cooperate with one another in implementing WIGOS, including assistance to Members with specific WIGOS implementation needs.

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

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

4.4.6 The Association also urged its Members to continue providing resources, through the WIGOS Trust Fund and seconded experts or Junior Professional Officers, to help support the implementation of WIGOS.

4.4.7 The Association noted that CBS-15 considered the new "Implementation Plan for the Evolution of Global Observing Systems" (EGOS-IP) that was subsequently approved by EC-65. In this regard, the Association requested its Members to: (a) nominate national focal points tasked to monitor the implementation of the EGOS-IP nationally, report on implementation issues, and provide feedback to CBS through the Secretariat; and (b) address the actions listed in the EGOS-IP in collaboration with partner organizations and agents identified in the EGOS-IP. It also encouraged Members to mobilize additional resources to drive these activities forward. It further requested the relevant RA V subsidiary bodies to address the EGOS-IP in their work programmes, and promote its effective implementation. The Association noted that the EGOS-IP builds on the analysis and guidance of the WMO Rolling Review of Requirements (RRR) process, and provides a substantial contribution to the third WIGOS key activity area on design, planning and optimized evolution of WIGOS component observing systems.

4.4.8 The Association noted with great appreciation that, in response to the request from the Sixteenth Congress, the development of the Regional WIGOS Implementation Plan for RA V (R-WIP-V) was accomplished by the RA V Working Group on Infrastructure (WG-INFR). The Association expressed its appreciation to WG-INFR for the development of R-WIP-V.

4.4.9 The Association accordingly adopted Resolution 6 (RA V-16) – WMO Integrated Global Observing System Implementation Plan for Regional Association V (South-West Pacific). The Association agreed that the implementation of R-WIP-V be supported by all the Members of the Region, and be guided, supervised and monitored by the Management Group of RA V, with periodic reports from appropriate subsidiary bodies in charge of WIGOS. In this regard, the Association emphasized that commitment by Members to WIGOS is essential and urged their Members to support implementation of WIGOS in their Region, including providing sufficient resources. In particular, the Association urged Members to make experts available to contribute to relevant regional Working Groups.

4.4.10 The Association further agreed that R-WIP-V be further revised to accommodate new projects which would be submitted by Members and authorized the president to approve any revisions of R-WIP-V during the intersessional period in consultation with the Management Group. In this regard, the Association agreed that the regional WIGOS projects should be expandable to include more subregional and national projects.

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

4.4.11 The Association noted that owing to Members' efforts, the RBSN and RBCN have demonstrated sustainable performance. However, the Association recognized that further efforts should be made by Members to improve the data sustainability and availability performance to a satisfactory level to meet service requirements. It also recognized that in order to increase the availability of CLIMAT messages, greater efforts by Members should be made in ensuring that their operational observing stations compile and transmit the climate-related messages according to existing WMO regulations. The Association also appreciated the work done in the beginning of the intersessional period by the Lead Centre for monitoring the data quality of land surface observations in Melbourne to improve monitoring procedures and for the presentation and distribution of monitoring results on the availability and quality of land surface-based observational data. However, it noted that this monitoring was interrupted and no reports were received in the last two years. It also recalled that quality management is a key activity area of the WIGOS framework Implementation Plan and noted that improved monitoring is a significant element of this activity.

4.4.12 By adopting Resolution 7 (RA V-16) – Regional Basic Synoptic Network and Regional Basic Climatological Network In Region V (South-West Pacific), the Association approved the new list of RBSN and RBCN stations as given in Annexes I and II to this resolution. The Association noted that the concepts behind the RBSN and RBCN are becoming outdated as Members implement a wider range of observing systems in integrated composite networks serving multiple purposes. The Association noted further that an aim of WIGOS is to develop the definition of an integrated Regional Basic Observing Network (RBON) together with a new database of station information, which will more completely describe the WMO observing capabilities achieved collectively by Members. It requested CBS and relevant technical commissions, the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS), with the support of the WIGOS Project Office, to give priority to making progress on these matters and to keep WMO Members and this regional association well informed and guided of developments in this regard.

GCOS Reference Upper-Air Network (GRUAN)

4.4.13 The Association noted that the issues are addressed in paragraphs 4.4.51 to 4.4.60.

Marine and Oceanographic Observations

4.4.14 The Association noted that implementation of marine observing network in the Region has continued to expand thanks to the prominent role of Members in the Region. In particular, 26 of the planned 32 targeted deep ocean moorings of the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA) have been deployed and are maintained. However, the Association expressed concerns that data availability for both the moored buoy arrays in the Tropical Pacific (TAO, now complete with 67 units) and Indian oceans is not at its optimum (reduced to 50% only) due to vandalism on the data buoys, and difficulties to assure maintenance due to the cost of ship time, and piracy. The Association urged its Members to contribute to the JCOMM Observations Programme Area Implementation Goals and thereby invest additional resources in the further development of ocean observing systems in order to address the increasing needs for climate applications and services. The Association recommended that its Members work closely with the Data Buoy Cooperation Panel (DBCP), the Global Drifter Programme, and the Argo programme for providing opportunities for the deployment of drifting buoys and profiling floats in the Region. The Association urged its Members to install barometers on all drifters they are planning to deploy in the Region.

4.4.15 The Association invited its Members to investigate providing the infrastructure for establishing WMO-IOC Regional Marine Instrument Centres (RMIC) in the Region in order to assure traceability of the marine observations, improve data quality, permit bias correction, and facilitate adherence of observational data, metadata, and processed observational products to higher-level standards.

Aircraft Observations

4.4.16 The Association was advised that a new programmatic structure for the development and maintenance of aircraft-based observations and the WMO AMDAR observing system had now been established within the WMO Technical Commissions, CBS and CIMO.

4.4.17 The CBS Expert Team on Aircraft-based Observing Systems, in line with the global actions on Aircraft Meteorological Stations within the Implementation Plan for Evolution of the Global Observing System (WIGOS Technical Report No. 2013–4) has offered to collaborate with each WMO Regional Association towards the development, maintenance and application of regional aircraft-based observations implementation plans.

4.4.18 The Association agreed that an appropriate subsidiary body of the Association should be responsible for planning and coordination of regional activities on aircraft-based observations improvement over the South-West Pacific as an action for the regional WIGOS implementation, and decided to consider it further under the item of the subsidiary body of the Association.

Cryospheric Observations and Global Cryosphere Watch (GCW)

4.4.19 The Association expressed its interest in the ongoing development of the Global Cryosphere Watch (GCW) as reported to EC-65, the recent availability of the GCW Implementation Plan and a need for the engagement of experts from RA V in GCW activities. Members were urged to provide comments on the GCW Implementation Plan and to indicate those activities in which they would like to be engaged. It urged those Members that routinely measure solid precipitation and snow and ice parameters to consider the establishment of GCW reference sites as part of GCW's CryoNet initiative. The Association urged interested Members to nominate national focal points for GCW activities and to review and provide the EC Panel of Experts on Polar Observations, Research and Services (EC-PORS) with information on how GCW could help them.

WMO Polar Activities

4.4.20 The Association acknowledged the importance of WMO polar initiatives and the need for ongoing coordination of activities with the regional associations and technical commissions. It urged its Members to review and comment on the International Polar Partner Initiative (IPPI) Concept for follow-on activities in the Polar Regions and to provide their guidance on what the role of WMO could be in IPPI.

Atmospheric Chemical Composition and UV Measurements of the GAW Programme

4.4.21 The Association noted the issues addressed in paragraphs 4.5.18 to 4.5.30.

Terrestrial observations – Water cycle

4.4.22 The Association noted the importance of information exchange standards such as WaterML 2.0 and supported the potential adoption of WaterML 2.0 as a WMO standard for information exchange managed by WMO (supported by the WMO/OGC MOU), subject to the successful implementation of the testing programme proposed.

4.4.23 The Association encouraged further work by WMO in the evaluation of the usefulness and suitability of the HY_Features model to WMO applications.

4.4.24 The Association noted further that CHy-14 had invited Members that had developed good practices in the use of radar data for nowcasting in operational hydrology to support the AWG member responsible for Data Operations and Management (Tony Boston (Australia)) in providing guidance, advice and training in this regard.

4.4.25 The Association was informed that, to date, efforts to implement a second phase of the Pacific HYCOS had not been successful, despite strong support for the initiative amongst the Member countries and that the proposed South East Asia HYCOS (SEA HYCOS) was still in its early planning stages.

Space-based Observations

4.4.26 The Association noted the issues addressed in paragraphs 4.4.40 to 4.4.50.

Observing System Experiments (OSEs)

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

Instrument Standards and Best Practices

4.4.28 The Association recalled that Cg-XVI stressed that Regional Instrument Centres (RICs) and Regional Marine Instrument Centres (RMICs) should provide effective support to Members in ensuring the traceability of their standards and reaffirmed the need to regularly assess their capabilities making use of the evaluation scheme that was developed to this effect. The Association noted that Regional Radiation Centres (RRCs) should provide support to Members for the traceability of radiation measurements. The Association requested its Members hosting RICs, RMICs and RRCs to reconfirm their on-going willingness to provide these facilities and their compliance with the relevant Terms of Reference of these centres at the latest by December 2014 as they play a crucial role in ensuring traceability of measurement to the International System of Units (SI), and capacity-building which is fundamental for the development of WIGOS.

4.4.29 The Association noted the support expressed by Congress and the Executive Council to the further development of the “Siting classification for observing stations on land” that was published in the Guide to Instruments and Methods of Observations (WMO-No. 8), as a common ISO-WMO standard. The Association urged its Members to implement this classification and to share experience.

4.4.30 The Association noted that CIMO proposed to carry out an extensive revision and update of the *International Cloud Atlas – Manual on the Observation of Clouds* (WMO-No. 407, Volume I and II), parts of which constitute Annexes to WMO *Technical Regulations* (WMO-No. 49). This would make it the undisputable web-based global reference standard for the classification and reporting of clouds and meteors. The Association noted that funding had to be identified for this activity as the document had not been updated since 1975 (Volume I) and 1987 (Volume II) and no technical commission was in charge of this document since then. In view of the importance of this document to Members, in particular from developing countries which still make extensive use of human observers, the Association strongly supported this CIMO proposal and recommended that the Executive Council and/or Congress identify funding possibilities to urgently develop this new edition.

4.4.31 The Association expressed its appreciation for the ongoing Solid Precipitation Intercomparison Experiment (SPICE) activity under the lead of CIMO, within which substantial progress is expected in the understanding and calibration of solid precipitation measuring equipment. It further stressed that the measurement and exchange of cryospheric data at synoptic and climate stations, where appropriate, but particularly in mountain and high land regions, would

be especially useful to meet the operational, research and service needs of weather, climate, hydrology and environmental science nationally, regionally and globally. The Association noted that two RA V sites (Guthega Dam – Australia and Mueller Hut – New Zealand) were taking part in the WMO SPICE, which encompasses overall 20 sites in 15 Members with instruments of 30 different types in various set-ups. The main measurement phase will last two winters, until 2014/15. The Association welcomed the plan to complete the data analysis and publish the final report of the intercomparison by 2016 in spite of the complexity of the experiment and noted this could only be achieved if external resources could be identified. The Association encouraged its Members to support this initiative either by secondment of experts for the data analysis or through financial contribution to the CIMO Trust Fund.

National Climate Networks

4.4.32 The Association took note of a CCl-led initiative, following a request of EC-65, to work – in close collaboration with GCOS and CIMO – for establishing a minimum set of objective assessment criteria for the recognition of centennial observing stations. The work will lead to a draft document containing these criteria; and propose through WIGOS a WMO mechanism for verifying compliance of candidate stations. Centennial observation data – carefully treated in terms of quality assurance and archiving – are of utmost importance for documenting and studying climate variability and change on decadal to centennial time scales, thereby providing basic input to relevant climate research and services. By raising the profile of centennial observing stations the initiative is intended to assist Members in their efforts to maintain such stations under the most preferable conditions.

4.4.33 The Association noted with appreciation the consideration given by CCl for supporting the WIGOS implementation in the area of national climate networks; in particular on the urgent need in providing guidance for improving these networks. These networks are becoming increasingly useful for climate services at local level. However in many cases these networks are operated by collaborative agencies or by individuals with a low level or lack of standardization, continuity and sustainability.

4.4.34 The Association urged its Management Group to consider these issues as a matter of high consideration in the Regional WIGOS Implementation Plan in close collaboration with CCl.

Radio Frequency Coordination

4.4.35 The Association recalled Resolution 11 (EC-64) on radio frequencies for meteorological and related environmental activities. It noted that its Members, both individually and through the participation in the CBS Steering Group on Radio Frequency Coordination (SG-RFC), had contributed significantly to the WMO success at the International Telecommunication Union (ITU) World Radiocommunication Conference 2012 (WRC-12) in protection of the existing and providing additional radio-frequency spectrum employed by meteorological and Earth observation systems and applications. However, there remains increasing pressure to share (also allocate) radio-frequency bands used for meteorological purposes that could impact on Members' operations, in particular their observing systems.

4.4.36 The Association noted Resolution 9 (EC-65) relating to the ITU World Radiocommunication Conference 2015 (WRC-15) to be held in November 2015. It further noted that according to the WMO Preliminary Position Paper on WRC-15 Agenda (information documents EC-65-inf04-4(1)-RFC_en.doc available at http://ec-65.wmo.int/information-papers-e-f), there are many WRC-15 Agenda items that may affect the operation of systems/applications of NMHSs. As most countries in RA V are members of the Asia Pacific Telecommunity (APT), which is one (out of six) of the regional telecommunication organizations participating in the ITU preparation to WRC-15, the Association emphasized the necessity of appropriate representation of meteorological requirements/interests in the relevant national and APT activities. It further noted that Permanent Representatives in RA V should endeavour to ensure that the WMO position on radio-frequency matters is made known to their national and APT representatives.

4.4.37 The Association noted the pressure to share frequencies presently allocated to radiolocation, meteorological-satellite and Earth observation radiocommunication services and used by systems/applications for meteorological and related environmental observations with International Mobile Telecommuncations (IMT) and RLAN systems, which are widely used for fixed, semi-fixed (transportable) and portable computer equipment for a variety of broadband applications, as well as for fixed, nomadic and mobile wireless access applications. Of special concern to RA V Members were the initiatives from countries in RA IV and VI to allocate to the mobile service and identify to RLAN C-Band frequency range 5 350–5 470 MHz. This frequency range is allocated to the Earth exploration-satellite (active) and radiolocation services, and used, in particular, by the Synthetic Aperture Radars (SAR) for remote sensing from satellites (e.g. Sentinel and Radarsat) as well as ground-based weather radars. Studies to date show that the use of RLAN systems in this frequency range could have significant negative impact on above-mentioned systems/ applications. This in turn relates to RA V's current and future use of these remote sensing systems for improved environment monitoring, disaster prediction and warning systems, especially in remote or isolated areas.

4.4.38 The Association agreed that, in order to protect present and future services provided by NMHSs for timely warning of impending natural and environmental disasters, accurate climate prediction and detailed understanding of the status of global water resources, it is essential that the Association emphasized the necessity of appropriate representation of meteorological requirements/interests in the relevant national and APT activities. It further noted that Permanent Representatives in RA V should endeavour to ensure that the WMO position on radio-frequency matters is made known to their national and APT representatives and related environmental activities with other radiocommunications systems and especially that IMT/RLAN systems are made available to the wider radio-frequency management community.

4.4.39 The Association supported the need for all Members to participate actively in national, regional and international activities on radio-frequency spectrum regulatory and use issues in order to defend radio-frequency bands used for meteorological and environmental activities. Noting the draft "WMO Strategy on Radio-Frequency Protection for Meteorology" developed by the SG-RFC and provided to EC-65 as an information document (information documents EC-65-inf04-4(2)-Draft-Strategy-RFP_en.doc available at http://ec-65.wmo.int/information-papers-e-f) the Association requested CBS to provide as a matter of priority guidance material for NMHSs on radio-frequency coordination and on how to effectively participate in this important activity.

Continuity of satellite observations

4.4.40 The Association reaffirmed the vital role of continuous satellite observation for tropical cyclone track monitoring and prediction, for other severe weather warning and for the safety of air navigation among many other applications. It thanked China, Japan, the Republic of Korea and the United States of America for ensuring operational continuity of geostationary satellite observations over the Region, respectively operating the Himawari, FY-2, COMS and GOES-West satellite systems. In addition, global observations from polar-orbiting satellites operated by China (FY-3), EUMETSAT (Metop) and the USA (e.g., Suomi-NPP, NOAA/POES) greatly contributed to improving predictions and services of weather and climate.

4.4.41 The Association welcomed progress in coordinated space agency monitoring of Antarctica under the auspices of the Polar Space Task Group (PSTG) using Synthetic Aperture Radar (SAR) sensors, leading to better understanding of regions of rapid change such as the West Antarctic Ice Sheet. The datasets to be acquired until 2016 will provide significant improvement in monitoring ice sheet dynamics and mass balance, and contribute to further understanding of interannual variability in ice sheet mass and its impact on sea level.

Preparing users to new generation of geostationary satellites

4.4.42 The Association looked forward to the launch of the geostationary satellite Himawari-8 scheduled by Japan in 2014 with a new-generation 16-channel imager, and thanked JMA for providing early technical information on data access and utilization. It stressed the need to keep

the user community informed of any updates in this respect, and to continue capacity-building of users throughout the Region.

4.4.43 The Association appreciated the latest information provided by CMA, JMA and NOAA during the regional association session with regard to the new generation of geostationary meteorological satellites, and encouraged all Members to set-up projects to prepare for the use of new satellite systems, in accordance with the guidelines adopted by CBS-15, in view of Himawari-8 to be followed by other new-generation geostationary satellites planned for launch in 2016–2018 by China (FY-4), the Republic of Korea (GEO-KOMPSAT) and the USA (GOES-R).

4.4.44 The Association commended NOAA for the GOES-R Proving Ground programme and highlighted the online Satellite User Readiness Navigator portal (SATURN) developed by the Secretariat as a valuable information resource for user preparation to new generation satellites.

Access to satellite data and products

4.4.45 The Association confirmed the need for a standing regional mechanism enabling a structured dialogue between regional satellite data user communities and satellite operators. Such a mechanism should raise users' awareness of available satellite data, foster the expression of user requirements, and improve data access and exchange. The Association commended the Task Team on Satellite User Requirements for its achievements, called for broad membership in this mechanism. Noting Resolution 12 (EC-65) – Regional requirements for satellite data access and exchange, calling upon all regional associations to establish standing mechanisms for documenting and maintaining their requirements for satellite data access and exchange, the Association decided to consider this mechanism further under the agenda item which reviews the subsidiary bodies of the Association.

4.4.46 The Association noted with concern the persisting poor telecommunication connectivity of some Members, especially least developed countries and small island developing States, disallowing them proper access to basic data, products, and services. It urged Members in RA V and RA II to coordinate efforts towards a sustainable, Region-wide approach to satellite data dissemination, building on existing systems such as CMACast and emerging initiatives such as RapidCast.

Building capacity in the use of satellite data and products

4.4.47 Noting the success of the Asia-Oceania Meteorological Satellite User Conferences (AOMSUC) as a primary forum for meteorological satellite users in RA V and RA II, the Association encouraged all sponsors of the Conference to enable their continuation on an annual basis, and to facilitate participation by all Members. It further encouraged Members to attend the Conferences for the exchange of information on the utilization of satellite data and products for improved weather and climate services.

4.4.48 To raise the capacity of operational forecasters in using satellite data, the Association encouraged all Members to participate in online monthly Regional Focus Group discussions recently established by the Australian Bureau of Meteorology Training Centre, as part of the WMO-CGMS (VLab).

4.4.49 The Association addressed the challenges of access to satellite data in light of the dramatic expected increase in the volume of satellite data and products available over the next 5–10 years, while user surveys showed that actual access often remains well below expectations, as well as the regional diversity of needs and capabilities of the various types of users, requiring different data access solutions. Considering further the importance of the closer coordination and collaboration between satellite operators and the regional Members and users, the Association encouraged the Management Group to be very active in guiding and supporting the efforts of its subsidiary bodies to facilitate the exchange of information, satellite data and products access, workshop and training events, and promotion of satellite data utilization in weather and climate services. It further encouraged the Management Group to consider the potential for future joint

Management Group meetings with Regional Associations II and V covering all aspects of WMO programmes of common interest.

Case example: Satellite data assist in tracking Haiyan

4.4.50 The Association emphasized the critical importance of satellite data from various sources for providing reliable monitoring and forecasting services of tropical cyclone track and intensity, as demonstrated in the case of TC *Haiyan*.

Global Climate Observing System (GCOS)

4.4.51 The Association recalled that undertaking the actions identified in the 2010 updated Implementation Plan for the Global Observing System for Climate in Support of the United Nations Framework Convention on Climate Change (UNFCCC) would address many of the needs for climate observations in support of the Global Framework for Climate Services (GFCS). The Association was reminded of the importance of a strengthened Global Climate Observing System to the successful implementation of the Global Framework for Climate Services (GFCS), recognizing that observations and monitoring constitute one of the essential pillars of the GFCS. The Association reiterated its urgent call to Members to assist and advise international and national organizations in the implementation of the global observing systems for climate.

4.4.52 The Association was informed on the next steps of the GCOS improvement and assessment cycle. At the thirty-seventh session of the Subsidiary Body for Scientific and Technical Advice of the UNFCCC in November 2012, GCOS was invited to submit an assessment of the adequacy of the global observing system for climate to SBSTA in 2015, and a new Implementation Plan in 2016, with a draft of the latter encouraged to be provided one year before. The Association noted the recommended planning and requested that the GCOS Secretariat report back on the process at the next Association session.

GCOS Expert Panels for Land, Atmosphere and Oceans

4.4.53 The Association noted that the GCOS/GTOS/WCRP Terrestrial Observation Panel for Climate (TOPC) had held its sixteenth session from 10 to 11 March 2014, at JRC, in Ispra, Italy. TOPC reviews the climate-observing components of terrestrial global observing systems and is managed by the GCOS Secretariat. This years meeting focused on discussing the status of terrestrial ECVs in light of the next GCOS assessment cycle, as well as in regard to the adequacy of the global observing system on climate in the next two years to come. TOPC-XVI focused on discussing the status of terrestrial ECVs in light of the next GCOS assessment cycle, as well as in regard to the adequacy of the global observing system on climate.

4.4.54 The Association noted the most recent outcomes of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC), which met for its 19th session from 9 to 11 April 2014, at JRC, in Ispra, Italy. Members commended the Panel's work as an efficient platform for discussions on the climate-components of existing research and operational atmospheric observing systems and the related programmes, including important cross-cutting links to the World Climate Research Programme (WCRP) as well as to the Global Atmosphere Watch (GAW) Programme. The Members appreciated in particular the Panel's work on the GCOS Surface Network (GSN), the GCOS Upper-Air Network (GUAN) and the GCOS Reference Upper-Air Network (GRUAN). The Association requested the Panel in its future sessions to continue to advise explicitly on climate-observing elements of the WMO Integrated Global Observing System (WIGOS), and to ensure that there is full cooperation between GCOS, WIGOS and WIS as they develop. It was noted that the AOPC was preceded by an expert meeting from 7 to 8 April 2014 which discussed the principal design and quality criteria of the GCOS surface and upper-air networks.

4.4.55 The Association was informed that following the approval of the Framework for Ocean Observations the panels of the Global Ocean Observing System (GOOS) have been reorganized. GOOS will now be overseen by a steering committee and three panels for Ocean Physics (OOPC), Biogeochemistry (the International Ocean Carbon Coordination Project will expand to include

nutrients and oxygen) and a new Biology Panel. At the sixteenth session of the OOPC, a workplan for the coming five years was developed. Key tasks included coordinating an evaluation of the Tropical Pacific Observing System, reducing uncertainty in air-sea flux estimates and identifying requirements for observations of western boundary currents. The panel is also expected to expand its focus to the coastal oceans and shelf seas. The Evaluation of the Tropical Pacific Observing System was the first priority of the panel: in particular, due to the challenges in sustaining the TAO/TRITON mooring array across the Tropical Pacific: the backbone of the El Niño-Southern Oscillation (ENSO) monitoring system. A Tropical Pacific Observing System (TPOS) 2020 workshop was held at Scripps Institution of Oceanography, San Diego, 27–30 January 2014, involving both scientists and agency representatives with an interest in the Tropical Pacific region. The seventeenth session of the OOPC will be held in Barcelona, 22–24 July 2014.

4.4.56 In the context of the GCOS Panels' work, the Association noted the importance of liaising closely with space agencies on dedicated space-based observations for climate, in particular through the Committee on Earth Observation Satellites (CEOS), the Coordination Group for Meteorological Satellites (CGMS), the WMO Space Programme and their development of the architecture for climate monitoring from space. The Association recommended that progress and future needs in the development of the architecture for climate monitoring from space be addressed in the next GCOS Adequacy Report and requested the GCOS Secretariat to remain engaged in the next stages of development and implementation of the architecture.

GCOS Reference Upper-Air Network (GRUAN)

4.4.57 The Association noted that the implementation of GRUAN has progressed steadily over the past years and initial GRUAN-quality data can be accessed at NOAA's National Climatic Data Center (NCDC). As the GRUAN currently consists of 16 initial reference sites, which are predominantly located in the Northern Hemisphere mid-latitudes, the Association encouraged its Members to support GRUAN operations, in particular in arctic and tropical regions, and also to collaborate with scientific institutions to reach better global coverage over major climatic zones. It welcomed the exemplary collaboration between an operational service and a scientific institution at the new GRUAN site of Ny-Ålesund. The Association also noted that criteria for site assessment and certification, and the process for implementation, had been developed. It encouraged those Members maintaining GRUAN sites to undergo the formal GRUAN certification and assessment process. The Association welcomed that representatives of the WMO Technical Commissions (CBS, CIMO, CAS and CCl) are now officially represented at the Working Group on GRUAN. It was recognized that whilst good progress has been accomplished in implementing the GRUAN, funding the operation of reference sites, particularly in RA V, was an ongoing challenge. The Association urged its Members to work with GRUAN and the GCOS Secretariat to ensure the long-term sustainability of the network.

GCOS Cooperation Mechanism

4.4.58 The Association recognized that the cooperation mechanism of the GCOS programme to improve climate observation networks, most recently focused in RA I and parts of RA V, has made good progress in improving the coverage and performance of the networks. In addition, significant progress was made in obtaining CLIMAT reports from the Regional Basic Climatological Network (RBCN) stations. The Association noted that strengthening of such networks was an important requirement for an effective GFCS. The GCOS Steering Committee had noted in its last session that many Members of WMO were not preparing and sending CLIMAT reports from all of their listed RBCN stations. The Association recalled the recommendation of Congress that Members were encouraged to expand these networks and urged Members to take appropriate actions.

4.4.59 The Association emphasized the importance of GCOS for the region, especially given the vulnerability of many Members to the impact of climate change. The Association explicitly thanked Germany, Japan, Switzerland and the United Kingdom who have contributed to the GCOS Cooperation Mechanism in the past 4 years. In particular, the Association thanked the Government of the United Kingdom (Department of Energy and Climate Change) and the UK Met Office who

support the position of the GCOS Implementation Manager in the GCOS Secretariat since 1 March 2013. The Association urged Members and the Secretary-General, with the support of the GCOS Secretariat, to continue efforts to mobilize additional resources to maintain an effective and sustainable GCOS network in the region.

4.4.60 The Cook Islands acknowledged the assistance in funds from Japan and the United Kingdom in support of the Global Upper Air Network (GUAN) at Rarotonga, located in a region where upper-air observations are very sparse. The Association urged Members to appreciate the assistance from donor countries and to ensure that the performance of their tasks in support of these projects is of the highest quality. Members are encouraged to develop/maintain a dialogue with the donor countries and the GCOS Secretariat to ensure the continuity of the programme.

WMO Information System (WIS)

WIS Implementation Plan

4.4.61 The Association expressed its appreciation to the RA V Working Group on Infrastructure's (WG-INFR) Task Team on WIS (TT/WIS) for the Region V Implementation Plan (see the annex to Resolution 8 (RA V-16)) for WIS. It noted that the plan was based on the successful RA VI WIS Implementation Plan taking into consideration regional requirements including a special focus on addressing deficiencies in the telecommunications systems of RA V Members. It noted that the plan aims to assist RA V Members to implement WIS functionality in their National Meteorological and Hydrological Services (NMHSs) and other identified national centres (NCs) or Data Collection or Production Centres (DCPCs) in order to become effective WIS users in a timely and harmonized manner.

4.4.62 The Association noted the significant input from Australia through the provision of GISC services to 23 of the 27 NCs and nine of the ten DCPCs in the Region, as well as taking a leading role in the capacity-building activities. It expressed its appreciation to Australia for the successful RA V WIS/TDCF workshop held in April/May 2013 organized by GISC Melbourne and attended by representatives of nearly all RA V Members. In addition to increasing relevant experts' knowledge of WIS and TDCF, the workshop was a major first step in the development of the RA V WIS Implementation Plan and in training RA V Members how to use and benefit from WIS. The workshop was the first phase of an AusAID sponsored initiative: the second phase includes a series of in-country visits to further reinforce the WIS capabilities. The Association noted further that GISCs Exeter, Tokyo, Toulouse and Washington are also supporting RA V centres, either as a principal GISC, or as back up GISC. It thanked France, Japan, the United Kingdom and the United States for their contributions and encouraged them to continue to work with GISC Melbourne and TT/WIS to oversee the implementation of WIS in the Region.

4.4.63 Noting the objective set by the Sixteenth Congress (Cg-XVI) for achieving the implementation of WIS in all NMHS national centres by 2015, the Association highlighted the important role the national WIS Focal Points (terms of reference available at http://www.wmo.int/pages/prog/www/CBS/Lists_WorkGroups/CBS/cross-cutting/fp%20wis-gts/tors play in the coordination and monitoring of WIS implementation. The Association emphasized that all Members should have clearly identified National Focal Points for WIS and should keep the WMO Secretariat informed of any changes of the status and operation of their centres and/or changes of their focal points information.

4.4.64 The Association highlighted that the implementation of WIS functionality can be achieved internally by upgrading a Member's current information management and message switching systems or by making use of the remote WIS services offered at the GISCs complementing their current GTS and Internet connectivity. The Association encouraged its Members to ensure that WIS functionality was taken into consideration in future information management and message switching systems. The Association highlighted that regardless which technical solution is chosen by centres for implementing WIS, a major effort will be required by centres to ensure staff are appropriately trained in the skills required to use WIS effectively in their activities. It noted the progress in the work of CBS in identifying WIS Competencies and Learning

Guide (in development; see http://wis.wmo.int/file=687 (competences) and http://wis.wmo.int/file=689 (training and learning guide)) and encouraged Members to take advantage of this information in the implementation and sustainability of their WIS functionality.

4.4.65 The Association reminded its Members that, in order to derive benefits from WIS, accurate WIS Discovery Metadata records describing the information provided through the WIS needs to be ensured. This includes registering data and products available for national usage. It further encouraged its Members to enable their national web pages to include remote search of their Principal GISC metadata catalogues to facilitate national users' access to all WIS data and products. The Association adopted Resolution 8 (RA V-16) – WMO Information System Implementation Plan for Regional Association V (South-West Pacific).

Migration to Table Driven Code Forms

4.4.66 The Association noted the progress made in migrating to Table Driven Code Forms (TDCF), and reminded those Members that had not yet completed their preparations for using TDCF in their operations that some nations have declared their intention to cease transmission of information in Traditional Alphanumeric Codes after the completion of the migration.

WIS Discovery Metadata

4.4.67 The Association agreed that the WIS Discovery Metadata allows users to find out what information is available through the WIS, and entries within metadata records control how GISCs serve information to users in response to requests for subscriptions or ad hoc delivery. The initial WIS Discovery Metadata records for information exchanged on the GTS were derived from Volume C1 using an automated tool. The Association urged its Members to review the WIS Discovery Metadata records that correspond to information the Members generate and to correct the records to reflect more accurately the information provided. The Association reminded its Members that metadata records describing information that Members are willing to share but that are not exchanged as a matter of routine could also be provided.

Climate Data Management and Applications

Climate Data Management

4.4.68 The Association was informed of the outcome of the WMO survey on the implementation of climate database management systems by Member's National Meteorological and Hydrological Services (NMHSs). The survey reveals that more than half of the 137 responding Members do not have a proper or fully operational Climate Data Management System (CDMS) in place. The Association agreed that concerted efforts are needed to improve availability of, and access to, quality controlled and long-term climate data that is needed for research, applications and climate services.

4.4.69 The Association recalled the availability of a variety of CDMS solutions that Members can use in undertaking essential climate data management functions at national level, including, among others, solutions to those CDMS that have been evaluated and made available through WMO.

4.4.70 The Association further appreciated the recent development and implementation of open source based systems, which include MCH (Meteorological, Climatological and Hydrological Database Management System; developed and offered to WMO Members by Mexico) and CliDE (Climate Data for the Environment, developed and offered to WMO Members by Australia). The Association further appreciated the deployment of CliDE software and associated hardware in 14 Pacific nations and Timor-Leste by the Australia Bureau of Meteorology in close partnership with the respective NMHSs, through funding from the Australian Department of Foreign Affairs and Trade.

4.4.71 The Association welcomed the efforts of the CCl Expert Team on Climate Database Management Systems to develop a CDMS specifications document. The Association is looking forward to the publication of this document which will provide guidance for developing and acquiring suitable CDMSs in compliance with new and evolving technological requirements and standards.

4.4.72 The Association noted with concern the induced relative costs for upgrading CDMSs or acquiring new ones, which posed financial challenges to some countries due to incurred relatively high fees related to software license, installation, and training. The Association further encouraged Members to actively create subregional CDMS user groups as a cost-effective means of CDMS modernization and information sharing. Although the Association welcomed the development and implementation of open source based systems as providing a cost-effective CDMS, it is essential to factor in the ongoing maintenance, support and development costs required to maintain the viability of these open source based systems when being deployed.

Data Rescue (DARE)

4.4.73 The Association recalled Resolution 16 (Cg-XVI) on climate data requirements which decided that priority be given to accelerating rescue and digitization of climate records and promoting global and regional initiatives to collaborate on Data Rescue (DARE) and the exchange of related scientific knowledge and technological advances. It further recalled that accelerating DARE is one of the priority projects of the GFCS implementation plan.

4.4.74 The Association appreciated the progress made in DARE activities carried out in the Region with the support and guidance from the WMO Commission for Climatology (CCl), ACRE-SE ASIA, NMHSs and universities.

4.4.75 The Association further urged Members to work individually and collectively to make all possible efforts to mobilize the required financial and human resources to accelerate the preservation, recovery and digitization of all climate records, hence preventing unparalleled climate observations from unrecoverable deterioration.

4.4.76 The Association welcomed CCl's plan to develop an International Data Rescue portal (I-DARE) to inform on data rescue activities worldwide and provide information services on data inventories, best practices and technologies that will help Members in carrying out Data Rescue more effectively and efficiently.

4.4.77 The Association urged Members to work closely with WMO and CCl on I-DARE with provision of suitable expertise, infrastructure and financial resources that the project may require during its implementation phase.

World Weather Records (WWR)

4.4.78 The Association recalled Resolution 16 (Cg-XVI) on climate data requirements and the subsequent Resolution 14 (EC-64) on the submission of the ten-year WWRs of the period pertaining to 1991–2000 and 2001–2010, and the shift from the ten year to an annual submission, which should apply to the WWRs of 2011 and onward.

4.4.79 The Association noted the progress made in the WWRs submission in RA V. It urged Members who have not yet submitted their WWRs to do so as soon as possible.

International Climate Assessment and Dataset (ICA&D)

4.4.80 The Association welcomed CCl and Members' efforts to extend the concept of the European Climate Assessment and Dataset (ECA&D) to a more International Climate Assessment and Dataset initiative under WMO/CCl auspices (ICA&D) to support GFCS product generation and services. ICA&D aims at providing access to high-quality station data sets with a daily resolution and producing climate monitoring and climate change information. The Association appreciated the

implementation of this system in the South-East Asian region, namely the South-East Asian Climate Assessment & Dataset (SACA&D), hosted by BMKG Indonesia in close collaboration with contributing Member countries. It urged Members to collaborate enthusiastically within SACA&D on sharing the required data and metadata necessary for the regular provision of derived climate products and services to the contributing countries.

WMO Climate Normals

4.4.81 The Association took note of a CCl-led initiative to submit a proposal for amending the WMO Technical Regulations concerning the provision and updates of Climate Normals. The new model, endorsed at EC-65, comprises: (i) a varying 30 year period updated every 10 years (Climatological Standard Normal); and (ii) a fixed reference period (1961–90) for long-term climate variability and change assessment. This reference period should be applied until such time as there is a compelling scientific case for changing it.

Global Data Management Framework for Climate

4.4.82 The Association welcomed the CCl plan to work closely with other Commissions and programmes in setting up a high-quality global data management framework for climate. The aim of this initiative is to establish a global infrastructure for ensuring that climate-relevant data are consistently managed, at global, regional and national levels, using a commonly agreed and well described minimum set of procedures, regulations and system specifications.

Training and capacity development

4.4.83 The Association reiterated the need for climate data-related capacity-building including training in the Region to further raise the profile of its Members' NMHSs as well as to underpin climate service capabilities where required. In this regard, the Association welcomed the multitude of previous and upcoming capacity-building activities, including training, in the Region in the domains of climate data management, CDMS implementation and data rescue.

4.5 Research and technology development (agenda item 4.5)

World Climate Research Programme (WCRP)

4.5.1 The Association recalled with appreciation that WCRP organized the very successful Open Science Conference (OSC) entitled "Climate Research in Service to Society" (http://conference2011.wcrp-climate.org), which was held in Denver, Colorado, USA, in October 2011 and attracted over 1900 participants including a number of researchers from the South-West Pacific. A major emerging theme from the OSC was the science support to climate-reliant decision-making.

4.5.2 The Association was pleased to note that following the OSC, the WMO/ICSU/IOC appointed Joint Scientific Committee (JSC) for WCRP had identified six "Grand Science Challenges" for WCRP, as follows:

(a) Provision of skilful future climate information on regional scales;

(b) Regional sea-level rise;

(c) Cryosphere in a changing climate;

(d) Clouds and climate sensitivity;

(e) Changes in water availability;

(f) Prediction and attribution of extreme events.

The Association further noted that WCRP and its constituencies are developing implementation plans for the Grand Challenges. It emphasized that progress in the research on climate extremes and on regional sea-level rise would be of exceptional importance for the Region, which is impacted by devastating tropical cyclones, also taking into account that their impact may be augmented by rapid regional sea-level rise.

4.5.3 The Association noted with interest that WCRP had been participating in the planning of Future Earth, a 10-year multidisciplinary research initiative in support of global sustainability, on modalities of their cooperation. Noting that Dr Mark Stafford Smith, the Chairperson of the Future Earth Science Committee is from the RA V Region, the Association expressed a hope that Future Earth would develop a vigorous regional research programme on sustainable development in the South-West Pacific, the climate aspects of which would be conducted in close cooperation with WCRP.

4.5.4 The Association acknowledged with appreciation that the sixth General Assembly of the WCRP SPARC Project was held on 12–17 January 2014 in Queenstown, New Zealand, and attracted 280 participants from all regions of the world. The Association noted the significant progress in research on the stratospheric ozone conducted by SPARC. One direct beneficiary of this research was the WMO/UNEP Scientific Assessment of Ozone Depletion 2010, in which important predictions of the restoration of the stratospheric ozone layer were reported.

4.5.5 The Association recognized significant progress on a number of research priorities pursued by WCRP, including, but not limited to, some issues of high importance for RA V, for example, predictability of the Madden–Julian Oscillation on the seasonal time scale and of global surface temperatures on the decadal time scale. Major achievements have been made in advancing understanding of regional climate, especially through the successful implementation of the Coordinated Regional Downscaling Experiment (CORDEX) in many regions of the world. The Association also noted with appreciation a major contribution of WCRP and its affiliated scientists to the Fifth Assessment Report of IPCC, especially to the WG I Report ”Climate Change 2013: The Physical Science Basis”. The WCRP intercomparison experiment CMIP Phase 5 (CMIP5) provided an unprecedented dataset of model projections, which were widely used around the world to study climate variability and change and the impacts of climate change. The CMIP5 output constituted the basis for more than 350 scientific publications. The Association was pleased to learn that WCRP is now working on design of CMIP6, which is expected to make climate predictions more robust and comprehensive.

4.5.6 The Association noted the significant impacts of monsoons in the Region and the vital importance of continued scientific research in this area. The Association noted and supported the plan to establish a joint GEWEX/CLIVAR Monsoon Panel and urged its formation at the earliest opportunity.

