Bali
30 April–6 May
2010

Regional Association V (South-West Pacific)

Fifteenth session

World Meteorological Organization

WMO-No. 1056

Weather • Climate • Water

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Abridged final report with resolutions

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

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

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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 fifteenth session of Regional Association V (South-West Pacific) was held in Bali, Republic of Indonesia, from 30 April to 6 May 2010. The session was declared open by Mr Arona Ngari, president of the Association, at 10.00 a.m. on Friday, 30 April 2010, at The Patra Bali.

1.2 Mr Ngari welcomed the participants to the session and expressed his appreciation to the Government of Indonesia for hosting the session in Bali as well as for having hosted the thirteenth session of the RA V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean, from 26 to 29 April 2010. He acknowledged the initiative in hosting this session as a sign of the commitment by Indonesia to the work of the World Meteorological Organization (WMO) in ensuring the safety of the people of the country in terms of weather-related phenomena.

1.3 The president extended his gratitude to Ms Sri Woro B. Harijono, vice-president of RA V and for her contribution to the work of RA V. He expressed appreciation to Ms Harijono and her staff for excellent arrangements made. Mr Ngari thanked the Secretary-General of WMO for his support rendered to the Members of WMO, especially to those of RA V, which is vulnerable to natural hazards.

1.4 Mr Ngari welcomed a new Member of RA V, Timor-Leste, which had become a Member of WMO in December 2009.

1.5 Ms Sri Woro B. Harijono, vice-president of RA V, Director General of the Meteorological Climatological and Geophysical Agency (BMKG) and Permanent Representative of Indonesia with WMO, extended a warm welcome to all participants. She stated that WMO had played a significant role in global change issue (climate and environmental change issues). She recalled that the World Climate Conference-3 (WCC-3) established a High-Level Taskforce (HLT) for the Global Framework for Climate Services (GFCS). She noted that two eminent persons from the Region were among the members of HLT. Ms Harijono stated that WMO and National Meteorological and Hydrological Services (NMHSs) should promote the understanding of global warming and climate to guide the global change issue. She also stressed the importance of “Science Aspect” in understanding climate change process.

1.6 Mr Michel Jarraud, Secretary-General of WMO, in his address, extended a warm welcome to all the participants. He welcomed Timor-Leste participating in RA V session for the first time since becoming a Member of WMO. He expressed the deep appreciation to the Government of Indonesia, through Mr Bambang Susantono, Vice-Minister for Transportation, for hosting the session in Bali. He noted that Indonesia had continuously demonstrated its strong commitment to WMO’s Programmes and activities since becoming a Member of WMO on 16 November 1950 and was the one of earliest Members of WMO since WMO had turned 60 on 23 March 2010. Mr Jarraud thanked Mr A. Ngari, president of RA V, and Ms Sri Woro B. Harijono, vice-president of RA V, for their strong leadership in implementation of the programmes and activities of the Association during the intersessional period. He also expressed his appreciation to chairs, rapporteurs and working group members for their valuable services. He expressed gratitude to Ms Harijono and her staff for the excellent arrangements made to ensure the success of the session.

1.7 Recalling that this is the first session of RA V conducted along the new WMO strategic framework, which was adopted by the Fifteenth World Meteorological Congress (May 2007), the Secretary-General said that the work of the session would be aligned to the five Strategic Thrusts and the 11 Expected Results of the WMO Strategic Plan 2008–2011. He was pleased to note that the Association had developed a draft Strategic Plan for the Enhancement of NMHSs in RA V (2010–2011)

as well as a preliminary draft Strategic Operating Plan for 2012–2015, which was based on the draft WMO Strategic Plan 2012–2015.

1.8 The Secretary-General informed the session that a new WMO Secretariat structure had been implemented in 2008 to better align with the decision of the Fifteenth Congress as well to improve the integration of plans and programmes, optimize the use of resources and streamline management and decision making.

1.9 In looking to the future, the Secretary-General identified some issues in the Region that the Association should consider when planning its future work programme, including the further improvement of the forecasting and warning capabilities of NMHSs; efforts to incorporate climate change adaptation in the national development strategies and plans as well as specific sectoral in addition to key traditional WMO initiatives like the Regional Climate Centres and GFCS; appropriate development and implementation of the WMO Integrated Observing System and the WMO Information System; enhanced efforts in disaster risk reduction; enhanced cooperation with other service providers and sectors as well as strengthened collaboration with the UN System Agencies and regional organizations; enhanced focus on public education and awareness-developing initiative; and sustainable human resources development.

1.10 He wished all the participants fruitful discussions and success in the future activities of the Association.

1.11 H.E. Mr Bambang Susantono, Vice-Minister for Transportation of the Republic of Indonesia extended a warm welcomed to all participants on behalf of H.E. Mr Freddy Numberi, Minister for Transportation. He remarked that the session met at the challenging time as climate change had posed for decades considerably serious challenges to human society and significantly impacted socio-economic development and the environment. H.E. Mr Susantono noted that after WCC-3, it had been acknowledged that many socio-economic sectors are highly sensitive to weather and climate extremes and decision-makers in these sectors are increasingly concerned by the adverse impacts of climate variability and change but are not sufficiently equipped to make effective use of climate information to manage current and future climate risks as well as ecosystems. He stressed that there is an urgent need not only for enhanced global cooperation in the development of accurate and timely climate information but also for the exchange of the information between providers and users of climate services, thus ensuring that relevant climate information is integrated into planning, policy and practice at various levels.

1.12 He stressed that the regional strategic plan to be discussed at the session will provide Members in the Region with the guidance for the implementation of the national programmes and will also build capacity, through enhanced international cooperation for development and transfer of technology and mobilization of resources, among national and regional meteorological service providers in Members in developing and least-developed countries, whose contributions are essential for improved climate information products at global, regional and national scales.

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

2.1 CONSIDERATION OF THE REPORT ON CREDENTIALS *(agenda item 2.1)*

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

2.1.2 The session was attended by 50 participants from 20 Members of Regional Association V (South-West Pacific), 7 observers from 3 Members from outside the Region, 11 observers from regional and international organizations. The list of participants is given in the appendix to the present report.

2.2 APPROVAL OF THE AGENDA *(agenda item 2.2)*

The Provisional Agenda for the session was unanimously adopted, as contained in XV-RA V/Doc. 2.2(2).

2.3 ESTABLISHMENT OF COMMITTEES *(agenda item 2.3)*

2.3.1 It was agreed that the work of the session be carried out by all plenary sessions to deal with the various agenda items. The General Plenary was to be chaired by the president and the vice-president, Plenary A co-chaired by Dr Gregory P. Ayers (Australia) and Mr Rajendra Prasad (Fiji), and Plenary B co-chaired by Dr Yap Kok Seng (Malaysia) and Dr Neil Gordon (New Zealand).

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

Nomination Committee

2.3.3 A Nomination Committee was established composed of the principal delegates of Australia, the Philippines and Tonga (Chair).

Coordination Committee

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

2.4 OTHER ORGANIZATIONAL MATTERS *(agenda item 2.4)*

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

2.4.2 The Association designated Mr Sionetasi Pulehetoa (Niue) as rapporteur on Agenda item 9 – Review of previous resolutions and recommendations of the Association and of relevant Executive Council resolutions.

2.4.3 The Association agreed to waive the Regulation 109 during the duration of the session.

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

3.1 The Association noted with appreciation the report of the president of RA V which provided an overall review and assessment of the major activities of the Association since its fourteenth session and expressed satisfaction at the effective manner in which the activities of the Association were being undertaken. The president also highlighted the issues that the Association would have to address, such as the development of the Strategic Plan for the Enhancement of NMHSs in RA V; the future working mechanism of the Association; and other priority activities, including the implementation of Quality Management System (QMS) and the designation of a Regional Climate Centre(s) (RCC(s)) in the Region.

3.2 The Association commended its president, Mr Arona Ngari (Cook Islands), for the dedication, enthusiasm and initiative with which he 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, Dr Sri Woro Budiati Harijono (Indonesia), for her valuable contribution to the work of the Region. It also expressed its appreciation to the chairs and members of the working groups and rapporteurs, who had effectively collaborated in carrying out the activities of the Association.

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

3.4 The Association, in considering the tsunami in April 2007 which affected Solomon Islands and another tsunami in September 2009 which affected American Samoa, Samoa and Tonga, recognized that the setting up of effective and sustainable tsunami warning systems became an important task for Small Island Developing States (SIDS) and Least Developed Countries (LDCs) in the Region. In most of these countries, NMHSs were designated authorities for issuing tsunami warnings. The Association noted that NMHSs had demonstrated the improved collaboration and coordination with national disaster risk reduction and disaster management agencies, and in the case of tsunami warnings, the Pacific Tsunami Warning Centre (PTWC). This has been demonstrated for example in the recent Chile tsunami in February 2010. The Association also noted the excellent progress in the development of the Indian Ocean tsunami early warning and mitigation system composed of a coordinated system of national tsunami early warning and mitigation systems. However there is still a need for further improvement in the overall early warning systems, including human resource capacity development. In this regard, the Association requested the Secretary-General to continue providing assistance to Members in establishing multi-hazard early warning systems; and to enhance partnerships with international and regional organizations for capacity development in the Region, notably with other UN agencies in accordance with the recent “UN: Working as One” initiative.

3.5 The Association also recognized that Members of the Region were affected by natural disasters during the intersessional period, including: the earthquakes and tsunamis in Indonesia in July 2006 and September 2009; mudslides and floods in the Philippines affected by Typhoons Durian in November-December 2006 and Ketsana in September 2009; the tsunami which affected Solomon Islands in April 2007; the tsunami which affected American Samoa, Samoa and Tonga in September 2009; abnormally high sea levels which affected the Federated States of Micronesia, Kiribati, Marshall Islands, Papua New Guinea and Solomon Islands in late 2008; floods which affected Solomon Islands, Fiji and other Members and; tropical cyclones such as Oli and Tomas, Pat and Rene affecting Fiji, Cook Islands and Tonga, respectively.

3.6 The Association further recognized that other natural hazards such as coastal floods caused by abnormally high sea levels, tropical cyclones and floods affected Members of the Region. The Association encouraged its Members to continue to improve their warning systems and requested the Secretary-General to support them in these efforts through facilitating provision of infrastructure for operational exchange of forecasts, warnings and other information on a real-time basis through the implementation of regional components of WMO programmes such as the Storm Surge Watch Scheme (SSWS), the Severe Weather Forecast and Disaster Risk Reduction Demonstration Project (SWFDDP), Pacific-HYCOS and South-East Asian (SEA)-HYCOS to support multi-hazard early warning systems. The Association noted with satisfaction the president’s report highlighting the progress in the implementation of SWFDDP in the Region in a complete end-to-end cascading process with a pilot phase.

3.7 The president noted the WMO Fact-Finding Mission to Fiji in August 2007 and assistance provided to Fiji including human resources development, and the Association supported his view that the Secretary-General should continue to give high priority to strengthening the capacity of the Fiji Meteorological Service (FMS)/RSMC Nadi-TCC to ensure providing tropical cyclone-related services and aviation services to Members in the Region.

3.8 Noting that there is still a need to improve the capabilities of NMHSs in the Pacific region to access sophisticated products in the preparation and dissemination of weather information and products and timely warning for severe weather and climate extremes, the president suggested that the Association request the Secretary-General and Members to give special attention to the communication technology issues in the Region.

3.9 The Association acknowledged the roles of the Regional Office for Asia and the South-West Pacific and the WMO Office for the South-West Pacific in various regional capacity development activities, facilitating implementation of WMO regional events, maintaining close contact with Members, providing support to meet Members requirements, and addressing WMO cross-cutting programmes, all being carried out in close collaboration with Members and relevant regional organizations.

3.10 The Association expressed a warm welcome to the Democratic Republic of Timor-Leste for a new membership with WMO (22nd Member of RA V) as from 4 December 2009. In this regard, the Association was pleased to note that Marshall Islands, Palau and Tuvalu had taken the necessary steps to becoming Members of WMO following continuing discussions and missions carried out by the president of RA V and the Regional Director for Asia and the South-West Pacific in November 2009.

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

4.1 ENHANCED CAPABILITIES OF MEMBERS TO PRODUCE BETTER WEATHER FORECASTS AND WARNINGS *(agenda item 4.1)*

Global Data-processing and Forecasting System (GDPFS)

Severe Weather Forecasting Demonstration Project (SWFDP)

4.1.1 The Association noted that the CBS Severe Weather Forecasting Demonstration Project (SWFDP) had achieved significant results and benefits for developing countries, underpinned by the GDPFS, and delivered improved warning services through the Public Weather Service (PWS), as had been experienced through its regional sub-project in southern Africa (RA I).

4.1.2 The Association anticipated similar benefits through the sub-project in RA V, entitled: “Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP)” for the South Pacific Islands, which commenced its pilot phase in November 2009. Participating Members, including Fiji, Samoa, Solomon Islands and Vanuatu, and the regional centres RSMC Darwin, RSMC Nadi, and RSMC Wellington, were all encouraged to carry out the Implementation Plan fully and to provide their earliest feedback and on a routine basis on progress and issues to the project’s Regional Subproject Implementation Team, so that a comprehensive evaluation of the sub-project could be performed, and gaps and areas of improvement be identified. The Association also expressed its appreciation to the global products centres Met Office (United Kingdom of Great Britain and Northern Ireland), NCEP (United States of America), and the ECMWF for their continuous support and, in particular, for participating in the SWFDDP. The Association also expressed its appreciation to MetService (New Zealand) for its substantial contribution to the web portal, training and provision of routine guidance products.