4.5.7 The Association acknowledged with appreciation the WCRP commitment to capacity development in the domain of climate research and its support to Early Career Scientists (ECS), as well as students and scientists from developing countries. The Association also noted with appreciation the increasing number of WCRP science and training events. A recent example of relevance for RA V was the 1st CORDEX Southeast-Asia workshop at BMKG Headquarter Office, Jakarta, Indonesia in November 2013, organized in close cooperation with the Asian-Pacific Network for Global Change Research (APN). Another recent WCRP-cosponsored capacity-building event in the Region was the Workshop “Matching Oceanographic Problems of the Indonesian Seas to the Right Data Sets and Models” held on 13–23 January 2014 in Bandung, Indonesia. The Association took note on the preparations for the 2014 Summer School on attribution and prediction of extreme events (21 July–1 August 2014, Trieste, Italy), and encouraged its Members to support suitably qualified candidates for participation in this event.

World Weather Research Programme (WWRP)

4.5.8 The Association noted the importance of the Forecast Demonstration Projects/ Research and Development Projects (FDPs/RDPs) in responding to regional needs. The

Association requested its Members to identify and develop FDPs/RDPs in Region V, in consultation with WWRP, in aligning the outcomes to improve operational weather and related environmental services and to meet users' needs.

4.5.9 The Association requested the Secretary-General to ensure that the WWRP works closely with the WCRP towards preparing scientific studies on the impact of climate change on high impact weather events in Region V, especially in the LDCs and SIDS, along similar lines to the research that led to the statement on the impact of climate change on tropical cyclone activity by the Expert Team on Climate Change Impacts on Tropical Cyclones.

4.5.10 Noting with appreciation that the WWRP is placing special emphasis on advancing better predictions of high impact weather events on wider time ranges, from nowcasting to seasonal time scale, as the socio-economic effects of these events remain of central importance to Members, the Association requested the Secretary-General to ask the WWRP to coordinate its activities related to high impact weather with WCRP, the Global Framework for Climate Services (GFCS), Disaster Risk Reduction (DRR), relevant technical commissions, the regional associations, NMHSs, and the appropriate WMO Programmes.

4.5.11 The Association acknowledged that the use of predictions has value only when they support decisions and supported the emphasis placed on communication and interaction with stakeholders. Therefore, the Association requested the involvement of operational forecasters in the proposed High Impact Weather (HIWeather) project. The Association welcomed the consideration that will be given to high impact weather in urban environments, as well as including flooding as a central element in many high impact weather phenomena. The Association requested that special attention be given to better predictions of the hydrological consequences of high impact weather and to build the resilience of the urban environments.

4.5.12 The Association requested the Secretary-General to ask the WWRP to further refine the proposed HIWeather project plan and to consult widely with RA V Members in the process to ensure that the needs of Members are considered, so that the most pertinent scientific issues receive priority. The Association further requested the Secretary-General to ensure that this project is formally established at the sixty-sixth session of the Executive Council (EC-66).

THORPEX

4.5.13 The Association acknowledged the activities and continuing efforts in the five THORPEX Regional Committees (RCs) in Africa, Asia, Europe, North America, and the Southern Hemisphere. These THORPEX RCs facilitated provision of funding, logistical and other support, planning, coordination and implementation of THORPEX activities conducted by the Region and as part of global initiatives with respect to the THORPEX International Research Implementation Plan.

4.5.14 The Association noted that the research products on the occurrence probability of extreme weather events (warm, cold, strong wind, and heavy precipitation) are available, using the four operational centres' ensemble forecasts from the TIGGE database, in not only all continents, but also for four SWFDP areas, including the SWFDDP area in the South-West Pacific, at http://tparc.mri-jma.go.jp/TIGGE/tigge_swfdp.html.

4.5.15 The Association noted with appreciation the provision of the forecast data from ten operational centres, which included the Bureau of Meteorology in Australia, to the TIGGE archives hosted by the European Centre for Medium-Range Weather Forecasts (ECMWF), the National Centre for Atmospheric Research (NCAR) and China Meteorological Administration (CMA).

4.5.16 The Association further noted the establishment of three THORPEX legacy projects aligned to the requirements of Members and the GFCS namely, the sub-seasonal to seasonal prediction project (S2S), the polar prediction project (PPP) and the high-impact weather prediction project (HIWeather) currently being developed. The first two projects were approved at EC-64 and as per Resolutions 16 and 17, their trust funds have been established and the International Coordination Offices were formalized. The Association encouraged Members to participate in the

implementation of these projects that are relevant to the Region and to provide the resources required.

4.5.17 The Association urged WWRP to facilitate linkages between S2S, PPP and the proposed HIWeather project, and the World Weather Open Science Conference planned from 16 to 21 August 2014 in Montreal, Canada.

Global Atmosphere Watch Programme (GAW)

4.5.18 The Association valued the important support by several Members (Australia, Indonesia, Malaysia, New Zealand, and USA) for GAW global stations in the Region and welcomed the establishment of three regional stations by Australia and the decision to establish two new GAW stations in Sulawesi and West Papua (both to be operated by BMKG, Indonesia). In spite of these improvements, efforts are needed to fill the observational gaps in the Tropics and the equatorial belt. The Association appreciated the recent efforts of Fiji on reinforcement of atmospheric composition observations and establishment of collaboration in the Region. The Association welcomed an extension of the Australian Greenhouse Gas Observation Network (AGGON) with plans to further investigate key atmospheric processes in the Australian-South-East Asian tropical region and work on quantification of the changing ocean CO2 sinks. The Association appreciated the efforts of Australia to establish new research platforms, namely the Australian blue water research vessel RV Investigator. The Association was pleased with the global initiative by Switzerland to enhance atmospheric composition measurements, specifically those related to climate, through the Capacity-building and Twinning for Climate Observing Systems (CATCOS) project, which includes support for the Bukit Koto Tabang station in Indonesia. The Association recommended for its Members to consider offering similar assistance.

4.5.19 The Association noted that the GAW Station Information System (GAWSIS, http://gaw.empa.ch/gawsis/) provides up-to-date information on GAW networks and urged the Members that operate regional, global or contributing GAW stations to make sure that their information is updated regularly and that observational data are made available through the GAW World Data Centres (WDCs) in a timely fashion.

4.5.20 The Association noted the recommendation from CAS-16 to supplement the observational programmes at GAW stations by measurements of the total amount of greenhouse gases in the atmospheric column using solar absorption spectroscopy. The Association valued the observations of greenhouse and ozone depleting gases made in Australia and New Zealand. The Association appreciated the recognition of the Total Carbon Column Observing Network (TCCON) in 2012 as a contributing GAW network, noting that several TCCON stations operate in the Region. The Association further encouraged regional networks that perform observations of GAW parameters and satisfy GAW recommendations on quality assurance to join the GAW Programme as contributing networks.

4.5.21 The Association appreciated the collaboration established between the Members of RA V and RA II through the joint activities on greenhouse gas observations, participation in the annual Regional Asia-Pacific GAW Greenhouse Gases workshops organized by the Republic of Korea since 2009 and publications of the Asia-Pacific GAW Greenhouse Gases Newsletter (http://www.wmo.int/pages/prog/arep/gaw/documents/Asian_GAW_GHGs_Newsletter_Vol4.pdf). The Association welcomed the organization by NIWA of the 16th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2011) in 2011 in Wellington, New Zealand. This was the first GGMT meeting held in the Southern Hemisphere. These activities, as well as the network extension, contribute to the development the Integrated Greenhouse Gas Information System (IGIS).

4.5.22 The Association noted that the implementations of IGIS requires a higher density of the greenhouse gas observational network and increased variety of observations (including isotopic measurements and measurements of co-emitted species), improved complexity and performance of transport models on global, regional and local scales, and better coordination of efforts with developments in other Earth system components (e.g., biosphere and oceans). The Association

requested its Members to undertake the necessary steps in the development of these high-quality observations for them to be compatible with the established GAW network and to improve the modelling tools to implement IGIS.

4.5.23 The Association appreciated the arrangement of two workshops on GAW activities in tropical regions, both held in Jakarta, in October 2010 and in September 2013. The second workshop recommended and noted that: (1) capacity-building in twinning-type projects should be encouraged bearing in mind that the human capital is the key for the sustainability of high-quality observations; (2) GAW Urban Research Meteorology and Environment (GURME) type of activities should be developed and enhanced in the Region due to the needs for air quality services in the growing urban areas; (3) it is important to connect the observations that are made to users at relevant sectors, for instance as regards forestry experts and the ministry; (4) in view of the large diurnal variations at several GAW stations in pristine tropical forest areas, enhancement of metadata is recommended in order to better utilize the measurements; and (5) GAW stations generate good quality data which can be analysed further to produce more enhanced outcomes or results, which can be used by the policymakers in each country.

4.5.24 As regards GAW Central Facilities, the Association appreciated the important continued support for the Regional Dobson Calibration Centre in Australia. It was noted that there still are needs for Central Facilities related to quality assurance for other groups of the GAW variables observed in RA V.

4.5.25 The Association appreciated the support from the Canadian Brewer Trust Fund that allowed for the calibration of Brewer instruments in Indonesia in November 2010 and in March 2013. It was noted that there was a need for continued support so that these instruments can be calibrated every two years.

4.5.26 The Association noted the importance that UV radiation plays in the Region, especially in Australia and New Zealand, and recognized that further information is still needed in order to properly address both negative and positive health effects.

4.5.27 The Association stressed that continuous observations of Volatile Organic Compounds (VOCs) have high value but are still rare, and encouraged its Members to include these measurements at their stations. The Association further noted that an extension of the VOC network could be reached through better collaboration with the biosphere community and encouraged steps to be undertaken to establish such collaboration. The Association appreciated the initiative to hold a GAW VOC expert meeting back-to-back with the 2014 Regional Asia-Pacific GAW Greenhouse Gases workshop.

4.5.28 As regards GAW products, the Association noted the importance of the WMO Greenhouse Gas Bulletin, an authoritative WMO publication on the state of the key greenhouse gases in the atmosphere with valuable contributions from Members and urged for this to be supported. The Association appreciated the input from Australia and New Zealand to the WMO Antarctic Ozone Bulletin through timely provision of data to the WMO-GAW World Data Centre for Greenhouse Gases from the measurement sites.

4.5.29 The Association recognized the increased coordination between WWRP, GAW, and the Education and Training Programme. This coordination allows NMHS personnel, particularly young scientists, to contribute to and benefit from wider research activities and outcomes. The Association recognized that it would be useful to expand WMO Regional Training Centres to include atmospheric composition observations.

4.5.30 The Association noted that it is important for GAW to enhance the value chain from research to operational observations, including model development and application, and to services. In this context Member contributions to research, infrastructure, capacity and institutional development are very essential and the Association encouraged further involvement and contributions in these areas.

Joint Research Activities

Model development and Numerical Experimentation

4.5.31 The Association noted the success of the 29th session of the Working Group on Numerical Experimentation (WGNE), held in Melbourne, 10–13 March 2014, hosted by the Bureau of Meteorology, Australia. WGNE was established, jointly, by the World Climate Research Programme (WCRP) Joint Scientific Committee (JSC) and the Commission for Atmospheric Sciences (CAS) to foster model development and comparisons between the weather and climate communities. The Association encouraged its Members to visit the WGNE website for an overview on the activities of this working group: http://www.wmo.int/pages/about/sec/rescrosscut/resdept_wgne.html.

Forecast Verification Research

4.5.32 The Association noted the success of the 5th International Verification Methods Workshop held in Melbourne in 2011 and its 6th workshop in the series held in New Delhi, India, during March 2014, which was organized by the Joint Working Group (WWRP/WGNE) on Forecast Verification Research. The Association was also pleased to note that the working group had organized training activities during the intersessional period, namely, a 3-day Tutorial on Verification (Melbourne, 2011), Hands-on forecast verification training (Lima, 2010), Summer Colloquium on Forecast Verification (Boulder, 2010), and a 1-day Training Workshop on Verification of Ensembles (Reading, 2013).

Sub-seasonal to Seasonal Prediction

4.5.33 The Association noted the establishment of the Sub-seasonal to Seasonal Prediction project (S2S) as a joint WWRP-WCRP effort and appreciated the contributions of Australia, the United Kingdom and the United States of America to the S2S Trust Fund. The Association encouraged Members to contribute to the trust fund that will support the implementation of the project.

4.5.34 The Association took note of the plan to conduct joint research on the Maritime Continent that will involve many researchers from Indonesia, Japan, USA, Australia, Singapore, Philippines, Malaysia and other countries in the Maritime Continent. The project known as Year of Maritime Continent (YMC) aims to understand the role of the Maritime Continent in the local, regional and global weather-climate continuum with focus on the Madden–Julian Oscillation (MJO), the Indonesian ThroughFlow (ITF) transport, dynamics and ocean-atmospheric interaction of the marginal seas, and troposphere-stratosphere interactions, among others. An intensive YMC campaign is planned from April 2017 to October 2018. During this period, several intensive observations focusing on specific topics will be carried out. The Association requested WWRP and WCRP to support this project through the Madden–Julian Oscillation Task Force (MJO-TF) and the S2S project.

Links between the Polar Prediction Project and the WCRP Polar Climate Predictability Initiative

4.5.35 The Association noted the significant progress in the implementation of a Polar Prediction Project (PPP) and the planning of a Year of Polar Prediction (YOPP) in 2017–2018 which includes strong links with other polar-related activities. The Association encouraged its Members to engage in the process and, where appropriate, to use this as an opportunity to strengthen observational networks and polar science initiatives.

4.5.36 The Association noted with appreciation the contributions of Canada, the United Kingdom and the United States of America to the PPP Trust Fund. The Association encouraged Members to contribute to the trust fund in order to support the implementation of the project research activities.

4.5.37 The Association urged WWRP and WCRP to facilitate linkages between S2S and PPP and the World Weather Open Science Conference planned for 16 to 21 August 2014 in Montreal, Canada.

4.6 Capacity development in Regional Association V (agenda item 4.6)

WMO Capacity Development Strategy Implementation Plan 2012–2015

Capacity Development Strategy

4.6.1 The Association recalled the discussions in Cg-XVI on the need for a cohesive and coordinated approach to capacity development to maximize the outcome of capacity development activities. It further noted the importance of regional and subregional efforts to support the capacity development of NMHSs given the large number of existing and planned regional centres and the regional emphasis of development partners. In this regard, the Association welcomed the WMO Capacity Development Strategy (CDS) and the CDS Implementation Plan (CDSIP) that had been approved at EC-64 and EC-65 respectively, and acknowledged the key role that the Association would have to play in implementing the CDS (http://www.wmo.int/pages/prog/dra/CDS.html).

4.6.2 While the Association noted the progress of capacity development activities in the Region, it also recognized the need to further strengthen and harmonize such activities to address existing gaps in human, institutional, infrastructural and procedural capacities for many RA V Members. To foster the capacity development in the Region, the Association encouraged its Members to implement the CDS and adopted Resolution 9 (RA V-16) – Implementation of the WMO Capacity Development Strategy in Regional Association V (South-West Pacific). In order to utilize limited resources effectively and efficiently the Association urged its Members to consider the strategic approaches to capacity development corresponding to the six Strategic Objectives of the CDS.

4.6.3 The Association was informed of the ongoing efforts of the EC Working Group on Capacity Development (EC-WG/CD) which led to the approval by EC-64 and EC-65 of the Capacity Development Strategy (CDS) the CDS Implementation Plan (CDSIP) respectively for 2012–2015. The Association noted the creation of EC-WG/CD Task Teams on the Country Profile Database and on the Categorization of NMHSs by level of service provision. At this point, the Association thanked representatives and experts from Indonesia, USA, UK and other Members of the Region for their participation in the Working Group and related programmes and encouraged them to continue providing a Region's perspective to the Working Group, especially as it considers further implementation priorities for 2016–2019.

4.6.4 The Association requested the Secretary-General to further enhance the capacity development in the Region taking into account the needs reflected in the RA V survey on institutional arrangements for NMHSs and identification of future priorities and as expressed by some of the NMHSs during the RA V-16 session.

4.6.5 The Association also agreed to reinforce the work of the Management Group in coordinating and harmonizing capacity development activities in line with the CDS and approved Resolution 9 (RA V-16) – Implementation of the WMO Capacity Development Strategy in Regional Association V (South-West Pacific).

4.6.6 The Association reviewed two tools being developed as part of the CDS: the prototype on-line Country Profile Data Base; and the on-line Guide for the Role and Operations of Meteorological Services. Following a demonstration of these tools, the Association discussed how the tools can be used to build the NMHSs in RA V and offered suggestions and expressed their support for the deployment of the pre-operational capability of these tools in 2014.

4.6.7 The Association encouraged its Members to support the Country Profile Data Base (CPDB) by updating their information during the roll-out of the CPDB initial operating capability and by maintaining the information contained in a database thereafter.

Special Focus on LDCs and SIDS

4.6.8 The Association recalled the discussions in Cg-XVI on the importance of the WMO Programme for the Least Developed Countries (LDCs) and the high priority to be continually attached to it. It welcomed Congress' decision to continue and enhance the WMO Programme for the LDCs to address the obstacles and constraints limiting NMHSs in LDCs and Small Island Developing States (SIDS) to provide relevant weather, water and climate information and services and to strengthen their capabilities to meet the demands and requirements of the priority areas for action as defined in the Istanbul Programme of Action (IPoA) for the LDCs for the decade 2011–2020. In this connection, the Association encouraged the Secretariat to ensure that all WMO's scientific and technical programmes continue to give higher and visible priority to LDCs and SIDS in their assistance and capacity-development activities.

4.6.9 The Association encouraged its Members to participate actively in, and to contribute to the maximum extent possible, to the funding of the WMO Programme for the LDCs, including through the WMO trust funds for NMHSs of LDCs and SIDS.

4.6.10 The Association noted that there are capacity-building needs relevant to the Pacific included in the WMO Strategy, RAV SOP, Pacific Islands Meteorological Strategy (PIMS) and the Pacific Roadmap for Improved Climate Services that should also be considered in the implementation of the Capacity Development Strategy.

Human Capacity Development, including education and training

Introduction

4.6.11 The Association acknowledged the importance of education and training for all Members in RA V, and the varying capabilities of Members to address their national needs. The Association noted that there were few institutions offering graduate level forecasting courses and none currently offering some or all of these courses online to reduce the time and expense associated with personnel being absent from their Service. The large distances, small staff numbers and cost of travel make the utilization of distance learning very important for the Pacific to ensure that these small NMHSs are able to access education and training opportunities.

4.6.12 The Association welcomed the information that the University of the South Pacific (USP) was strengthening its course offerings in climate and related matters with these courses being available in a distance mode as well as face-to-face mode. The Association noted that the Pacific Island Meteorological Services were working with USP to investigate the possibility of proposing USP as a Regional Training Centre. The Association welcomed advice that USP had held discussions with Fiji on forming a partnership to propose an RTC providing operationally focused training opportunities as well as accredited academic courses. A key success factor for such an RTC would be identifying ongoing external funding to ensure that Members could access the training offered through such an RTC. The Association requested the president to monitor this potential development in the intersessional period and propose it for consideration by the Executive Council if it seems sufficiently mature and workable.

Role of education and training in assisting the regional association meet its goals

4.6.13 The Association acknowledged the key role education and training would have to play in meeting the goals outlined in its 2012 to 2015 Operating Plan and the 2016 to 2019 intersessional period. The Association thus requested its president and the RA V Management Group to identify any education and training gaps that could impact upon successfully achieving the goals and expected results of those plans. This gap analysis should be seen as part of the risk management actions and be based around the Member's need in the high priority areas vis-à-vis Members' and Regional Training Centres' existing education and training capabilities. The Association recommended that the Management Group make any necessary adjustments to the Operational Plan if the gap analysis revealed deficiencies in meeting the training needs of the Region. In particular, noting the imminent deadlines for meeting the requirements for competencies

and qualifications for aeronautical meteorological personnel laid down in the Technical Regulations, the Association recommended that the determination of the regional needs and ability to address the aeronautical issue should be accorded high priority.

4.6.14 The Association recalled that the Region was represented on the WMO Executive Council Panel of Experts on Education and Training and that this Panel member should act as an interface between the Panel and the Management Group to ensure smooth coordination and communication between the Panel and the Region. The Association recommended that the Management Group nominate one of its members to be the focal point for the ongoing assessment of the regional education and training needs against the Operational Plans and the ability of the regional training institutes to deliver that training. The focal point should also liaise with the regional member of the EC Panel of Experts on Education and Training.

Fellowships

4.6.15 The Association noted that over the intersessional period eight of its Members had been supported by the WMO Fellowship Programme. Twenty-eight fellowships ranging from 6 months to 2 years had been awarded. Twenty of the fellowships were undertaken within the Region with the remainder in RA II, RA IV and RA VI. The Association noted that WMO had considerably increased its outreach to more partners for support to WMO fellowship activities in general and hence there was an increase in opportunities available to Members in the Region. The Association thanked its Members for the support they provided to the WMO Fellowship Programme and requested all Members to provide further support for this important programme. The Association encouraged Members who did not have national training institutes and were not able to fully fund staff development to consider cost sharing options with WMO for on-the-job training opportunities for their staff in more developed Services in the Region. The Association expressed its appreciation to the Government of the Philippines, through its Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) for providing special fellowships opportunities to Members in the Region since 2012.

Regional Training Centres

4.6.16 The Association recalled that in previous sessions it had requested the Executive Council to recognize the following institutions as WMO Regional Training Centres (RTCs) to address the education and training needs of RA V Members and, where possible, assist in addressing the needs of WMO Members outside the Region: RTC Indonesia composed of the Agency for Meteorology, Climatology and Geophysics (BMKG) and the Research Centre for Water Resources in Bandung; RTC Philippines composed of PAGASA, Quezon City and the Institute of Environmental Science and Meteorology (IESM) Department of Meteorology and Oceanography Diliman, University of the Philippines Quezon City, Philippines.

4.6.17 The Association noted the upcoming (December 2016) requirement for Aeronautical Meteorological Forecasters to have completed the Basic Instruction Package for Meteorologists (BIP-M). The Association went on to further recognize the importance of the BIP-M outside aeronautical meteorology. The Association therefore urged RTC Indonesia and RTC Philippines to assist RA V Members with their staff qualification requirements by offering, or continuing to offer, courses that comply with the BIP-M, and making these courses available to RA V Members at the earliest possible opportunity.

4.6.18 The Association noted that both RTCs were active as RTCs and offering a range of education and training opportunities to regional Members in the WMO high priority areas. Furthermore the NMHSs of these Members, and their governments through foreign aid programmes, subsidized these ETR activities providing Members with very good value for the investment that the ETR Programme made in supporting the RTCs.

4.6.19 The Association encouraged the Permanent Representatives of the two RTC host countries to enhance the coordination and collaboration between the institutes making up these two RTCs. The enhanced coordination and collaboration should lead to further increase the

education and training opportunities available to Members in the Region and build upon the strengths of the individual institutions. Noting the possibility for a third RTC based in the Pacific, the Association stressed the importance of linking these institutions to not only provide better opportunities to Members but to also provide professional development for the RTC staff. The Association further encouraged Members with developed training centres to seek opportunities for collaboration with these institutes and thus further strengthen their capabilities.

4.6.20 The Association welcomed the work of the ETR office to systematically identify the global and regional NMHS staffing profiles and numbers and training capability. The Association acknowledged the work of the ETR Office to help Members address their education and training needs and supported the ETR Office training plans and approaches. The Association urged the two RA V RTCs to liaise closely with the ETR Office to ensure the Region's education and training requirements are recognized and actions taken to address them.

Training activities

4.6.21 The Association noted with pleasure the wide variety of training activities that had been provided to Members by WMO and Members from RA V and other Regions during the intersessional period. These activities ranged from regular online weather briefings such as Regional Focus Group weather discussions and other offerings from the Australian Bureau of Meteorology, to workshops and events under the FINPAC project, training for the Severe Weather Forecast Demonstration Project (SWFDDP) by Met Service New Zealand, re-vitalization of the Pacific Desk by the US NWS plus workshops and other support from JICA and KOICA. The Association recognized the contributions of workshops and training opportunities from Members outside the Region such as China, Finland, France, Israel, Japan, United Kingdom and the United States of America.

Resource Mobilization and Development Partnerships

Resource Mobilization, Development Cooperation and Partnerships; including Infrastructure and Operational Facilities Development

4.6.22 Many countries in the Region benefited from the support from the Voluntary Cooperation Programme (WMO-VCP) during the period 2009–2013. RA V, particularly the Pacific Islands Region, was in fact the Region that availed most of the opportunities for support afforded by the VCP. In total, 20 requests for support were received from the Region and of these 18 have been supported to date (see Annex I to the present report).

4.6.23 The Association expressed its appreciation to WMO Members, particularly Australia, Canada, China, Finland, France, Germany, Indonesia, Japan, Norway, New Zealand, Republic of Korea, Spain, Switzerland, UK and the USA for the financial and in-kind support that they have provided to WMO Members within and from outside the Region, through the VCP. Total VCP contributions have remained steady over the intersessional period at approximately 27 to 29 M USD as illustrated in the table in Annex II to the present report.

4.6.24 The Association noted also the successful relationships being established for major hydromet development projects between WMO and national Aid Agencies and in most cases with the partnership of the respective NMHS, representing some tens of millions of USD in financial terms. In particular the support of Canada for initiation of GFCS activities in the Pacific Islands region within the SIDS component of the Canada GFCS Programme was greatly appreciated (see http://www.wmo.int/pages/prog/dra/vcp/InformalPlanningMeeting2014.php for global report and Annex III to the present report for key regional initiatives).

4.6.25 The Association also welcomed also the information that significant bi-lateral support was being target to Hydromet Services development as evidenced by the reports of the Informal Planning Meeting (IPM) on the VCP. It encouraged its Members to continue to contribute to and participate more actively in the Programme to address the requirements of NMHSs in the Region (see http://www.wmo.int/pages/prog/dra/vcp/InformalPlanningMeeting2014.php).

4.6.26 The Association welcomed the establishment of the Project Coordination Unit (PCU) within the Office for Resource Mobilization to enhance delivery of multi-disciplinary projects and donor reporting. It welcomed also the support provided to the PCU through secondment from the UK and from Germany, Norway and Finland through the JPO programme.

4.6.27 The Association noted also that in 2013 the WMO Resource Mobilization Office (RMO) was renamed Office for Resource Mobilization and Development Partnerships (RMDP), focusing not only on resource mobilization but also strengthening development partnerships with key organizations, including the Multilateral Development Banks such as the, World Bank (WB), the Asian Development Bank and the African Development Bank, the European Commission, Regional Economic Communities, UN system organizations and bilateral development agencies, among others.

4.6.28 In this context the Association was informed of the upcoming 3rd International Conference on Small Island Developing States (SIDS) and the various partnership platforms supported by WMO and in particular the Global Framework for Climate Services for SIDS and the Pacific Meteorological Council (PMC) among others (http://www.sids2014.org/index.php?page=view&type=232&nr=1&menu=1507).

4.6.29 The Association requested the Secretary-General to further enhance the resource mobilization and capacity development in the Region, taking into account the special needs reflected in the recent regional survey and expressed by some of the NMHSs during the RA V session. The Association noted its appreciation for recent efforts to seek political and financial support from the Pacific Ambassadors of the African, Caribbean, and Pacific Group of States (ACP) at their recent meeting with the EU in Brussels. The Association recognized that if the WMO Pacific South-West Office, working in the context of the SPREP Pacific Meteorological Desk Partnership, could be strengthened, it would be well situated to further assist in resource mobilization efforts, especially at the regional level.

4.6.30 The Association noted the importance of action by the Members to mobilize resources from both outside and within national structures to ensure the sustainability of capacity development.

4.7 Partnership and cooperation in Regional Association V (agenda item 4.7)

4.7.1 The Association noted with satisfaction the strengthened cooperation activities with the regional bodies of the United Nations (UN) system, through active support and participation in relevant events including regular sessions of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), and the UNESCAP/WMO Typhoon Committee. Noting the continued cooperation of UNESCAP and WMO in supporting the Typhoon Committee, the Association invited the Secretary-General and UNESCAP to continue their support to the activities of the Committee.

4.7.2 The Association highlighted the importance of cooperation with the UN International Strategy on Disaster Reduction (UN-ISDR), particularly in preparation for the Third World Conference on Disaster Risk Reduction (WCDRR-III), scheduled to take place in Sendai, Japan in March 2015. The Association confirmed its commitment and that of its Members to participate in the preparation process for WCDRR-III. The Association sought the support of the WMO Secretariat to provide relevant information and assist the president and Members with respect to key messages for interventions at these events. The Association urged RA V Members to submit papers for 2015 Global Risk Assessment Report (GAR-15) including contributions to the chapter on Early Warning System (EWS).

4.7.3 The Association also encouraged strengthening partnership and collaboration with the Intergovernmental Oceanographic Commission of the UN Education, Social and Cultural Organization (IOC-UNESCO) in the development and implementation of tsunami-related and Global Ocean Observing System (GOOS) projects. The Association requested that support for the Tropical Atmospheric Ocean/Triangular Trans-Ocean Buoy Network (TAO-TRITON) and Research

Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA) be maintained so that valuable services, including early warnings of El Niño and La Niña events and the associated climate forecasts that provide substantial benefits to the RA V Members and their communities, can be continued.

4.7.4 The Association noted that the Regional Office for Asia and the South-West Pacific and the WMO Office for the South-West Pacific are participating in various activities of the UN system agencies in the Pacific region to increase inter-agency partnerships in support of national development priorities and strengthened capacities, as well as the implementation of the UN System Chief Executives Board for Coordination (CEB) decisions on global policies relating to climate change, disaster risk reduction, oceans, water and energy, at the subregional and country levels. The Association requested the Secretary-General to strengthen WMO participation in the activities and programmes of the UN system agencies including ICAO in the Pacific region.

4.7.5 The Association recognized the roles of the Regional Office for Asia and the South-West Pacific and WMO Office for the South-West Pacific with regional organizations, and encouraged the Offices to continue strengthening partnerships and collaboration with the regional organizations including the Association of Southeast Asian Nations (ASEAN) Sub-Committee on Meteorology and Geophysics (SCMG), the Secretariat of the Pacific Regional Environment Programme (SPREP), the Applied Geoscience and Technology Division (SOPAC) of the Secretariat of the Pacific Community (SPC), the Pacific Islands Forum Secretariat (PIFS), the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre), APEC Climate Center (APCC), and the Asian Disaster Preparedness Center (ADPC) relating to weather, climate, water and disaster risk reduction.

4.7.6 The Association further acknowledged the benefits from enhanced partnership and collaboration between WMO and SPREP, through the Memorandum of Understanding (MOU) signed in August 2011, and followed by the signing of a Letter of Agreement (LoA) in October 2011 supporting the Pacific Meteorological Desk Partnership (PMDP) and subsequently the Pacific Meteorological Council (PMC). The Association requested its Members to support PMDP's and PMC's activities. The Association also requested the Secretary-General of WMO and the Director-General of SPREP to renew this LoA for continuous support to PMDP and PMC beyond 2015.

4.7.7 In addition, following the conclusion of a Memorandum of Understanding between WMO and the International Federation of the Red Cross (IFRC) in July 2013, and WMO and the International Union for the Conservation of Nature (IUCN) in December 2013, the Association encouraged the active engagement of its Members in implementing associated activities, while ensuring the best synergy with the other GFCS partner initiatives in the Region.

4.7.8 The Association acknowledged WMO preparations for the Third International Conference on Small Island Developing States (SIDS). The Association sought the support of WMO Secretariat to provide relevant information and assist its Members especially SIDS with respect to key messages for interventions at the Conference.

Information and Public Affairs

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

4.7.10 The Association recognized that the WMO Secretariat is committed to making significant improvements to the WMO website over the coming year. As a first step the Communications and Public Affairs Office (CPA) has launched a new "youth corner" for the website. As the WMO website should represent and promote the entire WMO community, the

Association stressed that it is important that as many Members as possible engage in strengthening WMO's presence on the Internet.

4.7.11 The Association appreciated that, despite increasing competition for attention by the media, global press coverage of WMO activities and programmes continues to increase every year. WMO's reports on the status of the global climate, the Greenhouse Gas Bulletin, the WMO/WHO Atlas of Health and Climate, and other regular and periodic publications play an important role in raising public awareness about the issues of "weather, climate and water". These reports and their public impact rely on the cooperation of the entire WMO community.

4.7.12 The Association noted that CPA works with Members and partners to promote WMO activities around the world, including conferences, workshops and launches of reports. Recent and upcoming events in RA V include the first Pacific workshop on the Global Framework for Climate Services, stakeholder consultations on the Canada project, and the Third International Conference on Small Island Developing States. The Association encouraged its Members to support outreach and communications for these events.

4.7.13 The Association requested WMO-affiliated centres and facilities, such as RSMCs, RTCs, RCCs, RICs and WIS centres, to provide visible WMO identity on their websites.

4.7.14 The Association invited its Members to:

(a) Link NMHSs' websites to the www.wmo.int website;

[One way that the Secretariat seeks to promote Members is to ensure that the WMO website features a link to all existing Members' websites see www.wmo.int/pages/members/members_en.html). As of today, 6 of the 19 NMHSs in RA V provide links back to the WMO website. In addition, 16 of the RA V NMHSs facilitate international access to their sites by providing an English-language version. Members are encouraged to re-post WMO news and reports on their own sites.]

(b) Contribute to the "News from Members" section on the WMO website;

[The Secretariat also promotes international awareness of Members' activities through its News from Members feature (see www.wmo.int/pages/mediacentre/news_members/newsfromMembers_en.html). To date, most of the news presented comes from a very limited number of Members. All Members are encouraged to send news that they believe may be of broad global interest to ipa@wmo.int.]

(c) Designate and empower an IPA Focal Point;

[Twelve NMHSs in RA V have designated an Information and Public Affairs Focal Point for coordinating communications activities in the Region and with the WMO Secretariat. Members that have not yet done so may send to ipa@wmo.int the name of a Focal Point for supporting cooperation on websites and related issues.]

(d) Promote regional cooperation on information and public affairs.

[Any Members that are in a position to provide in-kind or extrabudgetary support may consider collaborating on the organization of future regional meetings of IPA Focal Points.]

5. EFFECTIVENESS AND EFFICIENCY IN REGIONAL ASSOCIATION V ACTIVITIES (agenda item 5)

5.1 WMO strategic planning – regional aspects (agenda item 5.1)

WMO Strategic Plan 2016–2019

5.1.1 The Association recalled that the Sixteenth Congress requested the regional associations (RAs) to:

(a) Provide regional needs and priorities that should be taken into consideration in developing the WMO Strategic Plan 2016–2019;

(b) Coordinate, as necessary, national contributions to regional aspects of the Plan.

5.1.2 The Association noted with appreciation the active involvement of its Members and the president of the Association in the development of the WMO Strategic Plan 2016–2019 (SP) under the guidance of the Executive Council and its Working Group on Strategic and Operational Planning (WG-SOP), and with contributions from all regional associations and technical commissions (TCs).

5.1.3 The Association recalled that in December 2013 the Secretary-General communicated the draft Strategic Plan to all WMO Members for their input and indication on whether the capacity of NMHSs to provide services would be improved if the WMO followed the strategic directions proposed in the Plan, and the Members would be able to use the Plan to inform the governments of the strategic directions and priorities of WMO.

5.1.4 The Association further noted that the latest draft SP incorporated the views and inputs from constituent bodies of WMO and Members of the Organization received so far. The following global WMO strategic priorities are formulated in the draft SP:

(a) Disaster Risk Reduction (DRR);

(b) Service Delivery;

(c) Global Framework for Climate Services (GFCS);

(d) WMO Integrated Global Observing System (WIGOS);

(e) Capacity Development.

5.1.5 The Plan also recognized the significance of WMO's research priorities in the area of high impact weather, seasonal to sub-seasonal forecasting, polar prediction and urban meteorology as means of enabling improvements in operational service delivery. Furthermore, this is also true for advancements in monitoring and information technologies, in particular keeping WMO's Information System (WIS) current with WIGOS developments.

5.1.6 The Association discussed and agreed on the following four priorities for the Region for the period 2016–2019:

(a) Maintenance and improvement of observations and telecommunications networks at the regional and national levels through completion of the implementation of WIS and WIGOS;

(b) Delivery of improved climate services through the establishment of the optimum network of RCCs to sustainably implement the GFCS;

(c) Implement effective education and training programmes that build the capability of NMHSs in resource management, advocacy and outreach, and NWP utilization;

(d) Achievement by all Members of the standards required for quality management and staff competencies, with a focus on aviation and marine meteorology.

WMO Operating Plans 2016–2019

5.1.7 The Association recalled that the Sixteenth Congress requested the regional associations to prepare their operating plans to support the implementation of the WMO Strategic Plan. The Executive Council further decided that the Organization should have a single integrated Operating Plan that includes the activities of RAs and TCs and incorporates their own operating

plans. The Association urged its president and Management Group to develop the Association's operating/action plan for 2016–2019 and to submit it as contribution to the WMO Operating Plan (OP).

5.1.8 In order to ensure timely provision of the Association's contribution to WMO integrated strategic planning process in the future, the Association requested its president and Management Group to set a process and develop and submit such contributions, as required, in consultation with Members of the Association in the intersessional period.

Monitoring and Evaluation

5.1.9 The Association noted that the Secretariat continued to develop and implement the WMO Monitoring and Evaluation (M&E) System and that the Executive Council encouraged constituent bodies to make use of the M&E System and Guide prepared by the Secretariat and provide feedback for further improvement (M&E documents and reports are available at http://www.wmo.int/pages/about/monitoring_evaluation_en.html).

5.1.10 The Association also noted that under the guidance of the Executive Council its WG-SOP continued to further develop and improve the implementation of the M&E System. This particularly required better coordination with RAs to increase the level of Member's response to questionnaires. The Association noted with concern that that only 33% of Members from the Region responded to the survey on impacts of achieved results on Members conducted in November 2013. The Association encouraged its Members to respond to this and further M&E surveys to provide information that would assist in further development of their NMHSs.

5.2 Regional Association V strategic and operational planning (agenda item 5.2)

RA V SOP 2012–2015

5.2.1 The Association recalled that XV-RA V (Bali, Indonesia, April-May 2010) agreed on the necessary processes for the development and adoption of the RA V Strategic and Operating Plan (SOP) for 2012–2015, and endorsed the proposed roadmap towards development, refinement and endorsement of the Plan. The revised RA V SOP 2012–2015 by the Management Group had a total of 19 Regional Key Outcomes (RKOs) and a total of 46 Key Performance Indicators (KPIs). Five RKOs were identified as priority areas, with 17 associated KPIs. The RA V SOP for 2012–2015 (available at: http://www.wmo.int/pages/prog/dra/rap/documents/RA-V-SOP2012-2015.pdf) had been adopted by the president in December 2010. In this respect, the Association expressed its appreciation to its Members and the Management Group for developing, refining and implementing the RA V SOP for 2012–2015.

5.2.2 The Association noted that at the 2012 Meeting of the Presidents of Regional Associations and Technical Commissions (Geneva, January 2012), the presidents of the RAs agreed to develop the Operating Plans 2012–2015 of the RAs as part of the WMO-wide Operating Plan 2012–2015 by adjusting the current regional strategic (operating) plans to align with the Congress decisions and the WMO-wide Operating Plan. In considering the above decision, the Management Group requested the RA V Task Team on Strategic and Operating Planning (TT-SOP) to further develop an Operating Plan for RA V 2012–2015 using a new format and requested the Secretariat to facilitate the working groups' activities for inputs to the further development of the RA V SOP 2012–2015.

5.2.3 The Association affirmed that there was a need to identify concrete activities and deliverables to complete the RA V SOP 2012–2015, which could also be necessary for monitoring and evaluation. The Association was pleased to note that the TT-SOP prepared the deliverables and activities. The Association accepted the deliverables and activities in RA V for 2012–2015 as given in Annex IV to the present report developed by the TT SOP and requested the president, with the assistance of the MG, to keep the RA V SOP 2012–2015 under review and report to the EC and Congress as required.

RA V Operating Plan (OP) 2016–2019

5.2.4 The Association noted that Cg-XVI requested the regional associations to: (a) provide regional needs and priorities that should be taken into consideration in developing the WMO Strategic Plan 2016–2019; (b) coordinate, as necessary, national contributions to regional aspects of the Plan; and (c) develop their own Operating Plans 2016–2019 in support of the implementation of the next WMO Strategic Plan.

5.2.5 The Association was pleased to review the deliverables and activities of RA V SOP 2016–2019 prepared by the TT-SOP, and requested the president with the assistance of the Management Group, to develop the RA V Operating Plan 2016–2019 as part of the WMO-wide Operating Plan 2016–2019 in alignment with the decisions on the regional priorities of RA V-16.

5.2.6 The Association also requested the president, with the assistance of the Management Group, to reflect activities contained in the Pacific Islands Meteorological Strategy (PIMS) 2012–2022, which are based on the needs of the Pacific National Meteorological and Hydrological Services into the WMO Operating Plan and RAV Operating Plan 2016–2019.

5.2.7 The Association extended its appreciation to the Chairperson of the TT-SOP, the Leads of WGs, and the Chairperson of TCC for their dedicated efforts to complete the RA V SOP 2012–2015, and also contributed key deliverables and activities to the RA V Operating Plan 2016–2019 as a guideline for further improvements.

5.3 Internal matters of the Association (agenda item 5.3)

Review of subsidiary bodies of the Association

Reports of the Management Group and other subsidiary bodies of RA V

5.3.1 The Association noted with appreciation the reports of the fifth to tenth sessions of the RA V Management Group (MG). The Association complimented Dr Sri Woro B. Harijono, president and chairperson of the RA V MG, Mr 'Ofa Fa'anunu, vice-president, and members of the Group for the activities carried out according to its terms of reference, in particular, for guiding the development and implementation of the Strategic Operating Plan for the Enhancement of NMHSs in Regional Association V (South-West Pacific) (2012–2015), for monitoring the work of RA V subsidiary bodies, as well as the implementation of the WMO Programmes and activities in the Region. The MG also provided guidance for the future working mechanism of the Association and for the organization of the sixteenth session of RA V as well as the Regional Seminar and the Regional Conference in an efficient and cost-effective manner.

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

5.3.3 The Association noted with appreciation the information provided by the chairperson of the Tropical Cyclone Committee and the leads of working groups on the activities during the intersessional period.

Future working mechanism of the Association

5.3.4 The Association noted that, following the decision of the fifteenth session (Bali, 2010), the MG completed the establishment of an adequate structure of regional subsidiary bodies by agreeing on the membership of the working groups and setting up relevant task teams. It further

noted that MG provided guidance for the future structure of the subsidiary bodies of the Association, and welcomed the recommendations of the tenth session of the MG (MG-10) (Jakarta, 14–15 March 2014) on the future working mechanism of the Association as follows:

(a) The Association should continue to play an important and active role in the implementation of WMO Programmes and activities in the Region in the fields of weather, climate and water;

(b) The Association, through its future working mechanism, should continue to enhance and establish a strong linkage with technical commissions;

(c) The structure of future working mechanism of the Association remains the same as the current mechanism to secure the continuity, but it may require some changes for the details including working groups' Terms of Reference and the composition of the Task Teams.

5.3.5 Acknowledging the successful activities and accomplishments during the intersessional period, and to ensure the continuity of the subsidiary bodies' activities, the Association agreed to maintain the current structure of working mechanism of the Association: (i) Management Group (MG); (ii) Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean (TCC); (iii) Working Group on Hydrological Services (WG-HYS); (iv) Working Group on Weather Services (WG-WXS); (v) Working Group on Climate Services (WG-CLS); and (vi) Working Group on Infrastructure (WG-INFR).

5.3.6 The Association endorsed the following recommendations proposed by the MG-10 on the composition and mandates of the subsidiary bodies as the initial working structure for the Region:

(a) Strengthen the mandates of MG to oversee disaster risk reduction and services delivery for proper implementation in the Region;

(b) Expand the mandates of TCC to other severe weather and related events through a creation of a Task Team on Severe Weather Forecasting including Global Data Processing and Forecasting System (TT-SWFD/DPFS), and another Task Team on Coastal Inundation including Storm Surges (TT-CISS);

(c) Reduce the number of Task Teams in WG-HYS from five to four and rename them as: (i) Task Team on Training and Capacity-building in Hydrology (TT-TCB-H); (ii) Task Team on Hydrology Database Management (TT-HDM); (iii) Task Team on Disaster Risk Reduction – Water related Disasters (TT-DRR-W); and (iv) Task Team on Water and Climate (TT-WC);

(d) Ensure continuity of the WG-WXS to assist in the implementation of robust and effective weather service delivery throughout RA V and maintain with the following modified structure: (i) Task Team on Cost Recovery (TT-CR); (ii) Task Team on Quality Management (TT-QM);(iii) Task Team on Training, Competencies and Qualifications (TT-TRG); and (iv) Task Team on Weather Services Implementation (TT-IMP);

(e) Ensure continuity and maintain the current structure of the WG-CLS with: (i) Task Team on Climate Information and Prediction Services including Regional Climate Centres (RCCs) and Regional Climate Outlook Forum (RCOF) (TT-CLIPS); (ii) Task Team on Climate Data Management/Data Rescue (TT-CDM); (iii) Task Team on Climate Change (TT-CC); (iv) Task Team on Use of Improved Tools for Operational Agrometeorology including Coping with Impacts of Natural Disasters on Agriculture (TT-ITA); and (v) Task Team on Agrometeorological Information (TT-AIF);

(f) Modify the Task Teams of WG-INFR to focus on priorities as follows: maintain the Task Team on WIGOS (TT-WIGOS) with new challenges and the Task Team on

Observations Quality Management (TT-OQM) with broader scope than the previous Task Team on Traceability of Observations; rename the Task Team on the Regional Implementation Strategy for new WIS Discovery and Retrieval Services (TT-DAR) as the Task Team on Regional implementation and Operation of WIS (TT-WIS); establish a new Task Team on Satellite Utilization (TT-SU) by combining the two existing Task Teams on Pacific Satellite Communications (TT-PSC) and Satellite User Requirements (TT-SUR). A Task Team on Aircraft Based Observations (TT-ABO) should be formed if relevant experts are available.

5.3.7 In this respect, the Association agreed on the future working structure of RA V subsidiary bodies as illustrated in the Annex V to the present report. The Association further agreed on the terms of references of the Management Group, Tropical Cyclone Committee and four Working Groups. In that connection, the Association adopted Resolution 10 (RA V-16) – Management Group of Regional Association V (South-West Pacific), Resolution 11 (RA V-16) – Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean, Resolution 12 (RA V-16) – Regional Association V Working Group on Hydrological Services, Resolution 13 (RA V-16) – Regional Association V Working Group on Weather Services, Resolution 14 (RA V-16) – Regional Association V Working Group on Climate Services, and Resolution 15 (RA V-16) – Regional Association V Working Group on Infrastructure.

5.3.8 The Association, in recognizing the importance of coordinating its activities, encouraged the MG with flexibility to address intersessional issues, and also agreed that the active use of the MG by the RA V president during the intersessional period was a key aspect of being able to meet the challenges. In this regard, the Association urged the MG to review the details of the compositions of task teams with the Terms of References for individual WGs with a focus on the priority areas in the Region decided under agenda items 5.1 and 7, and to complete the establishment of the subsidiary bodies in consultation with the WG Leads, the TCC Chairperson, and Members, for approval by the president of the Region.

5.3.9 The Association encouraged Members to nominate the Leads of the WGs and the Chairperson of TCC, members of the Task Teams, and continue providing necessary support to the designated members of the subsidiary bodies to allow them to discharge their responsibilities efficiently, and urged the Secretary-General to allocate adequate financial resources and Secretariat support for the Management Group and other subsidiary bodies to conduct their work effectively. The Association agreed that for the purpose of continuity the membership of the current subsidiary bodies will remain effective until the new membership is decided by the president of the Association.

5.3.10 The Association expressed its deep appreciation to the experts in the Region, including the Leads of WGs, the Chairperson of TCC, members of the WGs and the Chairperson of the Task Team on RA V Strategic and Operating Planning, who had effectively collaborated in carrying out the activities of the Association during the intersessional period, by giving recognition to their valuable work for the regional association.

Representation of the Association in the Executive Council

5.3.11 The Association recalled that EC-LXII (Geneva, June 2010) considered the proposal submitted by the president of RA II to increase the number of EC seats from 37 to 38 to allow for an additional EC seat (from 6 to 7) for RA II, and Cg-XVI (2011) had acknowledged the proposals made by the presidents of Regional Associations II (Asia), IV (North America, Central America and the Caribbean), and V (South-West Pacific) to increase the number of the Executive Council seats to enable these Regions to obtain an extra seat with respect to the distribution of seats adopted by Resolution 44 (Cg-XVI) for consideration at Cg-17, in accordance with the procedures described in the WMO Convention.

5.3.12 The Association noted that at its sixty-fifth session, the Executive Council requested the Secretary-General to assist the presidents of regional associations in the preparation of submission of a proposal for the consideration of the EC Working Group on Strategic and

Operating Planning (EC WG/SOP) by September 2013, and instructed the EC WG/SOP to prepare the proposal, which includes the necessary changes to the WMO Convention and General Regulations if required, for consideration at EC-66.

5.3.13 The Association further noted that at its January 2014 meeting, the presidents of regional associations (PRAs) came to a common understanding that an increase of 1 seat for RA II is the acceptable option, and that accounting to this proposal the third EC WG/SOP (Geneva, February 2014) considered the possibility of increasing seats in the Executive Council and made a proposal to EC-66 for its consideration, including potential amendments to Article 13 of the WMO Convention and General Regulation 17 on the distribution of seats in the Executive Council (see the *Abridged Final Report with Resolutions of the Sixty-sixth Session of the Executive Council* (WMO-No. 1136), paragraphs 7.3.6–7.3.10).

5.3.14 The Association considered the issue regarding the representation of RA V in the Executive Council with respect to the distribution of seats adopted by Resolution 44 (Cg-XVI), and agreed to respect the recommendation by the EC WG/SOP on maintaining the current 4 seats for representing RA V in the Executive Council.

6. GLOBAL FRAMEWORK FOR CLIMATE SERVICES (agenda item 6)

Outcomes of the Extraordinary Session of the World Meteorological Congress

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

6.2 The GFCS identified four initial priority areas; agriculture and food security, water, health and disaster risk reduction. To ensure that the entire value chain for the production and application of climate services is effectively addressed in support of effective decision-making in the four priority areas, the following components or pillars have to be implemented:

(a) The User Interface Platform – to provide ways for climate services users and providers to interact to identify needs and capacities and improve the effectiveness of the Framework and its climate services;

(b) The Climate Services Information System – to produce and distribute climate data, products and information according to the needs of users and to agreed standards;

(c) Observations and Monitoring – to generate the necessary data for climate services according to agreed standards;

(d) Research, Modelling and Prediction – to harness science capabilities and results and develop appropriate tools to meet the needs of climate services;

(e) Capacity Development – to support the systematic development of the institutions, infrastructure and human resources needed for effective climate services.

6.3 The Association noted that the major outcomes of the extraordinary session of the World Meteorological Congress held in October 2012, in Geneva, Switzerland were the adoption of three resolutions (see report at http://library.wmo.int/pmb_ged/wmo_1102_en-p1.pdf) pertaining to:

(a) The Implementation Plan of the GFCS for the subsequent consideration by the Intergovernmental Board on Climate Services;

(b) The establishment of the Intergovernmental Board on Climate Services as an additional body accountable to Congress under Article 8(h) of the Convention of the WMO;

(c) Financing of the Intergovernmental Board on Climate Services, Secretariat and Implementation Plan of the GFCS.

6.4 The Association noted that a Dialogue for Climate Services Users and Providers was organized in October 2012 as part of the extraordinary session of the World Meteorological Congress. The Dialogue provided a platform for sharing experiences, lessons and good practices on the production and application of climate services worldwide. A publication, "Climate ExChange" containing case studies on experiences from around the world on the development and application of climate services in various socio-economic sectors was launched at the Dialogue (the publication is available at: http://www.wmo.int/pages/tudor-rose/index.html).

First session of the Intergovernmental Board on Climate Services (IBCS-1)

6.5 The Association noted that the first session of the Intergovernmental Board on Climate Services (IBCS-1) was held in Geneva from 1 to 5 July 2013. As part of the session, a one-day workshop on "Operational Climate Services: a dialogue on practical action" was held on 1 July (see details at: http://gfcs.wmo.int/content/operational-climate-services-dialogue-practical-action). The workshop demonstrated the value of an organized and coordinated system to maximize synergies in addressing the entire value chain for the production and application of climate services and provided examples of concrete activities from the global to the national levels.

6.6 The Association noted that IBCS-1 took the following decisions (see approved documents with resolutions at: http://ibcs-1.wmo.int/documents-english):

(a) Approved the Implementation Plan of the GFCS and a Compendium of initial GFCS projects for immediate implementation;

(b) Agreed on the definition of processes and substructures supporting its advancement;

(c) Established a stakeholder engagement mechanism;

(d) Elected Dr Anton Eliassen (Norway) as the Chairperson, Dr Linda Makuleni (South Africa) and Dr Laxman Singh Rathore (India) as the Co-Vice-Chairpersons. It also selected the Members forming the Management Committee of the Board, including Australia, Fiji, Indonesia and the Philippines from the Region.

6.7 The Management Committee was entrusted with the following responsibilities:

(a) Draft recommendations to be submitted by the IBCS to the Seventeenth Congress on appropriate interaction mechanisms between the IBCS and WMO constituent bodies, including the technical commissions as well as constituent bodies of partner institutions;

(b) Review and update the "Principles and Criteria" for funding projects and activities from the GFCS Trust Fund;

(c) Design a monitoring and evaluation criteria and process for the implementation of the GFCS;

(d) Review the composition and criteria for membership of IBCS;

(e) Establish a process to capture the various contributions made by Members at the global, regional and national levels, which support the implementation of the GFCS.

6.8 With respect to implementation, the Association noted that a number of countries are conducting their national consultations intended to identify gaps and needs and to establish the internal coordination mechanisms needed to ensure that the entire value chain for the production and application of climate services in the country is effectively addressed (see http://gfcs.wmo.int/events). These consultations allow the identification of key gaps in the various components of the GFCS to support the development and application of climate services. They also facilitate the identification of critical elements that are supporting the development of guidelines for the establishment of frameworks for climate services at national level. In this regard, the Association encouraged its Members to initiate frameworks for climate services at national level as the coordination mechanism to ensure effective implementation of the GFCS.

6.9 The Association was pleased to note that a Regional Consultation on Climate Services for Pacific Small Island Developing States (SIDS) was organized in Rarotonga, Cook Islands, from 31 March to 4 April, 2014 and acknowledged the role of WMO and SPREP in organizing and leading the consultation. The Association further noted that it was clear from this workshop that there is both a significant amount of existing effort and new opportunities towards improving climate service delivery by WMO Members, as well as by numerous other organizations. The consultation allowed the identification of concrete actions to enable climate services in SIDS in the Pacific. It also served as a platform to prepare for the participation of NMHSs in the Region in the 3rd International Conference on Small Island Developing States, to be held in Apia, Samoa, in September 2014. The consultation approved key elements and principles for the implementation of the GFCS in the Pacific taking into account the priorities of NMSs. The consultation also recognized existing regional arrangements such as the role of the Pacific Meteorological Council (PMC) where a special session of the PMC during the consultation approved, in principle, the Pacific GFCS Roadmap and the Terms of Reference (ToR) of the Pacific Islands Climate Panel aimed at providing expert advice to PMC and to the implementation of the Pacific GFCS Roadmap and enabling collaboration and partnerships. The GFCS Roadmap is not a “new” or stand alone document but one that reflects priorities relevant to the Pacific highlighted in the RA V Strategic Plan and the Pacific Islands Meteorological Strategy. The Association supported the outcomes of this GFCS consultation, including the Terms of Reference for the new Pacific Islands Climate Service Panel.

6.10 Early efforts for implementation of the GFCS in the Region are taking place through specific activities supported by various donors such as Australia that is supporting data rescue, and Canada that supports the institutionalization of Pacific Regional Climate Centres (RCCs) and Regional and National Climate Outlook Forums (RCOFs) in the South-West Pacific at Regional and National Scales. The Association noted that WMO, USAID and Singapore sponsored the inaugural meeting of the ASEAN Regional Climate Outlook Forum (ASEANCOF) that was held in Singapore in December 2013. ASEANCOF involved the ASEAN member countries from RA II and RA V, as well as representation from WMO and the global climate prediction community. A regional survey of requirements for monthly and seasonal climate predictions was completed ahead of the ASEANCOF meeting (http://www.weather.gov.sg/wip/web/ASMC/ASEANCOF/1st_aseancof). The Association stressed that its Members should be actively involved in the implementation of the GFCS through supporting the ongoing activities and specific projects identified in the Implementation Plan of the GFCS and in the Compendium of initial GFCS projects.

6.11 The Association noted that the success of the GFCS will depend on the active and full participation of Members and partners in its implementation. In this regard, the Association urged its Members to establish frameworks for climate services at national level, identify gaps at regional and national levels, prioritize needs for climate services and initiate activities at national and regional levels to fill the identified gaps, contribute to the identification and documentation of existing climate services delivery mechanisms at national and regional levels, identification of partnerships with all potential stakeholders, establish user engagement mechanisms for effective provision of climate services, identify funding mechanisms, and share experiences on good practices in implementing GFCS activities. In addition, the Association urged its Members to strengthen the structures that support the pillars of the GFCS. Furthermore the Association urged its Members to make contributions to the GFCS Trust Fund and to second their experts to the GFCS Office to enable it to fully discharge its functions.

6.12 The Association acknowledged the contributions made by Australia and Canada in support of the implementation of GFCS-related activities for SIDS in the Region. It also acknowledged the pledge of Indonesia to the GFCS Trust Fund made at the IBCS-1 in July 2013.

6.13 The Association noted that the second session of the Intergovernmental Board on Climate Services will take place in Geneva, Switzerland from 10 to14 November 2014 and encouraged Members to include users of climate services and partners in their delegations or select national focal points from other sectors to ensure that the IBCS was true to the principles of user-driven climate services, intradisciplinarity. The Association further noted that the priorities identified in the consultation meeting for the Pacific Islands will help the Board in deciding on the expansion or update of the projects contained in the compendium of initial GFCS projects so as to ensure that the compendium responds to the evolving needs of Members for projects at national and regional levels. The Association stressed the need to keep the compendium updated and linked to regional plans and priorities.

6.14 The Association requested that, based on the actions undertaken by the GFCS to date, the GFCS Secretariat, in collaboration with the Members, prepare guidance on the methods and tools used and case studies of success stories for application as appropriate in all Regions as part of the capacity development activities.

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

7.1 The Association noted with appreciation the outcomes of the sixth session of the Regional Conference on Challenges and Opportunities for the South-West Pacific NMHSs (RECO-6) held in Jakarta, Indonesia from 30 April to 1 May 2014. The focus of RECO-6 was the identification of the main regional challenges and future priorities for the next intersessional period in order to support and guide the deliberations during RA V-16 on the Region's contribution to the WMO SOP 2016–2019, and to also provide recommendations to the Third International Conference on SIDS which is scheduled to be held in Apia, Samoa from 1 to 5 September 2014.

7.2 The Association was informed about the RA V survey on institutional arrangements, challenges and priorities conducted in January-February 2014 to identify challenges and future priorities in the Region. The Association reviewed the survey report which included the analyses of the responses from 19 Members on: institutional arrangements; management and organization; operations and services; challenges and priorities; and expected outcomes from the sixteenth session of RA V. The Association commended the Task Team on RA V Strategic and Operating Planning (TT-SOP) and the Secretariat for their efforts.

7.3 The Association recognized that the challenges and priorities for the NMHSs in RA V identified by the regional survey and further discussed by the RECO-6 highlighted the key elements to support further discussion and refinement. The challenges in the Region identified by the Survey and RECO-6 include the:

- Lack of qualified personnel and the need for ongoing competency assessments, particularly in the field of aeronautical meteorology;
- Need to improve institutional arrangements of Member NMHSs, including enabling legislation, support effective fiscal management, and securing of financial resources from Governments and other sources;
- Need to improve partnerships with key national, regional and global bodies, including funding agencies in order to enhance the service delivery and sustainability of the Member NMHSs;
- Need to improve access to, and usage of, NWP guidance material as underlying support to make service delivery better;

- Need to address inadequacies in regional observing and telecommunications systems for monitoring, forecasting, and dissemination of products for weather, water and climate;

- Need to address inadequacies of early warning services supporting DRR;

- Need to fully implement and sustain a quality management system;

- Need to improve communication with users and stakeholders for better delivery of user-focused services (e.g. climate services to support the agriculture sector).

and the priorities include:

- **Implementation of WIGOS and WIS** in each Member country focusing on concrete and urgent needs related to the maintenance and improvement of the observing and communications systems, and the quality of observations, including radar and upper air observation systems;

- **Strengthen Regional climate services** including improvement of existing climate services and the start of implementation for GFCS at regional and national levels: specific activity to include implementation of Regional Climate Centre networks in the Pacific and in South East Asia;

- **Full implementation and maintenance of a Quality Management System (QMS)** in each Member of the Association and the consolidation and maintenance of competence standards consistent with QMS implementation;

- **Improve Service Delivery** of hydrological and meteorological services of Members aligned with technical standards and best practice especially with a major focus on strengthening of the SWFDDP and demonstration of the social and economic benefits of these services through tailor made information and effective communication;

- **Enhance partnerships** to demonstrate the benefit of weather, water, and climate services to the community by increasing cooperation and partnership for outreach; this will be done through engagement with regional partners, national and local government and NGOs.

To make these improvements, which will result in improved service delivery at regional, nation, and local levels it will be necessary to:

- Improve the effectiveness and efficiency of the regional activities, building common position on issues like data policy, commercialization and public/private sector relationships;

- Enhance partnerships with existing development partners and create new partnerships that will lead to long term sustainability of the services;

- Undertake capacity-building to address issues relating to education and training needs, budget and staff resource deficiencies (including cost recovery), NWP utilization and insufficient qualified personnel.

7.4 The Association recognized that the financial and staffing constraints were one of the main challenges that limit the ability of many Members to participate in regional activities and working bodies, and Members look to support from other Members in the form of joint/twinning projects, capacity-building, technical support on QMS and infrastructure support, and to the WMO Secretariat for coordination support for participation in regional events, strategic planning and sharing information on regional activities.

7.5 The Association was also informed about the recommendations for the third International Conference on SIDS regarding the contributions and involvement of WMO and RA V to the Conference and the regional needs and expected outcomes from the Conference for the benefit of the SIDS members in RA V. The recommendations are given in Annex VI to the present report.

7.6 The Association agreed with the above issues and challenges, concerns and proposals recommended by the RECO-6, and requested the Management Group to consider them in the formulation of the work programmes of the subsidiary bodies, and deliver the recommendations to the third International Conference on SIDS.

7.7 The Association extended its appreciation to Mr Jon Gill, the Chairperson of the RA V Task Team on Strategic and Operating Planning (TT-SOP) for the Survey analyses and report, and all who have contributed to the outcomes of the RECO-6 including facilitators, rapporteurs, speakers, and drafting committee members.

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

8.1 The Association reviewed the activities of the Regional Office for Asia and the South-West Pacific (RAP Office) and the WMO Office for the South-West Pacific in Apia, Samoa, since its fifteenth session. It recognized that, through the reorganization and adjustment of the Development and Regional Activities (DRA) Department aiming at further coordinated and harmonized implementation of capacity development activities for Members, the Offices were strengthening their functions and responsibilities as an integral part of the WMO Secretariat. The Association noted that effective assistance had been provided by the Offices to the president, vice-president and subsidiary bodies of the Association in discharging their responsibilities. It expressed its appreciation to the Secretary-General and the staff of the Offices for their continued and enhanced support to the activities of the Association during the intersessional period 2010–2014.

Regional Office for Asia and the South-West Pacific

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

8.3 The Association expressed its appreciation for the efforts of the RAP Office in maintaining close contact with Members through visits, supporting regional events and developing and implementing technical cooperation projects in order to ensure the enhanced capabilities of the NMHSs, in particular developing countries, Least Developed Countries (LDCs) and Small Island Developing States (SIDS), in providing weather, climate and water services at national and regional levels.

8.4 The Association welcomed the efforts of the RAP Office in maintaining a close liaison and strengthening collaboration with regional bodies including UNESCAP, IOC-UNESCO, ASEAN SCMG, SPREP, SOPAC Division of SPC, PIFS, ADPC and regional offices of UNDP, UNEP and ICAO. It encouraged the Office to continue and further strengthen activities and support NMHSs to promote weather-, climate- and water-related issues and to increase awareness of policymakers of the role of NMHSs and WMO in contributing to sustainable development.. The Association requested the Secretary-General to provide support to the first Pacific Ministers meeting in meteorology which is planned to be held in 2015, in Tonga, within the context of PMC meeting and Finland-Pacific Project on Reducing Vulnerability in Pacific Islands' Communities.

8.5 The Association noted that the RAP Office had provided the information on regional events and activities in the Region through its website: (http://www.wmo.int/pages/prog/dra/rap.php) for maintaining close linkage and promoting partnerships between the Regional Office and Members. In that connection, the Association urged Members to contribute news items and articles to the WMO website on a regular basis to enable the exchange of information on events and activities being undertaken by Members in the Region.

8.6 The Association recognized that Members continued to benefit from development cooperation activities carried out within the framework of WMO VCP and through various funding sources.

8.7 The Association further recognized that six Members of RA V received support within the framework of the WMO VCP during the period 2010–2014, in particular for strengthening the WWW operational facilities and for climatological and hydrological activities. It expressed the desire for potential donors and recipient Members to participate more actively in the VCP.

8.8 The Association noted that the WMO fact-finding and needs assessment mission to Fiji was carried out by WMO staff and an expert from Australia in July 2012 to address the improvement of hydrological services including flood forecasting and warning services following the two severe flood events in early 2012. The Association encouraged its Members and the RAP Office to enhance support for such missions to more Members in the future to identify their needs and requirements.

WMO Office for the South-West Pacific

8.9 The Association expressed its appreciation to the Government of Samoa and SPREP for the continued support to the WMO Office for the South-West Pacific provided since its establishment at the SPREP Campus, Samoa, in 1999. It noted that the Office had played a key role in coordinating communications with the NMHSs in the Region for identifying requirements for development of NMHSs and in the organization of several events in the Pacific subregion. The Office had also developed and maintained close working relationships with the UN system agencies and regional and subregional organizations in the Pacific subregion, including IOC-UNESCO, SPREP, SOPAC Division of SPC and PIFS, in particular in the areas of weather, climate, water and disaster risk reduction.

8.10 The Association was pleased to note that, during 2010–2014, the main thrust of the Office was centred around the following domains: (a) providing support to the RA V president, vice-president and the working groups; (b) providing support to individual WMO Members, in particular those in the Pacific subregion; (c) providing support to various WMO Departments and assisting in the implementation of WMO Programmes and activities in the Region; (d) liaising and coordinating with and providing support to meteorology-related activities through the Pacific Meteorological Desk Partnership (PMDP), the ASEAN Sub Committee for Meteorology and Geophysics (SCMG) and the Pacific Meteorological Council (PMC); and (e) providing support to the UN Country Teams in Fiji, Papua New Guinea and Samoa and UN agencies and regional organizations on meteorology-related matters.

8.11 The Association acknowledged the collaboration with SPREP, through the Memorandum of Understanding (MOU) signed in August 2011, and followed by the signing of the Letter of Agreement (LoA) in October 2011 supporting the PMDP and subsequently PMC. It was pleased with the benefits of this partnership including: the organization of the second meeting of the Pacific Meteorological Council (Nadi, Fiji, July 2013) and the Consultation Workshop on Climate Services for Pacific Islands (Rarotonga, Cook Islands, March/April 2014); the implementation of the Finnish-Pacific project addressing many of WMO and RA V priorities in the Pacific subregion; capacity development in quality management for aviation weather services; and coordinating the drafting of meteorology legislations for Niue, Tonga and Vanuatu, and of strategy and implementation plans for Kiribati and Vanuatu. The Association urged its Members to support the PMDP's and PMC's activities, and invited the Secretary-General of WMO and the Director-General of SPREP to renew the LoA for continuous support to the PMDP and PMC beyond 2015.

8.12 Noting the need for enhanced coordination and liaison with UN Country Teams in Fiji, Papua New Guinea and Samoa, UN agencies and regional organizations including IOC-UNESCO, SPREP, SOPAC Division of SPC and PIFS, the Association requested the Secretary-General, and urged its Members, to consider further strengthening the WMO Office for the South-West Pacific through increased financial and human resources to enhance development of projects and national development plans. The Association urged WMO and SPREP Secretariat to strengthen PMDP streamline reporting to WMO RA V, SPREP Officials and PMC and raise the profile and linkages of WMO activities to relevant Pacific activities. It requested the Secretary-General to take the necessary actions for expressing WMO appreciation to SPREP and the Government of Samoa for continued support to the Office.

Review of Regional Office location

8.13 The Association was pleased to note that, on the recommendation of Cg-XVI, the Secretariat initiated a comprehensive review of resources and location of the Regional Office for Asia and the South-West Pacific, with a special focus on efficient and effective management and operation of the Office. It also noted with satisfaction the progress made on the review of the location of the RAP Office, including a basic pros and cons analysis for the location of the Regional Office in Geneva and in the Region; the development of generic criteria for consideration of the Regional Office location, and a WMO letter for soliciting the RAs II/V Members' examination of the possibility of hosting the RAP Office.

8.14 The Association noted that, in response to the WMO circular letter addressed to RA II and RA V Members, some Members (India, Indonesia, Republic of Korea, Singapore and Qatar) indicated their Governments' interest in hosting the Regional Office. The Association also noted that the Philippines indicated verbally its interest to also host the Regional Office. Noting that other Members offering to host the Regional Office have expressed their intents by official correspondences, the Association requested the Philippines to submit an official correspondence of intent to host the Regional Office. The Association expressed a preference for the Regional Office to be in Region V, should the Office be relocated from Geneva.

8.15 The Association endorsed the evaluation procedures and methodology as well as the regional criteria developed by the Management Groups of RA II and RA V with the assistance of the Secretariat, and noted that an objective assessment is under way through the evaluation of more detailed information on the offer provided by the candidate Members.

8.16 The Association agreed that, with close collaboration with the president of RA II and its Management Group, the president of RA V, in consultation with the RA V Management Group, make a recommendation to the Secretary-General on the appropriate location of the Office before Cg-17 (May–June 2015) based on the independent assessment of the candidates using the regionally-agreed criteria and evaluation procedures.

9. SCIENTIFIC LECTURES AND DISCUSSION (agenda item 9)

9.1 The following scientific lectures were presented during the session:

(a) Mr Mulyono Rahadi Prabowo, Head of Center for Meteorological Information for Public Weather Service (PWS), AMCG, Indonesia – "Recent Flash Flood and Landslides Evidences in Manado, North Sulawesi";

(b) Dr Chris Gordon, Director, Centre for Climate Research Singapore (CCRS), Meteorological Service, Singapore – "Prospects for Improved Seasonal Forecasting in South-East Asia";

(c) Mr Paul Davies, Executive Head, Head of Profession and Chief Meteorologist at the UK Met Office – "The Benefits of working together in Partnership; pull through Science to Services".

9.2 The lectures were followed by fruitful discussions. The Association expressed its appreciation to the lecturers for their interesting and informative presentations.

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

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

10.2 The Association noted that most of its past resolutions had been replaced by new resolutions adopted during the session. It further noted that while a few resolutions had been incorporated in the appropriate WMO publications, some of the previous resolutions were still required to be kept in force.

10.3 The Association accordingly adopted Resolution 16 (RA V-16) – Review of previous resolutions and recommendations of the Association.

11. ELECTION OF OFFICERS (agenda item 11)

The Association unanimously elected Dr Andi Eka Sakya (Indonesia) as president and Mr ‘Ofa Fa’anunu (Tonga) as vice-president of WMO Regional Association V (South-West Pacific).

12. DATE AND PLACE OF THE SEVENTEENTH SESSION (agenda item 12)

12.1 In accordance with Regulation 171 of the WMO General Regulations, the president of the Association should determine the date and place of the seventeenth session in agreement with the President of the World Meteorological Organization and after consultation with the Secretary-General, during the intersessional period.

12.2 The Association noted with appreciation the kind offer extended by Tonga to host the seventeenth session, subject to further confirmation.

13. CLOSURE OF THE SESSION (agenda item 13)

The sixteenth session of Regional Association V (South-West Pacific) closed at 16:55 on 7 May 2014.

RESOLUTIONS ADOPTED BY THE SESSION

Resolution 1 (RA V-16)

IMPLEMENTATION OF THE WMO STRATEGY FOR SERVICE DELIVERY IN REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) That the Sixteenth World Meteorological Congress (Geneva, May/June 2011) approved the WMO Strategy for Service Delivery,

(2) That the Executive Council at its sixty-fifth session (Geneva, May 2013) endorsed the Implementation Plan for the Strategy,

(3) That the Strategy and its Implementation Plan were cross-cutting and could be applied in the development of weather and warning services, and climate 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 Regional Association V, had expressed the desire for ownership of the Implementation Plan and taking the responsibility to implement it in their respective Regions,

(2) That service-delivery-related priorities of the Association were fully catered for in the Strategy and its Implementation Plan,

Decides to assign the work of ensuring a harmonized and synchronized implementation of the Strategy by Members to the appropriate mechanism within the Association;

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

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

Resolution 2 (RA V-16)

ENHANCEMENT OF METEOROLOGICAL SERVICE PROVISION TO CIVIL AVIATION IN REGION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting the International Civil Aviation Organization (ICAO) plans for significant changes in global Air Traffic Management as stipulated in the “One Sky” concept, the Global Air Navigation Plan and the Aviation System Block Upgrade methodology that will have significant impact on meteorological service for international air navigation,

Noting further the potentially serious legal and safety consequences of non-compliance with essential ICAO Standards and Recommended Practices and WMO Technical Regulations,

Considering:

(1) The importance of aviation as an enabler of socio-economic development,

(2) The particular importance of aviation as a main international transport mode in Region V and its importance for the small island developing States,

(3) The needs of the aviation industry for timely and accurate meteorological information and services contributing to safety, efficiency and regularity of air transport,

(4) The specific challenges facing the Members of the Association, in particular the small island developing States, in ensuring continuous service at the required quality level, that may need innovative national and regional solutions,

Considering further the urgency of raising awareness of the coming changes in global and regional Air Traffic Management and the related changes in meteorological service provision,

Urges Members:

(1) To ensure full compliance with the ICAO Standards and Recommended Practices and WMO Technical Regulations, in particular the full implementation of a quality management system for aeronautical services, the WMO competence standards for aeronautical meteorological personnel and, by 1 December 2016, the qualification standards for all aeronautical forecasters, that is, compliance with BIP-M level;

(2) To address cases of inability of providing requisite aeronautical meteorological services through establishing partnerships with other Members, in collaboration with ICAO and the respective national Meteorological Authorities;

Requests the presidents of the Commission for Aeronautical Meteorology and the Commission for Basic Systems, in cooperation with the Secretariat, to provide guidance and assistance to Members of the Association to resolve issues of non-compliance with aeronautical meteorological codes and to support the transition to the exchange of aeronautical meteorological information in digital form, that is, XML/GML;

Requests the Secretary-General to provide further guidance and assistance to Members of the Association on the practical implementation of cost-recovery for aeronautical meteorological services at the national and subregional levels, in coordination with ICAO;

Further requests the Secretary-General, in close cooperation with ICAO and relevant regional partners concerned with aviation safety, efficiency and regularity, such as the Pacific Aviation Safety Office and the International Air Transport Association, to organize a regional conference on the future of meteorological service provision to civil aviation to explore coordinated regional

approaches in Region V in response to the evolving Air Traffic Management system and information-centric requirements, based on the outcomes of the Conjoint Meteorology Divisional Meeting (July 2014), in order to support Members in meeting their needs specific to the requirements or strategies that will emerge from the Conjoint meeting;

Encourages Members to participate actively in the preparation of the conference and provide support for its organization, as appropriate.

Resolution 3 (RA V-16)

TROPICAL CYCLONE OPERATIONAL PLAN FOR THE SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) A series of resolutions by the General Assembly of the United Nations calling for international cooperation and action by WMO for the mitigation of the harmful effects of storms,

(2) Resolution 11 (RA V-16) – Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean,

Considering:

(1) The need to enhance cooperative efforts by countries in the South Pacific and adjacent areas affected by tropical cyclones in effectively carrying out their roles in coordinated arrangements for preparing and issuing meteorological forecasts and warnings of all tropical cyclones affecting the area,

(2) That, to achieve this aim, it is essential to have an agreed tropical cyclone operational plan for the South Pacific and the South-East Indian Ocean which describes the coordinated arrangements and defines the observing, forecasting and warning responsibilities of all cooperating countries,

Decides to make amendments to the *Tropical Cyclone Operational Plan for the South Pacific and South-East Indian Ocean* (WMO/TD-No. 292) as recommended by the RA V Tropical Cyclone Committee;

Authorizes the president of Regional Association V to approve, on behalf of the Association, amendments to this Tropical Cyclone Operational Plan, as recommended by the RA V Tropical Cyclone Committee;

Requests the Secretary-General:

(1) To maintain the WMO publication on the Tropical Cyclone Operational Plan and keep it up to date;

(2) To inform all Members concerned of any amendments and updating of the publication.

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Note: This resolution replaces Resolution 1 (XV-RA V), which is no longer in force.

Resolution 4 (RA V-16)

IMPLEMENTATION OF THE DISASTER RISK REDUCTION PROGRAMME IN REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) The decisions of the First Meeting of the Intergovernmental Board on Climate Services (IBCS-1), 1–5 July 2013, Geneva, (*Abridged Final Report with Resolutions of the First Meeting of the Intergovernmental Board on Climate Services* (WMO-No. 1124),

(2) The *Abridged Final Report with Resolutions of the Sixty-fifth Session of the Executive Council* (WMO-No. 1118), general summary, agenda item 4.2,

(3) The *WMO Strategic Plan 2012–2015* (WMO-No. 1069),

(4) The *Abridged Final Report with Resolutions of the Sixty-fourth Session of the Executive Council* (WMO-No. 1092), general summary, agenda item 4.2, and 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 including its annex,

(5) The *Abridged Final Report with Resolutions of the Sixteenth World Meteorological Congress* (WMO-No. 1077), general summary, paragraphs 11.5.1 to 11.5.21, and Resolution 52 (Cg-XVI) – Disaster Risk Reduction Programme,

(6) The final reports of the 2012 and 2013 Meetings of Presidents of Technical Commissions (PTC-2012 and PTC-2013), Geneva,

(7) The final reports of the 2012 and 2013 Meetings of Presidents of Regional Associations (PRA-2012 and PRA-2013), Geneva,

Noting further:

(1) The adoption of the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters,

(2) Decision 2/CP.19 – Warsaw international mechanism for loss and damage associated with climate change impacts, adopted by the Conference of the Parties to the United Nations Framework Convention on Climate Change at its nineteenth session held in Warsaw in 2013,

Considering:

(1) Disaster risk reduction (DRR) as one of the five priority areas for consideration under voluntary resources of WMO and among the initial four high-priority areas of the Global Framework for Climate Services,

(2) The WMO Disaster Risk Reduction Programme as cross-cutting and inextricably linked to other WMO Programmes, technical commissions, regional associations and the Secretariat,

(3) The importance of a user-driven approach to development and delivery of meteorological, hydrological and climate services to support policy development, risk analysis, multi-hazard early warning systems, sectoral risk management and disaster risk financing,

(4) That the WMO Disaster Risk Reduction Workplan (2012–2015) was approved by the Sixteenth World Meteorological Congress and was further developed by the Executive Council at its sixty-fourth and sixty-fifth sessions to establish DRR User-Interface Expert Advisory Groups related to thematic priority areas of WMO in disaster risk reduction including: (i) hazard and risk analysis; (ii) multi-hazard early warning systems; (iii) sectoral risk management in areas such as land-zoning, infrastructure and housing, agriculture and food security, water resource management, health, etc.; and (iv) disaster risk financing and insurance. Three concrete guidelines were under development as part of this workplan targeted at the National Meteorological and Hydrological Services and their stakeholders in areas (i), (ii) and (iv) above,

(5) The WMO DRR Survey 2006 outcomes and implementation of the 2015 second WMO DRR National and Regional Survey to assess national and regional capacities to support disaster risk reduction,

(6) Regional consultations for the post-2015 framework for disaster risk reduction coordinated by the United Nations Office for Disaster Reduction (UNISDR) through the UNISDR Subregional Office for the Pacific,

(7) The Third World Conference on Disaster Risk Reduction to be held in Sendai, Japan, from 14 to 18 March 2015, which would review and adopt a post-2015 framework for disaster risk reduction,

Considering further:

(1) The expressed need of Members for guidelines, standards and training modules for development and delivery of meteorological, hydrological and climate services to support DRR decision-making, in alignment with principles of quality management systems,

(2) The experiences of Region V as one of the most natural-hazard-prone regions particularly related to tropical cyclones, severe storms, floods, droughts, heatwaves, forest fires, and marine and aviation-related hazards,

(3) The opportunities for coordination of the Association's strategy and implementation plan with the regional DRR strategies through active engagement of the Association at the regional and subregional DRR platforms and events,

(4) That the Region offered some of the best practices in disaster risk management for a regionally coordinated meteorological network and was developing similar regionally coordinated institutional capacities for climate services,

(5) That a number of National Meteorological and Hydrological Services in the Region demonstrated good practices for provision of such services to the user community, and could thus support the development of DRR knowledge products and training materials,

(6) That most Members of RA V are involved in developing an integrated strategy on climate and disaster resilient development in the Pacific (SRDP) in the context of national sustainable development, where an integrated approach that reduces the risks to sustainable development from multiple hazards or phenomena, whether climate-related or geological, and whether of sudden or slow onset, is more effective and efficient; this is especially relevant if it takes into account the current limitations on national and regional capacities to address these concerns,

Requests the Secretary-General:

(1) To provide further regular updates on requirements, needs and progress with the implementation of the DRR workplan (2012–2015) to the Management Group, relevant subsidiary bodies and Members of the Association;

(2) To provide support pertaining to resource mobilization for projects to support disaster risk reduction and climate adaptation capacity development with a holistic user-driven approach to decision-making building on initiatives and the approach of the DRR Programme and its linkages to implementation of the Global Framework for Climate Services;

(3) To assist the president of the Association, the Management Group and relevant subsidiary bodies, in coordination with the UNISDR Regional Office for Asia-Pacific, Subregional Office for the Pacific and the Secretariat of the Pacific Regional Environment Programme (SPREP) to contribute to the regional consultation for the post-2015 framework for disaster risk reduction to replace the Hyogo Framework for Action;

(4) To assist the Pacific Meteorological Desk Partnership at SPREP in the implementation of relevant provisions of the SRDP that align with the Pacific Islands Meteorological Strategy, WMO and the RA V Strategic Operating Plan;

Requests the president of the Association and the Management Group:

(1) To document the initiatives of the Region for implementation of the Global Framework for Climate Services related to DRR activities and to formulate concrete recommendations to WMO governing bodies based on development of climate services for disaster risk reduction as input to the implementation of this Framework;

(2) In collaboration with the Secretary-General, to actively participate in the regional consultations under way and coordinated by UNISDR and the UNISDR Subregional Office for the Pacific to ensure that the needs for strengthening of national and regional capacities for development and provision of meteorological, hydrological and climate services is considered as an integral part of DRR strategies and development plans at national and regional levels, particularly in reference to the Global Framework for Climate Services;

(3) To address DRR-related matters as appropriate within respective areas of expertise of the Association's subsidiary bodies;

Urges Members:

(1) To support the implementation of the Disaster Risk Reduction Programme workplan in the context of regional/ national capacity development and contributions through documentation of their respective good practices;

(2) To participate in regional consultations for the post-2015 framework for disaster risk reduction;

(3) To participate actively in the 2015 second WMO DRR National and Regional Survey.