4.1.3 The Association noted that the overarching objective for SWFDDP was to raise the operational capacity of limited NMHSs in the Region to produce and deliver to users, including the public, effective longer range severe weather alerts and warnings for the people in their own countries. Another goal is to strengthen the role of the various RSMCs in their services to countries in the Region including RSMC Nadi–TCC in its provision of tropical cyclone warning services.

4.1.4 The Association encouraged its Members to identify areas for improvement in severe weather forecasting and in warning services, possibly for inclusion in, or in coordination with, the plans

for SWFDDP, which can then be addressed through capacity and resilience building activities under various regional programmes. It suggested, for example, to establish links to National Disaster Management Offices (NDMOs) and the Disaster Risk Reduction Community from the outset, and to focus on improvement in Public Weather Services.

4.1.5 The Association endorsed the plans for the SWFDDP to include other Members in the full demonstration phase planned to commence in late 2010, and agreed with the idea of extending a RSMC operational guidance area to a new "western window" in the future. It suggested that this possibility of setting up a similar guidance area north of the equator be examined.

4.1.6 The Association noted that through the SWFDDP, guidance could be developed on how WIS and WIGOS would better support the forecasting and service delivery functions of the NMHSs, and assist RSMCs to fulfil their responsibilities. It also emphasized the importance of NMHSs in engaging end-users to facilitate enhancements in public and marine weather services' contributions to national development (socio-economic benefits), and to strengthen links with natural disaster management organizations. Additionally, the Association indicated that the SWFDDP could take on other areas of interest at some later stage.

Status of the GDPFS

4.1.7 The Association noted that the number of centres operating NWP systems had increased since the last session. Indonesia, Malaysia and the Philippines currently operated limited area models and, in the case of Malaysia, included wave and storm surge models. Additionally, WMC Melbourne had been designated as a Global Producing Centre (GPC) for seasonal to interannual forecasts based on ensemble predictions from a coupled ocean–atmosphere model.

4.1.8 The Association encouraged Members to increasingly integrate outputs from ensemble prediction systems (EPS) into the process of forecasting to enhance the production of forecasts and warnings, and noted that continuing support for capacity-building in the use of EPS products was needed, especially in developing countries. It agreed that the inclusion of EPS outputs in the SWFDDP is central to demonstrating methods for extending the lead time for alerting of severe weather.

4.1.9 The Association requested Members to continue to provide status information on their respective NWP forecasting systems to the annual report of the "WMO Technical Progress Report on GDPFS including NWP Research". It also encouraged Members to include information on areas of specialized NWP-related predictions and applications, such as for sea-state, air quality, and other environmental predictions.

GDPFS – Long-Range Forecasts

4.1.10 The Association noted the significant progress made by the designated Global Producing Centres (GPC) of Long-Range Forecasts, including GPC Melbourne, which was also designated as the Lead Centre for LRF Verification in collaboration with GPC Montreal. It requested Members to continue to enhance collaboration among regional and national climate information and prediction centres to benefit from the outputs of the GPCs. The Association noted that GPC Melbourne had been contributing to the Multi-Model Ensembles (MME) efforts at the Lead Centre for Multi-Model Ensembles, jointly operated by GPC Washington and GPC Seoul, which in turn had been making available standard MME products to all WMO Members.

4.1.11 The Association urged its Members to continue to contribute to the joint CBS-CCl efforts, in order to ensure successful implementation and operation of Regional Climate Centres (RCCs) and to foster improved coordination of all relevant aspects of climate information and prediction services (monthly, seasonal and longer-term).

4.1.12 The Association noted that following the World Climate Conference-3, and in the context of developing a Global Framework for Climate Services (GFCS), the GPCs and other regional centres

would be expected to play a major role in providing global climate predictions from seasonal to longer timescales.

Aeronautical Meteorology – aviation forecasting

4.1.13 The Association noted that the Commission for Aeronautical Meteorology, at its fourteenth session (CAeM-XIV, Hong Kong, China, February 2010), discussed the concept of a "New Terminal Weather Forecast", encompassing information on weather phenomena and parameters impacting the safety and regularity of aviation operations in the wider terminal manoeuvring area, i.e., out to a distance of between 50 and 80 nautical miles (90 to 150 km). The Association also noted that these new forecasts would be directed at Air Traffic Management, Air Traffic Control and airline operations control offices with the aim to support their arrival and departure planning. The concept was based on existing projects in a number of Members and aimed to harmonize these efforts in order to achieve a higher efficiency by avoiding parallel developments and pooling of development resources, and to provide a standardized user interface to minimize confusion of different user communities. The further development of this new forecast type would be undertaken in close coordination with relevant study groups of ICAO and user representatives from the ATM and airline communities.

4.1.14 The Association noted the outcomes of CAeM-XIV concerning plans proposed by the ICAO Meteorological Warnings Study Group (METWSG) to establish a trial for the provision of advisory messages prepared by lead States. Such trial advisories could support the issuance of SIGMET for convection, turbulence and icing in a similar way as existing advisories on volcanic ash and tropical cyclones currently provided by the relevant Volcanic Ash Advisory Centres (VAACs) and Tropical Cyclone Advisory Centres (TCACs), respectively. Recognizing the safety implications of documented deficiencies in the provision of SIGMET, the Association strongly requested its Members to ensure full cooperation with relevant bodies in the Region such as national volcanic observatories, in operating the tests planned to take place in 2011. The Association noted the pressure from aviation stakeholders to establish a regional SIGMET system in response to the non-issuance of SIGMETS in some areas. It considered that were such changes to achieve operational status this could have profound implications for existing aeronautical forecast centres of Members of the Region, and so urged every Member to fully meet its existing aeronautical meteorological service requirements and requested the Secretary-General to focus capacity-building efforts in this area.

Marine Meteorological Forecasting

4.1.15 Noting the difficulties in achieving reliable forecasts of sea state and extreme wave and storm surge events, the Association requested its Members to improve the collection and dissemination through the GTS of wave, sea level and ocean surface meteorological observations to support the assessment of marine-related hazards via numerical modelling and verification. Additionally, the Association was pleased to note the expansion of the wave forecast verification scheme to include validation against remote sensed data, including wave spectra and surface vector wind. This would further improve monitoring and forecasting capabilities of severe events from extreme sea state conditions in data sparse ocean areas where storms are generated and propagated. The Association encouraged its Members to disseminate their data in order to further develop the scheme and to make maximum use of the verification scheme applications for marine forecasting purposes.

4.1.16 The Association was pleased to note that JCOMM had been supporting the development and implementation of the SWFDDP for the South Pacific Islands, which includes a component on damaging waves, both in terms of guidance information from the RSMC Wellington (New Zealand), and also through its dedicated website, on which sea state forecast products sourced from the ECMWF, and Met Office (United Kingdom) have been made available. Relevant products will also likely be made available to the project by NOAA/NCEP (United States), JMA (Japan) and Météo-France.

4.1.17 The Association recognized that probabilistic forecast of ocean wave height provides early guidance of extreme events, and the combined use of deterministic and probabilistic wave forecast

guidance would help the NMHSs in their risk assessment at an early stage in forecasting and improving marine-related decision-making processes. In this context, the Association was pleased to note that the ECMWF had provided EPS products, including probabilistic forecast of ocean wave height exceeding specific thresholds and Wave EPSgrams, to participating Members in the SWFDDP. The Association encouraged these Members to make maximum use of these products and to provide feedback on their utility to the ECMWF. The Association requested the ECMWF to consider providing technical expertise for building capacity of these Members in the implementation and use of such products in the marine forecasting process. Additionally, it requested the Secretary-General to ensure that capacity-building activities aimed at promoting and facilitating the access and use of such forecasts be continued and expanded to all Members in the Region.

4.1.18 The Association noted that a JCOMM/CHy project for building improved risk assessment and operational forecasts and warnings capability for coastal inundation had been initiated. The major outcome of this project would be the development of an effective software package involving both ocean and hydrological models to enable an assessment and forecast of total coastal inundation from combined extreme events. The Association reinforced the importance of an integrated effort for developing and improving forecasting capabilities and service delivery in coastal risk reduction by building and/or strengthening the cooperation among relevant programmes and technical commissions, and making use of existing frameworks or projects, including the SWFDDP.

4.1.19 The Association noted that met-ocean forecasting systems, as a central component of an end-to-end system for service delivery, including warning services, depended heavily on outputs of numerical ocean prediction (NOP) systems. These systems were being implemented in a number of GOOS Regional Alliances (GRAs), including the PI-GOOS and SEAGOOS, through pilot and demonstration projects. The Association strongly encouraged its Members to strengthen relationships with these bodies in the Region, in order to participate in and benefit from such activities, and also other ocean projects of the GRAs of relevance to NMHSs.

4.1.20 The Association recognized the value of the *Guide to Wave Analysis and Forecasting* (WMO-No. 702) and other relevant technical guidance publications in ensuring the provision of high quality, accurate, consistent and timely operational forecast products. In the same context, the Association noted that the English version of the first edition of the *JCOMM Guide to Storm Surge Forecasting* had been prepared, and would be published and available shortly.

Tropical Cyclone Forecasting

4.1.21 While recognizing that ensemble prediction techniques had achieved a high level of accuracy in tropical cyclone track forecasting, the Association noted that there was an increasing need for including uncertainty information in the forecasts for more effective disaster risk assessment. It therefore encouraged RSMCs and NMHSs to further exploit the use of ensemble techniques in tropical cyclone forecasting and probabilistic forecasts.

4.1.22 In this respect, the Association gave great attention to the two new projects which TCP and WWRP have jointly implemented for the Typhoon Committee Members to improve and exploit the use of ensemble prediction in tropical cyclone forecasting: the NW Pacific Tropical Cyclones Ensemble Forecast Project and the Typhoon Landfall Forecast Demonstration Project. Noting that those projects would facilitate the practical application of EPS products to the operational forecast, the Association requested the Secretary-General to take necessary actions towards development of the projects for other Regions including the South-West Pacific.

4.1.23 The Association noted with appreciation that Members in the Region and international agencies, such as SPREP and JICA (Japan), had provided significant support to the Fiji Meteorological Services in fulfilling its responsibilities as RSMC Nadi – Tropical Cyclone Centre. In view of its current difficulties, the Association emphasized that efforts should be continued to secure such support for improving and enhancing tropical cyclone forecasting and warning capabilities and capacities of the RSMC Nadi.

4.1.24 The Association noted that the RA V Tropical Cyclone Committee (TCC) for the South Pacific and South-East Indian Ocean had served as a very important platform for the implementation of the SWFDDP and the Storm Surge Watch Scheme (SSWS) in this Region. It recognized such performance as one of the essential aspects of the Committee leading to improved capability in tropical cyclone forecasting and warning services and related disaster risk reduction. The Association requested the Committee to continue to work closely with the Regional Sub-project Management Team (RSMT) for SWFDDP and the SSWS Action Team in order to ensure that both projects achieve their expected outcomes.

4.1.25 The Association noted that the eighth Southern Hemisphere Training Course on Tropical Cyclone and Public Weather Services (Melbourne, Australia, September/October 2009), which was closely linked with the SWFDDP, had made a significant contribution to a sustained development of tropical cyclone forecasting and warning services provided by NMHSs in the Region. The Association stressed that such training events should be repeated, and requested the Secretary-General to continue to provide necessary resources and any other support to these training activities.

4.1.26 The Association recognized that operational tropical cyclone forecasting, particularly intensity forecasting, was still a serious challenge to many NMHSs and that technology transfer and transition from research to operational forecasting was essential. Noting that the International Workshop on Tropical Cyclones (IWTC) had been serving 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 tropical cyclone forecasters and researchers from Members in the Region to participate in the IWTC-VII, which would be held in La Réunion, France, from 15 to 20 November 2010.

4.1.27 The Association noted that the "Global Guide to Tropical Cyclone Forecasting" had been updated, and was currently under review. The Guide included topics/techniques/ methodologies such as forecasting of tropical cyclone track, intensity, rainfall and strong winds, and storm surge forecasting, societal impacts assessment, and warning and response strategies, etc. to satisfy the need for comprehensive enhancement of capabilities in tropical cyclone-related disaster risk reduction. The Association further noted that an e-version of the Guide would be published on the WMO Website by the IWTC-VII, in view of cost saving and easier access.

4.1.28 The Association noted the excellent work being done by the RA V TCC through their Tropical Cyclone Operational Plan and the 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. The Association adopted Resolution 1 (XV-RA V) – Tropical Cyclone Operational Plan for the South Pacific and South-East Indian Ocean. The Association approved the amendments to the Operational Plan and the updates of the Technical Plan recommended by the Tropical Cyclone Committee, at its thirteenth session (Bali, Indonesia, April 2010). The Association endorsed the recommendations of the Thirteenth Session RA V TCC as contained in Annex I to the present report.

Research and Development: Transition from Research to Operations and Next Generation Systems for Weather Forecasting

4.1.29 The Association noted the benefits to its Members from participation in Forecast Demonstration Projects (FDPs, e.g., Sydney 2000) and concurred with the recommendation of the Executive Council Research Task Team (EC-RTT) that two-way interactions between research, users and operations should begin early in the FDP planning process to help focus basic and applied research on user needs and ensure a more rapid transfer of research to operations and end-users. In addition to those projects mentioned in paragraph 4.1.22, for RA V, research, operation (including RSMCs) and user interaction was urged in the eventual incorporation of the Global Interactive Forecast System/THORPEX Interactive Grand Global Ensemble (GIFS-TIGGE) products for tropical cyclones and possible heavy rainfall into the SWFDDP.

4.1.30 The Association recognized the progress in the WMO Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) and the potential of this project to transit from research to operational forecasting. The Association encouraged its Members impacted by dust events to consider partnership with SDS-WAS. In addition, the Association urged its Members to work with GAW and the World Weather Research Programme to explore the development of similar capability for other aerosols (e.g., pollen, smoke and volcanic ash).