Resolution 5 (RA V-16)

IMPLEMENTATION OF REGIONAL CLIMATE CENTRE NETWORKS IN REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

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

(2) The *Abridged Final Report with Resolutions and Recommendations of the Fifteenth Session of the Commission for Climatology* (WMO-No. 1054),

(3) The *Abridged Final Report with Resolutions and Recommendations of the Fifteenth Session of the Commission for Basic Systems* (WMO-No. 1101),

(4) The relevant amendments to the *Manual on the Global Data-processing and Forecasting System* (WMO-No. 485),

(5) The report of the RA V Working Group on Climate Services,

(6) The *Abridged Final Report with Resolutions of the First Session of the Intergovernmental Board on Climate Services* (WMO-No. 1124),

Recognizing:

(1) The enhanced worldwide attention to climate change, the associated vulnerabilities in the Region and the need to support decision-making for adaptation to climate change and variability with more detailed regional climate information,

(2) The process for formal WMO designation of Regional Climate Centres (RCCs) and RCC-Networks in WMO Technical Regulations as part of the *Manual on the Global Data-processing and Forecasting System* (WMO-No. 485), Volume I – Global Aspects,

(3) The role of RCCs in the implementation of the Global Framework for Climate Services,

Decides:

(1) To work towards the implementation of RCCs/RCC-Network in Region V, through assessment of current RCC-related functions being performed in the Region vis-à-vis the mandatory and highly recommended RCC functions and an analysis of needs and capabilities;

(2) To adopt the RCC-Network concept in RA V, and develop implementation plans for RCC-Networks for two subregions, namely South-East Asia and the Pacific Island Countries and Territories;

(3) To keep the RA V RCC-Network operational activities flexible, allowing them to evolve based on the requirements of Members and within WMO regulations;

(4) To seek formal WMO designation of the RA V RCC-Network and to mandate the president of the Association to initiate this process, following satisfactory evaluation of the capability of the RCC-Network to fulfil the mandatory functions;

(5) That the implementation of the RA V RCC-Network, as well as the demonstration phase prior to formal designation, be coordinated by the appropriate RA V subsidiary body of under the overall guidance of the president of the Association;

Urges:

(1) The president of the Association, with support from the RA V subsidiary body concerned, to consult with the Commission for Climatology, the Commission for Basic Systems and the WMO Secretariat in the effective implementation of RCC-Networks including identification of potential hosts;

(2) The president of the Association to work closely with the president of Regional Association II (Asia) on the implementation of an RCC-Network for the South-East Asian subregion straddling both RA II and RA V;

(3) RCC-Network proponents to undertake a self-appraisal prior to submitting their proposals in order to determine their capabilities to fulfil the requirements of RCC designation criteria, develop implementation plans and submit these to the RA V subsidiary body concerned for their assessment and advice on commencing a demonstration phase;

(4) RCCs in the demonstration phase to submit activity reports on an annual basis to the RA V subsidiary body concerned, and to undertake recommended remedial actions to ensure fulfilment of WMO designation criteria;

(5) RCC-Networks to additionally include as many as possible of the highly recommended functions defined in the *Manual on the Global Data-processing and Forecasting System* in their activities, particularly those related to downscaling and climate change;

(6) RCC-Networks to actively support the further development and operation of Regional Climate Outlook Forums in the Region;

(7) All those concerned with the implementation of RA V RCC-Networks to keep themselves apprised of the implementation of the Global Framework for Climate Services, and to adjust and strengthen the activities to be in line with the corresponding follow-up actions that may be taken up by WMO;

(8) All Global Producing Centres for Long-range Forecasts to support the efforts of, and collaborate with, the RA V RCC-Networks;

(9) All Members of the Association to support RA V RCC-Network activities, use the products and provide feedback to RCC-Networks and Global Producing Centres for Long-range Forecasts on their effectiveness for further improvement and tailoring to user needs;

Requests:

(1) The presidents of the Commission for Climatology and the Commission for Basic Systems and the Secretary-General to provide the necessary support to ensure the success of RCC establishment in RA V, and effective collaboration with the RCCs in other Regions;

(2) The president of the Association to facilitate coordination within RA V Members on all matters related to RCC implementation;

(3) The RA V subsidiary body concerned to work in close collaboration with the Secretariat of the Pacific Regional Environment Programme, the Secretariat of the Pacific Community, the Association of Southeast Asian Nations and other relevant regional organizations.

Resolution 6 (RA V-16)

WMO INTEGRATED GLOBAL OBSERVING SYSTEM IMPLEMENTATION PLAN FOR REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) Resolution 50 (Cg-XVI) – Implementation of the WMO Integrated Global Observing System,

(2) Resolution 10 (EC-64) – WMO Integrated Global Observing System Framework Implementation Plan,

Noting further the final reports of the first, second and third sessions of the Inter-Commission Coordination Group on the WMO Integrated Global Observing System (WIGOS) and the recommendations on WIGOS implementation, including the development of Regional WIGOS Implementation Plans (R-WIPs),

Decides to adopt the Regional WIGOS Implementation Plan for Regional Association V (South-West Pacific) (R-WIP-V) as presented in the annex to the present resolution;

Requests the Management Group:

(1) To keep the Implementation Plan under regular review and updated; to guide, prioritize elements of, oversee and monitor the progress in the implementation of the Plan; and to submit amendments/updates to the Plan to the president of the Association for approval;

(2) To coordinate with Members of the Association the implementation of the Regional Plan and consult with the appropriate technical commissions on technical aspects of the implementation;

Requests Members:

(1) To develop their national WIGOS implementation plans;

(2) To organize their activities so as to realize WIGOS goals and associated outcomes as described in the R-WIP-V;

(3) To communicate and promote the concept and benefits of WIGOS in the Region and to Members;

(4) To continue providing resources, including through the WIGOS Trust Fund and/or seconded experts and in-kind contributions, to support the implementation of WIGOS;

Requests the Secretary-General to provide the necessary assistance and Secretariat support for WIGOS implementation in RA V;

Invites the partners to participate in relevant implementation activities as specified in the R-WIP-V.

Annex to Resolution 6 (RA V-16)

REGIONAL WIGOS IMPLEMENTATION PLAN FOR REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

WORLD METEOROLOGICAL ORGANIZATION

WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

REGIONAL WIGOS IMPLEMENTATION PLAN

FOR

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

(R-WIP-V)
Version 1.0
(05/05/2014)

VERSION CONTROL

Version	By	Date	Changes
			Initial template provided by WIGOS-PO
0.3	WIGOS-PO	09/01/2013	Table of WIGOS implementation activities prepared by the RA V WIGOS Workshop, then added to the template R-WIP-V
0.4	WG-INFR	27/04/2013 and 12/05/2013	Gaps in text completed, table of implementation activities reviewed. Feedback from WG-INFR members incorporated.
0.9	Chairperson, WG-INFR	30/08/2013	Final version 0.9 after review by PRs of Member countries in RA V, then finally the WIGOS Project Office, ready for approval by president RA V.

CONTENTS

WIGOS IMPLEMENTATION PLAN

1. INTRODUCTION AND BACKGROUND

1.1 Purpose of WIGOS and Scope of the Regional WIGOS Implementation Plan for RA V (R-WIP-V)

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

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

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

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

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

1.2 WIGOS Vision and Congress Guidance for WIGOS Implementation

The Sixteenth World Meteorological Congress decided that enhanced integration of the WMO observing systems should be pursued as a strategic objective of WMO and identified this as a major expected result of the WMO Strategic Plan[1].

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

[1] see http://www.wmo.int/pages/about/documents/1069_en.pdf

The implementation of WIGOS should build upon and add value to the existing WMO observing systems with emphasis on integration of surface- and space-based observations in an evolutionary process to satisfy requirements of WMO and WMO co-sponsored Programmes.

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

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

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

2. KEY ACTIVITY AREAS FOR REGIONAL WIGOS IMPLEMENTATION

The component observing systems of WIGOS comprise the Global Observing System (GOS), the observing component of the Global Atmosphere Watch (GAW), the WMO Hydrological Observing System (including the World Hydrological Cycle Observing System (WHYCOS)) and the observing component of the Global Cryosphere Watch (GCW), including their surface-based and space-based components. The above component systems include all WMO contributions to the co-sponsored systems, i.e., GCOS, GOOS, GTOS, as well as the WMO contributions to GFCS and GEOSS.

To migrate the existing observing systems into a more integrated single system that is WIGOS, focused effort is required in the following ten key areas, detailed in the sub-chapters to follow:

(a) Management of WIGOS implementation in RA V;

(b) Collaboration with the WMO co-sponsored observing systems and international partner organizations and programmes;

(c) Design, planning and optimized evolution of WIGOS component observing systems at regional, subregional and national levels;

(d) Observing System operation and maintenance;

(e) Quality Management;

(f) Standardization, system interoperability and data compatibility;

(g) The WIGOS Operational Information Resource;

(h) Data discovery, delivery and archival;

(i) Capacity development;

(j) Communication and outreach.

2.1 Management of WIGOS Implementation in RA V

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 will continue to monitor, guide, evaluate and support the overall implementation of WIGOS. Following the guidance by Cg-XVI, EC-LXIII 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 component observing systems. Progress on implementation of WIGOS will be reported to subsequent sessions of EC.

Regional Association

The regional association will play the key role in WIGOS implementation in the Region. The regional association, through its Working Group on Infrastructure, in particular the Task Team on WIGOS, will coordinate planning and implementation of WIGOS on the regional level taking into account all WMO future priorities, such as GFCS and DRR. The Working Group on Infrastructure, in particular the Task Team on WIGOS, under guidance from ICG-WIGOS, and with the support of the WMO Secretariat including the WIGOS Project Office, will be responsible for:

(a) The development of the Regional WIGOS 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)[2].

R-WIP will also address regional aspects of requirements, standardization, observing system interoperability, data compatibility, data management, Quality Management procedures including performance monitoring and data quality monitoring, and proposed improvements in observing networks/systems. An important role of the regional association 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 will plan, implement, operate and maintain national networks and observing programmes based on the standards, recommendations and best practices stated in the WMO Technical Regulations, the WIGOS Manual and the respective Manuals of the WIGOS component observing systems (e.g., GOS, GAW, WHOS and GCW). They will be encouraged to adopt a composite network approach to their networks and to include the acquisition, and onward transmission, of data from external sources, including NMHSs and other government agencies, the commercial sector and members of the public. A particular area of focus for Members of the Region under WIGOS will be increased attention to site protection and radio frequency spectrum protection.

Plans should also be developed to strengthen cooperation through partnership with different owners overseeing the WIGOS component observing systems 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.

Concerning Radio Frequency Spectrum Protection, Members should maintain close coordination with their national telecommunication authorities to register their frequencies for adequate protection, and to defend the availability of frequencies for Meteorology, Climatology and Earth observations, influencing positively the national delegations to the World Radiocommunication Conferences (WRC).

Countries in Region V which are not Members of WMO

There are countries in RA V which are not Members of WMO but nevertheless participate in WMO arrangements for data exchange and utilize WMO standards and recommended practices and procedures. These countries will be encouraged to adopt WIGOS standards and recommended practices and procedures.

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[2] http://www.wmo.int/pages/prog/www/OSY/gos-vision.html#egos-ip.

2.2 Collaboration with the WMO co-sponsored observing systems and international partner organizations and programmes

WIGOS will be an integrated, comprehensive, and coordinated system primarily comprising the surface-based and space-based observing components of the GOS, GAW, GCW, and WMO Hydrological Observing System (WHOS) (including WHYCOS), including 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. WIGOS is a major observing component of GFCS and also provides indispensable contributions to GEOSS.

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 SOPAC[3], SPREP[4], its PMC[5], and ASEAN[6] in order to resolve possible problems in data policy, product delivery and other governance issues. This interagency and inter-observing system coordination mechanism will need to be complemented and supported through similar cooperation and coordination arrangements among NMHSs and through national implementation mechanisms for GFCS, GCOS, GOOS, GTOS, and GEOSS.

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

2.3 Design, Planning and Optimized Evolution of WIGOS component observing systems at regional, subregional and national levels

The WMO has agreed on the Vision for the Global Observing Systems in 2025[7] 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) was approved by CBS-15 (September 2012). This EGOS-IP focuses on the long-term evolution of WIGOS component observing systems, while the WIP focuses on the integration of these component observing systems. Beyond 2015 these plans will provide Members of the Region with clear and focused guidelines, specifying actions that stimulate the cost-effective evolution of the observing systems to address in an integrated way the requirements of all WMO Programmes and relevant parts of co-sponsored programmes.

Concerning the surface-based sub-system of WIGOS, the current composition of mainly separate networks of observing stations comprises numerous different types of sites. With the implementation of WIGOS, these separate networks will continue to evolve but will also be given a more prominent collective identity as the WIGOS surface-based sub-system and for some

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[3] Applied Geoscience and Technology Division of the SPC (Secretariat of the Pacific Community)

[4] Secretariat of the Pacific Regional Environment Programme

[5] Pacific Meteorological Council

[6] Association of Southeast Asian Nations

[7] Available from the WMO Website at: http://www.wmo.int/pages/prog/www/OSY/gos-vision.html

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. The regional association 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)[8]

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-WIOS.

The RRR process involves regularly reviewing the observational data requirements[9] 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[10], 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[11] of the WIGOS Operational Information Resource (WIR, see section 2.7 below). The information on surface-based networks and instrumentation details is currently recorded in the WMO Publication No. 9, Volume A, but will ultimately be available, with additional metadata, through OSCAR. Space-based capabilities are also recorded and made available through OSCAR. OSCAR allows the performance of gap analyses to identify weaknesses in existing observing programmes.

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

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[8] 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

[9] 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.

[10] Capabilities are derived from the individual platforms characteristics submitted by Members to WMO e.g. through WMO-No. 9, Volume A, or its evolution.

[11] 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. The surface-based capabilities part is currently under development.

Table 1: The 12 recognized WMO Application Areas

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

At the Regional Level

Although the primary coordination of the RRR will lie with CBS for overall WIGOS planning, the regional association, through its Working Group on Infrastructure, 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.

The regional association 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 subregional level, where appropriate.

In Region V, a Strategic Operating Plan 2012–2015 was composed to respond to the WMO Strategic Plan and document the regional key priorities. Drawing in part on that document, the Pacific region countries prepared a Pacific Islands Meteorological Strategy 2012–2021 (PIMS).

It is already recognized that there are requirements for improved coordination and collection of observations related to lightning, marine coverage, upper-air systems including sustainable balloon programmes and AMDAR and affordable and reliable access to satellite data and products.

Region V includes many small island countries separated by vast ocean areas. Surface-based observing networks are consequently relatively sparse. Hence there is a unique level of requirement for satellite products and reliable communications.

At the National or Subregional 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 available 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 subregional, as opposed to national, approach to WIGOS observing infrastructure planning. In this case, it will be necessary

[12] Hydrological information only; water quality monitoring and information is currently excluded.

for the Members concerned to work in close cooperation to prepare subregional reviews of requirements to be used as a basis for detailed planning at that scale.

In Region V, many Pacific countries collaborate through the Pacific Meteorological Council (PMC) and several countries collaborate through the ASEAN Sub-Committee on Meteorology and Geophysics.

2.4 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.

Efforts also need to be made to identify opportunities to benefit from sharing (of experiences, practices and ideas, expertise and joint activities) across Regions (particularly with RA II as well as with other RAs).

Within Regional Association V, the following regional activities provide examples:

- CBS Lead Centre for GCOS;
- SOPAC Sea Level monitoring programme.

2.5 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 component observing systems (see *WMO Technical Regulations*, WMO-No. 49, Vol. IV). WIGOS quality management at the regional level will strive for compliance of all components of WIGOS with international standards, such as ISO 9001.and ISO 17025. Compliance with international standards and recommendations should be pursued in all quality assurance (QA) procedures applied by Members of the Region to all their national WIGOS component observing systems. In addition to the WMO QMF document, further guidance to Members will be provided by WMO via the standards, recommendations and best practices described in the Regulatory Materials, such as the WIGOS Manual and Guide. Such guidance, for both mandatory and desirable practices, can be referred to for the application and implementation of quality management in national observing systems. In this context, the Region will give attention to:

(a) The examination of current quality management practices being used in the Region;

(b) The documentation of the quality of observations from the WIGOS regional networks at all stages of data processing; and

(c) Ensuring, where possible, traceability of observations to the International System of Units (SI).

CGMS, in coordination and collaboration with WMO, supports the development of quality assurance standards, recommendations 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, the Region will

ensure that surface-based sites that are needed for calibration/validation of satellite data are specified.

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

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

2.6 Standardization, System Interoperability[13] and Data Compatibility

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

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

(a) Instruments and methods of observation across all components including surface-based and space-based elements (observations and their metadata);

(b) WIS information exchange, as well as discovery, access and retrieval (DAR) services; and

(c) Data Management (Data Processing, Quality Control, Monitoring and Archival).

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

Any regional deviations from the standard practices (documented in the WMO Technical Regulations through the WIGOS Manual and other relevant Manuals) will be reported to the Secretary-General (under Article 9 of the Convention of the World Meteorological Organization).

2.7 The WIGOS Operational Information Resource

The WIGOS Operational Information Resource (WIR), accessible via a centralized point (web portal), will provide seamless access to 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 standard and recommended practices and procedures 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, 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 standard and recommended practices and

[13] Interoperability is a property referring to the ability of diverse systems to work together (inter-operate)

procedures 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. *[For more information on each of these support tools, please refer to the WIP.]*

Understanding that sources of the individual components of the WIGOS Operational Information Resource rely on the inputs from its Members, the Region 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[14]) provides exchange of data and interpretation metadata[15], and management of related discovery metadata[16]. These discovery metadata play an important role in the discovery, access and retrieval of WIGOS observations and products by the entire WMO community.

Submission, management and archival of the data themselves is generally the responsibility of observing system owners/data custodians. However, several World Data Centres and a number of 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. The regional association will encourage its Members to abide by this commitment.

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

2.9 Capacity Development

A coordinated capacity-development effort at global, regional and national levels is of paramount importance to the developing countries in the implementation of WIGOS. This is especially the case for NMHSs of Least Developed Countries (LDCs) and Small Island Developing States (SIDS), to enable them to develop, improve and sustain national WIGOS component observing systems. 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 component observing systems, including both the infrastructure and human capacities development;

(c) Technological innovation, technology transfer, technical assistance and decision-support tools.

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[14] http://www.wmo.int/wis

[15] Interpretation metadata is the information required to interpret the data.

[16] Discovery metadata is the information describing the data-sets, generally using ISO-19115 standard, and WMO core profile in case of WIS.

In RA V, it is important to promote the training needs identified in collaboration with Member countries with respect to WIGOS.

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 lab (VL) will continue to grow and help all WMO Members realize the benefits of satellite data.

2.10 Communication and Outreach

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

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

3. REGIONAL PROJECT MANAGEMENT

The regional association will be responsible for the Project through its Working Group on Infrastructure, in particular the Task Team on WIGOS, with support from the Regional Office for Asia and the South-West Pacific, and the WMO Office for the South-West Pacific.

3.1 Monitoring, review and reporting mechanism

(a) The regional association, 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) The regional association, through the chairperson of the Working Group on Infrastructure, will report to the ICG-WIGOS and the WIGOS Project Office on the progress in implementation of WIGOS in the Region;

(c) The president will report at the RA's sessions 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. RAs and NMHSs will provide progress reports at the request of the WIGOS Project Office.

4. IMPLEMENTATION

4.1 Activities, Deliverables, Milestones, Costs and Risks

Table 2 presents the key implementation activities that are required for the regional WIGOS implementation within the timeframe 2012–2015. 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.

For each activity in Table 2, a detailed activity plan will be developed by the responsible entity or entities, with the support of the Working Group on Infrastructure. The Working Group on Infrastructure has the responsibility for tracking execution of these activities and this plan itself.

Table 2 WIGOS Implementation Activities (Region V)

Activities in bold are considered the most critical for WIGOS to gain operational acceptance by 2015.

Depending on the implementation scale, planned activities are specified as follows: **R** = Regional activity and **N** = National activity.

Key to activity numbers: **a.b.c**, where **a** is number of respective sub-section of section 2, **b** is for a regional (2) or national (3) activity, and **c** is a sequential number to distinguish activities from one another. ARB = Available Regular Budget. RB = Regular Budget.

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF	*Potential Risks*[17] Low/Mod/ High
1. Management of WIGOS Implementation in Region V						
1.2.1 R	Develop the Regional WIGOS Implementation Plan for Region V (R-WIP-V).	Regional WIGOS Implementation Plan for Region V (R-WIP-V).	2012–13	Drafting by WG-Infrastructure (TT-WIGOS), adoption by president RA V		Low
1.2.2 R	Compile information from Member countries, other relevant partners and WMO sources as input to a "stock-take" of existing WMO observing systems in RA V.	A report detailing all the current WMO observing systems in Region V, including the composition of networks, data outputs and who the owners/ operators are.	2013	WG-Infrastructure (TT-WIGOS) assisted by Secretariat		High
1.2.3 R	Assess the EGOS-IP and other WMO observing system implementation plans to identify actions relevant to RA V and Member countries; assign priorities to these actions.	Prioritized list of actions for RA V and for Members arising from the EGOS-IP and other IPs.	2012–13	Drafting by WG-Infrastructure (TT-WIGOS), adoption by president RA V		Low
1.2.4 R	Provide an effective RA V focal point to liaise with CBS about the implementation of EGOS-IP in RA V.	An effective RA V focal point for EGOS-IP, who is actively corresponding with CBS.	2012–15	RA V MG, focal point for EGOS-IP		Mod
2. Collaboration with WMO and co-sponsored observing systems						
2.2.1 R	Identify and engage further potential partners for collaboration in the collection of observations on a regional scale. Clarify the target area(s)for collaboration and the mechanism for resolving governance issues.	A report on existing partnerships on a regional level, to provide a baseline and reference.	2012–15	WG-Infrastructure (TT-WIGOS).		Mod

[17] A simple rating of "risk" is registered in this plan for each activity, using the scale Low/Medium/High to represent the combined assessment of the likelihood of not fully completing the activity and deliverable() as intended, plus the consequential impact of such non-completion. More detailed risk assessment, including mitigation where warranted, is needed when more detailed planning is undertaken for each activity.

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF	*Potential Risks*[17] Low/Mod/ High
2.3.1 N	Encourage Member countries to identify and engage further potential partners in the collection of observations for WMO Programmes. Clarify the target area(s) for collaboration and the mechanism for resolving governance issues.	Increased number of collaborating partners at a national level and increased collection of observations.	2012–15	Encouragement by MG, action by all Member countries in RA V.		Mod
2.2.2 2.3.2 R, N	Collaborate with CIMO to develop a *reliable feedback mechanism* on the performance of instruments and systems in Region V. Provide feedback regularly.	A status report is provided to RA V and CIMO on progress of meteorological observing systems against WMO regulations (standards and recommendations).	2013	WG-Infrastructure (TT-Traceability) develop mechanism, Member countries in RA V provide feedback.		Mod
3. Design, planning and optimized evolution of WIGOS component observing systems **at regional, subregional and national levels**						
3.2.1 R	Design and plan observing systems in the Region, taking into account: (i) the technical guidance of the technical commissions as represented in the EGOS-IP and other observation system implementation plans; (ii) the regional priorities adopted by the president of RA V (see action item 1.2.3); (iii) relevant actions identified in the Technical Plan of the Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean; (iv) the need for "gap filling" and restoration of silent stations; and (v) cross-regional coordination opportunities.	Improved WMO observing system design in **Region** V.	2012–15	Coordination by WG-Infrastructure (TT-WIGOS).		High
3.3.1 N	Evolve and implement national observing systems, taking into account: (i) the technical guidance of the technical commissions as represented in the EGOS-IP and other observation system implementation plans; (ii) the regional priorities adopted by the president of RA V (see action item 1.2.3); (iii) relevant actions identified in the Technical Plan of the Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean; (iv) the need for "gap filling" and restoration of silent stations.	Improved WMO observing systems in Region V.	2012–15	Member countries in Region V.		High

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF	*Potential Risks*[17] Low/Mod/ High
3.2.2 R	Define and describe the Regional WIGOS Network (building on action item 1.2.2) as the collective identity for all WMO observing systems in Region V.	A report to convey the definition and description of the Regional WIGOS Network.	2014	WG-Infrastructure (TT-WIGOS).		High
3.2.3 R	Validate the user requirements documented by the global RRR process against regional user requirements; use the results to update the RRR user requirements database and to fine tune the EGOS-IP and observing system plans.	WMO observing systems are responsive to regional user requirements.	2013–15	WG-Infrastructure (TT-WIGOS).		Mod
3.3.2 N	Validate the user requirements documented by the global RRR process against national user requirements for WMO systems; use the results to update the RRR user requirements database and to fine tune the EGOS-IP and observing system plans.	WMO observing systems are responsive to national user requirements for WMO systems.	2013–15	Member countries in Region V.		Mod
4. Integrated Observing System Operation and Maintenance						
4.2.1 R	Compile, from Member contributions, a set of examples of integrated operation and maintenance between observing system owners/operators, covering the sharing of experiences, practices and ideas, the sharing of expertise and the pooling of resources for joint activities; noting specifically that: (1) training is an effective way to share knowledge and skills; (2) funding for capacity development is often the trigger which enables increasingly integrated approaches. Promote this report amongst Member countries as a stimulus for thinking broadly about opportunities to benefit from integration.	A report providing examples of integrated approaches to operation and maintenance.	2013	WG-Infrastructure (TT-WIGOS).		Low
4.2.2 R	Capacity development in data communication techniques related to observations collection and reporting	Reference material, case studies and training, leading to enhanced capacities	2013–15	WG-Infrastructure (TT-PSC)		

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF	*Potential Risks*[17] Low/Mod/ High
4.2.3 R	Capacity-building in Radar Techniques in South-East Asia, supported by appropriate technical missions to countries, through: • All the ASEAN developing countries will prepare a national report on their arrangements for the operational use of weather radar data; and • A sub/cross-region (for the ASEAN developing countries) strategic plan for addressing technical issues and necessary actions identified in the national reports.	Enhanced capacity in monitoring and forecasting of severe weather using radar data.	2013–15	Those Member countries involved in the subregional/ cross-regional (with RA II) ASEAN Sub-Committee on Meteorology and Geophysics		Mod
5. Integrated Quality Management						
5.2.1 R	Progressively achieve traceability to SI standards of measurements made throughout RA V, focusing initially on surface pressure, temperature, precipitation, humidity, also sea level.	Traceable observations from progressively more components of the Regional WIGOS Network.	2012–15	WG-Infrastructure (TT-Traceability), in collaboration with the RICs and Members.		Mod
5.2.2 5.3.1 R, N	Develop a self-assessment tool to enable Members to follow CIMO guidelines for observations	Self-assessment tool.	2014	WG-Infrastructure (TT-Traceability), with input from Members.		High
5.2.3 R	Actively review and respond to the findings of CBS' periodic data flow monitoring exercises.	An active review process.	2012–15	WG-Infrastructure (TT-WIGOS).		Low
5.2.4 R	Find new means of continuous monitoring of observations data quality in Region V with the support of Centres of the GDPFS (Global Data Processing and Forecasting System).	Request is made (for the systemic errors in observations from the analysis scheme) and collaboration is established with Chairperson OPAG-GDPFS on this topic.	201x	WG-Infrastructure (TT-WIGOS), in collboration with Centres of the GDPFS.		Mod
6. Standardization, System Interoperability and Data Compatibility						
6.2.1 R	Achieve the migration to Table Driven Code Forms throughout Region V as specified by CBS.	Completed migration to Table Driven Code Forms throughout Region V.	2014	WG-Infrastructure (TT-TDCF).		Mod
6.2.2 R	Develop a process to monitor and report on what Members currently do in relation to compliance with WIGOS standards and recommendations.	A process is developed to monitor and report on what Members currently do in relation to compliance with WIGOS standards and recommendations.	20xx	WG-Infrastructure (TT-WIGOS).		Mod
6.2.3 R	Review and suggest requirements for new WIGOS standards, recommendations and/or regional best practices.	Proposals for new WIGOS standards, recommendations and/or regional best practices.	20xx	WG-Infrastructure (TT-WIGOS).		Mod

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF	*Potential Risks*[17] Low/Mod/ High
6.2.4 6.3.1 R,N	Implement the WMO Siting Classification Scheme in RA V, through: • Provision of information and training to Member countries, and • Adoption of new procedures by Member countries.	WMO Siting Classification Scheme is implemented in RA V.	201xxx	WG-Infrastructure		high
6.2.5 R	Determine capacity of WMO Members in RA V to maintain and submit to WMO interpretation metadata (as currently required for Vol. A)	Report on the capacity of WMO Members in RA V to maintain and submit to WMO interpretation metadata (as currently required for Vol. A).	2014	WG-Infrastructure (TT-WIGOS).		Mod
7. The WIGOS Operational Information Resource (WIR)						
7.2.1 R	Request, support and encourage Members to provide up-to-date metadata to the WIR and ensure its ongoing maintenance.	Up-to-date metadata maintained at WMO.	201x– (dependent on completion of database)	WG-Infrastructure (TT-WIGOS).		Mod
8. Data discovery, delivery and archival						
8.2.1 R	Foster increased exchange of observations data and discovery metadata using WIS in the Region, through awareness raising and provision of guidance for the adoption of WIS standards and recommendations, including implementation of Data Collection and Production Centres (DCPC) and National Centres (NC), in collaboration with GISC Melbourne.	Increased provision of "discovery metadata" hence accessibility of data through the WIS.	2012–15	WG-Infrastructure (TT-WIS).		Mod
8.2.2 R	Encourage Member countries to share data via the WIS, including from organizations other than NMHSs.	New sources of data are available through the WIS.	2012–15	WG-Infrastructure (TT-WIS).		Mod
9. Capacity development[18]						
9.2.1 R	Assist Member countries to introduce or improve institutional mandates and policies relating to observing systems.	Improved institutional mandates and policies in Member countries relating to observing systems.	2012–15	Management Group, supported by TT-WIGOS.		Mod

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

No.	Activity	Deliverables	Timeline	Responsibility	Estimated Costs (2012–2015) K CHF	*Potential Risks*[17] Low/Mod/ High
9.2.2 9.3.1 R, N	Assist Members to fill gaps (infrastructure & human capacities) in their WIGOS component observing systems, in particular: assist Fiji to fully implement and sustain their calibration facilities (end of 2013).	Gaps (both infrastructure and human capacities) in the WIGOS component obs systems of Member countries identified/filled.	2012–15	WG-Infrastructure (TT-WIGOS, Task Team on Traceability of Observations), in collaboration with regional partners and Members.		Mod
10. Communication and outreach						
10.2.1 R	Contribute to WIGOS communication and outreach across Region V by: (i) responding to the role defined in the ICG-WIGOS communication strategy; (ii) utilizing material provided by WIGOS-PO to raise awareness and commitment to WIGOS in Region V.	Effective communication and outreach for WIGOS across Region V.	2012–15	WG-Infrastructure (TT-WIGOS) and Management Group.		Low
10.3.1 N	Contribute to WIGOS communication and outreach within Member countries by: (i) responding to the role defined in the ICG-WIGOS communication strategy; (ii) utilizing material provided by WIGOS-PO to raise awareness and commitment to WIGOS in Region V.	Effective communication and outreach for WIGOS within Member countries.	2012–15	WMO Member countries in Region V.		Low

5. RESOURCES

The activities for implementation of the WIGOS framework will be completed through resources of:

- The experts conducting the work of WG-INFR and its Task Teams;
- Member countries and their efforts to implement WIGOS;
- Partner bodies;
- Capacity development initiatives.

Specific resources required for each activity will be identified when specific detailed planning is undertaken for each activity.

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) Awareness

The communication and outreach strategy for WIGOS in the Regions and Member countries is not very clear and does not appear to have progressed greatly yet. Increased resources in the WIGOS Project Office might help to address this. Part of this effort is development of materials, including materials suitable for RA V.

The WIGOS framework Checklist for Members might contribute as an awareness-raising device in addition to a self-assessment tool.

(b) Coordination and Commitment

There is a need for alignment and coordination between the R-WIP-V and other plans. That applies to other WMO plans as well as plans of other agencies for meteorological development in the Region (for example the Pacific Islands Meteorological Strategy). The commitment to any activities and the attention of donor agencies will be strengthened if alignment & coordination is achieved.

(c) Resources

Ultimately it is Member countries that must find the resources to implement and operate systems identified by some of the WIGOS framework activities. This is a significant challenge which calls for attention to WIGOS capacity development activities and to constraint in the demands placed on Member countries.

7. OUTLOOK

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

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Annex I

LIST OF ACRONYMS

ASEAN	Association of South-East Asian Nations
CBS	Commission for Basic Systems
CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CIMO	Commission for Instruments and Methods of Observation
CONOPS	Concept of Operations
DAR	Discovery, Access and Retrieval
DB	Database
DCPC	Data Collection or Production Centre (of WIS)
DRR	Disaster Risk Reduction
EGOS-IP	Implementation Plan for the Evolution of Global Observing Systems
ET	Expert Team (of WMO Technical Commission)
FAO	Food and Agriculture Organization of United Nations
GAW	Global Atmosphere Watch
GCOS	Global Climate Observing System
GCW	Global Cryosphere Watch
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GISC	Global Information System Centre (of WIS)
GFCS	Global Framework for Climate Services
GOOS	Global Ocean Observing System
GOS	Global Observing System
GTOS	Global Terrestrial Observing System
ICG-WIGOS	Inter-Commission Coordination Group on WIGOS
ICPC	Interagency Coordination and Planning Committee for Earth Observations
ICSU	International Council for Science
IOC	Intergovernmental Oceanographic Commission
ISO	International Organization of Standardization
ITU	International Telecommunication Union
LDCs	Least Developed Countries
MOU	Memorandum of Understanding
NMHS	National Meteorological and Hydrological Service
NOS	National Observing System
OSEs	Observing Systems Experiments

OSCAR	WIGOS Observing Systems Capabilities Analysis and Review tool
OSSEs	Observing System Simulation Experiments
PIMS	Pacific Islands Meteorological Strategy 2012–2021
PM&E	Performance Monitoring and Evaluation
PMC	Pacific Meteorological Council (of SPREP)
QA	Quality Assurance
QC	Quality Control
QMF	Quality Management Framework
QMS	Quality Management System
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 States
SoG	Statement of Guidance
SOPAC	Applied Geoscience and Technology Division of the SPC (Secretariat of the Pacific Community)
SORT	“Standardization of Observations” Reference Tool (of WIGOS)
SPREP	Secretariat of the Pacific Regional Environment Programme
SLA	Service Level Agreement
TC	Technical Commission
TOR	Terms of Reference
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCRP	World Climate Research Programme
WIGOS	WMO Integrated Global Observing System
WIP	WIGOS framework Implementation Plan
WIR	WIGOS Operational Information Resource
WIS	WMO Information System
WHOS	WMO Hydrological Observation System
WWW	World Weather Watch

Resolution 7 (RA V-16)

REGIONAL BASIC SYNOPTIC NETWORK AND REGIONAL BASIC CLIMATOLOGICAL NETWORK IN REGION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) Resolution 3 (XV-RA V) – Regional Basic Synoptic Network and Regional Basic Climatological Network in Region V (South-West Pacific),

(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) The *Manual on Codes* (WMO-No. 306),

(4) The *Manual on the Global Telecommunication System* (WMO-No. 386),

Considering:

(1) That the establishment and maintenance of a Regional Basic Synoptic Network (RBSN) of surface and upper-air synoptic stations, adequate to meet the requirements of Members and of the World Weather Watch, constitute one of the most important obligations of Members under Article 2 of the WMO Convention,

(2) That the Fourteenth World Meteorological Congress welcomed the establishment of Regional Basic Climatological Networks (RBCNs) in all WMO Regions and urged Members to ensure that their operational observing stations compile and transmit the CLIMAT messages according to existing regulations,

Decides:

(1) That the stations and the observational programmes listed in Annex 1 to the present resolution constitute the RBSN in Region V;

(2) That the stations listed in Annex 2 to the present resolution constitute the RBCN in Region V;

Urges Members:

(1) To secure, at the earliest date possible, full implementation of the network of RBSN and RBCN stations and observational programmes set forth in Annexes 1 and 2 to the present resolution;

(2) To comply fully with the standard times of observation, the global and regional coding procedures and data-collection standards as laid down in the *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 V (South-West Pacific), and to monitor the implementation by Members and to address non-compliance in consultation with the Member concerned and the Secretary-General.

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

Annex 1 to Resolution 7 (RA V-16)

LIST OF STATIONS COMPRISING THE RBSN IN REGION V (SOUTH-WEST PACIFIC)

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
AMERICAN SAMOA					
91764	0	CAPE TAPUTAPU AWS	S		
91765	0	PAGO PAGO/INT.AIRP	S	R	
91766	0	CAPE MATATULA AWS	S		
91767	0	OFU MANUA ISLAND	S		
91768	0	TA'U AWS	S		
AUSTRALIA					
94102	0	TROUGHTON ISLAND	S		
94103	0	BROWSE ISLAND	S		
94120	0	DARWIN AIRPORT	S	R	
94122	0	POINT FAWCETT	S		
94131	0	TINDAL RAAF	S		
94147	0	CAPE WESSEL	S		
94150	0	GOVE AIRPORT	S	R	
94151	0	NORTH EAST ISLAND	S		
94170	0	WEIPA AERO	S	R	
94183	0	COEN AIRPORT	S		
94200	0	MANDORA	S		
94203	0	BROOME AIRPORT	S	R	
94206	0	FITZROY CROSSING AERO	S		
94207	0	ROWLEY SHOALS	S		
94211	0	MOUNT ELIZABETH	S		
94212	0	HALLS CREEK AIRPORT	S		W
94216	0	KUNUNURRA AERO	S		
94236	0	ELLIOTT	S		
94238	0	TENNANT CREEK AIRPORT	S		
94248	0	CENTRE ISLAND	S		
94255	0	CAMOOWEAL TOWNSHIP	S		
94266	0	NORMANTON AIRPORT	S		
94268	0	KOWANYAMA AIRPORT	S		
94274	0	GEORGETOWN AIRPORT	S		
94287	0	CAIRNS AERO	S		
94290	0	FLINDERS REEF	S		
94293	0	LIHOU REEF LIGHTHOUSE	S		
94294	0	TOWNSVILLE AERO	S	R	
94298	0	MARION REEF	S		
94299	0	WILLIS ISLAND	S	R	
94300	0	CARNARVON AIRPORT	S		
94302	0	LEARMONTH AIRPORT	S	R	
94312	0	PORT HEDLAND AIRPORT	S	R	
94313	0	WITTENOOM	S		
94317	0	NEWMAN AERO	S		
94319	0	TELFER AERO	S		
94324	0	YUENDUMU	S		
94326	0	ALICE SPRINGS AIRPORT	S	R	
94327	0	JERVOIS	S		
94332	0	MOUNT ISA AERO	S	R	
94333	0	BOULIA AIRPORT	S		
94341	0	RICHMOND AIRPORT	S		
94346	0	LONGREACH AERO	S		W
94363	0	EMERALD AIRPORT	S		
94366	0	BOWEN AIRPORT	S		
94367	0	MACKAY M.O	S		W
94374	0	ROCKHAMPTON AERO	S	R	
94388	0	LADY ELLIOT ISLAND	S		
94393	0	FREDERICK REEF	S		
94394	0	CATO ISLAND	S		
94403	0	GERALDTON AIRPORT	S	R	
94429	0	MOUNT MAGNET AERO	S		
94430	0	MEEKATHARRA AIRPORT	S	R	
94449	0	LAVERTON AERO	S		
94451	0	CARNEGIE	S		
94461	0	GILES METEOROLOGICAL OFFICE	S	R	
94462	0	YULARA AERO	S		
94477	0	MARLA POLICE STATION	S		
94488	0	WINDORAH POST OFFICE	S		
94500	0	CUNNAMULLA POST OFFICE	S		
94510	0	CHARLEVILLE AERO	S	R	
94515	0	ROMA AIRPORT	S		
94552	0	OAKEY AERO	S		
94578	0	BRISBANE AERO	S	R	
94584	0	DOUBLE ISLAND POINT LIGHTHOUSE	S		
94601	0	CAPE LEEUWIN	S		
94610	0	PERTH AIRPORT	S	R	
94637	0	KALGOORLIE-BOULDER AIRPORT	S	R	
94638	0	ESPERANCE	S	R	
94642	0	BALLADONIA	S		
94647	0	EUCLA	S		
94651	0	NULLARBOR	S		
94653	0	CEDUNA AMO	S		
94659	0	WOOMERA AERODROME	S	R	
94672	0	ADELAIDE AIRPORT	S	R	
94691	0	BROKEN HILL AIRPORT AWS	S		
94693	0	MILDURA AIRPORT	S		
94703	0	BOURKE AIRPORT AWS	S		
94711	0	COBAR MO	S	R	
94729	0	BATHURST AIRPORT AWS	S		
94750	0	NOWRA RAN AIR STATION AWS	S	R	
94767	0	SYDNEY AIRPORT AMO	S		
94776	0	WILLIAMTOWN RAAF	S	R	
94791	0	COFFS HARBOUR MO	S		
94802	0	ALBANY AIRPORT	S	R	
94804	0	NEPTUNE ISLAND	S		
94821	0	MOUNT GAMBIER AERO	S	R	
94842	0	CAPE OTWAY LIGHTHOUSE	S		
94850	0	KING ISLAND AIRPORT	S		
94866	0	MELBOURNE AIRPORT	S	R	
94875	0	SHEPPARTON AIRPORT	S		
94893	0	WILSONS PROMONTORY LIGHTHOUSE	S		
94907	0	EAST SALE AIRPORT	S		
94910	0	WAGGA WAGGA AMO	S	R	
94926	0	CANBERRA AIRPORT	S		

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
94935	0	MALLACOOTA	S		
94954	0	CAPE GRIM BAPS	S		
94956	0	STRAHAN AERODROME	S		
94975	0	HOBART AIRPORT	S	R	
94983	0	LARAPUNA (EDDYSTONE POINT)	S		
94995	0	LORD HOWE ISLAND AERO	S	R	
94996	0	NORFOLK ISLAND AERO	S	R	
94997	0	HEARD ISLAND (THE SPIT)	S		
94998	0	MACQUARIE ISLAND	S	R	
95111	0	PORT KEATS AERO	S		
95146	0	NGAYAWILI	S		
95205	0	DERBY AERO	S		
95283	0	COOKTOWN AIRPORT	S		
95322	0	RABBIT FLAT	S		
95448	0	LEINSTER AERO	S		
95458	0	COOBER PEDY AIRPORT	S		
95480	0	MARREE AERO	S		
95481	0	MOOMBA AIRPORT	S		
95482	0	BIRDSVILLE AIRPORT	S		
95485	0	TIBOOBURRA AIRPORT	S		
95492	0	THARGOMINDAH AIRPORT	S		
95527	0	MOREE AERO	S	R	
95634	0	SOUTHERN CROSS AIRFIELD	S		
95637	0	LAKE GRACE	S		
95646	0	FORREST	S		
95666	0	PORT AUGUSTA AERO	S		
95697	0	IVANHOE AERODROME AWS	S		
95719	0	DUBBO AIRPORT AWS	S		
95762	0	TAMWORTH AIRPORT AWS	S		
95839	0	HORSHAM AERODROME	S		
95966	0	LAUNCESTON AIRPORT	S		
96995	0	CHRISTMAS ISLAND AERO	S		
96996	0	COCOS ISLAND AERO	S	R	
BRUNEI DARUSSALAM					
96315	0	BRUNEI AIRPORT	S	R	
COOK ISLANDS					
91801	0	PENRHYN		R	
91802	0	PENRHYN AWS	S		
91809	0	MANIHIKI AWS	S		
91812	0	PUKAPUKA AWS	S		
91831	0	AITUTAKI AWS	S		
91841	0	MAUKE AWS	S		
91843	0	RAROTONGA	S		W
91848	0	MANGAIA AWS	S		
DETACHED ISLANDS					
PITCAIRN					
91964	0	PITCAIRN ISLAND AWS	S		
WALLIS AND FUTUNA					
91753	0	HIHIFO (ILE WALLIS)	S		
91754	0	MAOPOOPO (ILE FUTUNA)	S		
FIJI					
91650	0	ROTUMA	S		
91652	0	UDU POINT	S		
91659	0	NABOUWALU	S		
91660	0	YASAWA-I-RARA	S		

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
91670	0	VIWA	S		
91676	0	VANUA BALAVU	S		
91680	0	NADI AIRPORT	S	R	
91683	0	NAUSORI	S		
91691	0	LAKEBA	S		
91693	0	VUNISEA	S		
91697	0	MATUKU	S		
91699	0	ONO-I-LAU	S		
FRENCH POLYNESIA					
AUSTRAL ISLANDS					
91954	0	TUBUAI	S		
91958	0	RAPA	S	R	
MARQUESAS ISLANDS					
91925	0	HIVA-OA	S	R	
SOCIETY ISLANDS					
91929	0	BORA-BORA-MOTU-AERO	S		
91938	0	TAHITI-FAAA	S	R	
TUAMOTU ISLANDS AND GAMBIER ISLANDS					
91943	0	TAKAROA	S		
91944	0	HAO	S		
91945	0	HEREHERETUE	S		
91948	0	MANGAREVA	S	R	
INDONESIA					
96009	0	LHOKSEUMAWE/MALIKUS SALEH	S		
96011	0	BANDA ACEH/BLANG BINTANG	S		
96035	0	KUALANAMU MEDAN	S	R	
96073	0	SIBOLGA/PINANGSORI	S		
96091	0	TANJUNG PINANG/KIJANG	S		
96109	0	PEKAN BARU/SIMPANGTIGA	S		
96145	0	TAREMPA	S		
96147	0	RANAI	S	R	
96163	0	MIA PADANG	S	R	
96179	0	SINGKEP/DABO	S		
96195	0	JAMBI/SULTAN TAHA	S		
96221	0	PALEMBANG/ST. M. BADARUDIN II	S		
96237	0	PANGKAL PINANG	S	R	
96249	0	TANJUNG PANDAN/BULUH TUMBANG	S		
96253	0	BENGKULU/PADANG KEMILING	S		
96295	0	TANJUNG KARANG/RADIN INTEN II	S		
96581	0	PONTIANAK/SUPADIO	S		
96633	0	BALIKPAPAN/SEPINGGAN	S		
96645	0	PANGKALAN BUN/ISKANDAR	S		
96655	0	PALANGKA RAYA/TJILIK RIWUT	S		
96685	0	BANJARMASIN/SYAMSUDIN NOOR	S		
96749	0	JAKARTA/SOEKARNO-HATTA	S	R	
96781	0	BANDUNG/HUSEIN	S		
96805	0	CILACAP	S		
96839	0	SEMARANG/AHMAD YANI	S		
96935	0	JUANDA SURABAYA	S	R	
97014	0	MENADO/ SAM RATULANGI	S	R	

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
97028	0	TOLI-TOLI/LALOS	S		
97048	0	GORONTALO/JALALUDDIN	S		
97072	0	PALU/MUTIARA	S	R	
97086	0	LUWUK/BUBUNG	S		
97096	0	POSO/KASIGUNCU	S		
97120	0	MAJENE	S		
97146	0	KENDARI/WOLTER MONGINSIDI	S		
97180	0	UJUNG PANDANG/HASANUDDIN	S	R	
97192	0	BAU-BAU/BETO AMBARI	S		
97230	0	DENPASAR/NGURAH RAI	S		
97260	0	SUMBAWA BESAR/BRANGBIJI	S		
97270	0	BIMA/M.SALAHUDDIN	S		
97300	0	MAUMERE/WAI OTI	S		
97340	0	WAINGAPU/MAU HAU	S		
97372	0	KUPANG/ELTARI	S	R	
97430	0	TERNATE/BABULLAH	S		
97460	0	LABUHA/OESMAN SADIK	S		
97502	0	DEO SORONG	S		
97530	0	MANOKWARI/RENDANI	S		
97560	0	BIAK/FRANS KAISIEPO	S	R	
97580	0	SARMI/MARARENA	S		
97600	0	SANANA	S		
97686	0	WAMENA	S		
97690	0	JAYAPURA/SENTANI	S		
97724	0	AMBON/PATTIMURA	S	R	
97748	0	GESER	S		
97760	0	KAIMANA/UTAROM	S		
97796	0	TIMIKA	S		
97810	0	TUAL/DUMATUBUN	S		
97876	0	TANAH MERAH	S		
97900	0	SAUMLAKI/OLILIT	S		
97980	0	MERAUKE/MOPAH	S	R	
ISLANDS IN THE PACIFIC OCEAN NORTH OF THE EQUATOR					
COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS					
91221	0	ROTA	S		
91222	0	PAGAN ISLAND AWS	S		
91231	0	TINIAN	S		
91232	0	SAIPAN (CG)	S		
FEDERATED STATES OF MICRONESIA					
91203	0	FALALOP ISLAND (CG), ULITHI ATOLL	S		
91204	0	FALALOP ISLAND, ULITHI ATOLL AWS	S		
91317	0	WOLEAI ATOLL	S		
91320	0	ONOUN	S		
91324	0	PULUWAT ATOLL AWS	S		
91328	0	ULUL AWS	S		
91329	0	FANANU	S		
91334	0	WEATHER SERVICE OFFICE, CHUUK, ECI	S	R	
91338	0	SATAWAN ATOLL AWS	S		
91339	0	LUKUNOCH ATOLL	S		
91343	0	OROLUK ATOLL AWS	S		
91348	0	WEATHER SERVICE OFFICE, POHNPEI	S	R	
91350	0	MWOAKILLOA	S		
91352	0	PINGELAP ATOLL AWS	S		
91353	0	PINGELAP ATOLL	S		

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
91355	0	KOSRAE AIRPORT AWS	S		
91356	0	KOSRAE AIRPORT VICE LELU, KOSRAE ATOLL	S		
91411	0	NGULU ATOLL AWS	S		
91413	0	WEATHER SERVICE OFFICE, YAP	S	R	
91425	0	NUKUORO ATOLL	S		
91434	0	KAPINGAMARANGI ATOLL	S		
GUAM					
91212	0	WEATHER FORECAST OFFICE	S	R	
HAWAII, JOHNSTON AND MIDWAY ISLANDS					
91066	0	MIDWAY ISLAND	S		
91158	0	PRINCEVILLE, KAUAI	S		
91159	0	KEKAHA, KAUAI	S		
91163	0	PORT ALLEN AIRPORT, KAUAI	S		
91165	0	LIHUE, KAUAI	S	R	
91175	0	BELLONS AIR FORCE BASE	S		
91182	0	HONOLULU, OAHU	S		
91190	0	KAHULUI AIRPORT, MAUI	S		
91194	0	KAHOOLAWE	S		
91285	0	HILO HI	S	R	
91294	0	SOUTH POINT	S		
KIRIBATI					
91487	0	FANNING ISLAND	S		
91490	0	CHRISTMAS ISLAND	S		
91610	0	TARAWA	S	R	
91612	0	TARAWA (AERODROME)	S		
91701	0	KANTON ISLAND	S		
MARSHALL ISLANDS					
91258	0	UTIRIK ATOLL	S		
91366	0	KWAJALEIN/BUCHOLZ AAF	S	R	
91367	0	AILINGLAPALAP ATOLL.	S		
91369	0	JALUIT ATOLL	S		
91371	0	WOTJE ATOLL	S		
91374	0	MALEOLAP, ATOLL AWS	S		
91376	0	MAJURO	S	R	
91377	0	MILI ATOLL AWS	S		
91378	0	MILI ATOLL	S		
91442	0	EBON ATOLL AWS	S		
PALAU					
91408	0	WEATHER SERVICE OFFICE, KOROR	S	R	
91410	0	TOBI ISLAND	S		
MALAYSIA					
48601	0	PENANG/BAYAN LEPAS	S	R	
48615	0	KOTA BHARU	S	R	
48620	0	SITIAWAN	S		
48647	0	KUALA LUMPUR/SUBANG	S		
48650	0	KUALA LUMPUR INTERNATIONAL AIRPORT (KLIA)		R	
48657	0	KUANTAN	S	R	
48665	0	MALACCA	S		
96413	0	KUCHING	S	R	
96421	0	SIBU	S		
96441	0	BINTULU	S	R	
96449	0	MIRI	S		
96465	0	LABUAN	S		

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
96471	0	KOTA KINABALU	S	R	
96481	0	TAWAU	S	R	
96491	0	SANDAKAN	S		
NAURU					
91530	0	NAURU AIRPORT		R	
91531	0	NAURU	S		
NEW CALEDONIA					
91570	0	ILE SURPRISE	S		
91574	0	ILE LOOP (CHESTERFIELD)	S		
91577	0	KOUMAC (NLLE-CALEDONIE)	S		
91582	0	OUANAHAM (ILE LIFOU)	S		
91592	0	NOUMEA (NLLE-CALEDONIE)	S	R	
NEW ZEALAND					
93004	0	CAPE REINGA AWS	S		
93023	0	PURERUA AWS	S		
93069	0	MOKOHINAU ISLAND AWS	S		
93110	0	AUCKLAND AERO AWS	S		
93112	0	WHENUAPAI		R	
93186	0	TAURANGA AERO AWS	S		
93196	0	HICKS BAY AWS	S		
93245	0	TAUPO AERO AWS	S		
93292	0	GISBORNE AERO AWS	S		
93309	0	NEW PLYMOUTH AERO AWS	S		
93373	0	NAPIER AERO AWS	S		
93404	0	PALMERSTON NORTH AERO AWS	S		
93417	0	PARAPARAUMU AERODROME		R	
93420	0	PARAPARAUMU AERO AWS	S		
93498	0	CASTLEPOINT AWS	S		
93527	0	FAREWELL SPIT AWS	S		
93615	0	HOKITIKA AERO AWS	S		
93678	0	KAIKOURA AWS	S		
93709	0	HAAST AWS	S		
93773	0	TIMARU AERO AWS	S		
93781	0	CHRISTCHURCH AERO AWS	S		
93800	0	SECRETARY ISLAND AWS	S		
93805	0	PUYSEGUR POINT AWS	S		
93831	0	QUEENSTOWN AERO AWS	S		
93844	0	INVERCARGILL AIRPORT		R	
93845	0	INVERCARGILL AERO AWS	S		
93891	0	DUNEDIN AERO AWS	S		
93909	0	SOUTH WEST CAPE AWS	S		
93929	0	ENDERBY ISLAND AWS	S		
93947	0	CAMPBELL ISLAND AWS	S		
93985	0	CHATHAM ISLAND AERO AWS	S		
93994	0	RAOUL ISLAND AWS	S		
93997	0	RAOUL ISLAND, KERMADEC IS.		R	
NIUE					
91824	0	HANAN AIRPORT	S		
PAPUA NEW GUINEA					
92001	0	KIUNGA W.O.	S		
92003	0	DARU W.O.	S		
92004	0	WEWAK W.O.	S		
92014	0	MADANG W.O.	S		
92035	0	PORT MORESBY W.O.	S	R	
92044	0	MOMOTE W.O.	S	R	
92047	0	NADZAB W.O.	S		
92076	0	KAVIENG W.O.	S		
92077	0	GURNEY W.O.	S		
92087	0	MISIMA W.O.	S		
92100	0	TOKUA W.O.	S		
PHILIPPINES					
98134	0	BASCO RADAR	S		
98223	0	LAOAG	S	R	
98232	0	APARRI	S		
98325	0	DAGUPAN	S		
98328	0	BAGUIO	S		
98330	0	CABANATUAN	S		
98336	0	CASIGURAN	S		
98429	0	NINOY AQUINO INTERNATIONAL AIRPORT	S		
98430	0	SCIENCE GARDEN	S		
98431	0	CALAPAN	S		
98440	0	DAET	S		
98444	0	LEGASPI	S	R	
98526	0	CORON	S		
98531	0	SAN JOSE	S		
98536	0	ROMBLON	S		
98543	0	MASBATE	S		
98550	0	TACLOBAN	S		
98618	0	PUERTO PRINCESA	S	R	
98630	0	CUYO	S		
98637	0	ILOILO	S		
98646	0	MACTAN	S	R	
98653	0	SURIGAO	S		
98741	0	DIPOLOG	S		
98747	0	LUMBIA AIRPORT	S		
98753	0	DAVAO AIRPORT	S		
98755	0	HINATUAN	S		
98836	0	ZAMBOANGA	S		
SAMOA					
91757	0	AVAVO	S		
91759	0	FALEOLO AIRPORT	S		
91760	0	ASAU	S		
91761	0	LATA	S		
91762	0	APIA	S		
91763	0	CAPE TAPAGA	S		
91769	0	TAFITOALA	S		
SINGAPORE					
48698	0	SINGAPORE/CHANGI AIRPORT	S	R	
SOLOMON ISLANDS					
91502	0	TARO ISLAND	S		
91503	0	MUNDA	S		
91507	0	AUKI	S		
91520	0	HONIARA/HENDERSON	S		
91541	0	SANTA CRUZ	S		
SOUTH CHINA SEA ISLANDS[1]					
59995	0	YONGSHUJIAO	S		
59997	0	NANSHA DAO	S		

[1]Stations operated by the People's Republic of China

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
TIMOR-LESTE					
97385	0	OE-CUSSIE	S		
97390	0	DILLI/DILLI AIRPORT	S		
TOKELAU AND SWAINS ISLAND					
91723	0	NUKUNONU AWS	S		
TONGA					
91772	0	NIUAFOOU	S		
91776	0	KEPPEL/MATA'AHO AIRPORT	S		
91779	0	LUPEPAU'U	S		
91784	0	HAAPAI	S		
91792	0	FUA'AMOTU	S		

INDEX	SUB INDEX	STATION NAME	OBSERVATIONS		
			Surface	Radio-sonde	Radio-wind
TUVALU					
91631	0	NANUMEA	S		
91636	0	NUI	S		
91643	0	FUNAFUTI	S	R	
91648	0	NIULAKITA	S		
VANUATU					
91551	0	SOLA (VANUA LAVA)	S		
91554	0	PEKOA AIRPORT (SANTO)	S		
91555	0	LAMAP (MALEKULA)	S		
91557	0	BAUERFIELD (EFATE)	S	R	
91565	0	WHITE GRASS AIRPORT	S		
91568	0	ANEITYUM	S		

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

Annex 2 to Resolution 7 (RA V-16)

LIST OF STATIONS COMPRISING THE RBCN IN REGION V (SOUTH-WEST PACIFIC)

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS[1]	
				GSN	GUAN
AMERICAN SAMOA					
91765	0	PAGO PAGO/INT.AIRP	X	X	X
AUSTRALIA					
94100	0	KALUMBURU	X	X	
94120	0	DARWIN AIRPORT	X	X	X
94131	0	TINDAL RAAF	X	X	
94150	0	GOVE AIRPORT	X	X	
94170	0	WEIPA AERO	X	X	
94174	0	HORN ISLAND	X		
94203	0	BROOME AIRPORT	X	X	X
94212	0	HALLS CREEK AIRPORT	X	X	
94232	0	VICTORIA RIVER DOWNS	X		
94238	0	TENNANT CREEK AIRPORT	X	X	
94255	0	CAMOOWEAL TOWNSHIP	X		
94260	0	BURKETOWN AIRPORT	X	X	
94266	0	NORMANTON AIRPORT	X		
94274	0	GEORGETOWN AIRPORT	X	X	
94276	0	PALMERVILLE	X		
94287	0	CAIRNS AERO	X	X	
94294	0	TOWNSVILLE AERO	X		X
94299	0	WILLIS ISLAND	X	X	X
94300	0	CARNARVON AIRPORT	X	X	
94302	0	LEARMONTH AIRPORT	X	X	X
94312	0	PORT HEDLAND AIRPORT	X	X	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS[1]	
				GSN	GUAN
94313	0	WITTENOOM	X		
94317	0	NEWMAN AERO	X	X	
94326	0	ALICE SPRINGS AIRPORT	X	X	
94332	0	MOUNT ISA AERO	X	X	
94333	0	BOULIA AIRPORT	X		
94340	0	RICHMOND POST OFFICE	X	X	
94346	0	LONGREACH AERO	X	X	
94350	0	BARCALDINE POST OFFICE	X		
94356	0	CHATERS TOWERS AIRPORT	X		
94367	0	MACKAY M.O	X	X	
94374	0	ROCKHAMPTON AERO	X		
94380	0	GLADSTONE RADAR	X	X	
94387	0	BUNDABERG AERO	X		
94403	0	GERALDTON AIRPORT	X	X	
94417	0	MORAWA AIRPORT	X		
94430	0	MEEKATHARRA AIRPORT	X	X	
94461	0	GILES METEOROLOGICAL OFFICE	X	X	X
94476	0	OODNADATTA AIRPORT	X	X	
94510	0	CHARLEVILLE AERO	X	X	X
94517	0	ST GEORGE AIRPORT	X	X	
94568	0	AMBERLEY AMO	X		
94570	0	TEWANTIN RSL PARK	X	X	
94578	0	BRISBANE AERO	X		
94589	0	YAMBA PILOT STATION	X	X	
94594	0	CAPE MORETON LIGHTHOUSE	X		

[1] GCOS Surface Network (GSN) / GCOS Upper-air Network (GUAN) for reference only

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS[1]	
				GSN	GUAN
94601	0	CAPE LEEUWIN	X	X	
94602	0	ROTTNEST ISLAND	X		
94610	0	PERTH AIRPORT	X		X
94637	0	KALGOORLIE-BOULDER AIRPORT	X	X	
94638	0	ESPERANCE	X	X	
94641	0	KATANNING	X		
94647	0	EUCLA	X		
94653	0	CEDUNA AMO	X	X	
94655	0	TARCOOLA AERO	X		
94657	0	KYANCUTTA	X		
94659	0	WOOMERA AERODROME	X		X
94672	0	ADELAIDE AIRPORT	X		
94675	0	KENT TOWN	X		
94681	0	NURIOOTPA VITICULTURAL	X		
94689	0	BROKEN HILL (PATTON STREET)	X	X	
94693	0	MILDURA AIRPORT	X	X	
94695	0	WILCANNIA (REID ST)	X		
94703	0	BOURKE AIRPORT	X		
94707	0	CONDOBOLIN AG RESEARCH STN	X		
94709	0	WYALONG POST OFFICE	X		
94711	0	COBAR MO	X	X	
94730	0	BATHURST AGRICULTURAL STATION	X		
94740	0	GUNNEDAH RESOURCE CENTRE	X		
94750	0	NOWRA RAN AIR STATION AWS	X		
94767	0	SYDNEY AIRPORT AMO	X		
94768	0	SYNDEY (OBSERVATORY HILL)	X		
94776	0	WILLIAMTOWN RAAF	X		
94786	0	PORT MACQUARIE AIRPORT AWS	X		
94791	0	COFFS HARBOUR MO	X		
94802	0	ALBANY AIRPORT	X	X	
94812	0	ROBE COMPARISON	X		
94814	0	STRATHALBYN RACECOURSE	X		
94821	0	MOUNT GAMBIER AERO	X	X	
94826	0	CAPE NELSON LIGHTHOUSE	X		
94827	0	NHILL AERODROME	X		
94842	0	CAPE OTWAY LIGHTHOUSE	X	X	
94844	0	KERANG	X		
94865	0	LAVERTON RAAF	X		
94866	0	MELBOURNE AIRPORT	X		
94868	0	MELBOURNE REGIONAL OFFICE	X		
94893	0	WILSONS PROMONTORY LIGHTHOUSE	X		
94907	0	EAST SALE AIRPORT	X	X	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS[1]	
				GSN	GUAN
94910	0	WAGGA WAGGA AMO	X	X	
94926	0	CANBERRA AIRPORT	X		
94933	0	GABO ISLAND	X		
94937	0	MORUYA HEADS PILOT STATION	X	X	
94954	0	CAPE GRIM BAPS	X		
94959	0	BUTLERS GORGE	X		
94967	0	CAPE BRUNY LIGHTHOUSE	X	X	
94970	0	HOBART (ELLERSLIE ROAD)	X		
94975	0	HOBART AIRPORT	X		X
94983	0	LARAPUNA (EDDYSTONE POINT)	X		
94995	0	LORD HOWE ISLAND AERO	X	X	X
94996	0	NORFOLK ISLAND AERO	X	X	X
94998	0	MACQUARIE ISLAND	X	X	X
95317	0	MARBLE BAR	X		
95322	0	RABBIT FLAT	X	X	
95480	0	MARREE AIRPORT	X	X	
95482	0	BIRDSVILLE AIRPORT	X	X	
95485	0	TIBOOBURRA AIRPORT	X	X	
95492	0	THARGOMINDAH AIRPORT	X	X	
95527	0	MOREE AERO	X		
95529	0	MILES CONSTANCE STREET	X		
95541	0	INVERELL (RAGLAN ST)	X	X	
95543	0	GAYNDAH AIRPORT	X		
95624	0	MERREDIN	X		
95625	0	CUNDERDIN AIRFIELD	X	X	
95629	0	DALWALLINU	X		
95632	0	BRIDGETOWN	X		
95640	0	WANDERING	X		
95646	0	FORREST	X	X	
95661	0	PORT LINCOLN AWS	X		
95670	0	RAYVILLE PARK	X	X	
95715	0	WALGETT AIRPORT AWS	X		
95719	0	DUBBO AIRPORT AWS	X	X	
95753	0	RICHMOND RAAF	X	X	
95758	0	SCONE AIRPORT AWS	X		
95784	0	TAREE AIRPORT AWS	X	X	
95805	0	CAPE BORDA	X	X	
95837	0	RUTHERGLEN RESEARCH	X		
95869	0	DENILIQUIN AIRPORT AWS	X	X	
95908	0	THREDBO VILLAGE	X		
95916	0	CABRAMURRA SMHEA AWS	X	X	
95918	0	ORBOST	X		
95940	0	POINT PERPENDICULAR AWS	X		
95959	0	LIAWENEE	X		
95964	0	LOW HEAD	X	X	
95966	0	LAUNCESTON AIRPORT	X		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS[1]	
				GSN	GUAN
95977	0	GROVE (RESEACH STATION)	X		
96995	0	CHRISTMAS ISLAND AERO	X	X	
96996	0	COCOS ISLAND AERO	X	X	X
BRUNEI DARUSSALAM					
96315	0	BRUNEI AIRPORT	X		X
COOK ISLANDS					
91802	0	PENRHYN AWS	X	X	
91812	0	PUKAPUKA AWS	X	X	
91831	0	AITUTAKI AWS	X	X	
91843	0	RAROTONGA	X	X	X
91848	0	MANGAIA AWS	X		
DETACHED ISLANDS					
PITCAIRN					
91964	0	PITCAIRN ISLAND AWS	X	X	
WALLIS AND FUTUNA					
91753	0	HIHIFO (ILE WALLIS)	X	X	
FIJI					
91650	0	ROTUMA	X	X	
91652	0	UDU POINT	X	X	
91680	0	NADI AIRPORT	X	X	X
91683	0	NAUSORI	X		
91699	0	ONO-I-LAU	X	X	
FRENCH POLYNESIA					
AUSTRAL ISLANDS					
91954	0	TUBUAI	X	X	
91958	0	RAPA	X	X	X
MARQUESAS ISLANDS					
91925	0	HIVA-OA	X	X	X
SOCIETY ISLANDS					
91929	0	BORA-BORA-MOTU-AERO	X	X	
91938	0	TAHITI-FAAA	X	X	X
TUAMOTU ISLANDS AND GAMBIER ISLANDS					
91943	0	TAKAROA	X	X	
91945	0	HEREHERETUE	X	X	
91948	0	MANGAREVA	X	X	
INDONESIA					
96745	0	JAKARTA/OBSERVATORY	X	X	
96805	0	CILACAP	X	X	
96925	0	SANGKAPURA (BAWEAN IS.)	X	X	
96935	0	SURABAYA/JUANDA			X
97502	0	SORONG/JEFMAN	X	X	
97560	0	BIAK/FRANS KAISIEPO	X	X	
97686	0	WAMENA	X	X	
97690	0	JAYAPURA/SENTANI	X	X	
97724	0	AMBON/PATTIMURA	X	X	
97900	0	SAUMLAKI/OLILIT	X	X	
97980	0	MERAUKE/MOPAH	X	X	
97240	0	MATARAM/LOMBOK INTERNATIONAL AIRPORT	X	X	
97340	0	WAINGAPU/MAU HAU	X	X	
97372	0	KUPANG/ELTARI	X	X	
97014	0	MENADO/ SAM RATULANGI	X	X	
97146	0	KENDARI/WOLTER MONGINSIDI	X	X	
96073	0	SIBOLGA/PINANGSORI	X	X	
96145	0	TAREMPA	X	X	
96163	0	PADANG/TABING	X	X	
ISLANDS IN THE PACIFIC OCEAN NORTH OF THE EQUATOR					
FEDERATED STATES OF MICRONESIA					
91334	0	WEATHER SERVICE OFFICE, CHUUK, ECI	X	X	X
91348	0	WEATHER SERVICE OFFICE, POHNPEI	X	X	
91413	0	WEATHER SERVICE OFFICE, YAP	X	X	
GUAM					
91212	0	WEATHER FORECAST OFFICE	X	X	X
HAWAII, JOHNSTON AND MIDWAY ISLANDS					
91165	0	LIHUE, KAUAI	X	X	
91182	0	HONOLULU, OAHU	X		
91190	0	KAHULUI AIRPORT, MAUI	X		
91285	0	HILO HI	X	X	X
KIRIBATI					
91487	0	FANNING ISLAND	X		
91490	0	CHRISTMAS ISLAND	X	X	
91610	0	TARAWA	X	X	X
91701	0	KANTON ISLAND	X	X	
MARSHALL ISLANDS					
91366	0	KWAJALEIN/BUCHOLZ AAF	X	X	
91376	0	MAJURO	X	X	X
PALAU					
91408	0	WEATHER SERVICE OFFICE, KOROR	X	X	X
MALAYSIA					
48601	0	PENANG/BAYAN LEPAS	X		
48615	0	KOTA BHARU	X		
48620	0	SITIAWAN	X	X	
48647	0	KUALA LUMPUR/SUBANG	X		
48650	0	KUALA LUMPUR INTERNATIONAL AIRPORT (KLIA)	X		
48657	0	KUANTAN	X	X	
48665	0	MALACCA	X		
96413	0	KUCHING	X	X	
96421	0	SIBU	X		
96441	0	BINTULU	X	X	
96449	0	MIRI	X		
96465	0	LABUAN	X	X	
96471	0	KOTA KINABALU	X		
96481	0	TAWAU	X		
96491	0	SANDAKAN	X	X	

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS[1]	
				GSN	GUAN
NAURU					
91531	0	NAURU	X		
NEW CALEDONIA					
91577	0	KOUMAC (NLLE-CALEDONIE)	X	X	
91592	0	NOUMEA (NLLE-CALEDONIE)	X	X	X
NEW ZEALAND					
93012	0	KAITAIA AWS	X	X	
93110	0	AUCKLAND AERO AWS	X		
93292	0	GISBORNE AERO AWS	X	X	
93309	0	NEW PLYMOUTH AERO AWS	X	X	
93417	0	PARAPARAUMU AERODROME			X
93420	0	PARAPARAUMU AERO AWS	X	X	
93439	0	WELLINGTON AERO AWS	X		
93615	0	HOKITIKA AERO AWS	X	X	
93678	0	KAIKOURA AWS	X		
93747	0	TARA HILLS AWS	X	X	
93781	0	CHRISTCHURCH AERO AWS	X		
93844	0	INVERCARGILL AIRPORT			X
93845	0	INVERCARGILL AERO AWS	X	X	
93947	0	CAMPBELL ISLAND AWS	X	X	
93985	0	CHATHAM ISLAND AERO AWS	X	X	
93994	0	RAOUL ISLAND AWS	X	X	
93997	0	RAOUL ISLAND, KERMADEC IS.			X
NIUE					
91824	0	HANAN AIRPORT	X	X	
PAPUA NEW GUINEA					
92001	0	KIUNGA W.O.	X		
92003	0	DARU W.O.	X		
92004	0	WEWAK W.O.	X		
92014	0	MADANG W.O.	X	X	
92035	0	PORT MORESBY W.O.	X	X	X
92044	0	MOMOTE W.O.	X	X	
92047	0	NADZAB W.O.	X		
92076	0	KAVIENG W.O.	X		
92077	0	GURNEY W.O.	X		
92087	0	MISIMA W.O.	X		

INDEX	SUB INDEX	STATION NAME	CLIMAT	GCOS[1]	
				GSN	GUAN
PHILIPPINES					
98223	0	LAOAG	X		X
98232	0	APARRI	X	X	
98430	0	SCIENCE GARDEN	X	X	
98444	0	LEGASPI	X	X	
98637	0	ILOILO	X		
98755	0	HINATUAN	X	X	
98836	0	ZAMBOANGA	X	X	
98851	0	GENERAL SANTOS	X	X	
SAMOA					
91762	0	APIA	X		
SINGAPORE					
48698	0	SINGAPORE/CHANGI AIRPORT	X		X
SOLOMON ISLANDS					
91503	0	MUNDA	X	X	
91517	0	HONIARA			X
91520	0	HONIARA/HENDERSON	X	X	
TIMOR-LESTE					
97385	0	OE-CUSSIE	X		
97390	0	DILLI/DILLI AIRPORT	X		
97395	0	BAU CAU	X		
TOKELAU AND SWAINS ISLANDS					
91723	0	NUKUNONU AWS	X	X	
TONGA					
91772	0	NIUAFOOU	X		
91776	0	KEPPEL/MATA'AHO AIRPORT	X		
91779	0	LUPEPAU'U	X	X	
91784	0	HAAPAI	X		
91785	0	TONGATAPU/NUKU'ALOFA	X		
91789	0	NUKU'ALOFA	X	X	
TUVALU					
91631	0	NANUMEA	X	X	
91643	0	FUNAFUTI	X	X	X
VANUATU					
91554	0	PEKOA AIRPORT (SANTO)	X	X	
91555	0	LAMAP (MALEKULA)	X		
91557	0	BAUERFIELD (EFATE)			X
91568	0	ANEITYUM	X	X	

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

Resolution 8 (RA V-16)

WMO INFORMATION SYSTEM IMPLEMENTATION PLAN FOR REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) Resolution 4 (Cg-XVI) – Report of the extraordinary session (2010) of the Commission for Basic Systems relevant to Technical Regulations concerning the Global Telecommunication System, data management and the WMO Information System,

(2) Resolution 13 (EC-65) – Amendments to the *Manual on the WMO Information System* (WMO-No. 1060),

Noting further:

(1) The importance of implementing the WMO Information System (WIS) to support WMO priority activities, including the WMO Integrated Global Information System and the Global Framework for Climate Services,

(2) That the new functionality of WIS became operational in January 2012 and that four Global Information System Centres (GISCs), Melbourne, Washington, Tokyo and Exeter, are providing operational support and capacity-building for the Region,

Decides to endorse the RA V WIS Implementation Plan as presented in the annex to the present resolution;

Requests:

(1) The RA V Management Group to monitor WIS implementation within the Region, noting the desire of the Association that all Members in RA V are able to use WIS by the end of 2015;

(2) All Members that have yet to do so, to confirm their Principal GISC and National WIS Focal Point as soon as possible in writing to the Secretary-General and to report on the progress of WIS implementation to the RA V Management Group;

(3) All Members to make the implementation of WIS a priority in their National Centres and Data Collection or Production Centres to ensure staff that support WIS components are appropriately trained in WIS support activities, in particular the creation and management of discovery metadata;

(4) All GISCs supporting RA V to work with Members to ensure that associated centres are compliant with the relevant standards in the *Manual on the WMO Information System* (WMO-No. 1060) and for GISCs to confirm compliance in writing to the Secretary-General;

Requests the Secretary-General to monitor WIS implementation and ensure liaison between Members, the regional association and technical commissions concerned.

Annex to Resolution 8 (RA V-16)

WMO INFORMATION SYSTEM IMPLEMENTATION PLAN FOR REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

WORLD METEOROLOGICAL ORGANIZATION

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

RA V

WIS IMPLEMENTATION PLAN

2013–2015

FEBRUARY 2014

VERSION CONTROL

Version	By	Date	Changes
0.1	WG-INFR	26/04/2013	The RA VI WIS Implementation Plan was used to guide the structure of the initial draft.
0.2	Weiqing Qu	08/05/2013	Structure developed, partial text completed for review.
0.3	Weiqing Qu	06/08/2013	Draft text completed.
0.4	Russell Stringer, Weiqing Qu	27/08/2013	• Added a version control table • Emphasize the benefits of WIS in RA V • Inserted contact details for GISC Melbourne • Added Figure 3b and notes/updates to Figures 3,4,5 (further updates are needed) • Added information about the AusAID funded project for RA V WIS implementation, including in-country visits.
0.5	WMO Secretariat	04/02/2014	Minor editorials for submission to RA V-16

CONTENT

1. Executive Summary

Benefits for the Member countries of WMO Regional Association V (South-West Pacific) arising from the full implementation of WIS (the WMO Information system) will include:

- Continued and enhanced operation of the GTS (WMO's Global Telecommunication System) providing a reliable and timely collection and dissemination service for time-critical and operation-critical data and products;
- In addition to private networks, the GTS will make better use of public communications including the Internet where appropriate, and supported by advanced satellite distribution systems;
- The GTS data management framework will continue to pursue fast and efficient coding practices and data representations;
- A new system of catalogues available through a Global Information System Centre (GISC) portal, enabling online search, discovery and access of available data and products. This facilitates access to a much greater range of current and archived data and products;
- Download or re-runs of GTS data and products published in the past 24 hours;
- Simplified processes for Member countries to update GTS routing and provide information about available data and products.

The WIS Implementation Plan (WIS-IP) is aimed at guiding RA V Members to implement WIS functionality in their identified centres and to become effective WIS users in a timely and harmonized manner. Therefore, it concentrates on enablement of new WIS functionality by NMHSs as National Centres (NC), i.e. it focuses on helping the members of RA V to set up National Centres (NC) connected to their principal GISC in the Region. Although the establishment of Data Collection or Production Centres (DCPC) has been mentioned briefly, the implementation detail is not covered by this document, because implementation procedures for DCPCs are documented in the Manual on WIS[1] and WIS Demonstration Process "Procedures and Guidelines"[2].

The WIS-IP outlines: the features of WIS; the benefits for Members to be connected to WIS; the current status of WIS in RA V; the telecommunication network used for meteorological data and products; then goes on to describe steps for implementation in RA V. The list of countries in RA V together with their proposed principal GISC provides an overview of the structure of WIS after its regional implementation. The steps an NMHS has to take to become a WIS NC are described in detail. The initial steps to establish a DCPC are also mentioned. Sample step-by-step implementation approach for these two cases is provided in the Appendices.

Challenges associated with the WIS implementation in RA V are identified, together with possible remedies. The responsibilities of the GISCs in the WIS implementation monitoring are described with their importance for the successful implementation of the plan. The participation and cooperation of the national WIS Focal Points is stressed. The future activities to implement the plan are listed with the goal that most of the RA V Members will be WIS enabled by the end of 2015.

Member countries and specifically their national WIS Focal Points are urged to maintain active collaboration with their principal GISC. For many RA V countries that is GISC-Melbourne for which the contact details are provided in Appendix VI.