4.1.31 The Association noted that nowcasting can integrate a variety of observational platforms (e.g., radars, satellite, lightning detection systems and in situ observations) and concurred with the decision of CAS-XV (Incheon, Republic of Korea, November 2009) that noted the potential benefits of non-radar based systems to Members with limited radar capability. The Association urged its Members to identify nowcasting needs and to initiate further research into non-radar based and integrated nowcasting systems.

4.1.32 The Association noted the increased accuracy in the prediction of the genesis and intensity of tropical cyclones that can result from improvements in model resolution. The Association urged the research community in Members to quantify these benefits in deterministic models and to investigate the use of high resolution ensemble systems, such as proposed by the developing TIGGE LAM (Limited Area Modelling) project, and requested Members and the Secretary-General to continue to explore the potential for a research and development project over this Region to investigate this approach to improved prediction and to quantify the potential societal benefits.

4.1.33 The Association noted the potential benefits to RA V Members from the WWRP-THORPEX/WCRP research project called YOTC (Year of Tropical Convection) and urged Members to participate in this research effort which aims at improved representation of tropical convection and its two-way interaction with large-scale circulations in both weather and climate models. These improvements in modelling capabilities would, inter alia, produce improved predictions of tropical cyclones, monsoons and heavy rainfall, which are particularly relevant to RA V. The Association urged its Members to participate in and support WMO research efforts to advance prediction of these forecast problems.

4.1.34 The Association noted with appreciation the efforts of the monsoon activity centre in Kuala Lumpur and the recent development of three specialized data archive centres (China, Japan and the United States) for monsoon research by the WWRP. The Association noted that in some cases the observations required for these data sets extend to RA V and thus requested its Members to cooperate with requests from these centres for observations.

4.1.35 Following recommendations of the Sixth International Workshop on Tropical Cyclones (IWTC-VI) to develop a common set of metrics to evaluate the skill of seasonal tropical cyclone forecasts, a Website (http://www.wmo.int/pages/prog/arep/wwrp/tmr/SeasonalFcst.html) was established in September 2009 to provide a self-consistent set of seasonal tropical cyclone forecasts The Association encouraged its Members with seasonal tropical cyclone forecast capabilities to actively participate in this activity by contributing with their forecast products to the website.

4.1.36 The Association noted the progress made by the THORPEX programme and the development of Asian and Southern Hemisphere Regional Plans for THORPEX. The Association welcomed such efforts, especially the recent efforts by Members in RA V across the South Pacific under the THORPEX Southern Hemisphere Regional Committee, and urged its Members to support the implementation of regional priorities and support of THORPEX through contributions to the THORPEX Trust Fund at the WMO Secretariat.

4.1.37 Improvements in communicating predictions and their uncertainty could greatly benefit society, ecosystems and the economy and open new areas of application for NMHSs. Currently, investments in SERA research were a very small fraction of the funds spent on observational and modelling hardware for weather prediction. Thus, the Association strongly urged its Members to

support the priority research activities of a proposed IRDR-WWRP SERA effort through involvement of experts, financial support of projects and open availability of data sets for research. Specifically support was asked for the development of plans for a Warning Information System “Pre-demonstration Project” which is relevant to the Region. This will include a GIFS-TIGGE/TIGGE-LAM evaluation component and applications derived from existing efforts in the Region.

4.1.38 The Association took note of the substantial progress in weather research at WMO including the establishment of the WWRP-THORPEX programme and WWRP research efforts across nowcasting, mesoscale weather forecasting, tropical meteorology, societal and economic applications, and verification (joint with WGNE). The Association welcomed this progress as outlined in CAS-XV, thanked those Members who participated in these efforts and urged continued participation.

4.2 ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER CLIMATE PREDICTIONS AND ASSESSMENTS *(agenda item 4.2)*

Introduction

4.2.1 The Association recognized that WMO’s climate initiatives include the observations that sustain the climate models and underpin assessments, the research that develops climate science and models, specialized knowledge of the treatment and use of climate information for analysis and products, and the operational activities that assess and serve the needs of users for decisions relevant to climate risk management and adaptation to climate variability and change (predictions, products and services, etc.). Also important are the partnerships with organizations in climate-sensitive sectors and the enhancements of the capacity of the Members, particularly of their NMHSs and in developing and Least Developed Countries. The Association noted that WMO climate activities are duly presented with respect to Expected Results (ERs) 2, 5, 6, 7, 8 and 9.

4.2.2 The Association recognized the need to systematically assess the basic capability of NMHSs in the Region for making observations to monitor climate change and climate variability and for providing long-range forecasts and future projections. The Association agreed that the needs of its Members who have not fully developed these capabilities will have to be addressed as an important part of WMO’s ER 2-relevant activities in the Region.

Coordination and Guidance for ER 2

4.2.3 Noting that climate activities that fall under ER 2 are guided by a number of WMO and co-sponsored constituent bodies, including the Commission for Climatology (CCl), the Commission for Basic Systems (CBS), the Commission for Atmospheric Sciences (CAS), the Commission for Instruments and Methods of Observation (CIMO), the Joint (WMO/Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO)) Technical Commission for Oceanography and Marine Meteorology (JCOMM), the Joint Scientific Committee of the World Climate Research Programme (WCRP JSC) and the Steering Committee of the Global Climate Observing System (GCOS SC), the Association urged enhanced interaction and coordination between these bodies, including those at regional and national levels.

4.2.4 The Association noted the outcomes of the fifteenth session of CCl at Antalya, Turkey, during 19–24 February 2010, and the Technical Conference on “Changing Climate and Demands for Climate Services for Sustainable Development” organized immediately prior to the CCl session. The Association noted with appreciation that a special joint session of WCRP JSC and CCl was also organized as part of the Technical Conference.

4.2.5 The Association recognized that climate adaptation is an emerging priority, and agreed that considerable effort and coordination will be required across the Region to establish operational climate services that will support effective decision-making on matters related to the impacts of climate variability and change. The Association noted the efforts made by Indonesia in enhancing the role of NMHSs in adaptation to climate change in water sector by organizing an International Seminar on 24

March 2009 on the topic. The Association further recognized that the special focus of WMO on agriculture and water sectors through the Commission for Agricultural Meteorology (CAgM) and the Commission for Hydrology (CHy) provides unique opportunities to contribute to climate user interface mechanisms.

Climate Monitoring and Assessment

4.2.6 The Association was informed on data rescue activities in the Region and welcomed the WMO plan to undertake data rescue and the analysis of climate variability and change as a joint theme in WMO seminars and workshops related to climate data management. This strategy allows increased appreciation of the value of historical climate data in climate-development issues and therefore the need for accelerating data rescue process in the countries. The Association was also informed of the data rescue process launched in the Mediterranean Basin (MEDARE) to increase multi-national and regional collaboration in rescuing and digitizing old climate records that are needed for climate research, monitoring and climate change adaptation studies, and urged its Members to undertake a similar collaborative approach. The Association noted with appreciation the data rescue activities undertaken over recent years by the Australian Bureau of Meteorology, with funding provided by the Australian Government. These activities have included securing at-risk climate records, creating inventories, and establishing best-practice records management systems and in some cases digitization programs, in a number of countries within the Region. These activities are continuing under the Pacific Climate Change Science Project (PCCSP), with funding provided by the Australian Government.

4.2.7 The Association noted the initiative taken by Australia as part of PCCSP to develop a Climate Database Management System (CDMS) for Small Island Developing States (SIDS) in the Pacific, building on other systems including ClimSoft. The system will have a user friendly web-based interface using open source software. It will also have WMO-compliant functionality in terms of messaging and encoding, and WIS compliance and will support a future GIS capability. The Association called on its Members to continue to support Australia's further development of this initiative. The Association noted and supports the desirability of ongoing collaboration between this initiative, and the broader ongoing CDMS development and implementation strategy being adopted by CCl.

4.2.8 The Association noted with appreciation the continuous contribution of RA V Members to the WMO statements on the status of the global climate system as well as to the WMO climate review publications. It noted in particular the prominent role played by the Australian Bureau of Meteorology for the WMO annual statement on the status of the global climate. The Association urged all Members to contribute, by providing relevant climate information based on their monitoring activities, to enhance the coverage of WMO annual statements, particularly with respect to extremes.

4.2.9 The Association appreciated the efforts of the Joint CCI/WCRP-CLIVAR/JCOMM Expert Team on Climate Detection and Indices (ETCCDI) to promote cooperative development of indices on extremes and welcomed the *Guidelines on Analysis of Extremes in a Changing Climate* (WMO/TD-No. 1500) developed by the team. The Association further appreciated the joint collaboration of Indonesia and the Netherlands to carry out a multi-year project, including seminars on climate indices with the participation of countries in the Indonesian Archipelago, including Indonesia, Malaysia, Thailand and the Philippines and noted that an International Workshop on Data Rescue (DARE) was held in Bogor, Indonesia from 7–11 December 2009 where the expert from the Netherlands introduced the ETCCDI software (RClimdex) as a tool for analysis the indices of extreme. The Association urged Members to sustain and enhance such collaborations for the benefit of the Region. It urged Members to promote the use of ETCCDI software and knowledge by NMHSs, in close collaboration with universities and Research Centres and continue their technical and scientific support to the ETCCDI activities.

4.2.10 The Association, noting that a process was underway to evaluate the feasibility of a WMO Global Cryosphere Watch (GCW), expressed its support for the GCW concept, and urged the

Secretary-General to strengthen the relevant mechanisms to guide GCW development and potential implementation.

Climate Modelling and Prediction Research

4.2.11 The Association expressed its satisfaction with the continuing progress of WCRP in international coordination and integration of climate research, and particularly its key contributions to the IPCC AR4 and WMO/UNEP 2006 ozone assessment, search for sources of predictability on seasonal to decadal timescales, and development of coupled climate system models. The Association noted with interest the outcomes of the GCOS, WCRP and IGBP Workshop "Learning from the IPCC Fourth Assessment Report" (Sydney, Australia, October 2007).

4.2.12 The Association noted with significant interest the start of the WCRP CMIP5 climate model intercomparison and that the experiment includes both centennial model runs and pilot decadal predictions. It also took note of a possible availability of the downscaled climate products for the Region in the result of implementation of the WCRP COordinated Regional climate Downscaling EXperiment (CORDEX) project. It encouraged its Members to make use of the archived global and regional climate predictions and projections in assessing the impacts of climate variability and change on their regions and areas of activity.

4.2.13 The Association noted with appreciation the success of the WMO/ICSU International Polar Year (IPY) during 2007–2008 and the many related fruitful polar activities, in which RA V scientists played a key role, for example, in the design of the Southern Ocean Observing System (SOOS).

4.2.14 The Association recognized the significant contribution of the WCRP Stratospheric Processes and their Role in Climate (SPARC) Project to the series of the WMO/UNEP Scientific Assessments of Ozone Depletion. Taking into account the predictions of the Stratospheric Ozone Depletion which are very important for the Region, the session noted the results of the SPARC Chemistry-Climate Model Validation Activity, which produced a series of numerical predictions suggesting the recovery of the stratospheric ozone layer in the twenty-first century due to a decline in the atmospheric burden of ozone-depleting substances.

Climate Information and Prediction Services

4.2.15 Recognizing a need for transition of results from climate research to the operational practices of regional and national centres, the Association urged the Secretary-General, CCl and the WCRP JSC to facilitate the development and operational implementation by Members of new or improved climate prediction techniques by including tropical island climate phenomena such as coriolis force and typical microclimate with super high horizontal resolution and to provide technical guidance to NMHSs through closer coordination of their activities at the regional and national levels.

4.2.16 The Association noted with satisfaction the sustained operation of the Pacific Island Climate Outlook Forum (PICOF) through the Pacific Islands-Climate Prediction Project (PI-CPP) funded and coordinated by Australia. The Association expressed its support to the PI-CPP project to use not only a statistical model but also a simple dynamic model that can be run with limited resources. The Association agreed that the Island Climate Update (ICU) coordinated and supported by New Zealand, and Pacific ENSO Applications Climate Centre (PEAC) supported by the United States, have also been making significant contributions to the RCOF process in the Region. The Association recognized the active support and leadership of Members in the establishment of Regional Climate Outlook Forums (RCOFs) in the Region, and expressed its deep appreciation for their demonstration of cost-effective implementation of RCOF process through teleconferences and online interactions. The Association urged all the concerned Members to sustain these efforts and expand the process to include cooperative assessments of climate change for the Region. The Association expressed the need to improve the Pacific Island Climate Outlook Forum and involve additional tropical island countries in the process.

4.2.17 Noting with appreciation the new initiative to extend the CLIPS project to polar regions through a WMO WCRP IPY Workshop on CLIPS in polar regions, and the agreement to work towards establishment of a Polar Climate Outlook Forum (PCOF), the Association urged all Members with polar interests in either hemisphere to actively contribute to the relevant efforts to identify the priority user requirements in the polar regions for climate information. The Association was informed that the second session of the WMO Executive Council Panel of Experts on Polar Observations, Research and Services (EC-PORS) is being hosted in Hobart, Australia, in October 2010 and will examine polar monitoring services which will be relevant in extending CLIPS to polar regions.

4.2.18 The Association expressed its appreciation to Members contributing to the development of consensus-based updates of El Niño and La Niña issued by WMO. In addition, the Association urged the CCl and WCRP CLIVAR to expand this process by including development of updates on other major oscillations that affect the climate of the Region.

4.2.19 The Association urged all Members in the Region to optimally utilize the products of the network of Global Producing Centres for Long-range Forecasts (GPCs) and the associated Lead Centres, and urged the CCl and CBS to promote and guide the uptake of GPC products within RCC, RCOF and NMHS activities for operational climate prediction. The Association urged continued collaboration among Members to ensure that all benefited from the progress being made in this area.