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1 *Manual on the WMO Information System* (WMO-No. 1060) – http://library.wmo.int/opac/index.php?lvl=notice_display&id=9254

2 WIS Demonstration Process Guidelines – http://www-db.wmo.int/WIS/centres/guidance.doc

2. Introduction

In 2003, the World Meteorological Congress (Cg-XIV) stated that for an overarching approach for solving the data management problems for all WMO and related international programmes, a single coordinated global infrastructure was required. This solution was named the WMO Information System (WIS) with the following features:

- WIS would be used for the collection and sharing of information for all WMO and related international programmes;
- WIS would provide a flexible and extensible structure allowing the participating centres to enhance their capabilities as their national and international responsibilities grow;
- Implementation of WIS should build upon the most successful components of existing WMO information systems in an evolutionary process;
- WIS development should pay special attention to a smooth and coordinated transition;
- The basis for the core communication network should be the communication links used within the World Weather Watch (WWW) for the high priority real-time data;

WIS should utilize international industry standards for protocols, hardware and software.

Between Cg-XIV (2003) and Cg-XV (2007), good progress was made in demonstrating the technological solutions for WIS through pilots and prototypes projects.

Cg-XV agreed that the WMO Information System should provide three fundamental types of services to meet the different requirements, as follows:

a. Routine collection and dissemination service for time-critical and operation-critical data and products;

b. Data discovery, access and retrieval service;

c. Timely delivery service for data and products.

Cg-XV also emphasized that the WIS implementation should build upon existing WMO information systems in a smooth and evolutionary process. It agreed that the WIS implementation plan should have two parts that would be developed in parallel:

- **Part A**: the continued consolidation and further improvements of the GTS for time-critical and operation-critical data, including its extension to meet operational requirements of WMO Programmes in addition to the World Weather Watch (including improved management of services);
- **Part B**: an extension of the information services through flexible data discovery, access and retrieval services to authorized users, as well as flexible timely delivery services.

Cg-XV further emphasized that the support and involvement of all NMHSs, including regional associations and technical commissions in the WIS development was a crucial factor for ensuring a successful implementation and a shared ownership of the system.

During the period 2007–2011, between Cg-XV and Cg-XVI, under the leadership of the CBS, the development of WIS progressed both in terms of technological solutions and preparation of regulatory and guidance material for its implementation. Thus, Cg-XVI (2011) noted the significant progress achieved by Members in implementing WIS with 18 Members/organizations that have entered into the first round of the demonstration process for a total of 13 GISCs and 56 DCPCs

(some of these centres had been in pre-operational mode since May 2010). Congress accepted the recommendation by CBS on the designation of the initial set of WIS centres. Congress requested that after the initial designation of WIS centres, further designations will be performed by EC in accordance with the Manual on WIS.

Cg-XVI stated that WIS had moved from a development stage into an operational stage and advised Members and relevant international organizations that WIS activities in 2012-2015 should focus on:

a. Complete WIS implementatio n across all WMO Centres;

b. Capacity building to ensure support of all WMO Members;

c. Leveraging WIS advantages for all WMO Programmes;

d. Taking advantage of WIS in all WMO Data Management.

Cg-XVI became a turning point for intensive global, regional and national planning for the implementation of WIS and emphasized that although the implementation of the new functionality of WIS had been advanced in a few core centres, many Members were yet to begin their implementation. Cg-XVI expected that the full implementation of WIS by all Members will take at least the whole of the 2012-2015 financial period.

Congress set-up the following major activities and implementation target dates, urging all Members and the Secretary-General to identify the necessary resources for reaching the objectives:

a. Improving the knowledge and capabilities of Members to benefit from WIS functionality, in particular least developed countries, developing countries and small island states through regional workshops and information sessions: 2012-2013;

b. Implementation of WIS at all NMHS national centres (NCs): 2012-2015;

c. Implementation of remaining candidate GISCs: 2012-2013;

d. Implementation of more DCPCs, i.e. WIS interfaces at WMO Programmes' centres: 2012-2015;

e. Amendments to the Manual on WIS for enhanced operational arrangements of WIS centres, especially GISCs: 2014.

The introduction on WIS presented above shows that the implementation of WIS in the WMO community opens the new chapter for the global data exchange. The benefits for the Member countries of WMO Regional Association V (South-West Pacific) arising from the full implementation of WIS will include:

- Continued and enhanced operation of the GTS (WMO's Global Telecommunication System) providing a reliable and timely collection and dissemination service for time-critical and operation-critical data and products;

- In addition to private networks, the GTS will make better use of public communications including the Internet where appropriate, and supported by advanced satellite distribution systems;

- The GTS data management framework will continue to pursue fast and efficient coding practices and data representations;

- A new system of catalogues available through a GISC portal, enabling online search, discovery and access of available data and products. This facilitates access to a much greater range of current and archived data and products;

- Download or re-runs of GTS data and products published in the past 24 hours;
- Simplified processes for Member countries to update GTS routing and provide information about available data and products.

At the fifteenth session of the World Meteorological Organization (WMO) Regional Association V (RA V) in Bali, Indonesia (30 April–6 May 2010) and the subsequent fourth session of the RA V Management Group, the following subsidiary bodies were established:

- Management Group (MG);
- Tropical Cyclone Committee for the South Pacific and South-east Indian Ocean (TCC), Chair, Mr Mike Bergin;
- Working Group on Hydrological Services (WG-HYS), Lead, Dr Arie S. Moerwanto;
- Working Group on Climate Services (WG-CLS), Lead, Mr Erwin E.S. Makur;
- Working Group on Weather Services (WG-WXS), Lead, Mrs Susan O'Rourke;
- Working Group on Infrastructure (WG-INFR), Lead, Mr Russell Stringer.

The objective of the Working Group on Infrastructure (WG-INFR) is to contribute to the improvement of infrastructure (data and information services) for weather, climate and water in Region V through implementation of the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS). To achieve this objective, the Task Team on WIS Development and Implementation (TT/WIS) was established.

One of the tasks for TT/WIS is to develop the RA V WIS Implementation Plan. The WG-INFR had a meeting from 24–27 April 2013 in Melbourne (BoM headquarters). The meeting reviewed the current status of GTS/WIS operation, as well as other infrastructure related issues, such as telecommunications in RA V. The meeting decided to develop the RA V WIS Implementation Plan (WIS-IP) led by TT/WIS.

In conclusion, the RA V WIS Implementation Plan is an all inclusive guiding document for RA V Members to follow in building an effective and efficient WIS infrastructure, in line with the guidance given by Cg-XVI for a fast transition from development to implementation phase of the WIS.

3. Scope and purpose of RA V WIS Implementation Plan

The RA V WIS Implementation Plan is aimed at guiding RA V Members to implement WIS functionality in their identified centres and to become effective WIS users in a timely and harmonized manner. Therefore, it concentrates on enablement of new WIS functionality by NMHSs as National Centres (NC). Included in the scope of this plan is assisting Members to understand the benefits of WIS and convey these benefits to stakeholders.

In order to facilitate the implementation process, RA V GISCs should establish close contacts with the NCs in their areas of responsibility. They are GISC Melbourne supported by GISCs Washington, Tokyo and Toulouse. In particular, GISCs should act as "help desks" and provide assistance to build the capacity of the NCs to handle the required discovery metadata. Also, the plan states the standards for WIS compliance of NCs for the guidance of Members and their principal GISCs.

The regional dimension of the implementation process is addressed in this WIS-IP. This dimension is important because it facilitates a synchronized and coordinated implementation by all Members and partner organizations of the Region. The existing capacity gaps, both technical and human

resource related, could be addressed through the cooperation and assistance mechanisms of the Regional Association, which would accelerate the implementation and bring the expected benefits to all Members.

The Plan also provides practical guidance and a step-by-step approach towards the WIS implementation by Members in their National Centres. A primary task for the NMHSs is ensuring compliance with the WIS requirements established by the WMO regulatory material WMO *Technical Regulations*, Volume I (WMO-No. 49) and its Annex VII, *Manual on the WMO Information System* (WMO-No. 1060).

4. Description of WIS

WIS is the global infrastructure for managing and making available weather, water and climate information. WIS meets the requirements for routine collection and automated dissemination of observed data and products, as well as data discovery, access and retrieval services for all weather, climate, water and related data and products provided by centres and Member countries in the framework of all WMO Programmes.

4.1 WIS Services

While WIS builds on and extends the GTS, it is also a new approach to data discovery and data provision in the meteorological community. WIS goes far beyond providing telecommunication services, and offers new and modern data management services to its users. These are essentially the possibility to discover all data and products of the wider WMO community, as well as the means and information on how to obtain the data. For this purpose, all information within WIS is described by discovery metadata in accordance to the WMO Metadata Core Profile. It is assumed that WIS by including the GTS and the Internet will have sufficient bandwidth/link capacity available to fulfill future user needs. To this end, WIS provides three types of services:

a. **Routine collection and dissemination service for time-critical and operation-critical data and products**: This service is an extension of the current GTS. It is based on subscription to real-time “push and forward” distribution systems, including multicast and broadcast, and implemented mostly through dedicated telecommunication means providing a guaranteed quality of service. An important component of this service will be the “all hazards warning network” facilitating warnings to be distributed from one point in WIS to all other points within 2 minutes;

b. **Service for the timely delivery of non time-critical, operationally critical or voluminous data and products**: This is a new service which allows users to subscribe to data that would not otherwise have been available through the GTS because it is too voluminous or because the delivery is not so critically time- or operationally- dependent. Thus, the delivery method for these data does not need to use the capacity of the GTS. It is also suitable for those users not connected to the GTS. The service is focused on a “push” mechanism and implemented mostly via public data-communication networks, such as the Internet. As with the time and operationally critical service (a), users may use the discovery service (c) to search for the information they would like to access or subscribe to;

c. **Data Discovery, Access and Retrieval (DAR) service**: This is a new service where the user can use a variety of discovery services to search for data, products or other information registered within the WIS. Depending on the access policy for the data, the user may also access and download the data. The service is based on a request/reply “pull” mechanism and is to be implemented mainly through the Internet, but the user may also subscribe to receive data or products via the GTS or any other delivery mechanism available between the information provider and the user (for example via e-mail, SMS, facsimile, courier or postal services). In this way, WIS users can

potentially discover and access all WMO data and products without having an extensive knowledge of the information practices and procedures of the WMO Programme responsible for the data or product. Note that if a user has an account at a GISC, then, depending on the data policy, it may be able to access information directly from the GISC, all of which hold information that is available for global exchange for at least 24 hours.

4.2 The structure of WIS

The WIS services described above are realized by WMO Members and associated centres through three types of WIS centres as well as the WIS data communication network. WIS centres need to be endorsed by WMO in accordance with the regulations described in the WMO *Technical Regulations* (WMO-No. 49) and the Manual on WIS (WMO-No. 1060).

The concept of interoperability guarantees that the overall functionality of WIS is realized by each WIS centre through implementing the specifications required for this type of centre. The four core components are:

- Global Information System Centres (GISC);
- Data Collection or Production Centres (DCPC);
- National Centres (NC);
- Data networks.

4.3 WIS Centres

GISCs collect and distribute information for routine global dissemination, such as GTS data. They serve as collection and distribution centres in their areas of responsibility and they provide access points for any request for data held within the WIS. A WIS user accessing the web portal of any GISC will be able to browse any data catalogue of information available in WIS.

DCPCs are connected to the GISCs and are responsible for the collection or generation of specialized sets of data, forecast products, processed or value-added information beyond the scope of NCs, and/or for providing archiving services.

NCs collect and distribute data on a national basis and coordinate or authorize the use of the WIS by national users, normally under a policy established by the respective Permanent Representative with WMO.

The terms NC, DCPC and GISC are used for describing the necessary functions, not actual organizational entities. There may be organizations, such as NMHSs, which combine all three functions within their structure. There may be several GISCs in a Regional Association (RA). NCs and DCPCs can be associated with several GISC but have to choose one of the GISCs as their principal GISC for the purposes of uploading and managing discovery metadata. The following diagram provides an overview of the various components:

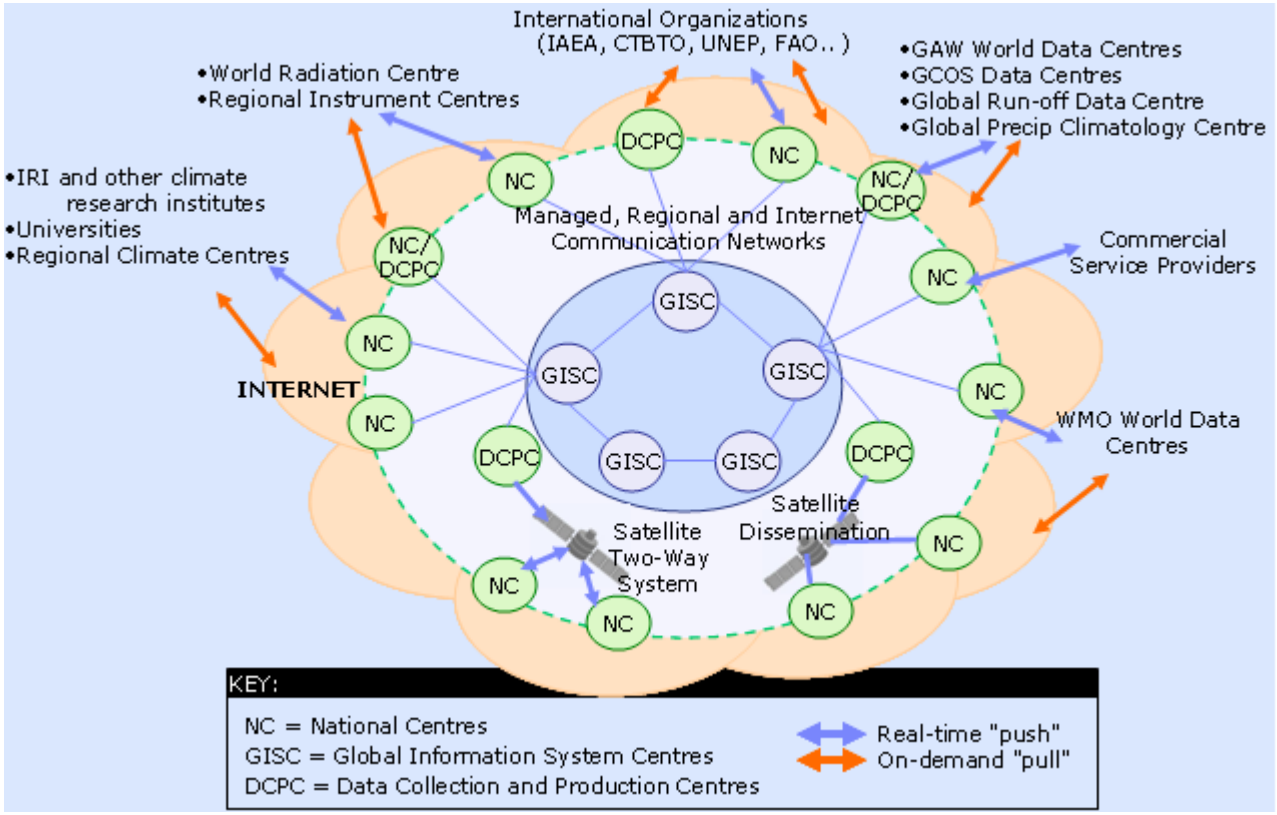


Figure 1: WIS core components and Information Exchange

4.4 WIS data networks

The WIS network structure consists of a WIS Core Network connecting all GISCs to each other. Each GISC has an Area Meteorological Data Communication Networks (AMDCN) connecting them to NCs and DCPCs in their area of responsibility. This is illustrated in Figure 2. An NC or DCPC may be in multiple AMDCNs. The AMDCNs incorporate GTS infrastructure and may involve single, partial or multiple regional meteorological telecommunication networks.

The data communication networks that can be used in WIS include:

- The Main Telecommunication Network (MTN) of the GTS[3] forms the WIS Core Network;
- GISCs are also connected by the Internet, which presently is being used for discovery metadata synchronization;
- The GTS (MTN and RMTN) provides the dedicated network component of the AMDCNs, especially for meeting real-time exchange requirements and the all hazards network. Note that the GTS includes extensive use of Internet through Virtual Private Networks (VPN) in many areas where no alternatives exist;
- Satellite distribution systems such as those described by the Integrated Global Data Dissemination Service (IGDDS) form an essential part of the GTS and therefore the WIS, especially for the support of remote areas where terrestrial communication systems do not effectively meet the need. This includes data collection systems for remote platforms as well as for distribution of data and products related to the WMO Space Programme;
- Terrestrial links or managed data network services;

[3] A full description of the existing GTS structure and networks can be found in the Manual on the GTS (WMO-No. 386). http://library.wmo.int/opac/index.php?lvl=notice_display&id=47

- The Internet, either open or utilizing VPN, which will be used in the AMDCNs to increase bandwidth capacity to many centres as well as providing connectivity for non-GTS centres and for individual users accessing WIS.

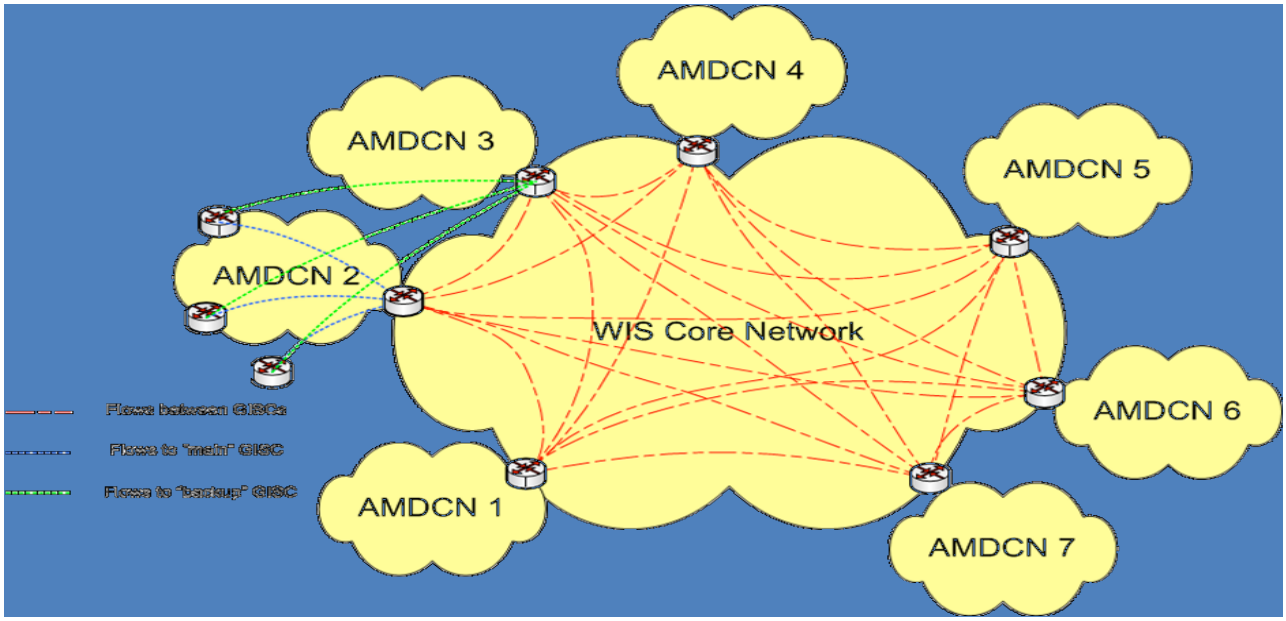


Figure 2: WIS network topology

4.5 Benefits of WIS

As an integrated part of WIS from the World Weather Watch Programme (WWW), the aim of the GTS is to ensure delivery of time-critical and operation-critical data, products and services for all WMO Programmes, including warnings to and from NMHSs. GTS realizes this through the "Routine collection and dissemination service for time-critical and operation-critical data and products", mentioned above.

The GTS will continue to develop and incorporate new technology, linking all WMO Members with a dedicated, secure network. This network will continue to be supported by advanced satellite distribution systems. In addition, the GTS will also be able to supplement the private networks and make better use of public communications such as the Internet, where appropriate.

The GTS data management framework will include the development of data representations, including fast and efficient coding practices that allow increasingly voluminous data streams to reach countries with less advanced or low capacity communication systems. New functionality of WIS for GTS users will include:

- Online discovery of which data and products are available on the GTS by interactively accessing a GISC portal;

- Download or re-runs of GTS data and products published during the past 24 hours. This is of interest for users that have missed data because of a failure of IT systems, equipment or networks;

- Updating of GTS routeing based on online subscription services rather than service messages requesting the GTS Point of Contacts to change the routeing. An NMHS may configure its own routeing information. Thus, a centre needs only deal with its associated GISC for changing subscription and publishing schedules;

- Configure upload of data to the GTS. Rather than requesting the GTS Point of Contact and WMO to change information about the data that is uploaded to the GTS, the NMHS may do the configuration;

- Ensure that the ownership and availability of the data provided is advertised by using the DAR metadata.

Existing centres within WMO Member States that comply with the required WIS functions and technical specifications will be designated as one of the three types of WIS centre. While Members can chose to apply for a type of centre matching their level of responsibilities and commitment, the expected mapping of WWW centres into WIS centres remains to be:

WWW Centre	WIS Centre
NMC	NC
RSMC	DCPC
WMC	DCPC and/or GISC
RTH	DCPC
RTH on MTN	DCPC and/or GISC
Others	NC and/or DCPC

4.6 WMO information sources and regulations on WIS

Information on all aspects of WIS is available on the WMO website at: http://www.wmo.int/wis

The implementation of the WIS is coordinated through a Global Project and Implementation Plan available at: http://www.wmo.int/pages/prog/www/WIS/documents/WIS-ProjectPlan-v1-2-1.doc.

The technical regulations related to WIS are published in the WMO *Technical Regulations* (WMO-No. 49), Volume 1, General Meteorological Standards and Recommended Practices, Part I, Section 3, and in Annex VII, *Manual on the WMO Information System* (WMO-No. 1060). Practical guidance on the implementation of the technical regulations is provided in the *Guide to the WMO Information System* (WMO-No. 1061).

5. WIS in Region V (South-West Pacific)

5.1 Current status of RA V telecommunication[4]

The current GTS in RA V is a hierarchical structure with three Regional Telecommunications Hubs (RTH); Melbourne, Wellington and Washington.

All Members are connected to at least one RTH. The data is sent from RTH to RTH and then from the RTHs to the other nodes connected to it. The current communication links and bandwidth of some links between the centres are given in Figure 3a below.

[4] The figures in this section (3a, 3b, 4 and 5) are in need of update and clarification. This will be done for a future version.

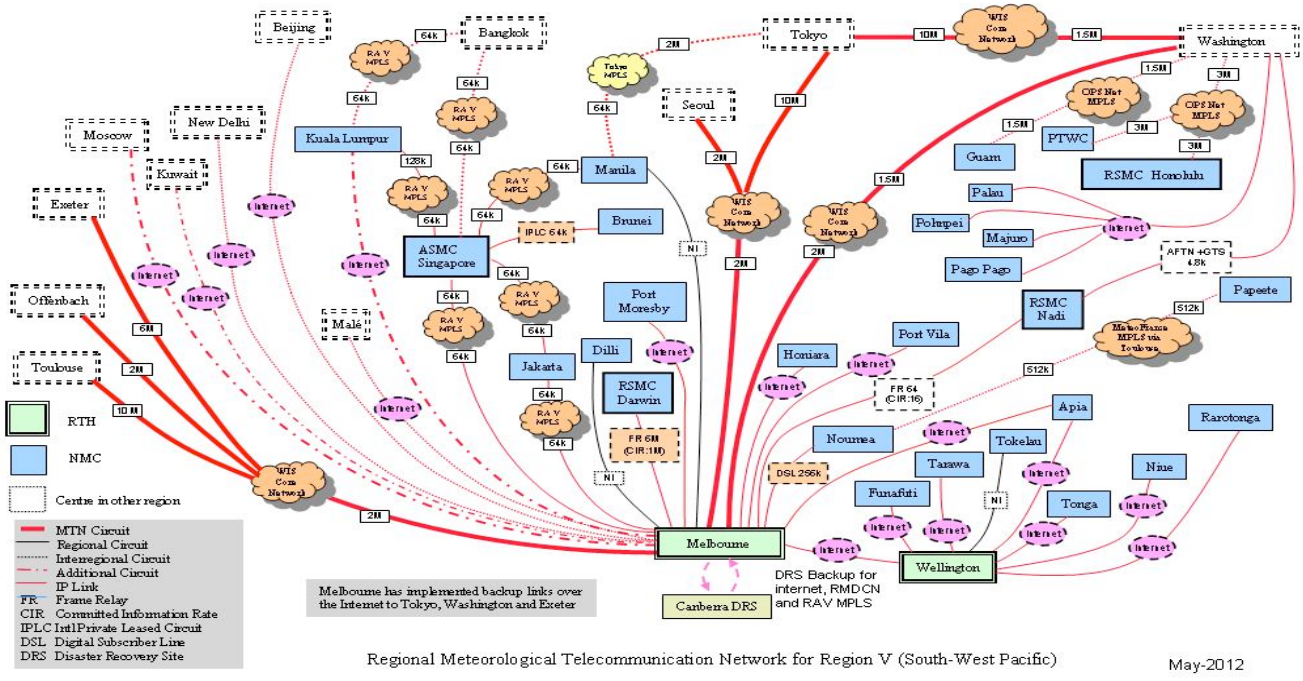


Figure 3a: Communication network in RA V

In addition to MPLS based communication network shown in Figure 3a, many centres in RA V also rely on satellite, digital HF radio as an important communication mechanism. Details of the implementation of telecommunication systems via satellite and radiobroadcasts are shown in Figure 3b.

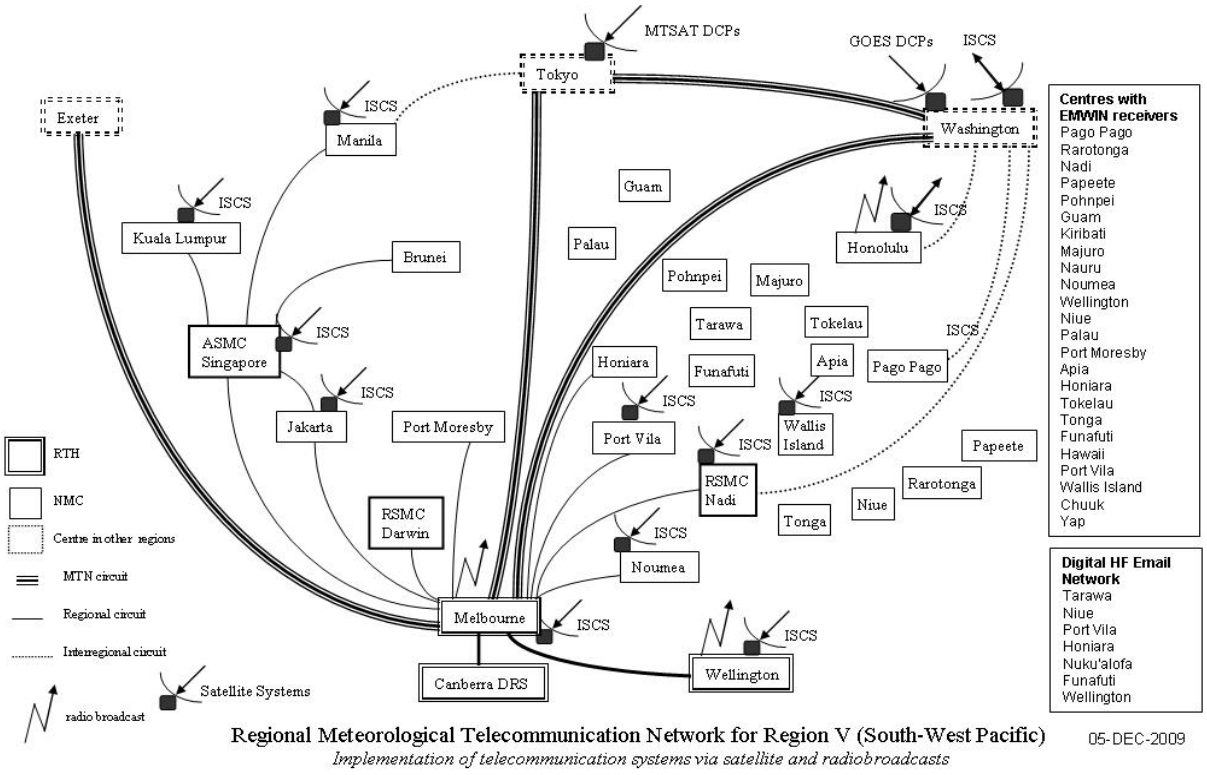
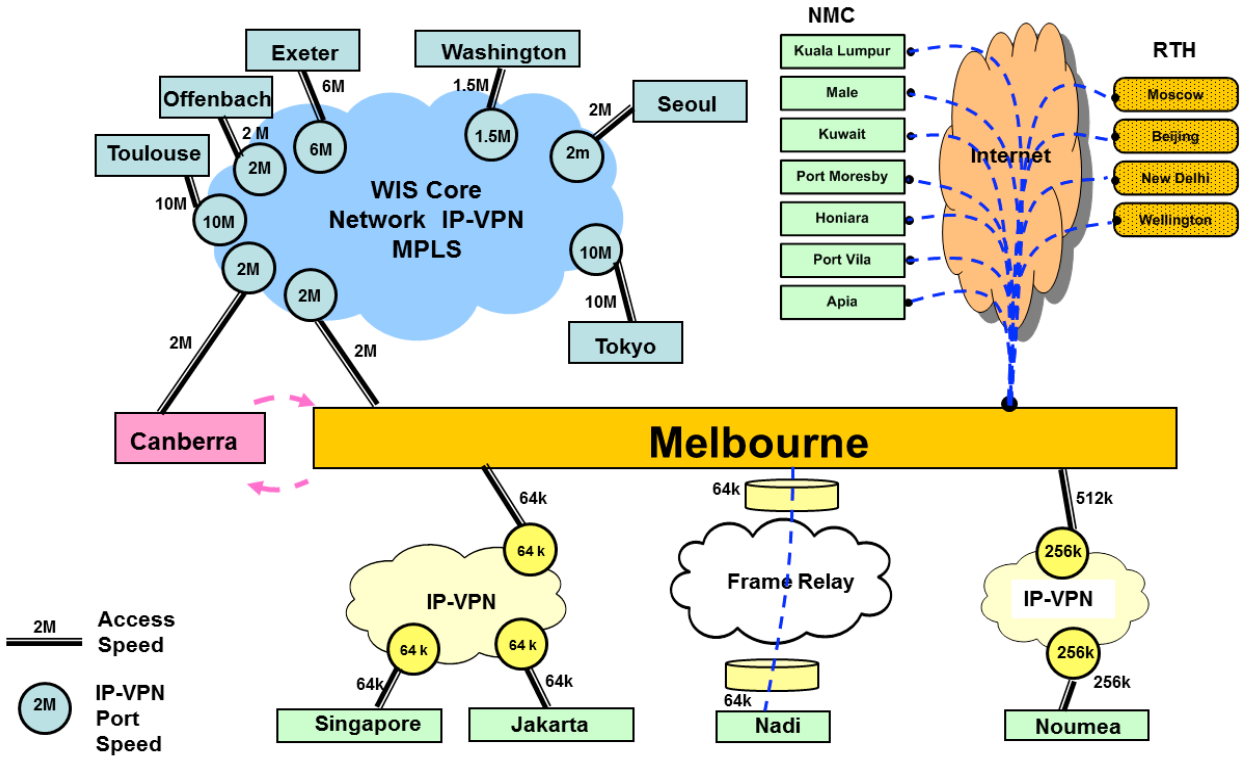


Figure 3b: Satellite and radiobroadcasts communication network in RA V

GISC Melbourne has joined the Regional Meteorological Data Communication Network (RMDCN)[5] since September 2009, which provides an Internet Protocol (IP) network infrastructure and gateway for the meteorological community in RA V.

Figure 4 below shows the WIS Core Network and GISC Melbourne's AMDCN in RA V, whereby:

- Melbourne will be connected to all GISCs, presently, GISCs Tokyo, Exeter, Washington, Toulouse and Offenbach, via the WIS Core Network;
- The new connection to GISC Offenbach completed in February 2013 and arrangement are being made with GISC Seoul to be connected as both centres became operational;
- AMDCN IP-VPN with Singapore and Jakarta;
- Frame relay with Nadi in Fiji;
- Internet connections with a number of NMC and RTH centres in the region and outside the Region.



GISC Melbourne - WISC Core Network and AMDCN

Figure 4: GISC Melbourne – WIS Core Network and AMDCN in RA-V

The Frame Relay connection between Melbourne and Noumea was replaced by a DSL link in 2011 as Frame Relay in Noumea was decommissioned on 31 May 2011. Unfortunately the DSL link could not be installed in time before the Frame Relay was decommissioned. In order to maintain the GTS dataflow to Noumea Melbourne and Toulouse established a re-routeing plan for all GTS traffic to Noumea via the Toulouse – Melbourne connection in the WIS Core Network. The Melbourne –Noumea DSL link became operational on 26 July 2011. The re-routeing plan proved to be a successful arrangement for Noumea and will serve as a backup link for Noumea.

[5] see http://www.ecmwf.int/services/computing/rmdcn/

Connections to GISC Offenbach and Seoul are organized for WIS operation including the planned DAR synchronization and harvesting operations between GISC centres. Bilateral arrangements between Melbourne and Seoul also require Melbourne to provide GISC backup for Seoul in re-routing GTS traffic to Karachi and Tashkent via New Delhi and Moscow.

The RA V AMDCN link between Singapore and Manila was not in operation until 2 December 2010 after the Frame Relay migration to IP-VPN in the Region (Figure 5). During the period of outage re-routeing of all GTS traffic to Manila was done via Singapore and Tokyo.

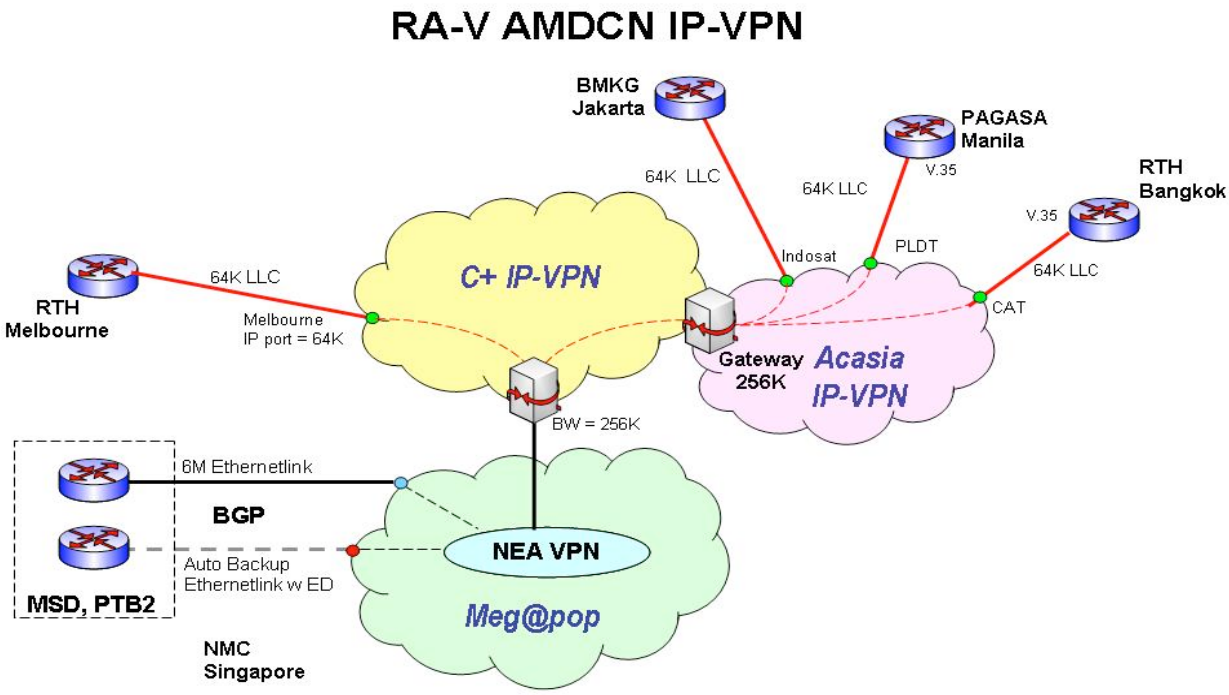


Figure 5: RA-V AMDCN IP-VPN

5.2 Status of WIS Centres in Region V (South-West Pacific)

The procedures for the designation of the three types of WIS centres are provided in the Manual on WIS (WMO-No. 1060), Part II. After successful completion of the designation procedure, the centre is included in Appendix B to the Manual, Approved WMO Information System Centres.

Note: Information on the current status of the designation of centres by Members is available on: http://www.wmo.int/pages/prog/www/WIS/centres/index_en.php.

a. GISCs in RA V

GISC Melbourne is the only GISC located in RA V having been formally designated by EC-64 in June 2012. It became operational on 16 April 2013.

b. DCPCs in RA V

The table below provides information on the DCPCs in RA-V with their planned functions and designation status (as of February 2014).

Member / Organization	Function	Principal GISC	Const. Body	Endorsement CBS	Congress/EC
Australia	Tsunami Warning Service (TWS)	Melbourne	JCOMM	Endorsed by CBS	2011-06-01
Australia	RTH	Melbourne	CBS	Endorsed by CBS	2011-06-01
Australia	RSMC-Geographical (Darwin)	Melbourne	CBS	Endorsed by CBS	2011-06-01
Australia	NCC	Melbourne	CCl	Endorsed by CBS	2011-06-01
Australia	IPS	Melbourne	CBS	Endorsed by CBS	2011-06-01
Fiji	RSMC-Activity-TC	Melbourne	CBS	Not submitted to ET-GDDP	
New Zealand	RTH	Melbourne	CBS	Not submitted to ET-GDDP	
New Zealand	RSMC-Geographical	Melbourne	CBS	Not submitted to ET-GDDP	
New Zealand	VAAC	Melbourne	CAeM	Not submitted to ET-GDDP	
United States of America	RSMC-Activity-TC (Honolulu)	Washington	CBS	Not submitted to ET-GDDP	

c. NCs in RA V

In accordance with the Manual on WIS (WMO-No. 1060), each WMO Member shall notify WMO of the name and location of its centre(s) that are to be designated as NC(s). It is therefore expected that each Member will have at least one NC in WIS (and for most of the Members, it is likely that one NC would be sufficient),

In February 2012, WMO circulated a letter to all Members inquiring information from the Permanent Representatives regarding: (1) nomination of a principle GIS which will be associated with the WIS centre(s) of the Member; and (2) nomination of a focal point for WIS/GTS related matters.

The table below presents the current status[6] of the designation of NCs in RA-V with their associated GISC and Focal Points.

Member / Organization	Function	Principal GISC	Focal Point (FP)	FP confirmed to WMO
Australia	NMC	Melbourne	Weiqing QU w.qu@bom.gov.au	Yes
Australia	NHS	Melbourne	Weiqing QU w.qu@bom.gov.au	
Brunei Darussalam	NMC	Melbourne		
Cook Islands	NMC	Melbourne	Roro TAIA rortaia@oyster.net.ck	No
Fiji	NMC	Melbourne	Leonard BALE Leonard.Bale@met.go.fj	No
France	WSO (Wallis and Futuna)	Toulouse		

[6] The current status is based WMO WIS Centres Database. Focal Point is based on answer to the questionnaire by the participants of the RA V Workshop on WIS/TDCF, Melbourne, Australia, 29 April–3 May 2013.

Member / Organization	Function	Principal GISC	Focal Point (FP)	FP confirmed to WMO
French Polynesia	NMC	Melbourne	Xavier MARESCOT xavier.marescot@meteo.fr	
Indonesia	NMC	Melbourne	Mochmmad RIYADI mochmmad.riyadi@bmkg.go.id Endang PUDJIASTUTI endang.pudjiastuti@bmkg.go.id Iky Asih MARIANI iky.asih@bmkg.go.id I. PUTA PUDJA puta.pudja@bmkg.go.id	Yes for I. PUTA PUDJA
Kiribati	NMC (Phoenix Islands)	Melbourne	Iokenti BENIAMINA beniamina70490@gmail.com	No
Malaysia	NMC	Melbourne	Zabani MD ZUKI zabani@met.gov.my	Yes
Micronesia, Federated States of	N/A	Washington	Sosten SOS sosten.sos@noaa.gov	No
New Caledonia	NMC	Melbourne	Jacqies ANQUETIL	No
New Zealand	NMC (Tokelau)	Melbourne	Filipo PEREZ filipo.perez.fp@gmail.com	No
New Zealand	NMC	Melbourne	Wim VAN DIJK wim.vandijk@metservice.com	Yes
Niue	NMC	Melbourne	Sionetasi PULEHETOA Sionetasi.Pulehetoa@mail.gov.nu	Yes
Papua New Guinea	NMC	Melbourne	Jimmy GOMOGA jgomoga@gmail.com	No
Philippines	NMC	Tokyo	Vicente Jr PALCON vppalconjr@pagasa.dost.gov.ph	No
Samoa	NMC	Melbourne	Mulipola Ausetalia TITIMAEA ausetalia.titimaea@mnre.gov.ws	No
Singapore	NMC	Melbourne	Huat Aik CHOO Choo_huat_aik@nea.gov.sg	Yes
Solomon Islands	NMC	Melbourne	Allan WALE'ELE a.wale@met.gov.sb	No
Timor-Leste	NMC	Melbourne		
Tonga	NMC	Melbourne	'Ofa FA'ANUNU ofaf@met.gov.to	No
Tuvalu	NMC	Melbourne	Tinapa FALETIUTE faletiute@yahoo.com	No
United Kingdom of Great Britain and Northern Ireland	WSO (Pitcairn Islands)	Exeter		
United States of America	WSO (Line Islands, Guam)	Washington		
Vanuatu	NMC	Melbourne	Patricia MAWA patou@meteo.gov.vu	Yes

***Note**: In view of the important role the national WIS focal points plays in the coordination of the WIS implementation, the Members who have not yet responded to the WMO circular letter are strongly encouraged to do soon as soon as possible. Members should also keep the WMO Secretariat informed of any changes of the status and operation of their centres and/or changes of their focal points information.*

6. WIS planning and implementation by RA V Members

In planning the WIS implementation at national level, Members should strive to comply with the relevant WMO technical regulations, that include procedures, specifications and functional requirements, provided in the *WMO Technical Regulations* (WMO-No. 49), Volume I, Part 1, Section 3, and the Manual on WIS, (WMO-No. 1060). The Guide to WIS (WMO-No. 1061) complements the technical regulations with additional description and explanation of the WIS, which would assist Members in their implementation actions.

6.1 Pre-requisites for participate WIS operation by an NMHS as NC

For a NMHS, there are several requirements to be met by a current GTS centre and thus become a compliant NC. They are mostly concerned with administrative issues and less with technical matters.

When a centre plans to use WIS, the PR of the country should nominate a “WIS Focal Point” and a “Principal GISC”.

a. WIS Focal point

The WIS Focal point should be a member of staff who is familiar with the service, in particular the current GTS support. The person will receive all WIS related information with regard to the country on one hand, but is expected on the other hand to inform WMO and its relevant bodies about any progress or problems encountered when using WIS. He/she will attend training courses organized by WMO or WIS centres and serve as the national distributor of WIS knowledge, in particular the concept of metadata. It is envisaged that the WIS Focal point will provide the necessary monitoring information.

Since the structure of WIS assumes that an NC is connected to a GISC for its WIS functions and thus participates in the AMDCN organized by that GISC, it is necessary to set up the required administrative links with the GISC. In principle, an NC may belong to the users of any GISC, unless the network connectivity only allows one choice. In any case, an agreement should be reached between the NC and the GISC about their relationship, including identifying their “Principal GISC” for the purposes of managing discovery metadata, of which the WMO should be notified together with the nomination of the WIS Focal point (see Appendix).

For users who want to access the GISC system for services and request an account on the GISC system, the GISC is required to seek permission from the WIS Focal Point of the country where the users are from.

b. Principal GISC

The principal GISC will ensure within its AMDCN that all connected centres will receive all the data meant for them, be it globally distributed, additional or addressed data. The principal GISC will also collect the data sent by NCs and distribute them in accordance with GTS/WIS regulations. It will maintain the global metadata catalogue and provide means for its AMDCN centres to create/update those parts of the discovery metadata catalogue describing their own data and products, possibly via Internet access.

The principal GISC is to be contacted first by any of its connected centres about any issue related to WIS. It will organize regular meetings with the WIS Focal Points of the centres belonging to its AMDCN and provide training material and courses as required. It will support the metadata activities in its area of responsibility in a suitable manner and provide data for the regional WIS monitoring.

Member countries and specifically their national WIS Focal Points are urged to maintain active collaboration with their principal GISC. For many RA V countries that is GISC-Melbourne for which the contact details are provided in Appendix VI.

Besides the principal, a back-up GISC is required for operational continuity in case the partial or total failure of the principal GISC. To guarantee at least the dissemination and collection of the globally distributed GTS data, the principal GISC need to consider a communication connection being established between NCs and the backup GISC, in collaboration with the NC and the backup GISC. Agreement needs to be reached on the network specific details, the conditions when it should be used and the actual services provided by it. Regular tests should be carried out to ensure the availability of the back-up when suddenly required. Details of further back-up arrangements to be provided still need further work by the relevant CBS WIS expert teams.

c. Connectivity

As mentioned in 5.1, the network connections of RA V Members vary from high-speed RMDCN links, IP-VPN, Frame Relay, to low bandwidth internet connections. RA V Members are connected to RTH Melbourne and RTH Wellington through one of those connections, which enable them to access the WIS services provided by GISC Melbourne.

d. Bandwidth

In contrast to the GTS where the dedicated network bandwidth between adjacent centres was limited and thus the traffic between any two centres had to be prioritized in advance, the WIS approach allows for the use of the Internet and allows for the combined the bandwidth of the Internet, satellite broadcast systems and dedicated network to be sufficient to support the intended data exchange between the GISC and the NC. For the purposes of transmit WMO essential and additional data, a dedicated bandwidth of 64 kbps should ideally be the minimum bandwidth. Unfortunately, this minimum bandwidth cannot be guaranteed in some countries in RA V. It is, however, important to improve the connectivity in the process of WIS implementation in RA V. The reliable connectivity with reasonable minimum bandwidth is the key to access WIS services, including data discovery, as well as data delivery.

e. Discovery Metadata

Whereas the GTS data is defined by its header which is recorded in the relevant volumes of publications, held by WMO, the data in WIS is described by a discovery metadata record in accordance to the WMO Metadata Core Profile and is stored in a metadata catalogue for each GISC and shared amongst all GISCs at regular intervals. It is the responsibility of the data owner to generate the corresponding discovery metadata record and to maintain it. However, in order to facilitate the initial deployment of WIS, Météo-France generated metadata records for all data currently exchanged via the GTS. In the longer term though, these initial records have to be taken over by the relevant data owners and updated if required. In addition, if any new data is being considered for exchange, a corresponding discovery metadata record has to be generated and sent to the principal GISC in advance of the data.

Each NC, therefore, requires personnel with metadata knowledge and responsibility. To train the staff of NCs in discovery metadata handling, their principal GISC will offer regular training courses in addition to WMO sponsored training events like the WMO WIS Centre Jump-Start Offer[7]. Each NC should make sure that staff are knowledgeable about the WMO Metadata Core Profile and are able to update its metadata records.

[7] WIS Jump Start – http://www.wmo.int/pages/prog/www/WIS/documents/JumpStartFlyer.doc

f. Access to metadata editor

The editor for metadata records consists of a software tool which can be used locally by an NC or remotely at a GISC which makes this service available to NCs. New or modified records have to be made available to the principal GISC for feeding them into the WIS.

g. Demonstration of WIS Compliance

A National Centre will need to demonstrate its compliance with WIS standards as laid out in the Manual on WIS. This is achieved by the centre working with the principal GISC to successfully complete the three test cases in Appendix IV and advising the Secretariat that the GISC has endorsed the centre as having demonstrated its compliance with relevant WIS standards.

6.2 Pre-requisites for participation of WIS operation by other centres

There may be other WIS centres besides the NC of an NMHS within a country. For example, the NMHS might also operate one or more DCPCs for specialized data or there may be multiple DCPCs run by different organizations like hydrology and oceanographic centres. It is also possible, though unlikely, that a centre other than the NMHS could operate an NC.

a. DCPC

As stated earlier, a DCPC is the WIS categorization of a programme centre that provides programme-specific data, e.g. an RTH is a centre supporting the GTS, or a RSMC providing specialize products under the GDPFS. Therefore, it has to be sponsored by a WMO Programme and connected to a GISC in the Region with sufficient bandwidth. In addition, special software to support the WIS functions of the centre has to be implemented. Once this has been achieved, the relevant PR may submit a proposal to WMO for the DCPC to be accepted, nominating a staff member responsible and stating the commitment to operate the DCPC after its validation.

In accordance with the Manual on WIS, a number of certifications and tests by WMO and, in particular, the CBS expert team designated for this role, will subsequently be carried out. When all operational and administrative requirements have been met successfully, including the handling of metadata in accordance with WMO Metadata Core Profile, CBS will propose to the EC that the DCPC becomes part of WIS.

b. NC

Any NC additional to that of the NMHS will have to adhere to the same procedures as stated in 6.1 Its WIS centre Focal Point should work closely with the national WIS Focal point of the NMHS who will be the main WIS interface of the country.

7. Challenges associated with WIS implementation in RA V

7.1 Insufficient bandwidth of communication links

A reliable communication link with sufficient bandwidth is a big challenge in RA V for the WIS implementation. As shown in Figure 5 above, there are many RA V Members who rely on internet communication links with limited bandwidth for their data services. There are also risks of service interruptions associated with possible failures of the Internet network, in particular in the Pacific Island Countries in RA V. Efforts have to be made in RA V to improve the connectivity. Although it is primarily the responsibility of each Member country to implement adequate communications, the Members are working together through the RA V WG-INFR in an effort to find optimum solutions.

7.2 General WIS acceptance

The benefits of WIS rely to a large extent on the global acceptance of WIS as the standard communication, discovery and access platform for WMO and associated institutions. Although WIS

has been declared operational in January 2013, many NMHC centres in RA V are still in the process of learning and understanding WIS. It is, therefore, necessary to raise the awareness of WIS in the Region. GISCs should help centres to gain in-depth knowledge of how WIS works and what the benefits are. Other WMO initiatives such as WIGOS and GFCS are encouraged to use WIS as their information system, which will ensure the full benefits of WIS to all WMO Programmes and activities.

7.3 Lack of staff resources for operational WIS centre

Depending on the type of WIS centre being considered, there may be a concern of staff resources. For example, to operate a DCPC, staff are required who understand the software/system such as DAR to support the metadata. For an NC, the requirements can usually be met by the available resources for the on-going GTS support. Generally, staff need to be trained to run a WIS system and handle WIS related requests.

7.4 Discovery Metadata knowledge

Initially, there may be a lack of relevant metadata knowledge amongst the staff of the prospective WIS centre. It is therefore important to train staff on the WMO Metadata Core Profile and metadata in general. In addition, the WMO would try to arrange for training courses and support the attendance of relevant staff from developing countries. The necessary training material should be widely circulated. Furthermore, centres may take the WIS Jump-Start offered by the WMO Secretariat or GISCs.

8. RA V WIS Implementation Plan – Execution and Timeline

8.1 Approval

This Implementation Plan will reviewed by WG-INFR and then presented to the president of RA V for approval.

8.2 Regional coordination and monitoring

The regional WIS implementation will be coordinated by RA V WG-INFR, with the support from GISC Melbourne. An important aspect of the regional approach is the monitoring of the implementation actions that would allow quick identification and response to the problems and deficiencies. Without monitoring, there is a high risk that the implementation of WIS in some parts of RA V would be delayed. The monitoring procedures will be defined to include regular information flow between RA V WIS Focal Points, and WG-INFR/TT-WIS. GISCs and DCPCs will play an important role in the monitoring as described in 8.6 below.

8.3 National implementation plans

Members are expected to develop their national WIS Implementation Plans by November 2014. The national WIS Focal point should communicate to the RA V WG-INFR the national plans with the target dates for the planned operation of WIS centres (NC, DCPC). The national plans should be coordinated with the principal GISC and should be in agreement with the RA V WIS Implementation Timeline.

8.4 Capacity building – training and support

WG-INFR (through its Task Team on WIS and Task Team on migration to Table Driven Code Forms) is tackling a funded project to assist the implementation of WIS in RA V. The RA V WIS/ TDCF workshop was held from 29 April to 3 May 2013, and organized by GISC Melbourne. Training on WIS related topics, such as Metadata etc., was provided during the workshop. After the workshop, the Members will need to continue to build the capacity on WIS and its operation.

GISCs should provide help and support in this regard. Countries will be assisted by their principal GISC to develop their national implementation plans, with in-country visits to Pacific countries by a WIS expert.

8.5 Goals and timeline

The main goal of the WIS implementation in RA V is that the majority of RA V Members should be WIS users by November 2015, which means that most NMHSs are:

(a) Certified as a NC or DCPC, according to the WMO WIS center certification procedure outlined in the Manual on WIS. The principal GISC of those NMHSs shall help in this process by providing technical support and conducting test for all WIS related operations together with the NCs or DCPCs;

(b) Able to participate in major WIS operations, i.e. a NC or DCPC should be able to obtain data and products from the WIS system of its principal GISC, and to provide its own observation data and other products, along with the associated metadata, to its principal GISC.

The WIS implementation efforts so far and future timeline is as follow:

(a) April 2013: RA V WG-INFR meeting – set the direction for WIS (and WIGOS) implementation;

(b) May 2013: RA V WIS/TDCF Workshop – provided the training on WIS/TCDF to majority of RA V Members, with the support from AusAID and WMO;

(c) August 2013: RA V WIS Implementation Plan being developed and agreed by the Members through RA V WG-INFR and TT-WIS;

(d) November 2013–November 2014: GISC Melbourne, as the Principal GISC form majority of RA V Members, helps the following countries to establish their national WIS implementation plan: Cook Islands, Papua New Guinea, Samoa, Fiji, Solomon Islands, Kiribati, Tokelau, Tonga, Nauru, Tuvalu, Niue, Vanuatu. This effort is supported by a BoM project funded by AusAID and includes in-country visits by a WIS expert. GISC Melbourne will also provide support for other RA V Members in their efforts of making their national WIS implementation plan. During this period, the Members should starts to review/update/generate their metadata hosted in the DAR catalogue of their Principal GISC;

(e) November 2014–November 2015: Act on the National WIS Implementation plan by each Member, with the help and support from its Principal GISC, to archive the goal outline at the beginning of this paragraph.

8.6 Progress and Performance Monitoring

RA V WG-INFR in conjunction with GISC Melbourne will play an active role in monitoring the progress of the WIS implementation in the Region. A half-yearly (quarterly?) report will be issued to all Members to report the overall progress of the implementation. The Members should also report their experience with metadata and problems encountered, as well as other implementation related issues, so that this information can be shared among the Members through the half-yearly report.

Further improvement of the communications connectivity in RA V is an ongoing task, which is crucial for the success of WIS implementation in the Region. It is important to cooperate with other Task Teams within WG-INFR to work on this task.

APPENDIX I

Action Plan for implementing a NC in RA V under WIS

1. Make (national) decision to join WIS as a NC.

2. Identify the Principal GISC.

3. Nominate the WIS Focal Point for the NC. The person should preferably be knowledgeable on current GTS operation and the concept of WIS.

4. Review the status of the communication network, in particular the bandwidth to the current RTH and the bandwidth of the Internet connection.

5. Review the current GTS operation in terms of data exchange and ensure that the communication network is sufficient to send and receive data a reliable and timely fashion under WIS. If this is not the case, the improvement of the communication network would be a priority. Solutions, such as increasing the bandwidth existing network or adopting additional communication means (e.g. satellite communication etc.) need to be implemented.

6. Communicate with the chosen Principal GISC for support in the process of NC certification. Test cases listed in Appendix IV need to be carried out in cooperation with the GISC and approved by GISC.

7. Set up a communication link to the principal GISC and create user accounts at the GISC for using the GISC systems.

8. Decide whether the metadata generation/update should be supported locally or remotely by the GISC. In view of this decision, set up the necessary software environment: either by installing the metadata editor on a local server or by setting-up a connection to the GISC to use the metadata editing facility on GISC system.

9. Inform WMO by letter from the PR on: (a) the decision to become an NC and the endorsement from the Principal GISC after the success in performing the test cases; (b) the choice of the principal GISC and the nomination of the WIS Focal point, if haven't done so yet.

10. Train a staff member and, if possible, a back-up in the WMO metadata Core Profile by sending them to training courses organized by WMO or the GISC. It is also possible to ask for on-site support/training through the WMO WIS Jumpstart Offer.

11. Take over responsibility for the metadata records describing the data submitted by the NMHS and modify/update them, if necessary.

12. Start using the WIS functionality for sending and receiving data with their associated metadata.

13. Join the user group of the GISC by attending meetings and other organized events.

14. Support the monitoring of the regional WIS operation by responding to queries and/or questionnaires from the Principal GISC, which collects information, including availability of service, network traffic status, errors and other comments etc.

APPENDIX II

Action Plan for implementing a DCPC in RA V under WIS

1. Make (national) decision to join WIS as a DCPC. Inform WMO, in particular CBS, by letter from the Director of the Organization about the wish to become a DCPC.

2. Identify the Principal GISC.

3. Nominate the WIS Focal Point for the DCPC. The person should preferably be knowledgeable on current GTS operation and the concept of WIS.

4. Review the status of the communication network, in particular the bandwidth to the current RTH and the bandwidth of the Internet connection.

5. Review the current GTS operation in terms of data exchange and ensure that the communication network is sufficient to send and receive data a reliable and timely fashion under WIS. If this is not the case, make sure that an upgrade of the communication network is planned and implemented prior to the operation as a DCPC.

6. Select and install system(s) that can provide required services by a DCPC, as described in the Manual on WIS, in particular the metadata management, which is new under WIS.

7. Communicate with the chosen Principal GISC for support in the process of DCPC certification. Contact CBS ET-WISC to organize demonstration of DCPC capability, in order to be endorsed by CBS and designated by WMO Cg as a DCPC.

8. In accordance with the Manual on WIS, collaborate with the relevant CBS ET's to pass all the necessary tests for a DCPC, which are outlined in the WIS Demonstration Process "Procedures and Guidelines" (http://www-db.wmo.int/WIS/centres/guidance.doc).

9. Once the tests have been passed successfully and the centre has been endorsed by WMO Congress/EC, set up operations as a DCPC.

10. Join the user group of the GISC by attending meetings and other organized events.

11. Support the monitoring of the regional WIS operation by responding to queries and/or questionnaires from the Principal GISC, which collects information, including availability of service, network traffic status, errors and other comments etc.

APPENDIX III

Sample letter by PR of country to WMO for Establishment of NC, nomination of the WIS Focal point and the Principal GISC

To: the Secretary-General

WMO

Subject: Proposal for designation of WIS National Centre.

Dear Secretary-General,

In accordance with the *Manual on the WMO Information System* (WMO-No. 1060), paragraph 2.4.2, and as part of the national plan for the implementation of the WIS, I would like to request that the centre *[name, location]*, which is part of the *[name of the NMHS]*, be designated as a National Centre (NC) of the WMO Information System (WIS), in accordance with the established procedure. I would like to inform you that the principal Global Information System Centre (GISC) associated to NC [name] should be *[GISC name]*.

For coordination of WIS-related issues, I hereby nominate Mr/Ms *[name, position, e-mail address, phone]* as the national WIS Focal Point.

Please update the records accordingly.

I look forward to receiving your advice on the action taken on the above request.

Yours sincerely

Permanent Representative of *[WMO Member]*

APPENDIX IV – NC Demonstration Test Cases

Test Case Name: NC Demonstration Test Case 1	
Uploading of Discovery Metadata for Data and Products into DAR catalogue	
Test Case ID	NC-TC1
Component	Metadata Management

Purpose of test

Validate the function of adding, updating and deleting metadata records from NC to the Principal GISC.

All metadata records must be checked against the relevant schemas. (e.g. The record should be rejected if not fitting the schema)

Note 1: The term "upload" refers to the movement of metadata records between the National Centre that provides the metadata and the WIS center that manages the DAR catalogue hosted by the Principal GISC. It can actually be implemented as a "pull" initiated from the DAR catalogue site, or as a "push" initiated by the metadata provider.

Note 2: this functionalities can be implemented as:

- A web interface allowing registered users to manage their metadata interactively
- A machine-to-machine interface allowing automated batch processing of metadata

All GISCs support both methods. The NC may choose one or both methods

Relevant technical specifications

- Tech specs 1 (Uploading of metadata)
- Tech specs 8 (DAR Catalogue Search and Retrieval)

Precondition

1. Network connection (dedicated and/or public connection) exists between the NC and GISC
2. GISC has a file upload facility for collecting metadata from other WIS centre(s)
3. GISC has a fully functional DAR catalogue
4. GISC has a registered user/process that is authorized to manage metadata of a given WIS centre
5. GISC has a web interface to the DAR catalogue that allow searches (see WIS-TC6[8])

Test Steps

	Description	Expected Results	Actual Results
1	A user/process adds a valid metadata record to the DAR catalogue	The metadata record must be found when browsing/searching the DAR catalogue	
2	A user/process modifies a record from the DAR catalogue,	The modification should be immediately visible when browsing/searching the DAR catalogue	

[8] WIS Demonstration Process – http://www-db.wmo.int/WIS/centres/guidance.doc

3	A user/process deletes a record from the DAR catalogue,	The deleted record should not be found when browsing/searching the DAR catalogue	
…	A authorized user/process attempts to upload an invalid metadata record	The user/process must be notified of the fact that the metadata record is invalid. The addition/update operation is aborted. The DAR catalogue is unchanged.	
…	A authorized user/process attempts to upload a record with a unique identifier that is already in the DAR catalogue	The DAR catalogue should not contain record with duplicate identifiers. Either: 1. The new metadata record replaces the old metadata record. The old metadata record should not be present in the catalogue. The new metadata record must be found when browsing/searching the catalogue 2. The user/process must be notified of the fact that the record is a duplicate. The addition/update operation is aborted. The DAR catalogue is unchanged. Note: it is essential to ensure an update is an edit and not an accidental duplication	
…	Access control No unauthorized addition 1	A non-authorized user/process should not be able to add a metadata record to the DAR catalogue	
…	Access control – No unauthorized addition 2	A user/process should not be able to add a metadata record to the DAR catalogue representing data from another WIS centre	
…	Access control No unauthorized modification 1	A non-authorized user/process should not be able to modify a metadata record from the DAR catalogue	
…	Access control No unauthorized modification 2	A user/process should not be able to modify a metadata record from the DAR catalogue that belongs to another WIS centre	
…	Access control No unauthorized deletion 1	A non-authorized user/process should not be able to delete a metadata record to the DAR catalogue	
…	Access control No unauthorized deletion 2	A user/process should not be able to delete a metadata record from the DAR catalogue that belongs to another WIS centre	

Centre		**Organization**		**Country**	
Test Date					

Test Case Name: NC Demonstration Test Case 2					
Uploading and downloading of data between WIS centres					
Test Case ID	NC-TC2				
Component					
Purpose of test					
Validate the upload and download of data and products and association with metadata					
Requirements Covered					
• Tech specs 2 (Uploading of data and products) • Tech specs 10 (Downloading file via dedicated network) • Tech specs 11 (Downloading file via non-dedicated network) • Tech specs 12 (Downloading file via other methods)					
Precondition					
1. Network connection (dedicated and/or public connection) between the NC and GISC (includes via RTH where relevant) 2. Have file upload and download facilities (FTP, mail, HTTP, …) 3. Have data available for upload or download 4. Have DAR facilities available at GISC					
Test Steps					

	Description	**Expected Results**	**Actual Results**
1	a. upload a file which is associated with a metadata record in the DAR catalogue of the GISC to a GISC centre b. use DAR facilities to search the metadata then retrieve the file	a. The uploaded file has been delivered to the GISC and match with the corresponding metadata b. The file can be downloaded	

Center		**Organization**		**Country**	
Test Date					

Test Case Name: NC Demonstration Test Case 3	
Maintenance of users, roles, authorization and authentication	
Test Case ID	**NC-TC3**
Component	**Management of users and access**

Purpose of test

Create and exercise a variety of user types.

Note: A centre may use a GISC user control interface

Relevant Technical Specifications

- Tech specs 4 (Maintenance of User Identification and Role Information)
- Tech specs 6 (Authentication of a User)
- Tech specs 7 (Authorization of a User Role)
- Tech specs 13 (Maintenance of Dissemination Metadata)

Precondition

1. The Centre has authority to provide access to users (i.e. PR approval)
2. A process is in place between the NC and GISC for the Centre to authorize its users to use the GISC with appropriate access levels
3. The user interface is via the Internet (i.e. web page)

Test Steps

	Description	**Expected Results**	**Actual Results**
1	Provide access for an external user to search metadata	Temporary user can search metadata, but not access data from the GISC or cache, or subscribe to data.	
	a) User goes to search web page b) User makes metadata search c) Tries to access data	a) User has access to search page b) User finds metadata c) User tries to access data and is referred to authorization page at data source. Cannot access data without validating in an authorized user role	
2	Create accounts with access to WIS metadata and data for a WMO centre authorized user	Two users are created. One with access to metadata only, the other with the ability to access the Centre subscription service or ad hoc request from the cache	
	a) User goes to registered user web page b) User is required to login or create account	a) User has access to login page b) New user, so has to create an account	

	c) User registers account and selects role of valid WMO member with authority to access WIS data (eg is from WMO NC) d) User enters login details e) User makes metadata search f) Tries to access WMO globally available data from the centre g) User tries to access additional data at centre that he is not authorized to access h) Tries to access data or product at another site i) User subscribes to data for future delivery from centre j) User returns on another session and reuses login to search or subscribe k) User edits subscription details l) User cancels a subscription m) User logs out or leaves centre's site and tries to return to a bookmarked page at a later date and access data	c) User account is validated as a WMO NC member and account is created. The user receives a user login (e.g. code via e-mail or encrypted symbol) d) User is logged in. As user us validated as WMO NC member, he is allocated access to search and access to download data from cache and to subscription services e) User finds metadata f) User successfully accesses data from centre g) User receives advice that he is not authorized to access this data and referred to access page where he can request change in user role or re-login as another user h) User is referred to authorization page at other site. i) User receives scheduled data via agreed method at agreed time j) User maintains successful access with same access rights k) Users subscription details are updated and reflected in subsequent deliveries l) Users subscription details are updated and receives no further deliveries m) Attempting to use a bookmarked page from earlier session to access data, directs the user to the registered user login page.	
4	User checks status of account and subscriptions	User can view his account and subscription details, including historic and future transactions, and the status of current transactions	
…			

Center		**Organization**		**Country**	
Test Date					

APPENDIX V

List of acronyms

AMDCN	Area Meteorological Data Communication Network
CBS	Commission for Basic Systems
Cg	Congress
DAR	Data Access and Recovery
DCPC	Data Collection or Production Centre
ECMWF	European Centre for Medium-range Weather Forecasts
ET-WISC	CBS Expert Team on WIS Centres (responsible for GISC/DCPC demonstration process)
GFCS	Global Framework for Climate Services
GISC	Global Information System Centre
GTS	World Weather Watch Global Telecommunication System
IGDDS	Integrated Global Data Dissemination Service
IMTN	Improved Main Telecommunication Network
MPLS	Multi-protocol Label Switching
MTN	Main Telecommunication Network
NC	National Centre
NMHS	National Meteorological and Hydrological Service
PR	Permanent Representative
RA	Regional Association
RMDCN	Regional Meteorological Data Communication Network
RMTN	Regional Meteorological Telecommunications Network
RTH	Regional Telecommunication Hub
TT/WIS	Task Team on WIS in RA V WG-INFR
VPN	Virtual Private Network
WG-INFR	RA V Working Group on Infrastructure
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization
WWW	World Weather Watch

APPENDIX VI. CONTACT POINTS FOR THIS PLAN

The following contact details are referred to within the text of the plan. These are recorded in this Appendix so that they can be updated without changing the text of the plan itself.

GISC Melbourne
Dr Weiqing Qu, WIS Focal Point
Bureau of Meteorology, 700 Collins Street, Melbourne. Australia.
w.qu@bom.gov.au or GISC-OP@bom.gov.au
+61 3 9669 4236 or +61 3 9669 4006 (This is NMOC 24/7 helpdesk)

Resolution 9 (RA V-16)

IMPLEMENTATION OF THE WMO CAPACITY DEVELOPMENT STRATEGY IN REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) That the Executive Council at its sixty-fourth session (Geneva, June/July 2012) approved the Capacity Development Strategy that had been developed on the decision of the Sixteenth World Meteorological Congress (Geneva, May/June 2011),

(2) That the Executive Council at its sixty-fifth session (Geneva, May 2013) commented on and adopted the Capacity Development Strategy Implementation Plan developed by the Executive Council Working Group on Capacity Development,

Noting further:

(1) That the Executive Council at its sixty-fifth session urged regional associations to collaborate on and provide all possible support for the Capacity Development Strategy Implementation Plan,

(2) That the Strategy as approved by the Executive Council at its sixty-fourth session has a special focus on least developed countries and small island developing States, and thus, considering the geopolitical particularities of Region V, offers important support to RA V Members,

Decides to assign to the appropriate mechanism within the Association the work of ensuring a harmonized and synchronized implementation of the Strategy by Members;

Requests Members to coordinate within the Association and support the implementation of the Strategy, especially in RA V;

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

Requests the WMO Programmes to support the implementation of the Capacity Development Strategy in RA V by providing expertise and other forms of assistance, as may be requested.

Resolution 10 (RA V-16)

MANAGEMENT GROUP OF REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Considering the proposal of the Management Group of the Association,

Recognizing the need to have an effective and flexible mechanism to address issues of importance, particularly those of highest priority, to the Association between sessions,

Decides:

(1) To re-establish a Management Group of Regional Association V (South-West Pacific) to assist the president and make recommendations on matters relevant to the Association with the following terms of reference:

   (a) To review matters related to the work of the Association, in particular emerging issues or matters requiring actions that cannot wait until the next regular session of the Association;

   (b) To plan and coordinate the work of the Association and its subsidiary bodies;

   (c) To ensure priorities are addressed and advise on appropriate mechanisms for achieving results in accordance with the regional operating plan;

   (d) To establish and review the structure and work of the subsidiary bodies of the Association, including the implementation of their recommendations, and to disband or reorganize these bodies as needed;

   (e) To collaborate with the Secretariat on resource mobilization and advise on the alignment of resources with regional priorities and the implementation of the operating plan;

   (f) To provide the Association's input to the WMO Strategic Plan and develop, coordinate and monitor the implementation of the Strategic Operating Plan for Regional Association V based on the discussions during its sixteenth session and taking into account input from the Members of the Association;

   (g) To identify RA V Focal Points to ensure coordination with WMO Programmes and other organizations as appropriate and necessary;

   (h) To address other issues as they arise, including strengthening of strategic partnerships with regional organizations, development agencies, and other partners, ensuring coordination of development efforts, and overseeing disaster risk reduction and service delivery;

(2) To invite the president to act as chairperson of the Management Group, which is composed of the president, the vice-president and three other Executive Council members of the Region or their designated Alternates to be invited by the president. The chairperson of the Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean, the Regional Hydrological Adviser and the leads of the Working Groups on Weather Services, Climate Services and Infrastructure shall serve as ex officio members and participate in meetings, when possible. The president is encouraged to invite the Chairperson of the Pacific Meteorological Council to participate in Management Group meetings;

Requests the president to consider subregional representation as appropriate on the Management Group and that the Group meet face-to-face annually, or as needed, preferably in conjunction with other meetings or events, and quarterly by phone or videoconference, and scheduled at a time that ensures that a majority of members are able to attend;

Authorizes the president to take necessary decisions on behalf of the Association, after consultation with the Management Group, on matters of importance to the Region;

Further requests the president 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.

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Note: This resolution replaces Resolution 6 (XV-RA V), which is no longer in force.

Resolution 11 (RA V-16)

REGIONAL ASSOCIATION V TROPICAL CYCLONE COMMITTEE FOR THE SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) Resolution 23 (Cg-XVI) – Tropical Cyclone Programme,

(2) The *WMO Strategic Plan 2012–2015* (WMO-No. 1069),

(3) United Nations General Assembly resolutions on the International Strategy for Disaster Reduction,

(4) Decisions of the United Nations Global Conference on the Sustainable Development of Small Island Developing States,

(5) The decision of the Executive Council at its sixtieth session on the Storm Surge Watch Scheme,

(6) The reports of the sessions of the Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean,

Considering the need for the countries in the South Pacific and adjacent areas affected by tropical cyclones to continue to work together to accelerate action, particularly within the context of the sustainable development of small island developing States, to reduce the loss of human life and damage caused each year by tropical cyclones and phenomena with impacts similar to those caused by tropical cyclones,

Decides:

(1) To re-establish the Regional Association V Tropical Cyclone Committee for the South-Pacific and South-East Indian Ocean with the following Terms of Reference:

   (a) To promote and coordinate the planning and implementation of measures for the improvement of cyclone warning systems and related meteorological services and the facilitation of efforts to minimize loss of life, human suffering and damage caused by

tropical cyclones and related natural hazardous phenomena in the tropical part of Region V south of the equator;

(b) To review regularly the status of tropical cyclone warning systems in the RA V Tropical Cyclone Committee area and recommend measures for the development or improvement of these systems;

(c) To review regularly the Tropical Cyclone Operational Plan for the South-Pacific and South-East Indian Ocean and recommend any amendments to the text of the Plan to the president of RA V for approval;

(d) To coordinate its work with other activities carried out within the WMO Tropical Cyclone Programme, in particular, with the Regional Association I Tropical Cyclone Committee for the South-West Indian Ocean and the Economic and Social Commission for Asia and the Pacific/WMO Typhoon Committee;

(e) To coordinate its activities with other RA V working groups and rapporteurs;

(f) To develop, update and facilitate the implementation of the Technical Plan of the RA V Tropical Cyclone Committee;

(g) To seek, through RA V, financial and technical support for the programme activities;

(h) To promote and coordinate the planning and implementation of measures for the establishment of the Storm Surge Watch Scheme in the Region in collaboration with the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology;

(i) To establish task teams as it finds necessary to carry out the work of the Committee, noting the decisions of RA V with respect to the creation of the Task Team on Severe Weather Forecasting including Global Data-processing and Forecasting System and the Task Team on Coastal Inundation including Storm Surges;

(2) To invite the following Members of RA V to nominate experts to serve on the Committee:

Australia
Cook Islands
Fiji
French Polynesia
Indonesia
Kiribati
Micronesia, Federated States of
New Caledonia
New Zealand
Niue
Papua New Guinea
Samoa
Solomon Islands
Timor-Leste
Tonga
Tuvalu
United Kingdom of Great Britain and Northern Ireland
United States of America
Vanuatu

(3) To invite the following Pacific island countries to designate experts to participate in the work of the Committee:

Marshall Islands

Nauru

Palau

(4) To invite the Chairperson of the RA I Tropical Cyclone Committee for the South-West Indian Ocean to serve as an ex officio member;

(5) To designate, in accordance with Regulation 32 of the WMO General Regulations, an expert as chairperson of the Committee;

Requests the Chairperson of the Committee:

(1) To develop a Committee implementation plan in consultation with the president and Management Group of the Association, with reference to the key performance indicators/ targets and action plans under the respective expected results of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association V (South-West Pacific), to undertake work on the various theme areas under the charge of the Committee;

(2) To participate in the relevant sessions of WMO constituent bodies and expert groups, when invited, representing the regional interests in relation to the services development, and to coordinate the activities with the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology, the Commission for Aeronautical Meteorology and various regional working groups;

(3) To submit to the president of the Association an annual report by 31 December every year and a final report in time for presentation to the Association at its seventeenth session, both copied to the WMO Secretariat;

Requests the Secretary-General:

(1) To convene biennial sessions of the Committee;

(2) To continue to take the necessary steps to assist the Committee and to ensure the provision of appropriate Secretariat support to its activities.

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Note: This resolution replaces Resolution 7 (XV-RA V), which is no longer in force.

Resolution 12 (RA V-16)

REGIONAL ASSOCIATION V WORKING GROUP ON HYDROLOGICAL SERVICES

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

Decides:

(1) To re-establish the Regional Association V Working Group on Hydrological Services with the following terms of reference:

(a) To monitor, promote and develop strategies and activities that will enhance the capabilities of RA V Members to improve the quality of hydrological services and to

deliver and improve access to these services, with an emphasis on improved observation and monitoring systems;

(b) To coordinate with relevant WMO bodies and other groups to enable improved forecasting capabilities, including the provision of more accurate, timely and reliable forecasts and warnings and enhanced delivery of related information and services;

(c) To assist RA V Members to apply a quality management approach that will enable and support the sustainability of hydrological services;

(d) To establish and coordinate task teams, as required, to complete specific activities related to the objectives and priority areas of the Working Group;

(e) To report and provide advice to the RA V Management Group on the above issues;

(2) That the Working Group shall be composed of:

(a) A lead (nominally the Regional Hydrological Adviser) and a vice-lead;

(b) Task teams as agreed by the Management Group, with the task team leaders serving as core members of the Working Group;

(c) Other experts as necessary, taking into account that, due to funding constraints, the composition of working groups should be kept to a limited number allowing their effective operation during the intersessional period;

(3) To designate, in accordance with Regulation 32 of the WMO General Regulations, [*name, country*] as lead of the Working Group, and [*name, country*] as vice-lead;

Requests the lead:

(1) To submit to the Management Group within three months a work programme for the period 2014–2017 with due consideration of the deliverables outlined in the RA V Operating Plan;

(2) To submit to the Management Group a proposal for the establishment of task teams, including their terms of reference and workplan, as necessary, to facilitate successful implementation of the RA V Operating Plan in the area of responsibility of the Working Group;

(3) To provide an annual progress report to the president of the Association and a final report at least three months before the next session of the Association;

Invites Members:

(1) To nominate experts who are committed to serving actively on the Working Group, with due attention to gender balance;

(2) To support the activities of the Working Group.

Resolution 13 (RA V-16)

REGIONAL ASSOCIATION V WORKING GROUP ON WEATHER SERVICES

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Decides:

(1) To re-establish the Regional Association V Working Group on Weather Services with the following terms of reference:

   (a) To monitor, promote and develop strategies to enhance the capabilities of RA V Members to deliver and improve access to weather services, with an immediate focus on sustainable aviation weather services;

   (b) To coordinate with WMO, the International Civil Aviation Organization and other key organizations to assist with the implementation of an improved and sustainable weather and warning service;

   (c) To identify and evaluate international best practices on the delivery of weather and warning services and communicate these to RA V Members;

   (d) To establish and coordinate task teams, as necessary, to complete specific tasks related to the objectives and priority areas of the Working Group;

   (e) To report and provide advice to the RA V Management Group on the above issues;

(2) That the Working Group shall be composed of:

   (a) A lead and a vice-lead;

   (b) Task teams as decided by the Management Group, with the task team leaders serving as core members of the Working Group;

   (c) Other experts as necessary, taking into account that, due to funding constraints, the composition of working groups should be kept to a minimum number allowing their effective operation during the intersession period;

(3) To designate, in accordance with Regulation 32 of the WMO General Regulations, [*name, country*] as lead of the Working Group, and [*name, country*] as vice-lead;

Requests the lead:

(1) To submit to the Management Group within three months a work programme for the period 2014–2017 with due account of the deliverables outlined in the RA V Operating Plan;

(2) To submit to the Management Group a proposal for establishment of task teams, including terms of reference and work plan, as necessary, to facilitate successful implementation of the RA V Operating Plan in the area of responsibility of the Working Group;

(3) To provide an annual progress report to the president of the Association and a final report at least three months before the next session of the Association;

Invites Members:

(1) To nominate experts who are committed to serving actively on the Working Group, with due attention to gender balance;

(2) To support the activities of the Working Group.

Resolution 14 (RA V-16)

REGIONAL ASSOCIATION V WORKING GROUP ON CLIMATE SERVICES

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Decides:

(1) To re-establish the Regional Association V Working Group on Climate Services with the following terms of reference:

(a) To coordinate observational and other climate services with the Global Framework for Climate Services, the Global Climate Observing System and the Global Ocean Observing System programmes;

(b) To provide advice on methods to strengthen and improve climate system monitoring, analyses and indices;

(c) To keep abreast of the activities of the Commission for Climatology, the World Climate Research Programme and its core research projects, Global Framework for Climate Services, the Intergovernmental Panel on Climate Change, the United Nations Framework Convention on Climate Change and other climate-related bodies, to report results of meetings and workshops, and to encourage strong regional involvement in these bodies;

(d) To provide advice on and assist in the implementation of various climate information and prediction services in RA V, including the Climate Information and Prediction Services project, in many different sectors, such as extreme climate prediction, agriculture, renewable energy, bioclimatic indices, urban and building planning, risk management, air quality and health;

(e) To examine, coordinate, report on and encourage the use of Geographical Information Systems in the provision of climate services;

(f) To provide advice on, assist in identifying and coordinate attendance at climate-related education and training courses/workshops, including information technology and management courses, based on a survey of the training requirements in the Region;

(g) To provide further advice and proposals on the role, structure and mechanism of the Regional Climate Centres in the region;

(h) To provide advice and proposals on other important climate-related issues as they develop and evolve;

(2) That the Working Group shall be composed of:

(a) A lead and a vice-lead;

(b) Task teams as decided by the RA V Management Group, with the task team leaders serving as core members of the Working Group;

(c) Other experts as necessary, taking into account that, due to funding constraints, the composition of working groups should be kept to a minimum number allowing their effective operation during the intersessional period;

(3) To designate, in accordance with Regulation 32 of the WMO General Regulations, [*name, country*] as lead of the Working Group, and [*name, country*] as vice-lead;

Requests the lead:

(1) To submit to the Management Group within three months a work programme for the period 2014–2017 with due account of the deliverables outlined in the RA V Operating Plan;

(2) To submit to the Management Group a proposal for establishment of task teams, including terms of reference and work plan, as necessary, to facilitate successful implementation of the RA V Operating Plan in the area of responsibility of the Working Group;

(3) To provide an annual progress report to the president of the Association and a final report at least three months before the next session of the Association;

Invites Members:

(1) To nominate experts who are committed to serving actively on the Working Group, with due attention to gender balance;

(2) To support the activities of the Working Group.