Regional Climate Centres (RCCs)

4.2.20 The Association noted that the formal procedures for the establishment of WMO Regional Climate Centres (RCCs), including the definitions and designation criteria of RCCs, have been included as amendments to the *Manual on the Global Data-processing and Forecasting System* (GDPFS), Volume 1 – Global Aspects, as approved by EC-LXI.

4.2.21 The Association reaffirmed its commitments to establish RCCs to serve the climate information needs of RA V Members. The Association noted that considerable attention had been given to the matter of assessing the needs and capabilities in the Region for climate services and urged the president of RA V to assess the needs and capabilities in the Region for climate services, and to develop an implementation plan for the establishment of RCCs in the Region. The Association urged potential RCC hosts to build, under the guidance of the president of RA V, CCl, CBS and the WMO Secretariat, demonstrable and sustainable capacity for all the mandatory RCC functions defined in the GDPFS Manual and, where possible, the highly recommended functions. Accordingly, the Association adopted Resolution 2 (XV-RA V) – Establishment of Regional Climate Centres.

4.2.22 The Association urged GPCs to continue and to reinforce their inputs to RCCs. The Association urged its Members to extend their active support to the implementation of RCCs in RA V and requested the potential RCC hosts to adequately address the needs of the Members in the Region while planning their operational activities.

Capacity-building for Improved Climate Prediction and Assessments

4.2.23 The Association noted with appreciation that several Members and international organizations had actively contributed to CLIPS-related training activities in the Region. The Association further appreciated the efforts of NOAA, NIWA and the Australian Bureau of Meteorology in capacity-building in both regional and extra-regional projects. Notwithstanding these efforts, Members recognized the special needs of developing countries in the Region for provision of a full range of climate predictions and assessments.

4.2.24 The Association agreed that the current components of the CLIPS Curriculum needed to be further developed into complete, self-contained modules that could be integrated into regular training activities, and urged Members and the concerned bodies of RA V to formulate a coordinated strategy to meet this need.

Adaptation to Climate Variability and Change

4.2.25 The Association, noting the great concern the governments in the Region had on climate change and related environmental issues, recognized that NMHSs need to have the capability to provide relevant advice to their governments and policymakers. In this connection, the Association was pleased to note that representatives from the Region attended the Inter-Regional Workshop on Policy Aspects of Climate Change, held in Petaling Jaya, Malaysia (19–21 April 2010). The Association also noted with appreciation the work being undertaken on climate change adaptation under the PCCSP.

4.2.26 The Association noted that EC-LX had endorsed the concept of a new WMO initiative to support adaptation to climate variability and change, with the mission 'To strengthen coordination and enhance the provision of user-oriented climate information, products, advisories and services and to thereby support national and regional climate-risk assessment, climate adaptation planning and implementation practices for sustainable development'. The Association noted the needs of key socio-economic sectors across the Region for climate information for climate-risk management, the requirements of Members for developing reliable climate scenarios, and assessing the inherent uncertainty, and the vulnerability of Members in the Region, particularly the Small Island Developing States (SIDS), to climate-related hazards. The Association was pleased to note that the key aspects of this initiative have been integrated into the Global Framework for Climate Services (GFCS), the overarching outcome of World Climate Conference-3, and urged the Secretary-General and the CCl to actively pursue these efforts.

4.2.27 The Association recognized the benefits to the Region of establishment and sustained operation of global and regional mechanisms for providing climate information (e.g., GPCs, RCCs, RCOFs), for improving capability of Members to support adaptation to climate variability and change, in particular to engage in and improve user liaison and development and delivery of products and services to users at national and local scales. The Association therefore urged the Secretary-General to strongly promote these mechanisms as part of the overall WMO contribution to the GFCS.

4.2.28 The Association further recognized the need to promote climate applications in key socio-economic sectors and appreciated the CCl initiatives to support climate applications in agriculture, water resources, health, energy, tourism, urban and building sectors. The Association, noting the need for partnerships with user sectors to realize more effective climate applications, appreciated the efforts of WMO to sustain longstanding partnerships with UN agencies such as FAO, WHO, UNWTO, UNEP, UNESCO and other international organizations. The Association urged its Members to complement these efforts by working towards strengthening partnerships between NMHSs and user agencies at the national level.

4.2.29 Recognizing the need to establish a baseline for the extent to which WMO Members are currently engaged in sector-specific activities relevant to Adaptation to Climate Variability and Change, the Association appreciated the online survey launched in October 2008 by the WMO Secretariat. The Association noted that the outcomes of the survey would address key gaps and build on current strengths of efforts for adaptation measures. The Association urged all Members to provide the required inputs to make the results comprehensive.

World Climate Conference-3 (WCC-3)

4.2.30 The Association appreciated the successful organization of the World Climate Conference-3 (WCC-3) (Geneva, Switzerland, 31 August–4 September 2009). The Association thanked Members in the Region for their strong support to this important event. The Association appreciated that a number of experts from the Region contributed to the WCC-3 International Organizing Committee (WIOC) and also the scientific programme of the conference.

4.2.31 The Association noted that the Heads of State and Government, Ministers and Heads of Delegations present at WCC-3, through the Conference declaration, decided to establish a Global Framework for Climate Services (GFCS) to strengthen the production, availability, delivery and

application of science-based climate prediction and services. The declaration decided that a taskforce, consisting of high-level independent advisers, would recommend the proposed elements of GFCS. The Association noted that, subsequent to these decisions of WCC-3, WMO organized an Inter-Governmental Meeting of Member States on the High-level Taskforce on GFCS (IGM-GFCS) from 11 to 12 January 2010, in Geneva, Switzerland. The Association took note that the IGM-GFCS approved the Terms of Reference (ToRs) of the high-level taskforce and endorsed its composition, which included two members Prof. Emil Salim (Indonesia) and honourable (Mrs) Fiame Naomi Nataafa (Samoa) from Region V. The Association urged its Members to strongly support the follow-up actions of WCC-3, particularly with regard to the further development and implementation of GFCS.

4.3 ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE BETTER HYDROLOGICAL FORECASTS AND ASSESSMENTS *(agenda item 4.3)*

4.3.1 The Association noted that, in general, the needs of Members in the Region were adequately reflected in the activities of the Hydrology and Water Resources Programme given in the WMO Strategic Plan as approved by Fifteenth Congress and in the Secretariat Operating Plan.

4.3.2 The Association noted with appreciation the report of the chair of the Working Group on Hydrology (WGH), Mr Charles Pearson, (New Zealand). It noted the activities that had been undertaken during the period which had been identified at the previous RA V session in 2006 and the challenges related to hydrological issues in the Region. In particular, it noted with interest the progress on the following areas: (a) interaction between RA V-WGH and the Commission for Hydrology (CHy); (b) progress in WHYCOS projects; (c) organization of Flood Forecasting Workshop; and (d) organizing intermediate session for RA V-WGH.

4.3.3 The Association also noted the major challenges facing NHSs in the Region, including the limited availability of: maintenance and operating hydrological networks, instruments and equipment, flood forecasting and drought prediction, water resources assessment and training, as well as the limited regional presence of WMO and funding of NHSs. The Association noted with appreciation the offer of Indonesia to host a Regional Training Centre – Hydrology at the Research Centre for Water Resources, and the recommendation of the RA V Working Group on Hydrology on the desirability of having such a centre in the region. The Association felt that such a facility will assist in meeting the long-outstanding needs of the region on training in hydrology and water issues. Members expressed the need for designing the curriculum of the courses expressly keeping in view the particular situation and needs of countries in the region. The Association endorsed the proposal put forth by Indonesia and recommended to the Secretary-General to take action to progress its formal designation process.

4.3.4 The Association was informed about the outcome of the thirteenth session of the Commission for Hydrology (CHy). It took note that the Commission had re-established an Advisory Working Group (AWG) composed of nine members and had identified four Open Panels of CHy Experts (OPACHEs) on four thematic work areas: Quality Management Framework – Hydrology, Water Resources Assessment, Hydrological Forecasting and Predictions, and Water, Climate and Risk Management. The Association was pleased to note that Mr Bruce Stewart (Australia) was elected as president of CHy and encouraged Members to nominate experts to the OPACHEs set up for each thematic area, and to contribute actively to the work programme.

4.3.5 The Association welcomed the launching of the Help Desk for Integrated Flood Management on 17 June 2009 during the Global Platform for Disaster Risk Reduction and noted the broad based support to the initiative provided by several key partners from the Region.

4.3.6 The Association commended the number of manuals and guidelines which have been published or are under development in the framework of the Hydrology and Water Resources Programme and their usefulness in support of day-to-day activities of NHSs. It encouraged the translation of these publications into local languages to ensure wide use, and the provision, of training based on publications in order to make the best use of these resources. The Association also recommended the development of guidelines for ‘hydrological observations and processing within the

WMO Quality Management Framework-Hydrology, it also identified a need for integration within WIGOS through coordination with CHy and CBS.

4.3.7 The Association noted that Cg-XV had recognized that the regional Working Groups for Hydrology formed one of the strong mechanisms to project the specific needs of the Regions and that this was echoed by EC-LXI. It also noted that at the last meeting of the RA V WGH in December 2009 the participants stressed the need felt by all NHSs in the Region, for having a forum for networking, discussing and coordinating their activities as an integral part of RA V activities.

4.3.8 Recognizing the need to streamline the structure of the working groups in accordance with the Result-based Management (RBM) principles, the Association felt that any change in structure must ensure that the operational hydrological inputs from NHSs to the activities of the CHy are maintained. The Association took note of the proposal emanating from the WGH regarding the reformulation of deliverables of the RA V Strategic Plan.

4.4 INTEGRATION OF WMO OBSERVING SYSTEMS *(agenda item 4.4)*

4.4.1 Regional Association V discussed and agreed with the proposed actions on observing systems improvements to support WMO Members' activities in weather, climate and water, and their enhanced integration towards a WMO Integrated Global Observing System (WIGOS). It recognized that behind every weather, water, and climate condition forecasted, every disaster mitigated, and every prediction debated, are the observational data. WMO Members acting collectively achieve far more than any one could individually. Among all the collaborations of WMO Members, none is more crucial than their investments in the observing systems, collection and sharing of data and information.

Atmospheric Observations

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

4.4.2 The Association noted that owing to Members' efforts, the RBSN has demonstrated slightly improved performance. It appreciated the work done by the Working Group on Planning and Implementation of the WWW in Region V (RA V WG-PIW) to identify and address deficiencies in the observing programmes. It also appreciated the work done 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, the Association recognized that great efforts by Members should be made to further improve the data sustainability and availability performance to a satisfactory level to meet service requirements.

4.4.3 The Association noted with satisfaction that the RBCN in the Region continued to assure effective and consistent monitoring of the availability of climatological data. This progress is in part due to the joint Technical Support Projects of the United States NOAA GCOS programme and Met Service New Zealand, the CBS Lead Centres for GCOS, the WWW and GCOS Network Monitoring activities, and the GCOS system improvement programme. It stressed that in order to increase the availability of CLIMAT messages, further efforts by Members should be made to ensure that their operational observing stations compile and transmit the climate-related messages according to existing WMO regulations.

4.4.4 The Association agreed to the revisions of the RBSN and RBCN as compiled by the WMO Secretariat in consultation with the Chair of the RA V-WG-PIW and circulated among RA V Members prior to this session. By adopting Resolution 3 (XV-RA V) – 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 in Region V as given in Annexes 1 and 2 to this resolution.

4.4.5 The Association noted that problems existed in the mechanism of updating the designated National Focal Points (NFP) on both the RBSN/RBCN (GSN and GUAN) and Weather Reporting

Publication, No. 9, Volume A (Observing Stations). It recalled the concept of establishing the lists of NFP for the relevant observational programmes in the Region and urged Members to ensure an update of their designated NFP in a timely and regular manner. The Association also requested its Members, through their NFP, to make sure that Volume A correctly describes respective national observing stations.

4.4.6 The Association noted the decision taken by the Commission for Climatology (CCl-XV, Antalya, Turkey, 19–24 February 2009) in view of finalizing and publishing two peer-reviewed guideline documents on the use of AWS for climate and on capacity-building in climate observations for developing countries. It concurred with the Commission's request for Members to provide further assistance to the developing countries for maintaining their observation networks in order to sustain adequate observations with the required quantity and quality for climate.

4.4.7 The Association noted with appreciation the publication of a CD-ROM (WMO/TD-No. 1481, WCDMP-No. 68) enclosing seven previously published CCl guidelines covering climate observations, climate data management and data rescue; as well as a CD-ROM (WMO/TD-No. 1484, WCDMP-No. 70) providing guidelines on plant phenological observations. The Association further noted the importance for the NMHSs to make a wide use of these guidelines by distributing copies of these CD-ROMs to the relevant entities and the staff at the observation sites as appropriate.

Aircraft observations

4.4.8 The Association welcomed the discussion by the twelfth AMDAR Panel meeting (Toulouse, France, November 2009) regarding the further promotion of AMDAR in the Region. It supported the proposal that national and regional AMDAR Programmes consider additional coverage of AMDAR data outside the national territory to be provided to the GTS as a contribution to the WWW Programme. The Association noted the recent developments of the WVSS-II water vapour sensor currently under test in the United States and Europe and that the United States AMDAR Programme will provide a draft report on the evaluation testing being performed on the WVSS-IIv3 water vapour sensor to the AMDAR community to allow for a decision on its worldwide implementation.

4.4.9 The Association also noted the establishment of a new AMDAR Pilot Project that will encompass areas of the South-West Pacific. The Association encouraged operational AMDAR Programmes and those Members that are considering establishing their own operational AMDAR Programme in the Region to support the project by extending their national AMDAR coverage to include additional areas in the South-West Pacific.

Atmospheric Chemical Composition and UV Measurements

4.4.10 The Association recognized the important support by several Members for GAW Global stations in the Region, in Australia, Indonesia, Malaysia, New Zealand and USA (Mauna Loa and American Samoa) and welcomed the establishment of the two new GAW stations in central and eastern Indonesia. The Association agreed on the usefulness of the GAW Station Information System (GAWSIS, http://gaw.empa.ch/gawsis/) 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 GAW WDCs in a timely fashion.

4.4.11 The Association noted the importance of quality assurance and control activities regarding greenhouse gases and urged Members to continue, expand and participate in them as required. The Association acknowledged the greenhouse gases (GHG) total column observations performed by the Total Carbon Column Observing Network (TCCON), of crucial importance for the new GHG satellite-based measurement validation, and as complementary network of the surface GHG network. The Association encouraged the SAG-GHG to obtain an integration of total column ground- and satellite-based measurement systems with surface in situ GHG networks.

4.4.12 The Association recognized that atmospheric aerosols (i.e., suspended particulate matter) are a key component of GAW because of their importance in advancing climate change prediction, improvement of weather forecasts and reducing impact on human health and ecosystems of aerosols from air pollution, biomass burning and sand and dust. The Association thus recommended that Members continue and enhance the coverage, effectiveness and application of long-term aerosol measurements within the Region.

4.4.13 The Association noted that the lack of coherent information related to VOCs and NO_{xy} compound concentrations is recognized as a major gap in Earth observations and encouraged Members to continue and to enhance their observations of reactive gases.

4.4.14 Noting the current interest in vitamin D and UV and also the importance of UV in atmospheric chemistry, the Association recognized that it is important for Members to continue their efforts in UV measurements.

Marine and Oceanographic Observations

4.4.15 The Association noted that the implementation of marine observing networks had continued to expand in a substantial part of the Region thanks to the prominent role of Members in the Region. In particular, the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA) is now 52% completed and still developing. The Association urged its Members to invest additional resources in the further development of ocean observing systems in order to address the increasing needs for climate applications, and services.

4.4.16 The Association noted the establishment by JCOMM-III (Marrakech, Morocco, November 2009) of WMO-IOC Regional Marine Instrument Centres (RMIC) and invited its Members to offer such facilities in order to improve data quality, permit bias correction, and facilitate adherence of observational data, metadata, and processed observational products to higher-level standards. The Association adopted Resolution 4 (XV-RA V) – Support for the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology.

4.4.17 The Region noted the impact of the loss of QuikScat and the value of satellite ocean surface vector wind data, especially that from a QuikScat-like instrument. The Region stresses the importance of improving availability of ocean surface vector wind data as well as other microwave data and satellite radar altimetry (wave height) data noting that RADAR altimeters are essential for the real-time calibration of ocean wave models. Because of the narrow data swath, it is preferable that several platforms are available. The Region encourages Members and organizations involved in space based observations to address this issue.

Terrestrial Observations

Water Cycle

4.4.18 The Association noted the activities carried out by the experts of the RA V Working Group on Hydrology (RA V-WGH) related to the Pacific-HYCOS and the progress on developing a WHYCOS component for the South-East Asian countries. It also noted Members need to have standards for hydrological observations and processing, aimed at the compatibility of monitoring results within the framework of the WMO Quality Management Framework.

Polar and Cryosphere Observations

Polar Observations

4.4.19 The Association noted with appreciation the EC Panel of Experts on Polar Observations, Research and Services (EC-PORS) activities report (Annex II to the present report). Referring to the fact that there is no regional association covering the Antarctic region, the Association requested EC-

PORS to deal with the operational dimension of Antarctic activities. EC-PORS should lead the review and updating of relevant resolutions of Congress and the Executive Council, and of standard regulatory material relevant to the Antarctic. The Panel should communicate with WMO Members engaged in Antarctic activities, and explore modalities for communicating these resolutions to the Antarctic Treaty Consultative Meeting (ATCM). The Association requested interested Members to provide EC-PORS with a contact for their Antarctic activities.

4.4.20 Recognizing that Polar observation is a high priority in support of research and services that includes research and operational networks, satellite, in situ and new technologies, and includes issues of acquisition, exchange, access and ensuing products, the Association agreed that EC-PORS should acquire information on deficiencies in the implementation and operation of the networks and define possible measures to close gaps by identifying priorities. Satellite remote sensing is a very effective way to increase our ability to observe polar areas.

Global Cryosphere Watch (GCW)

4.4.21 The Association noted that GCW would be an integrator between water, weather, climate and the cryosphere (e.g., snow, ice, glaciers, permafrost) and requested EC-PORS to provide oversight and support to the GCW led by the efforts of the task team developing the observational framework.

4.4.22 The Association recognized the ongoing collaboration between BMKG, Indonesia, the Lamont Doherty Earth Observatory of Columbia University, and Ohio University in the United States, to explore a historical proxy record of the remaining tropical ice sheet over the Papua island for a reconstruction of regional paleoclimatic conditions.

Cross-cutting aspects

Space-based observation

4.4.23 The Association noted that the Vision for the GOS, approved by EC-LXI, called for the transition to operational status for several space-based missions currently performed in an R&D framework only. It encouraged cooperative efforts of R&D and operational agencies of Members, the Coordination Group for Meteorological Satellites (CGMS), the Committee on Earth Observation Satellites (CEOS) and WMO towards implementing this Vision. The Association noted with appreciation that the new Vision addressed climate observation needs with the high-level goal of avoiding gaps in satellite-based climate records. The Association stressed the importance of the Global Space-based Inter-Calibration System (GSICS) to ensure consistency of satellite datasets as required for climate applications.

4.4.24 The Association noted that the Region was heavily relying on operational geostationary satellite coverage for weather observation and in particular for typhoon or tropical cyclone monitoring. It noted that China, Japan, and the United States were developing a new generation of geostationary satellites, the FY-4, Himawari-8, and GOES-R series, respectively, that were currently planned to be launched in the 2014–2016 timeframe. While looking forward to the advanced capabilities of these satellite systems, it stressed the need to anticipate the impact on the ways and means to access and use the data. In order to ensure a smooth transition to the use of these new systems by WMO Members, it stressed the need to develop a user preparation plan in cooperation with the relevant satellite operators. The plan should address in particular user information, data access strategy, parallel operation scenarios, implementation of equipment and user training. The Association expressed concern over the planned termination of MTSAT direct broadcasting – relying solely on internet access to critical real-time data is deemed insufficiently robust, especially during severe weather episodes.

Instrument Standards and Best Practices

4.4.25 The Association noted that the Executive Council had adopted revised Terms of Reference (ToRs) for Regional Instrument Centres (RICs) and Regional Radiation Centres (RRCs) and that the WMO Congress and Executive Council had requested regional associations to further strengthen RICs/RRCs and to initiate the process of continuous evaluation of RICs and RRCs under their responsibility to verify their capabilities and performance. The Association requested its Members who operated RICs to declare their level of capability under the new ToRs and those who operated RICs and RRCs to carry out periodic evaluations, in liaison with CIMO if appropriate, and to report their outcomes to the next session of the Association. The Association also recommended to its RICs and RRCs to advertise their capabilities on their website to improve their support to the Region.

4.4.26 Noting that the revised ToRs of RICs and RRCs had been published in the CIMO Guide, the Association concurred with their removal from the *Manual on the Global Observing System* (WMO-No. 544), Part II, Regional Aspects and to refer to the CIMO Guide. The Association requested the Secretary-General to carry out these modifications.

4.4.27 The Association highlighted the importance of carrying out instrument intercomparisons as they are extremely informative in providing comparable information on the performance of different instrument types, in providing and improving the calibration of instruments and in fostering the development of better instruments. The Association therefore encouraged its Members to do their utmost in supporting, organizing and participating in future instrument intercomparisons. The Association recommended to its RRCs to take part in the eleventh International Pyrheliometer Comparisons to be held in Davos, Switzerland, in Autumn 2010.

Radio-Frequency Coordination

4.4.28 Recalling the continuing threat to radio frequency bands allocated to meteorological systems and environmental satellites, the Association urged all Members to ensure continuous coordination with their national radio communication administrations and to participate actively in the national, regional and international activities involving radio communication regulatory issues for meteorological and related activities, using as a reference the new joint ITU-WMO Handbook “Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction”.

4.4.29 The Association noted that several RA V Members attended a joint WMO/ITU Seminar on the Use of Radio Spectrum for Meteorology (Geneva, September 2009), which constituted an excellent open forum for exchange of views and information between representatives of meteorological and radiocommunication communities. Discussions focused on the use of radio spectrum, space orbits and radio-based meteorological tools and systems for weather monitoring, mitigation and adaptation to climate change.

Evolution of the GOS

4.4.30 The Association noted the valuable contributions from RA V Members to the development of the Vision for the GOS in 2025, which was approved by EC-LXI. The Association requested that its Members support CBS in developing a new version of the Implementation Plan for Evolution of Space and Surface-Based Sub-systems of the GOS (EGOS-IP) that will incorporate the Vision for the GOS in 2025. In the transitional period, to allow a new EGOS-IP to be developed and adopted, the Association agreed to endorse a proposal developed by the RA V WG-PIW, attached as Annex III of the RA V WG-PIW Final Report. The Association also urged its Members to nominate focal points for the Evolution of the GOS.

Observing System Experiments (OSEs)

4.4.31 Noting the valuable conclusions and recommendations from the Fourth Workshop on the Impact of Various Observing Systems on NWP approved by CBS-XIV (2009), the Association

requested major RA V NWP Centres to continue observing and simulation experiments so as to contribute to the fifth workshop planned for 2012.

Coordination of observations for climate

Global Climate Observing System (GCOS)

4.4.32 The Association encouraged its Members to support the implementation of GCOS at the national level through the designation of GCOS National Coordinators and the establishment of appropriate national coordination mechanisms.

4.4.33 The Association noted with appreciation the activities undertaken in the GCOS system improvement programme in the Region, in particular the joint Technical Support Projects of the United States NOAA GCOS programme and Met Service New Zealand for the Pacific Islands and the CBS Lead Centre for GCOS Data in the Region, leading to improved performance of RBCN, GSN and GUAN through station renovation, training of operators, and improved data management and dissemination. It specifically welcomed the support by donor countries for these activities and encouraged their continuation.

4.4.34 Noting that four initial candidate GRUAN sites, located in the South-West Pacific, had been identified by the international climate community, the Association encouraged its Members, in particular the United States, Australia and New Zealand, to support these sites in their efforts to meet the network requirements, including appropriate instrumentation, data management and dissemination practices, international coordination and scientific support.

4.4.35 The Association noted that the GAW CO_2 and CH_4 networks were recognized as GCOS Comprehensive Networks in 2006. In 2007 an agreement between GCOS and GAW specified the terms under which the GAW ozone and contributing networks were designated as the GCOS Global Baseline Total Ozone Network and the GCOS Global Baseline Profile Ozone Network. The agreement further specified terms under which selected Network for the Detection of Atmospheric Composition Change (NDACC) stations could contribute to GRUAN. In this connection, the Association urged its Members to better integrate existing aerosol networks, and to strengthen their efforts towards establishing a GAW global network for aerosol properties.

4.4.36 The Association noted with appreciation the Global Terrestrial Observing System (GTOS) report entitled "Assessment of the status of the development of standards for essential climate variables in the terrestrial domain and development of a framework for climate-related terrestrial observations: Update on progress", which was endorsed by the fifteenth Conference of the Parties (COP-15) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2009. It agreed with the proposed development of a UN/ISO framework dealing with observations of terrestrial Essential Climate Variables and stressed the need for appropriate representation of WMO in such a framework through its Commissions for Hydrology and Agricultural Meteorology and involvement of the GCOS/GTOS Terrestrial Observation Panel for Climate.

4.4.37 The Association noted with appreciation the efforts by all Members to assist space agencies in meeting the satellite-related needs of the GCOS Implementation Plan. It particularly welcomed the initiatives of individual agencies, such as NOAA, to address the sustained generation of fundamental climate data records and ECV satellite products, including reprocessing of past satellite datasets.

4.4.38 The Association urged its Members to take special note of the priorities identified in the GCOS Progress Report 2004–2008, which have been endorsed by COP-15 in December 2009, and to address identified gaps, in particular to support developing countries in financing sustained operation of networks in line with the GCOS Climate Monitoring Principles.

WMO Integrated Global Observing System (WIGOS)

Implementation of the WIGOS concept

4.4.39 The Association expressed its strong support for the further development of the WIGOS concept and its implementation in collaboration with WMO's partner organizations and their observing systems. It recalled the request of the Executive Council at its sixty-first session that the Secretary-General provide the resources needed to move WIGOS from concept to reality.

4.4.40 The Association underlined the importance of the active collaboration of Members and appropriate regional working bodies in developing, testing and implementing the WIGOS concept. It requested its working bodies to include the relevant tasks and activities in their work plans, reflecting regional aspects of implementation and further development of the WIGOS concept.

4.4.41 Building on continued partnership in the development of WIGOS, the Association emphasized the value of active engagement of agencies and organizations co-sponsoring component observing systems and programmes (in particular GCOS, GOOS and GTOS), and also active involvement in GEOSS, recognizing the opportunities for cooperation and mutual benefit and the need to respect individual mandates and policies. Leveraging contributions from both GEOSS and WIGOS will advance the development of the Global Framework for Climate Services (GFCS).