Resolution 15 (RA V-16)

REGIONAL ASSOCIATION V WORKING GROUP ON INFRASTRUCTURE

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Decides:

(1) To re-establish the Regional Association V Working Group on Infrastructure with the following terms of reference:

   (a) To monitor, promote and develop strategies for the Regional development and sustainable implementation of the WMO Information System (WIS), including the steps described in the WIS Implementation Plan for Regional Association V (South-West Pacific). A high priority remains overcoming the persistent shortcomings of the Regional Meteorological Telecommunication Network for time-critical and operation-critical data exchange. Avenues include Pacific-wide satellite communications, collaboration in the development and support of the RAdio and InterNET (RANET) communication system, reception of the Emergency Managers Weather Information Network, and improved access to Internet services;

   (b) To monitor, promote and develop integrated strategies for the Regional development and sustainable implementation of the observing systems of WMO Programmes and co-sponsored Programmes, in particular through the WIGOS Implementation Plan for Regional Association V (South-West Pacific). Specific areas of focus are tabulated in that plan;

   (c) To review and propose updates for the WIGOS Implementation Plan;

   (d) To identify means for strengthening liaison with bodies involved in the development and implementation of relevant observing and information systems;

   (e) To identify education and training requirements for relevant information and communication techniques and observing systems and operations;

(f) To provide input for WMO regulatory material related to observations and information systems;

(g) To coordinate task teams to complete specific tasks and submit proposals to the RA V Management Group for winding up completed teams and starting new teams;

(h) To report to and advise the president and Management Group of the Association on the above issues;

(2) That the Working Group shall be composed of:

(a) A lead and a vice-lead;

(b) Task teams as decided by the Management Group, with the task team leaders serving as core members of the Working Group;

(c) Other experts as necessary, taking into account that, due to funding constraints, the composition of working groups should be kept to a minimum number allowing their effective operation during the intersessional period;

(3) To designate, in accordance with Regulation 32 of the WMO General Regulations, [*name, country*] as lead of the Working Group, and [*name, country*] as vice-lead;

Requests the lead:

(1) To submit to the RA V Management Group within three months a work programme for the period 2014–2017 with due account of the deliverables outlined in the RA V Strategic Operating Plan for 2012–2015 and for 2016–2019;

(2) To submit to the RA V Management Group a proposal for the establishment of task teams, including their terms of reference and work plan, as necessary, to facilitate successful implementation of the RA V Strategic Operating Plan for 2012–2015 and for 2016–2019 in the area of responsibility of the Working Group;

(3) To provide an annual progress report to the president of the Association and a final report at least three months before the next session of the Association;

Invites Members**:**

(1) To nominate experts who are committed to serving actively on the Working Group, with due attention to gender balance;

(2) To support the activities of the Working Group.

Resolution 16 (RA V-16)

REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

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

Considering:

(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 others of its previous resolutions have been incorporated in appropriate WMO publications or have become obsolete,

(3) That some of the previous resolutions are still to be implemented,

Decides:

(1) To keep in force Resolutions 7 (XII-RA V), 1 (XV-RA V) and 4 (XV-RA V);

(2) Not to keep in force the other resolutions adopted before its sixteenth session.

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Note: This resolution replaces Resolution 9 (XV-RA V), which is no longer in force.

Annex to Resolution 16 (RA V-16)

RESOLUTIONS OF REGIONAL ASSOCIATION V ADOPTED PRIOR TO ITS SIXTEENTH SESSION AND MAINTAINED IN FORCE

Resolution 7 (XII-RA V)

CLIMATE CHANGE IN THE SOUTH-WEST PACIFIC

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

NOTING:

(1) Article 10 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change,

(2) The plans of the WMO-UNEP Intergovernmental Panel on Climate Change (IPCC) for the preparation of its Third Assessment Report,

(3) The continuing high level of public concern within the Region about the possible impacts of climate change,

(4) The uncertainty about the likely nature and magnitude of human-induced climate change in the Region,

(5) The vital role of the NMSs of the Region in providing scientific data and advice to their governments on climate matters,

(6) Its own responsibility, under Article 18 of the WMO Convention, for coordination of meteorological (including climatological) and related activities in the Region,

ADOPTS the summary statement entitled Climate Change in the South-West Pacific as set down in the annex to this resolution;

REQUESTS the president of the Association and the Secretary-General to bring the statement to the attention of all concerned.

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Annex to Resolution 7 (XII-RA V)

CLIMATE CHANGE IN THE SOUTH-WEST PACIFIC

At its twelfth session in Bali, Indonesia (September 1998), the World Meteorological Organization (WMO) Regional Association for the South-West Pacific (RA V) reviewed the substantial recent global and regional action in connection with possible human-induced climate change. It noted that, despite considerable progress in the scientific study of possible climate change in the Region, there are great uncertainties about the nature and likely magnitude of future change and only modest progress has been made in establishing or upgrading the meteorological and related observing systems needed to detect and monitor climate variability and change in the Region.

Conscious of its role as the established intergovernmental body responsible for coordination of meteorological (including climatological) and related activities in the Region, the Association identified a number of important initiatives for priority attention. In particular, the Association agreed that:

(a) Those Members with the capability to do so should accelerate their efforts to develop scientifically sound regional assessments of future climate change for the South-West Pacific for a range of greenhouse gas emission scenarios;

(b) Necessary support should be sought to enable scientists from the developing countries in the Region to participate fully in the scientific studies in order to ensure that expert advice is available to their governments on the nature, scientific basis and reliability of the projections of possible future change;

(c) Members should be encouraged to participate as fully as possible in the work of the IPCC, including especially the preparation of its Third Assessment Report;

(d) The attention of all Members should be drawn to the fundamental role of the WWW and its RBSN as the observational foundation for climate monitoring in the Region and to the critical need for upgrading both the coverage and the performance standards of these networks, in line with the interest of Article 10 of the Kyoto Protocol;

(e) Close coordination should be maintained at both the national and regional levels between the WWW networks and the related observational initiatives such as GCOS;

(f) The existing routine climate monitoring systems for the Region should be upgraded in respect of both their content and timeliness, and training opportunities should be provided in their use for staff from the NMHSs of Members of the developing countries in the Region;

(g) Members should be encouraged to cooperate in annual assessments of observed climate variations and trends in the Region;

(h) In undertaking studies of the scope for adaptation to future climate change in the Region, Members and international organizations should pay greater attention to the very large natural variability of the climate of the South-West Pacific and, in particular, to the role of the various existing programmes on tropical cyclone, flood and other national disaster mitigation;

(i) There are still significant scientific uncertainties about the operation of the climate system, which add uncertainty to predictions of climate variability and change. Members were encouraged to participate in the planning and implementation of research programmes, such as CLIVAR, ensuring that they address global and regional processes important to South-West Pacific countries.

Resolution 1 (XV-RA V)

TROPICAL CYCLONE OPERATIONAL PLAN FOR THE SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) A series of resolutions by the General Assembly of the United Nations calling for international cooperation and action by WMO for the mitigation of the harmful effects of storms,

(2) Resolution 7 (XV-RA V) – Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean,

Considering:

(1) The need to enhance cooperative efforts by countries in the South Pacific and adjacent areas affected by tropical cyclones in effectively carrying out their roles in coordinated arrangements for preparing and issuing meteorological forecasts and warnings of all tropical cyclones affecting the area,

(2) That, to achieve this aim, it is essential to have an agreed tropical cyclone operational plan for the South Pacific and the South-East Indian Ocean which describes the coordinated arrangements and defines the observing, forecasting and warning responsibilities of all cooperating countries,

Decides to make amendments to the *Tropical Cyclone Operational Plan for the South Pacific and South-East Indian Ocean* (WMO/TD-No. 292) as recommended by the RA V Tropical Cyclone Committee;

Authorizes the president of RA V to approve, on behalf of the Association, amendments to this Tropical Cyclone Operational Plan, as recommended by the RA V Tropical Cyclone Committee;

Requests the Secretary-General:

(1) To maintain the WMO publication on the Tropical Cyclone Operational Plan and keep it up to date;

(2) To inform all Members concerned of any amendments and updating of the publication.

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Note: This resolution present resolution replaces Resolution 10 (X-RA V), which is no longer in force.

Resolution 4 (XV-RA V)

SUPPORT FOR THE JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting the *Abridged Final Report with Resolutions and Recommendations of the Third Session of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology* (WMO-No. 1049),

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 the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) is the appropriate and sole WMO body 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 WMO Information System will 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 World Weather Watch, Global Climate Observing System and Global Ocean Observing System, 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-to-shore telecommunication arrangements for oceanographic data and products, in particular through the greater use of satellite-based telecommunications facilities such as the International Maritime Satellite System and Argos and Iridium systems;

Requests the Secretary-General to take any action considered necessary, and within the available budgetary resources, to assist Members to participate in the JCOMM activities.

Note: The present resolution replaces Resolution 13 (XIII-RA V), which is no longer in force.

ANNEXES

ANNEX I
Annex to paragraph 4.6.22 of the general summary

INFRASTRUCTURE AND OPERATIONAL FACILITIES DEVELOPMENT (VOLUNTARY COOPERATION PROGRAMME)

COUNTRY	TITLE/FOCUS	YEAR	STATUS	DONOR
TONGA	Restoration of the Niuatoputapu Station	2009	Completed 2013	VCP EAF
FIJI	Financial support for the organization of 13 RMSD	2009	Completed 2009	VCP (F)
NIUE	Development of Niue Meteorological Policy and Act/Legislation	2010	On-going	VCP(F)
KIRIBATI	Training of Weather Forecasters	2010	Completed 2010	WMO (LDC) & VCP(F)
VANUATU	Training of Weather Forecasters	2010	Completed 2010	WMO (LDC) & VCP(F)
VANUATU	Financial and technical assistance to update Vanuatu Meteorological Act	2010	Completed	VCP(F)
COOK ISLANDS	Upgrade of Cook Islands basic synoptic network	2010	On-going	VCP(F)
SAMOA	Emergency telecommunications system	2011	Completed 2012	VCP(F)
FIJI	Financial support for participation to the Southern Hemisphere Course on TCs and PWS Workshop	2011	Completed 2011	VCP(F)
SOLOMON ISLANDS	Initial external auditing of the Meteorology Division's Quality Management System for Aviation Services	2011	On-going	VCP(F)
TONGA	Rehabilitation of Niuatoputapu Met station and Drafting of Meteorological Bill	2011	On-going	VCP(F)
VANUATU	Expert services to conduct auditing of Vanuatu Meteorology and Geo-hazard Department Quality Management System for Aviation Services	2012	Completed	VCP(F)

COUNTRY	TITLE/FOCUS	YEAR	STATUS	DONOR
SAMOA	Expert Services to assist establishing the Meteorology Division Quality Management System (QMS) for aviation services	2012	Completed	VCP(F)
FIJI	Emergency Disaster Assistance	2012	On-going	VCP(F)
KIRIBATI	Installation of Internet equipment at synoptic and meteorological stations in the Republic of Kiribati	2012	On-going	VCP (F)
MICRONESIA, FEDERATED STATES OF	Request for financial and expert services assistance for training in weather and climate observations	2013	On-going	US-NWS
KIRIBATI	In-country training in weather forecasting, preparation and delivery of weather information to end-users	2013	Request	
PHILIPPINES	High priority requirements for flood affected synoptic weather stations in the national capital region	2013	On-going	VCP(F)
NIUE	Capacity development for Quality Management System for Aviation Weather Services, Including Competency Assessment for Aeronautical Meteorological Personnel for Niue	2013	Request	
SOLOMON ISLANDS	Solomon Islands – Training in TAF Preparation	2013	Completed	VCP(F)

http://www.wmo.int/pages/prog/dra/vcp/InformalPlanningMeeting2014.php
http://www.wmo.int/pages/prog/dra/vcp/documents/IPM_2013_Report.pdf
http://www.wmo.int/pages/prog/dra/vcp/documents/IPM_2012_DRAFT_Report_26052012.pdf
http://www.wmo.int/pages/prog/dra/vcp/documents/IPM_2011_Final_Report_Consolidated.pdf
http://www.wmo.int/pages/prog/dra/vcp/documents/IPM2010FinalReportConsolidated.pdf
http://www.wmo.int/pages/prog/dra/vcp/documents/IPM2009FinalReportConsolidated.pdf

ANNEX II
Annex to paragraph 4.6.23 of the general summary

TOTAL INVESTMENT (VOLUNTARY COOPERATION PROGRAMME (F&ES)) AND BILATERAL 2010–2013

Amount listed includes contributions for Equipment and Services and Fellowships and Training and Development Projects, as reported by the members

Member	2010	2011	2012	2013
Argentina	8,300	69,214	8,300	
Australia		7,559,226	5,416,978	8,932,000
Canada	680,000	546,700	4,397,500	**1,323,000
China	716,770	2,181,030	1,686,511	10,000
Hong Kong, China		35,000	30,800	27,500
Finland	2,335,732	2,250,000	1,859,925	1,967,350
France	1,210,051	1,054,535	2,086,000	2,417,000
Germany	5,277,772	1,777,911	3,314,800	3,542,100
Indonesia			70,945	
Japan	250,000	335,00	335,00	335,00
Maldives	1,000	1,000	1,000	1,000
New Zealand	1,909,820	1,906,817	333,000	223,500
Norway		2,500,000	2,500,000	++
Republic of Korea	1,669,800	1,655,094	1,320,094	6,210,731
Spain	383,292	2,600,000	300,000	596,995
Switzerland	2,393,200	188,500	2,393,200	2,615,500
UK	1,120,410	1,448,619.10	1,718,126	1,427,687
USA	1,114,294	1,679,133	1,392,910	&&1,986,000
Total	**16,668,641**	**24,952,779**	**28,830,089**	**31,542,288**

* * not including 12.6M CAD Agreements (Haiti and GFCS)
++ not including 20M GFCS Projects
&& not including 10M USD DRR

ANNEX III
Annex to paragraph 4.6.24 of the general summary

WMO REGIONAL DEVELOPMENT PROJECTS, REGIONAL ASSOCIATION V

PROJECT	TIME	REGION	VALUE	DONOR	FOCUS
1) Hydrometeorological Disaster Impact Mitigation Projects	5 years (2011–2016)	Regions: South & S E Asia South East Europe South Africa	USD 9,035,000	(USAID) – OFDA	Flooding Coastal inundation Drought Climate Applications
2) Implementing the Global Framework for Climate Services (GFCS) at Regional and National Scales	4 years (2013–2017)	Arctic Region, South-West Pacific and Caribbean Small Island States South Asia/ 3rd Pole (Himalaya and Tibetan Plateau)	CAD 6,138,000	Canada	GFCS Climate resilience Development of climate services Drought
3) Development of an Integrated Coastal Inundation Forecasting System in Fiji – Phase I	2 years (2012–2014)	Fiji	USD 200,000	Republic of Korea – KOICA	Climate information services at national and regional scales Weather and climate monitoring Weather forecasting for the health sector
4) Severe Weather Forecast Demonstration Project	ongoing	S.W. Pacific		various	Severe weather Impacts
5) Severe Weather Forecast Demonstration Project	ongoing	S.E. Asia		Various	Severe weather Impacts

Pipeline

6) Implementing the Global Framework for Climate Services (GFCS) at Regional and National Scales	4 years (2015–2018)	Pacific, Caribbean and Indian Ocean Small Island States		EU-ACP	GFCS Climate resilience Development of climate Services

ANNEX IV
Annex to paragraph 5.2.3 of the general summary

DELIVERABLES AND ACTIVITIES IN REGIONAL ASSOCIATION V FOR 2012–2015

Expected Result 1 (ER 1):
Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate and water and related environmental predictions, information and services in response to users' needs and to enable their use in decision-making by all relevant societal sectors

The Key Outcome (KO) under ER 1 addresses the rapidly changing paradigm for the provision of weather, climate, water and related environmental services.

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 1.1.1: Aviation weather services are effective and sustainable	• Level of compliance with ICAO standards and recommended practices (SARPS)	Priority Area • Members • Aeronautical Meteorology Programme • WG Weather Services	• Timely and accurate weather forecast/ warning	• Client survey to be done at least once a year • Attachment/training at world class meteorological centre in weather analysis, forecast and warning for aeronautical purposes (military and civil aviation)	X	X	X	X
			• Minimal disruption of access to forecasts during peak hours/ seasons	• Enhance telecommunication network capacity and increase number of value-added products.	X	X	X	X
			1) RA-V TT-QM Implementation of QMS for Aviation Meteorological Service Providers	1) RA-V TT-QM • Input into QMS survey • QMS guidance (WMO webpage & forum, input into WMO/ICAO publications and COMET module) • Internal Auditor Training • 'Twinning' to mentor Members on QMS processes and audits • Lead Auditor training (international qualification)	X	X	X	X
			2) RA-V TT-CR Implementation of Cost Recovery for Aviation Meteorological Service Providers	2) RA-V TT-CR • Survey • Guidance • Assistance with cost recovery implementation				X

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
			3) RA-V TT-TRG Implementation of Competency Assessment for Aviation Meteorological Service Providers	3) RA-V TT-TRG • Survey • Guidance to assist Members • Assist Members with implementation, including Competency training in Samoa and TAF/SIGMET in Solomon Is.	X	X	X	X
RKO 1.1.2: Marine services are improved	• Level of satisfaction of users • Level of accuracy of marine forecasts and warnings	• Members • Marine Meteorology and Oceanography Programme • WG Weather Services	• Enhanced wave modelling and NWP products	• Enhance wave modelling capability, including 3 wave models with wind inputs from NCEP-GFS and NAVGEM (now running operationally.	X	X	X	X
			• Ferry operators, port authorities and enforcement agencies obtain marine forecasts.	• Provide forecasts for marine activities • Client summary at least once a year	X	X	X	X
RKO 1.1.3: Public weather services are improved	• Level of satisfaction of users • Level of accuracy of public forecasts and warnings	• Members • Public Weather Services Programme • WG Weather Services	• Accuracy of public forecasts and warnings is improved	• Inter-agency committee is formed to conduct research on the improvement of forecast accuracy			X	X
				• Enhance NWP limited area model, including MMD-WRF high-resolution model (1-4 KM).	X	X	X	X
			• Forecasts are displayed at billboards located along the major expressways	• Provide forecasts to motorists at major expressways	X	X	X	X
			• Timely and accurate weather forecast/ warning	• Attachment/training at world class meteorological centre • Client survey to be done at least once a year	X	X	X	X
			• Increase value-added forecasts available online • Enhanced human capital development	• Weather advisory and weather briefing as requested • Lectures/training on meteorological courses • Forecast for Search and Rescue (SAR) operations	X	X	X	X

Expected Result 2 (ER 2):
Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate and water and related environmental elements

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 2.1.1: Multi-hazard early warning systems are implemented and improved.	• Completion of Tropical Cyclone Operational Plan (TCOP) milestones • Level of success of the Severe Weather Forecast and Disaster risk reduction Demonstration Project (SWFDDP) including any western window extension • Level of implementation including coverage and number of hazards of multi-hazard early warning systems • Number and degree of integration of NMHSs into national emergency and disaster management systems • Level of cooperation and interaction between NMHSs and their marine/ocean/geophysical agency counterparts, and between WMO and IOC in supporting national and regional tsunami early warning systems • Level of implementation of WMO standards for the format and content of alerts, in particular the Common Alerting Protocol (CAP)	***Priority Area*** • Members • World Weather Watch Programme / Data Processing and Forecasting • Tropical Cyclone Programme • Disaster Risk Reduction Programme • Tropical Cyclone Committee (linked to RSMT for SWFDDP)	• Disaster management agencies received advisories/ warnings via various channels (SMS, telephone calls and fax)	• Communicate advisories/warnings to disaster management authorities	X	X	X	X
			• Provision of disaster early warning information to the government and stakeholders	• Briefing to the disaster committee • Implementation of WMO standards for the format and content of alerts, in particular the Common Alerting Protocol (CAP)	X	X	X	X
RKO 2.2.1: Flood warnings are improved	• Level of accuracy and timeliness of flood warnings	• Members • Hydrology and Water Resources Programme • WG Hydrological Services	• Improved Flood Forecasting Systems and Techniques	• Implementation of FFGS in the Region: • Reports on regional applications; IFAS, TopNet, IFFRM, Delft-FEWS etc			X	X
			• Improved linkages with DRR community	• Hydrological inputs to end-to-end multi-disaster warning systems – CIFDP			X	X
			• Improved Quantitative Precipitation Estimates and Forecasts	• Joint activities with SWFDP			X	X

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
			• Guidance on rainfall based flood forecasts	• Development of guidance material			X	X
			• Improved Drought Monitoring and Management Capabilities	• Evaluate accuracy of seasonal predictions for water management purposes; • Improve water elements in CliDE;			X	X
			• Benefits achieved for the water sector through the implementation of GFCS	• Involvement in GFCS activities • Represent WG in GFCS initiatives			X	X

Expected Result 3 (ER 3):
Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, prediction and warnings to support in particular climate impact and adaptation strategies

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 3.1.1: Climate information and prediction services are improved	• Level of accuracy of monthly/seasonal predictions • Level of application of, and satisfaction with, climate services • Level of implementation of regional aspects of GFCS including RCCs • Level of contribution of RA V Members to the WMO Annual Climate Summary	***Priority Area*** • Members • World Climate Programme • WG Climate Services	• Technical papers and maps of surface air temperature element published	• Conduct research on modelling of surface air temperature			X	X
			• Seasonal outlook	• Monthly updates • Provision of climate services to relevant agency	X	X	X	X
RKO 3.3.1: Hydrological information is improved	• Accuracy of information, and coverage, and density, of hydrological observations	• Members • Hydrology and Water Resources Programme • WG Hydrological Services	• Contributed Meteorological information for IHP Publication	• Participation in UNESCO-IHPMalaysia's activities				
			• Guidance material on the establishment of a quality assurance programme, including finance strategies	• Development of a guidance manual with case studies.			X	X
			• Guidance and training on water information systems, Neon and Delft-FEWS	• Workshop on improved presentation of hydrological data and information			X	

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
			• Pacific HYCOS Phase II concept document	• Establish a sub-group of the WG to develop concept document; consultancy			X	X
			• SEA HYCOS Phase I concept document	• Establish a sub-group of the WG to develop concept document; consultancy				X

Expected Result 4 (ER 4):
Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable surface-based and space-based systems for weather, climate and hydrological observations, as well as related environmental observations, based on world standards set by WMO and partner organizations

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 4.1.1: WIGOS is implemented in RA-V	• Traceability of observations • Availability of station metadata • Regional WIGOS Implementation Plan is Developed • Regional priorities for observing system development documented	***Priority Area*** • Members • Space Programme • Global Climate Observing System • World Weather Watch Programme • World Climate Programme / Global Observing System • World Weather Watch Programme / Instruments and Methods of Observation Programme • World Weather Watch Programme / WMO Integrated Global Observing System • WG Infrastructure	• Regional WIGOS Implementation Plan prepared	• Prepare a draft plan, circulate for review then update it and obtain endorsement	X	X		
			• Increased levels of traceability of observations to international standards	• Assess/survey the traceability of calibration standards in RA-V	X	X		
				• Identify and promote opportunities to enhance the capacity of Members in RA-V to achieve traceability	X	X	X	X
			• Documented RA V user requirements and priorities for satellite data and products	• Follow the CBS / Space Programme guidelines for documenting Regional satellite requirements	X	X	X	X
RKO 4.1.2: Observing networks are further improved in RA-V	• Level of implementation of RBSN and RBCN including GSN and GUAN • Level of implementation of hydrological networks • Level of implementation of marine observations	• Members • World Weather Watch Programme • World Climate Programme / Global Observing System • Hydrology and Water Resources	• More complete implementation of basic networks (RBSN and RBCN including GSN and GUAN)	• Regularly review monitoring reports and bring to the attention of Member countries			X	X

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
	• Progress against GOOS, GTOS and GCOS Regional Action Plans	Programme • Marine Meteorology and Oceanography Programme • WG Infrastructure • WG Hydrological Services						
RKO 4.2.1: WIS is implemented in RA-V	• Extent of participation in international exchange through the WIS / GTS • Existence of, and progress against, a regional implementation strategy for WIS / DAR services • Extent to which communication needs of members are met • Level of use of NWP products accessed via WIS	***Priority Area*** • Members • World Weather Watch Programme / WMO Information System Programme • World Climate Programme • WG Infrastructure	• Migration to the use of Table Driven Code Forms (TDCF)	• Training and support provided to Members	X	X	X	
			• Regional WIS Implementation Plan	• Prepare a draft plan, circulate for review then update it and obtain endorsement		X	X	
			• Implementation of WIS across the Region	• Training and support provided to Members		X		
RKO 4.3.1: Historical climatological data are preserved	• Level of availability of long period, rescued, digitized climate records with appropriate metadata	• Members • World Climate Programme • WG Climate Services	• Meteorological database	• Manage and maintain the meteorological database • Contributing in Global Framework Climate Services	X	X	X	X

Expected Result 5 (ER 5):
Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and environmental science and technology development

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 5.3.1: Atmospheric chemistry observations and assessment meet regional needs	• Level of implementation of GAW	• Members • Global Atmosphere Watch Programme	• 1 Global Station and 2 regional/ contributing stations	• Maintenance/ enhancement of Global Atmosphere Watch (GAW) stations in the country • Support training and capacity building activities related to atmospheric chemistry	x	x	x	x
			• Monthly air quality bulletin • Annual air quality report	• Continuation/ enhancement of Global Atmosphere Watch (GAW) activities in the country • Enhance the technical exchange and cooperation on atmospheric composition observation	X	X	X	X
RKO 5.4.1: THORPEX GIFS benefits warning services	• THORPEX GIFS products trialled as part of SWFDDP	• Members • World Weather Research Programme • Tropical Cyclone Committee (linked to RSMT for SWFDDP)						
RKO 5.5.1: ENSO, IOD, monsoons and MJO predictions are improved	• Level of understanding of these phenomena • Level of predictive skill for these phenomena	• Members • World Weather Research Programme • WG Climate Services	• Accuracy (temporal and spatial) of forecasts/warnings are enhanced	• Perform studies on monsoons and their interactions with ENSO, IOD and MJO	X	X	X	X
			• Accuracy (temporal and spatial) of forecasts/warnings are enhanced • Lead time of heavy rainfall warning is increased	• Conduct research on high impact weather events related to monsoons such as heavy rainfall episodes due to cold surge	X	X	X	X

Expected Result 6 (ER 6):
Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 6.1.1: Regional and national meteorological and hydrological services are more effective	• Extent of implementation of recommendations of SPREP review on regional meteorological services • Availability of, and progress against, national plans for improved products and services	• Members • Least Developed Countries Programme / Regional Programme (in partnership with SPREP) • Hydrology and Water Resources Programme / Regional Programme (in partnership with SOPAC/SPC) • WG Weather Services	• A set of competencies for provision of hydrological services, including technicians and professionals	• Establish a sub-group of the WG to develop appropriate competencies and related training requirements			X	X
			• Technical training carried out in at least one country per year (topics to include highest priority as determined by Members)	• Identify Members requiring this training; seek sponsorship; • undertake the training;			X	X
			• Training in quality assurance to be provided	• Training session based on guidance material developed under data management theme				X
			• Catalogue of available of technology in use in the Region	• Survey of instrumentation in use;				
			• Reinforced communication platform for hydrological services in the region	• Build on IWRM forum, e-mail and other platforms				X
RKO 6.3.1: Education and Training Development activities at national and regional levels are improved	• Capacity for providing, and satisfaction with, regional training services • Capacity for providing training at national level in accordance with WMO-No. 258 • Level of compliance of meteorological and hydrological staff with WMO-No. 258	• Members • Regional Training Centres • Education and Training Programme • WG Weather Services						
RKO 6.4.1: Donor funding is coordinated and effective	• Level of funding support for regional programmes and activities	• Resource Mobilization and Development Partnerships Programme • Least Developed Countries Programme / Regional Programme						

Expected Result 7 (ER 7):
New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategies

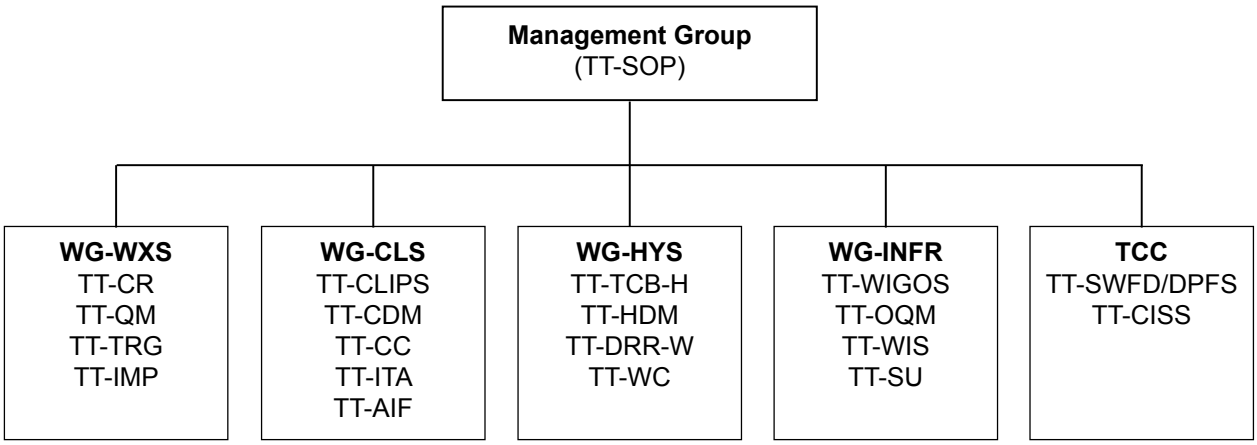
Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 7.1.1: Collaborations with other agencies add value	• Updated MoU between WMO and SPREP • Updated MoUs between WMO and other relevant regional organizations • Number of international agencies taking part in WMO-coordinated projects that benefit Members	• Regional Programme • Resource Mobilization and Development Partnerships Programme						
RKO 7.1.2: GEOSS involvement is increased	• Number of RA-V Members who are also Members of GEO	• Members 3. Regional Programme						

Expected Result 8 (ER 8):
An effective and efficient Organization

Key Outcomes	Key Performance Indicators	Contributing Programmes	Deliverables	Activities	Timeline			
					2012	2013	2014	2015
RKO 8.3.1: **RA V subsidiary bodies are well organized and effective**	• Completion of the 2012-2015 Strategic Operating Plan • Establishment of the Working Groups and work plan approved by Management Group. • Availability to Members of regular, useful reports on progress by RA V Subsidiary Bodies • Level of awareness of and satisfaction with work carried out by RA V Subsidiary Bodies • Level of explicit reference to RA V activities and requirements in the work plans of WMO working groups, Scientific and Technical Programmes, and Technical Commissions • Completion of the 2016-2019 Strategic Operating Plan	• RA V Management Group • All other RA V Subsidiary Bodies • Regional Programme						

ANNEX V
Annex to paragraph 5.3.7 of the general summary

FUTURE WORKING STRUCTURE OF SUBSIDIARY BODIES OF REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)



Management Group

TT-SOP	Task Team of RA V Strategic and Operating Planning
WG-WXS:	Working Group on Weather Services
TT-CR	Task Team on Cost Recovery
TT-QM	Task Team on Quality Management
TT-TRG	Task Team on Training, Competencies and Qualifications
TT-IMP	Task Team on Weather Services Implementation

WG-CLS: Working Group on Climate Services

TT-CLIPS	Task Team on Climate Information and Prediction Services including Regional Climate Centres (RCCs) and Regional Climate Outlook Forum (RCOF)
TT-CDM	Task Team on Climate Data Management/Data Rescue
TT-CC	Task Team on Climate Change
TT-ITA	Task Team on Use of Improved Tools for Operational Agro-meteorology including Coping with Impacts of Natural Disasters on Agriculture
TT-AIF	Task Team on Agro-meteorological Information

WG-HYS: Working Group on Hydrological Services

TT-TCB-H	Task Team on Training and Capacity-building in Hydrology
TT-HDM	Task Team of Hydrology Database Management
TT-DRR-W	Task Team on Disaster Risk Reduction – Water-related Disasters
TT-WC	Task Team on Water and Climate

WG-INFR: Working Group on Infrastructure

TT-WIGOS	Task Team on WIGOS
TT-SU	Task Team on Satellite Utilization
TT-WIS	Task Team on Regional Implementation and Operation of WIS
TT-OQM	Task Team on Observations Quality Management

TCC: Tropical Cyclone Committee for the South Pacific and South-East Indian Oceans

TT-SWFD/DPFS	Task Team on Severe Weather Forecast and Disaster Risk Reduction including Data Processing and Forecasting System
TT-CISS	Task Team on Coastal Inundation including Storm Surge

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ANNEX VI
Annex to paragraph 7.5 of the general summary

RECO-6 RECOMMENDATIONS ON WMO AND NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES ENGAGEMENT IN THE PROCESS OF THE THIRD INTERNATIONAL CONFERENCE ON SMALL ISLAND DEVELOPING STATES

(Jakarta, Indonesia, 31 April to 1 May 2014)

In June 2012, world leaders at the United Nations Conference on Sustainable Development (Rio + 20) decided to convene the Third International Conference on Small Island Developing States (SIDS) in 2014. This decision came as a result of the acknowledgement and recognition that SIDS remains a special case for sustainable development in view of their unique and particular vulnerabilities. Furthermore, Rio + 20 outcome document recognized the importance of coordinated, balanced and integrated actions to address the sustainable development challenges facing SIDS. The Third International Conference on SIDS will be held from 1 to 4 September 2014, preceded by activities related to the conference from 28 to 30 August 2014 in Apia, Samoa. The theme of the 2014 Conference is "*SIDS Sustainable Development Through Genuine and Durable Partnership*".

The Conference will serve as a forum to build on existing successful partnerships as well as to launch innovative and concrete new ones, to advance the sustainable development of SIDS. The Conference will include six multi-stakeholder partnership dialogues, held in parallel with the plenary meetings.

The multi-stakeholder partnership dialogues will be clustered by the following areas:

(a) Climate Change & Disaster Risk Management;

(b) Oceans, Seas and Biodiversity;

(c) Water and Sanitation, Food Security and Waste Management;

(d) Sustainable Economic Development;

(e) Sustainable Energy;

(f) Social Development in SIDS, Health and NCDs, Youth and Women.

WMO has registered GFCS-SIDS under the Climate Change & Disaster Risk Management partnership. SPREP has also registered the Pacific Meteorological Council (PMC) for one of the side events.

WMO engagement with the Third International Conference on SIDS is to raise political awareness among SIDS leaders and development partners on the contribution and benefits to the sustainable of SIDS of robust weather and climate services and early warning system.

Implementing the GFCS in SIDS and SIDS Regions through a long-term cooperative arrangement through which the SIDS and various international, regional and national institutions together with stakeholders will work together to achieve a new paradigm in provision of weather and climate services for sustainable development.

WMO is engaging the NMHSs in preparations for the Conference through a series of target and opportunistic interventions. RECO-6 has provided an opportunity for WMO to have further discussion with NMHSs on engagement in the Conference's process, and the outcomes of the discussion are presented below:

How would WMO contribute to the 3rd International Conference on Small Island Developing states (SIDS)?

- To establish a group to work with the WMO Secretariat on WMO/NMHSs engagement in the process of the preparation for the Conference;
- Include other UN agencies and development partners in preparation for the Conference;
- Encourage and assist NMHSs from SIDS to be in involved in the national process and participation in the Conference;
- To include (in the draft documents) the major roles and their importance within NMHSs; primarily, meteorological observations, and the provision of weather and climate services.

What tangible outcomes would WMO and NMHSs are expecting from the Conference?

- Clear direction from the Conference (in the draft documents) on the importance of weather and climate services to other sectors (e.g., DRR, CCA, agriculture and water) and their contribution to national development;
- Outcomes of the Conference to link to National Development Plans and NMHSs' Strategy and Implementation Plans.

APPENDIX

LIST OF PARTICIPANTS

1. Officers of the session

‘Ofa FA’ANUNU	Acting president

2. Representatives of WMO Members within Region V

Australia

Robert Alexander VERTESSY	Principal Delegate
Jonathan Paul GILL	Alternate
Susan Elizabeth O'ROURKE (MS)	Delegate
Russell Keith STRINGER	Delegate

Brunei Darussalam

Muhamad Husaini AJI	Principal Delegate
Shahalmie EMRAN	Alternate

Cook Islands

Arona NGARI	Principal Delegate

Fiji

Alipate WAQAICELUA	Principal Delegate
Misaeli FUNAKI	Alternate

Indonesia

Andi Eka SAKYA	Principal Delegate
Widada SULISTYA	Alternate
Suko Prayitno ADI	Delegate
Edvin ALDRIAN	Delegate
Riris ARDIYANTO	Delegate
DARWAHYUNIATI (MS)	Delegate
Anni Arumsari FITRIANY (MS)	Delegate
Dodo GUNAWAN	Delegate
Bambang HARGONO	Delegate
Damianus T. HERYANTO	Delegate
Syamsul HUDA	Delegate
Mustari Heru JATMIKA	Delegate
Erwin Eka Syahputra MAKMUR	Delegate
Untung MERDIJANTO	Delegate
Dian NURATRI (MS)	Delegate
NURHAYATI (MS)	Delegate
Mulyono Rahadi PRABOWO	Delegate
Fachri RADJAB	Delegate
Nelly Florida RIAMA (MS)	Delegate
Widjoseno SASTROAMIDJOJO	Delegate
Amsari Mudzakir SETIAWAN	Delegate
Jaumil Achyar Dewantoro SITUMEANG	Delegate
SOEPRIYO	Delegate
Ardhasena SOPAHELUWAKAN	Delegate
Yunus S. SWARINOTO	Delegate
Edward TRIHADI	Delegate
Wida FIRLIYAN TIRTANI (MS)	Observer
Nur Fizili KIFLI (MS)	Observer
Haris SYAHBUDIN	Observer

Malaysia

Alui BAHARI	Principal Delegate

Micronesia, Federated States of

Johannes BERDON	Principal Delegate

New Caledonia

Philippe FRAYSSINET	Principal Delegate

New Zealand

Peter LENNOX	Principal Delegate
James LUNNY	Alternate

Papua New Guinea

Samuel MAIHA	Principal Delegate
Kasis INAPE	Delegate

Philippines

Vicente MALANO	Principal Delegate
Cynthia P. CELEBRE (MS)	Delegate
Flaviana D. HILARIO (MS)	Delegate

Samoa

Luteru TAUVALE	Principal Delegate

Singapore

Chin Ling WONG (MS)	Principal Delegate
Lesley CHOO (MS)	Delegate
Christopher GORDON	Delegate

Solomon Islands

Lloyd TAHINI	Principal Delegate

Tonga

‘Ofa FA’ANUNU	Principal Delegate

United Kingdom of Great Britain and Northern Ireland

Jane WARDLE (MS)	Principal Delegate

United States of America

Raymond TANABE	Principal Delegate
Courtney DRAGGON (MS)	Alternate
Jennifer LEWIS (MS)	Delegate
Kelly SPONBERG	Delegate

Vanuatu

Philip MALSALE	Principal Delegate

3. Representatives of WMO Members outside Region V (observers)

China

YU Jun	Observer

Finland

Joanna SAARINEN (MS)	Observer
Petteri TAALAS	Observer

Japan

Yoshiro TANAKA	Observer

4. Representatives of international organizations (observers)

Association of Hydro-Meteorological Equipment Industry (HMEI)

Robert B. WRIGHT	Observer
Dewey BURCHFIELD	Observer
Heather HOPE (MS)	Observer
Panu PARTANEN	Observer
Ashish RAVAL	Observer
Rémy SIRONNEAU	Observer

Secretariat of the Pacific Regional Environment Programme (SPREP)

Netatua PELESIKOTI (MS)	Observer

5. Invited experts

Mr David GRIMES	President of WMO
Mr Bruce ANGLE	Adviser of the President of WMO
Mr Paul DAVIES	Lecturer
Mr Kasis INAPE	Expert
Mr Samuel MAIHA	Expert
Mrs Dilwal Maria NGEMAES	Expert
Mrs Kamaitia RUBETAAKE	Expert

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