WIGOS Pilot Projects (WPP)

4.4.42 The Association recognized that WIGOS Pilot Projects (WPP) made it possible to address major issues at an early stage in the integration process and would help in elaborating the WIGOS Development and Implementation Plan (WDIP). It welcomed the initiation of the seven WPPs related to GAW, CHy, AMDAR, CIMO, JCOMM, Space Programme and GRUAN.

4.4.43 Regarding the WPP on Improvement of Dissemination of Ozone (total column, profiles and surface) and Aerosol Observations through the WIS, the Association agreed that near-real-time (NRT) delivery of ozone and aerosol variables needed for NWP and air quality applications should be addressed as a matter of priority; it urged its Members to support the efforts to move to NRT delivery of GAW data.

4.4.44 The Association urged Members currently operating AMDAR programmes and those considering implementing AMDAR Programmes in the Region to participate and support the AMDAR WPP activities in order to further advance the integration of AMDAR into WIGOS.

4.4.45 The Association noted that the CIMO WPP was also addressing the issue of a siting classification for surface meteorological stations and radar calibration. In view of the importance of these topics for exchange of quality data, the Association encouraged its Members to support this pilot project and related activities through active involvement of their experts in the Project.

4.4.46 The Association noted that following recommendation from the JCOMM WPP, JCOMM-III (Marrakech, Morocco, November 2009) adopted Recommendation 1 (JCOMM-III) – WMO-IOC Regional Marine Instrument Centres (RMICs), which defines Terms of Reference of an RMIC, including capabilities and corresponding functions, and a mechanism for formal WMO and UNESCO/IOC designation of an RMIC. The Association urged its Members to participate actively in WPP through: (i) engaging in active cooperation with the oceanographic data centres in order to ensure the development of or interoperable arrangements among their data systems and the WIS and/or the Ocean Data Portal of IOC; and (ii) offering facilities for running Regional Marine Instrument Centres on a trial basis.

4.4.47 The Association urged its Members to participate actively in the GRUAN WPP through: (i) supporting the development of manuals and guidelines for GRUAN operation in alignment with existing WMO guidelines and documentation; (ii) fostering the development of a GRUAN data

dissemination model; (iii) supporting the assessment of best instrumentation; (iv) supporting the involvement of GRUAN members in CIMO radiosonde intercomparison campaigns and other international instrument intercomparison exercises; and (v) supporting the operation of the existing initial network, as appropriate.

WIGOS Demonstration Projects (WDP)

4.4.48 The Association noted with appreciation the demonstration project "Implementation of a Composite Observing System" conducted by Australia, exploring the WIGOS concept of a composite observing system. However, the Association expressed concern that lessons learnt from the project might not be generalized to the entire Region. The Association recognized the need to begin now the development of a regional WIGOS plan and supported a broader regional demonstration project as a priority.

4.4.49 The Association noted the dependence of WIGOS on the WMO Information System (WIS) that is a core enabler of WIGOS and recommended that special attention be paid to the coordination of WIGOS and WIS. In this regard, the Association recommended that a project was needed in RA V to demonstrate WIS capability in a small developing NMHS.

4.4.50 The Association requested that the new Working Group responsible for WIGOS collaborate closely with Australia in the implementation of this WDP. The Association also requested that Australia regularly inform the president of the Association on the implementation and progress of its WDP.

Cooperation with GEOSS

4.4.51 The Association noted that WMO efforts to integrate observing systems through WIGOS and WIS, and compliance with related WMO, ISO and ITU standards, will also ensure interoperability with other systems within the Group on Earth Observations (GEO) Global Earth Observation System of Systems (GEOSS). The Association also noted that EC-LXI called for a review of WMO's participation in GEO/GEOSS and requested an evaluation of the contributions being made by WMO, the benefits and results that the Organization has gained through its participation, and potential opportunities for enhanced involvement. The Association noted that Membership of GEO is low among RA V Members, with no Pacific Island countries as GEO members. The Association urged the WMO Secretariat to work with the GEO Secretariat to promote the benefits of GEOSS to PICs. This might be facilitated by arranging a special forum at Ministerial level with the participation of senior GEO officials, along with side visits.

4.5 DEVELOPMENT AND IMPLEMENTATION OF THE NEW WMO INFORMATION SYSTEM *(agenda item 4.5)*

WIS development and implementation strategy

WIS Implementation Plan

4.5.1 The Association recalled that the WIS would 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.

4.5.2 WIS implementation should build upon existing WMO information systems in a smooth and evolutionary process. The WIS Implementation Plan has two parts that would be developed in parallel:

(a) Part A: the continued consolidation and further improvements of the Global Telecommunication System (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 (WWW), including improved management of services;

(b) 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; it would be implemented essentially through the Internet.

Progress in the improvement to the GTS (Part A of WIS)

4.5.3 The Association noted that with regards to Part A, considerable progress has been made in RA V with the continuous improvement of the Regional Meteorological Telecommunications Network (RMTN). This has been primarily through the migration from Frame Relay Services to Multi-protocol Label Switching (MPLS) clouds. There are now three MPLS clouds within RA V. One is the Improved Main Telecommunication Network (IMTN) operated by OBS (Orange Business Services), and managed by the European Centre for Medium-Range Forecasts (ECMWF) as an extension to the MPLS cloud supporting RA VI. This cloud connects WMC Melbourne to RTH Tokyo, WMC Washington and RTH Exeter. The second MPLS cloud is operated by SingTel, and connects Singapore to Jakarta, Melbourne, Kuala Lumpur, Bangkok and Tokyo. The third MPLS cloud is NOAANet, servicing the northern Pacific centres of Honolulu and Guam from Washington.

4.5.4 The Association noted that in addition to the MPLS clouds, many centres use the Internet as their prime connection, running standard GTS procedures to reliably exchange data and products. The Internet has also demonstrated its reliability as a medium for GTS backup circuits, with WMC Melbourne able to maintain normal operations for extended periods to Tokyo, Washington and Exeter.

4.5.5 The Association emphasized that despite advances in many areas, some centres in RA V still rely on satellite broadcasts, digital HF radio and e-mail for access to the GTS, and although the Internet is available to almost all centres, it still remains very expensive and unreliable in the Pacific for NMHS operations. Problems are often associated with limited bandwidth availability so that e-mails containing observations and forecasts can be significantly delayed or even lost.

4.5.6 The Association noted that RANET is effectively moving from a pilot project to an operational system for several centres within the Region. It noted the need for a central reporting procedure for RANET support activities, the provision of a central repository of documentation and software, enhancing the current ad hoc technical support provided by Wellington on a best efforts basis, and further training activities, in addition to those planned by Wellington in the coming year, in order for RANET to be sustained in the long-term. The Association thanked New Zealand for its efforts and encouraged each centre utilizing RANET to appoint an in-country coordinator to assist Wellington in maintaining and enhancing RANET services.

4.5.7 The Association noted that there remain significant variations in communications technologies available across RA V. It was pleased that consideration is now being given to bringing other centres to MPLS, providing such transitions are economically and technically viable. It supported such initiatives as the establishment of a Manila – Melbourne link as an operational circuit that has been proposed by Manila. However, the Association noted that Dili still does not have a connection to the GTS and encouraged appropriate Members to work together to establish the link as a matter of priority.

4.5.8 The Association noted that WIGOS is crucially dependant upon effective WIS support and services, e.g., the specialized data collection means, the generation, collection, management and handling of related metadata and the distribution, of and access to, the data. It invited RA V Members to contribute, in coordination with ICG-WIS, the EC Working Group on WIGOS-WIS and relevant technical commissions activities, to ensure that the WIS elements and components required

respectively for the implementation of the WIGOS pilot projects are developed and coordinated to meet the respective projects' aims and requirements.

Amendments to the Manual on the GTS, Volume II, Region V

4.5.9 The Association agreed on amendments to the Manual on the GTS, Volume II, Region V as follows*:*

To include the following circuits:

(a) Manila-Melbourne;

(b) Dili-Melbourne;

(c) Tokelau-Wellington;

(d) Apia-Wellington;

(e) Tonga-Wellington;

(f) Niue-Wellington;

(g) Rarotonga-Wellington;

(h) Tarawa-Wellington;

(i) Funafuti-Wellington;

(j) Pago Pago-Honolulu;

(k) Palau-Honolulu;

(l) Pohnpei-Honolulu;

(m) Majuro-Honolulu;

(n) Guam-Washington;

(o) Nadi-Washington (replaces Nadi-Honolulu).

The Association requested the Secretary-General to amend the Manual on the GTS accordingly.

Implementation of the new functionality of WIS (Part B of WIS)

4.5.10 The Association recalled that the Fifteenth Congress endorsed in principle WIS procedures for the designation of Global Information System Centres (GISCs) and Data Collection or Production Centres (DCPCs) and encouraged Members to adhere to them. It noted that, upon the request from the sixtieth session of the Executive Council, the Secretariat had requested Members to identify potential GISCs and DCPCs centres with supporting information. Members' contribution on identified GISC and/or DCPC(s) was reviewed by an ad hoc ICG-WIS task group and by CBS-XIV and consolidated for presentation to the sixty-first session of the Executive Council. The Association noted with appreciation that four Region V Members (Australia, New Zealand and Fiji, as well as the United States for Hawaii) have identified collectively one potential GISC and seven potential DCPCs associated to RA V Centres. These will fulfil, within specific WMO Programmes, an international responsibility for the collection/generation and provision of data, forecast products, processed or value-added information (e.g., RSMCs). The Association requests the ICG-WIS and the WIS Project Office to provide greater clarity on the full scope and implementation timescale of GISC responsibilities so that candidate GISCs can be better informed on the need or otherwise for geographic spread in GISC locations, and better prepared for planning and scaling their implementation activities to meet the technical challenges within resource limitations. The Association fully supported the candidate GISC and DCPCs, and invited the Members operating these centres to make their best implementation and preparatory efforts towards demonstrations of capabilities of candidate WIS centres at the CBS extraordinary session (November 2010), with a view to a formal designation by Cg-XVI in May 2011.

4.5.11 The Association expressed its appreciation that WMC Melbourne had offered to be a GISC serving RA V. It noted that WMC Melbourne's new connection via MPLS on the IMTN means RA V is now connected to the WIS core network and that the various communication technologies making up the present RA V RMTN will become the WIS Area Meteorological Data Network (AMDCN).

4.5.12 Noting the availabilty of WIS reference documentation including the WIS Project and Implementation Plan, the WIS Functional Architecture and the WIS Compliance Specifications, the Association noted that the WIS User Requirements have progressed little during 2009. It highlighted the request from ICG-WIS for Members to provide the necessary information to support the WIS Rolling Review of Requirements (RRR) process. The Association urged its relevant working groups to actively pursue their contributions to the refinement of WIS User Requirements to ensure that the regional programmes requirements on WIS are taken into account.

4.5.13 The Association noted with appreciation the "quick start offer" from the WIS project office to have a technical expert visit Members who are implementing a GISC or DCPC to assist in their implementation. It encouraged Members implementing a GISC or DCPC to consider taking advantage of this offer.

4.5.14 The Association emphasized the importance of appropriate regulatory and guidance documentation on the WIS. It noted and supported the important building blocks that were developed towards the future "Manual on WIS" including the WIS Compliance Specifications and the WIS Functional Architecture. It noted that CBS re-affirmed the high-priority need for the development of the Manual on WIS, based on the experience gained through early WIS implementation.

4.5.15 The Association was aware that WIS information Discovery, Access and Retrieval (DAR) services, based on request/reply "pull" mechanism operated essentially through the Internet, are the salient extensions of services that will be provided by WIS. The Association agreed that CBS and the ICG-WIS should urgently develop recommended procedures and practices, based on international standards and current technologies, for adequate authentication and authorization mechanisms to enable and manage the use of the service, at national and international levels, by authorized users. It especially requested that guidance and training be provided on the creation, management and use of metadata that underlies the DAR services.

4.5.16 The Association emphasized the need for capacity-building in developing countries to enable them to participate in WIS, taking into account the capabilities, opportunities and constraints of the NMHSs of developing countries. Noting the high value of WIS pilot projects, the Association urged its relevant working groups, with the support and coordination of the ICG-WIS, to develop and promote pilot projects that facilitate the introduction of WIS functions and services. It invited NMHSs from developed countries, and in particular those participating in the early phase of WIS implementation, to support and assist in these initiatives. In particular it supported the recommendation of the RA V Working Group on Planning and Implementation of the World Weather Watch that the Region should take advantage of the support of the Secretariat's JumpStart offer to establish the new functionality of WIS at some RA V centres, including an RTH, RSMC and at least one Small Island Developing State. It would also be useful if the demonstration included a non-WMO centre to show how they could link to WIS.

Data representation and codes

4.5.17 The Association noted that significant work is being undertaken within CBS on data representation and codes. Of particular importance to RA V are discussions in JCOMM on the importance of uniform codes supporting the sea level monitoring in the Region and the impact on the cost and maintenance of tools related to ocean warning services such as tsunamis and storm surge. It also noted the work being undertaken on a common alerting protocol (CAP) under PWS and its associated registry of alerting authorities. It was pleased that the transmission of the CAP message via the GTS would not be difficult to facilitate, although it noted there are some concerns about populating the spatial distribution elements of the protocol.

4.5.18 The Association noted with appreciation the action taken by Dr Weiqing Qu, the Rapporteur on the Regional TDCF Migration Plan, with a view to the migration in Region V. It noted that positive progress on migration at a number of centres and how the Wellington Message Switch Upgrade presently in pre-operational mode would facilitate code migration for a number of centres within its area of responsibility. However, it emphasized that complete migration to TDCF will need forecasting tools used in smaller centres to be upgraded to support TDCF. It also noted that dependence on HF e-mail and SMS prompts centres to continue to use TAC as the primary means of exchange for observations. It encouraged the developed centres to continue to assist those less developed centres in the migration to ensure no degradation to their services by converting between TAC and TDCF when required. The Association requested the Secretary-General to assist Members to develop and implement plans for creating, exchanging and using data in TDCF.

Other implementation coordination and support activities

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

4.5.19 The Association expressed its appreciation to New Zealand and other contributors to the success of the Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP) now underway as a trial in the Region. It noted that this project incurs additional demands on the communications infrastructure of the Region, and that further expansion of the trial and the expansion of the product set, specifically products from Météo-France's high resolution spectral model, reinforces the need for robust communications infrastructure.

IGDDS development and implementation

4.5.20 The Association acknowledged the distribution of space-based data and products in near-real time through Digital Video Broadcast (DVB) systems within the Integrated Global Data Dissemination Service (IGDDS), as an essential operational component of the WIS architecture. It expressed its appreciation to CMA, JMA and NOAA that provide services over the Region and efficient access to a wide-range of satellite data and products, as well as to non-satellite data and products from several WMO Members. The Association stressed the need to ensure end-to-end robustness of these systems and recalled the complementary role in this respect of the GTS and of the Internet to meet the various operational and other needs. It highlighted the need to adopt the WIS metadata standards in order to ensure full inter-operability within the WIS and the GEOSS. The Association further noted that the DVB-S dissemination means, promoted through IGDDS, had the potential to serve a wide range of applications and welcomed the expansion of this concept to other Societal Benefit Areas through the GeoNetCast initiative. It further noted the contribution of Members supporting the Regional ATOVS Retransmission Services (RARS) which make a significant contribution to the improvement of Numerical Weather Prediction to the otherwise data sparse areas of RA V.

4.5.21 The Association endorsed the reports of the chairs of the WG-PIW and its sub-group of ISS that noted the future potential role of using commercial satellite services to supplement the existing distribution systems of the RMTN, in particular if the NOAA GOES 7 satellite, which is nearing the end of its life, fails.

Operational Information Service (OIS)

4.5.22 The Association noted that the operational information is posted on the WMO server under http://www.wmo.int/pages/prog/www/ois/ois-home.html. The document "Best practices for the management of the operational information" available from this Web page provides information on why, when and how to update the operational information, and how to be kept informed of the updating of the operational information. The Association emphasized that the overall efficiency of the OIS is dependent on the prompt notification of changes and updated information from NMHSs. It urged NMHSs to ensure that all changes will reach the WMC/RTH Melbourne (Vol. C1) and the Secretariat without delay, and thus benefit from the improved OIS for access to the up-to-date information required for operations.

Climate Data Management and Exchange

Interfacing Climate Data Management System with WIS

4.5.23 The Association was pleased to note that WMO is promoting and facilitating the interfacing of Climate Data Management Systems (CDMSs) with WIS. This should enable NMHSs to achieve inter-operable interface for data access and retrieval through WIS. The Association was pleased to note the increased collaboration between Members in and outside the Region for the provision of modern CDMSs and their installation by NMHSs. This should allow NMHSs to benefit from the increased capacity and functionalities of modern data management technology, allowing better management of data and metadata for services on all timescales.

Data Rescue and Digitization of Climate Records

4.5.24 The Association reiterated the importance of the WMO Data Rescue (DARE) project in safeguarding, digitizing and making available historical climate archives for the benefit of the Members in the Region, as well as globally. It called on all Members to continue their efforts in accelerating the digitization process of old climate records. In addition, the Association encouraged future Regional Climate Centres (RCCs) to provide, where acceptable to Members, an alternative secure database system for duplication of Members' data as recommended by CCl. The Association took note with appreciation of the progress in rescuing and digitizing historical climate records in the Region.

Towards a high quality global climate data management system

4.5.25 The Association appreciated the strong collaboration amongst the Members in the Region for implementing the World Climate Data and Monitoring Programme with reference to its Climate Data Management component. The Association further concurred with the conclusions of CCl on the future work on CDMSs including the following main activities:

(a) Provide further guidance on CDMSs to help the providers of these systems to describe them adequately and the potential users to make an informed choice of the CDMSs;

(b) Produce a minimum set of functions a CDMS should offer based on a new evaluation of the existing and future CDMSs;

(c) Conduct a comprehensive survey on the degree of operational use of the already installed CDMSs in the developing and Least Developed Countries (LDCs) which benefited from the various capacity-building mechanisms, e.g., training workshops, bilateral collaboration and the WMO Voluntary Cooperation Programme (VCP). The result of the survey should lead to revisiting the ongoing capacity-building strategy to ensure that the CDMS implementation should have a positive impact on producing CLIMAT, and their exchange, in addition to the improved historical data digitization in the countries.

4.5.26 The Association urged Members to further increase their efforts in implementing modern technology and inter-operable systems for climate data management and urged the Members and the Secretariat to continue to provide support to the developing and LDCs and Small Island Developing States (SIDS) to implement and use modern CDMSs.

4.5.27 The Association noted with satisfaction the pro-active approach taken by CCl during its fifteenth sessions, Antalya, Turkey, in February 2010 with regard to climate data management. The Association concurred with CCl recommendations to consider climate data issue within the "UN Delivering as One" concept, bring the climate data issue to the attention of the UN General Assembly and to organize, under the auspices of WMO, an international conference addressing the various aspects of climate data involving a wide participation of technical commissions, WMO Programmes and co-sponsored programmes, as well as partners. The conference should lead to the development of a High Quality Global Climate Data Management System (HQ-GCDMS) which would benefit from the

progress made in implementing modern CDMSs and Climate Data Rescue; the set up of WIS architecture; and the utilization of international standards for data representation, exchange and data base models.

Discontinuation of CLIMAT TEMP reports

4.5.28 The Association took note of the CCl decision (Resolution 3 (CCl-XV)) to agree with the conclusion of the GCOS-AOPC to discontinue the provision and dissemination of CLIMAT TEMP reports. The decision was based on the result of the CCl/Secretariat questionnaire, sent to all Members, to assess the impacts of a possible discontinuation of CLIMAT TEMP on other domains as requested by EC-LX. The CCl assessment concluded with an overwhelming majority of responses agreeing on the discontinuation of the provision, dissemination and international exchange of CLIMAT TEMP reports. The Association further noted that the discontinuation of CLIMAT TEMP should not affect in any way the provision, dissemination, monitoring and exchange of the daily upper-air TEMP reports, nor the monthly surface CLIMAT reports which remain critical and essential for WWW, GCOS and WCP.

Coordination with related international projects (GEOSS)

4.5.29 The Association concurred with the Executive Council in emphasizing the important role WIS has to play as a WMO core contribution to the GEOSS. It noted the mutual benefits made available by the inter-operability arrangements common to WIS and GEOSS, enabling WMO Members to have access to other GEO data and products, while facilitating the further distribution of weather, climate and water data.

4.5.30 In particular, the Association noted the report of the Subgroup on ISS. Given the geographic extent of the Region and its inequality of terrestrial communications infrastructure, and the availability of commercial satellite bandwidth, the report asserts that a regional satellite broadcast service is now seen as a viable option for servicing the Region. It noted that there is the potential for the GEONETCAST Americas broadcast to be expanded to cover the large gap over the Pacific between GEONETCAST broadcasts by CMA (Asia) and NOAA (the Americas). It also noted that any efforts to establish a Pacific GEONETCAST service would be enhanced by increased Pacific Island participation in the GEOSS framework.

4.6 ENHANCED CAPABILITIES OF MEMBERS IN MULTI-HAZARD EARLY WARNING AND DISASTER PREVENTION AND PREPAREDNESS *(agenda item 4.6)*

Disaster Risk Reduction Programme Strategy and Implementation Framework

4.6.1 The Association recalled that Cg-XV approved the strategic goals of WMO in disaster risk reduction, derived from the Hyogo Framework for Action (HFA). The Association further noted that Cg-XV approved the Disaster Risk Reduction (DRR) Programme implementation framework, built upon five major thrusts: (i) modernization of NMHS observing networks and operational systems; (ii) implementation of national operational multi-hazard early warning systems; (iii) strengthening of NMHS capacity for maintaining hazard databases, analysis in support of hydrometeorological risk assessment tools, risk reduction and risk transfer; (iv) strengthening NMHS cooperation with disaster risk management agencies and other disaster risk management (DRM) stakeholders; and (v) coordinated training and public outreach programmes. This action plan would be implemented through coordinated regional and national projects, leveraging activities of the WMO network and external partners.

4.6.2 The Association recalled the outcomes of the country-level fact-finding DRR survey conducted in 2006 with a 74% response from RA V, providing a benchmark on Members' NMHS's capacities, requirements and priorities to support DRM. The survey results confirmed that strong winds, tropical cyclones, floods, thunderstorms and lightning, drought, storm surge, tsunami, landslide or

mudslide, forest and wild fire, transboundary haze, marine hazards are the top weather-, water- and climate-related hazards of greatest concern in RA V. Based on the results of the survey, Members can be divided into four categories with respect to their capabilities, gaps and needs for support from WMO. The Association was informed that the results of the survey is one of the main drivers for the development of the WMO national and regional DRR-related projects undertaken by WMO Programmes and constituent bodies and with external partners.

Provision of hazard information and analysis for risk assessment and planning

4.6.3 The results of the country-level survey in RA V confirmed that over 92% of NMHSs responding to the survey requested guidance on standard methodologies for monitoring, archiving, analysis and mapping of hazards. The Association was informed of the request of EC-LXI that a "good-practices approach" be pursued by technical commissions towards the development of standard methodologies on hazard data, metadata and mapping tools and noted the initiatives of technical commissions in developing such guidelines for floods, droughts, storm surges and other meteorological hazards. In this regard, the Association:

(a) Emphasized that the guidelines developed by the technical commissions first be tested and operationalized through national risk assessment and DRR pilots, as appropriate;

(b) Encouraged Members to ensure that their NMHSs establish mechanisms and methodologies for the provision and sharing of meteorological, hydrological, climate hazard data and metadata, analyses, value-added information and technical expertise;

(c) Agreed to work with technical commissions and other relevant agencies in matters related to hazards analysis to support risk assessment in RA V.

4.6.4 The Association noted that the ANADIA (Assessment of the Natural Disaster Impacts on Agriculture) task force (Italy 2006) provided a much needed framework for assessing the impacts of natural hazards on agriculture. The Association urged the Secretary-General to find donor funding for ANADIA activities in RA V similar to the ANADIA-Mali project.

4.6.5 The Association noted that some Members are exploring plans for renewing their nuclear energy plans. In this context, NMHSs could be requested to contribute hydrometeorological information for improving safety, selection of location and operations of nuclear installations. Stressing the need for continuing collaboration with the International Atomic Energy Agency (IAEA) in relation to its current revision of their Safety Guide: "Meteorological and Hydrological Hazards in Site Evaluation for Nuclear Installations", the Association encouraged its Members to participate in the current review through their respective national organizations, and to provide input to the anticipated review of WMO's Technical Note on "Meteorological and Hydrological Aspects of Siting and Operations of Nuclear Power Plants" (WMO–No. 550) when requested. In this context, the Association:

(a) Agreed to review and update relevant WMO technical publications and to arrange training on disaster risk reduction in this area;

(b) Requested relevant technical commissions concerned to address this matter, specifically with respect to reviewing WMO Technical Note No. 170.

Multi-Hazard Early Warning Systems (EWS) and Emergency Response Operations

4.6.6 The Association was informed that 84% of disasters caused by natural hazards in RA V are linked to meteorological-, hydrological-, and climate-related events. In reference to the outcomes of the country-level DRR survey, the Association noted that almost all (92%) of NMHSs in RA V considered that upgrading and improving operational forecasting and warning services would enhance their disaster risk reduction capacity within their countries for saving of not only lives but also economic impacts. In light of these needs, the Association:

(a) Re-emphasized the continuing need to improve NMHS technical capacities and methodologies for the generation of warnings particularly stressing technical development projects related to key hazards identified in the country-level survey for RA V. In this regard, the Association requested the Secretary-General: (i) to report to its next session the results achieved through technical transfer and capacity development projects for various hazards in the region; and (ii) to ensure that these technical capacities be linked at national level to operational disaster risk management processes, through well-defined projects based on user requirements and partnerships and utilization of guidelines on hazard analysis, EWS and sectoral planning. The Association reemphasized the need to strengthen the cooperation between meteorological, hydrological and climate services;

(b) Supported the "Lincoln Declaration on Drought Indices" from the Regional Workshop on Indices and EWS for Drought, held in December, 2009, stressing that progress was made towards consensus among experts that the Standardized Precipitation Index (SPI) should be used to characterize meteorological droughts by all NMHSs around the world. The Association encouraged the Secretary-General to bring this recommendation to EC-LXII for approval;

(c) Noted that the same level of drought severity can cause very different impacts in different regions due to the underlying vulnerabilities. A simple, systematic analysis of drought impacts in different sectors should be initiated in all affected countries in order to provide useful decision-making information for policymakers;

(d) Noted that guidelines covering various aspects of service delivery and particularly on exchange of warnings were availed on the PWS Website (www.wmo.int/pws). In this regard, the Association encouraged its Members to make full use of the "Guidelines on Integrating Severe Weather Warnings into DRM," (PWS-13; WMO/TD-No. 1292), and the "Guidelines on Cross-Border Exchange of Warnings," (PWS-9; WMO/TD-No. 1179);

(e) Noted with interest the advances in the development of the project SEA-HYCOS, as the South-East Asia component within the framework of WMO WHYCOS programme;

(f) Reinforced the importance of an integrated effort for developing and improving forecasting capabilities and service delivery in coastal risk reduction by strengthening the existing cooperation between JCOMM, CHy, CAS and UNESCO. It noted the JCOMM/CHy project for building improved operational forecasts and warnings capability for coastal inundation, which would have as its major outcome an effective software package involving both ocean and hydrological models to enable an assessment and forecast of total coastal inundation from combined extreme events.

4.6.7 The Association recalled the request of the Executive Council, at its sixtieth session (June 2008) to the Secretary-General of WMO, in consultation with UNESCO/IOC, to facilitate the development of storm surge watch schemes (SSWS). The Association was pleased to note that, through collaborative efforts of JCOMM and TCP, immediate actions were taken by the five TCP regional bodies to assist their members by establishing regionally coordinated frameworks for enhancing their capabilities to access, understand and utilize existing wave and storm surge products worldwide, for operational forecast and warning services.

4.6.8 The Association recognized that sea level observations are critical for enhancing storm surge forecasting and thus contribute to the storm surge watch schemes and tsunami prediction. The Association therefore requested that efforts be made, by all concerned, to ensure that in situ and remotely sensed sea level observations are routinely collected and disseminated via the GTS. The Association urged its Members undertaking sea level observation programmes to make their sea level data freely available in real time, in support of coastal marine hazard warning services, including in particular for storm surges and tsunamis.

4.6.9 The Association recognized the critical importance of the GTS as the primary reliable, robust communications system for the transmission of tsunami message products to the NMHSs globally. Further, the Association recognized the importance of the Emergency Managers Weather Information Network (EMWIN) system for providing timely message products to NMHSs and National Disaster Management Offices (NDMOs) in the Region. Therefore, the Association requested that a high priority be given to maintaining these communication systems in working order at all times.

4.6.10 The Association noted the establishment of the RA V Storm Surge Watch Scheme (SSWS) Action Team and recommended that any watch scheme for RA V should address: (a) storm surges associated with tropical cyclones; (b) waves associated with tropical cyclones; and (c) long-period waves. In light of the joint workshops and efforts of TCP and JCOMM to develop SSWS in a number of regions and with consideration for the high risks associated with storm surges in RA V, particularly in the small island countries, the Association urged the Secretary-General to take necessary action for an early establishment of the SSWS and also to provide technical assistance for the provision of storm surge prediction in RA V.

4.6.11 The Association noted that JCOMM, at its last session (Marrakech, November 2009), adopted a recommendation on the Integrated SSWS and agreed that it should give high priority to the development of demonstration project(s) for building integrated global and regional SSWS within a multi-hazard framework, in collaboration with relevant stakeholders and to provide technical advice, guidance and coordination in the development of such demonstration project(s), in close collaboration with WMO Regional Associations. The Association also noted the joint activity between JCOMM and CHy with respect to the Coastal Inundation Forecasting Demonstration Project (CIFDP) and stressed the need for these activities to be undertaken in concert.

4.6.12 The Association stressed that effective EWS have four components including: (1) detecting, monitoring and forecasting hazards; (2) analysing risks; (3) disseminating timely warnings, which should carry the authority of governments; and (4) activating emergency plans to prepare and respond. These four components need to be coordinated across many agencies at national to community levels for the system to work, and in addition the warnings and associated information, require public education and mass distribution to maximize their effectiveness.

4.6.13 Following the request from the Executive Council at its fifty-seventh session, the Association noted that extensive consultations through two international symposia in Multi-Hazard Early Warning Systems (MH-EWS) and working with WMO Members, the DRR Programme has developed a training programme based on detailed documentation of six good practices in MH-EWS (Cuba, Bangladesh, France, United States, Germany and Shanghai (China)) pertaining to intuitional partnerships and cooperation in MH-EWS, and development of “Guidelines on Institutional Partnership and Cooperation in MH-EWS”. Two MHEWS training workshops were already conducted engaging the Directors of NMHSs and national disaster risk management agencies in South East Europe and Central America and the Caribbean to initiate strategic partnerships and operational cooperation projects in MH-EWS. In this regard, the Association:

(a) Reiterated the need to ensure that the guidelines are utilized in training workshops for MH-EWS development projects to facilitate institutional cooperation and operational collaboration between the NMHSs and disaster management agencies;

(b) Requested the Secretary-General to facilitate documentation of other good practices in MH-EWS identified and urged its Members to engage partners to support documentation of the good practices including transboundary collaboration in EWS;

(c) Requested the Secretary-General to facilitate a training workshop in the Region and to facilitate development of early warning system capabilities with other partners.

4.6.14 The Association noted that the experiences gained in the Shanghai Multi-Hazard Early Warning System could prove useful for similar activities in the Region.

4.6.15 The Association noted that an Inter-Commission ad hoc Task Team on "Meteorological, Hydrological and Climate Services for Improved Humanitarian Planning and Response", involving CBS, CCl and CHy, had been established to address meteorological, hydrological, and climatological information needs for humanitarian planning and response operations. In this regard, the Association stressed the importance of collaboration of NMHSs through pilot projects with humanitarian agencies.

Catastrophe insurance and weather risk management within financial risk transfer markets

4.6.16 The risks of economic losses associated with hydrometeorological and climate-related hazards can be hedged through weather-indexed and catastrophe insurance markets. The Association stressed the importance of these new opportunities for NMHSs and particularly appreciated the WMO expert meeting held in December 2007 on "Requirements of Catastrophe Insurance and Weather Risk Management Markets" to identify potential contributions of NMHSs to these markets. These activities would, among others, require from NMHSs the provision of reliable historical and near-real-time observations of hydrometeorological parameters, related metadata and other relevant information and services. The Association considered that this would lead to new challenges as well as opportunities for strengthening the observing networks, data rescue and management systems for NMHSs, as demonstrated in other countries such as Ethiopia, India and Malawi. The Association:

(a) Acknowledged that Cg-XV requested the Secretary-General to: (i) document experiences of NMHSs around the world serving these markets; and (ii) facilitate relevant forums and mechanisms for NMHSs to share their experiences and transfer their knowledge. In this regard, the Association was informed that the guidance documents are being developed in the 2009/2010 time frame;

(b) Stressed the importance of WMO's collaboration with agencies such as the World Bank and the World Food Programme (WFP) to develop an action plan to assist NMHSs with serving these markets;

(c) Requested its Members to support the emerging requirement associated with these markets as an opportunity to build services through collaboration and provide relevant information to the Secretary-General, as appropriate, to assist in determining further activities of WMO in this field.

Leveraging Cooperation and Partnership to Strengthen the Role and Capacities of NMHSs in DRR

4.6.17 The Association stressed the need for enhanced recognition of NMHS' potential contributions in DRM by their governments that would translate into resources for building and sustaining NMHSs capacities. The Association noted WMO strategic partnerships with agencies such as the UN-ISDR, UNDP and the World Bank and key agencies that influenced national DRR policies, planning and funding. The Association stressed that these partnerships had demonstrated a successful model for regional and national cooperation with partners in other regions. It noted specifically that a small amount of WMO resources had resulted in much higher returns through leveraging partners' resources and expertise as well as increased recognition of the NMHSs by their governments. The Association was informed that an initiative was launched in 2009 involving five countries in Southeast Asia (Cambodia, Indonesia, Lao People's Democratic Republic, Philippines and Viet Nam). The first step of the initiative consists in detailed analyses of capacities, gaps and needs of the NMHSs to support disaster risk management and an evaluation of the needs and requirements of disaster risk management agencies for NMHSs products and services. The second step is a regional meeting of all involved countries and partners to develop a road map for the development and implementation of projects in the selected countries. In this regard, the Association:

(a) Requested the Secretary-General to continue efforts in development of similar partnership projects for RA V, noting that the NMHSs involved in these projects need significant technical development and operational partnerships with disaster risk management agencies;

(b) Requested the Secretary-General to ensure a coordinated approach engaging all relevant WMO Programmes in these projects.

4.6.18 With respect to initiatives through the Pacific Islands Geoscience Commission (SOPAC) in DRR, the Association urged the participation of the NMHSs and regional organizations in the national and regional DRR platforms and engagement in related DRR initiatives. It also requested the Secretary-General to:

(a) Continue to participate in and service the UN-ISDR mechanisms and events;

(b) Facilitate participation of the NMHSs and regional organizations in the DRR coordination platforms and processes at the national and regional levels;

(c) Further strengthen WMO partnerships with the UN-ISDR partners for the implementation of national and regional DRR projects;

(d) With respect to tsunami early warning under the UNESCO/IOC Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS), the Association urged the active engagement of the NMHSs with the ICG/PTWS working groups and task teams (e.g., risk assessment, detection, warning and dissemination, seismic data sharing, emergency communications, awareness and response, exercises, South-West Pacific, South China Sea) in order to cooperatively identify priority needs and take action to fill gaps that will improve the timeliness and accuracy of tsunami warnings, and enhance the preparedness of vulnerable communities to respond effectively to this no-notice, fast-evolving hazard. The Association recognized the commonalities in strategy with ICG/PTWS and encouraged greater synergy between NMHSs and regional organizations to strengthen the tsunami early warning component of DRR.

4.6.19 The Association recalled the potential increase in hydrometeorological disasters associated with climate variability and change and particularly noted the recommendation of the World Climate Conference-3 (WCC-3) during the session on Climate Hazards, EWS and DRR. The Association stressed the importance of climate information from monthly to decadal timescales for climate adaptation and disaster risk management decision-making, particularly in supporting sectoral planning. In this regard, the Association requested its president, in cooperation with the WMO Secretariat and other regional bodies, to facilitate development and implementation of DRR and climate adaptation demonstration projects through a coordinated approach.

4.7 ENHANCED CAPABILITIES OF MEMBERS TO PROVIDE AND USE WEATHER, CLIMATE, WATER AND ENVIRONMENTAL APPLICATIONS AND SERVICES *(agenda item 4.7)*

Public Weather Services (PWS) Programme

User focus

4.7.1 The Association welcomed the work that the WMO Public Weather Services Programme (PWSP) is doing to help RA V Members develop user focus in service delivery through complete understanding of, and response to, user requirements. It encouraged its Members to pay attention to this aspect of service delivery as a means of ensuring that National Meteorological and Hydrological Services (NMHSs) retain their validity, credibility and public and political support.

4.7.2 The Association welcomed the production of the PWS publication titled *Public Weather Services Strategy for Developing Public Education and Outreach,* PWS-14, WMO/TD-No. 1354, as a guide to assist NMHS inform the public of the services that NMHSs can deliver, their usefulness and their limitations, as well as ways of assessing users' needs. The Association encouraged its Members to make full use of the guidelines which were provided freely to NMHSs as hard copies and which are also accessible on the WMO PWS Website at: http://www.wmo.int/pws.

Improved products and services

4.7.3 The Association appreciated that PWS, as a component of the Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project (SWFDDP), played a crucial role in effective communication and user-based service assessment. The Association expressed strong support for the PWS role in the project and noted that it would result in improved coordination with the media, public education and outreach activities, public understanding of the products and their application, and improved coordination between the NMHSs and disaster management authorities. It also noted that there was an opportunity to link SWFDDP to the Radio Internet (RANET) communication project, which is already implemented by some of the Members.

4.7.4 The Association recognized the need to further improve the communication of probabilistic forecasts so that the public can easily understand the forecast confidence and uncertainty. In this regard, the Association requested Members to make full use of the recently published *Guidelines on Communicating Forecast Uncertainty*, PWS-18; WMO/TD-No. 1422. It noted that the publication had been distributed to NMHSs and was also freely available on the WMO PWS Website.

4.7.5 The Association agreed that user-based service assessment of the quality of service delivery by NMHSs to users is required as an input for product and service improvement, as well as for the development of new products and services. It therefore requested Members of the Region to institute, or, if already instituted, to improve on the assessment of the utility and value of the services to users. It further requested the Secretary-General to plan for training activities in the Region to equip NMHSs with the necessary skills in this regard.

4.7.6 The Association noted the experience in this and other Regions that enabling TV weather presentation services on national TV channels in developing countries has the potential to significantly enhance the visibility of NMHSs, especially for communication of disaster warnings. Implementation of TV services in the Cook Islands has been very successful in this regard. The Association requested the Secretary-General to develop a project to enable NMHSs of SIDS in the Region to deliver TV weather presentations on national TV channels.

Service delivery

4.7.7 The Association expressed its satisfaction that the WMO Strategic Plan had accorded the highest priority to service delivery. It requested Members to keep in view the new WMO Policy Framework for Service Delivery that was being developed by the Executive Council Working Group on Disaster Risk Reduction and Service Delivery (EC-WG DRR & SD), as requested by the Executive Council during its sixty-first session (EC-LXI, Geneva, June 2009). It noted that the Policy Framework aims to guide NMHSs in the provision and delivery of services that fully incorporate user needs and performance metrics, in accordance with the WMO Strategic Plan.

4.7.8 The Association welcomed the recognition by EC-LXI of PWS as the most important vehicle for the communication of outputs of other WMO Programmes and that it should serve all programmes of WMO as well as NMHSs in the area of service delivery. It agreed that service delivery should be considered as an essential role of PWS, providing the overall mechanism for delivering services to all sectors of society that require them from their NMHSs. The Association therefore requested the Secretary-General to assist NMHSs in RA V to strengthen their PWS programmes in order to fulfil this role.

4.7.9 The Association encouraged its Members to keep in view the recommendations of the "International Symposium on Public Weather Services: A Key to Service Delivery" (Geneva, December 2007) which is guiding the implementation of public weather services programmes and activities of Members, especially in addressing strategic issues contained in the United Nations (UN) Millennium Development Goals (MDGs), the Intergovernmental Panel on Climate Change (IPCC) Nairobi Work Programme and the Madrid Action Plan (MAP).

4.7.10 The Association was informed of the "Learning Through Doing" (LTD) initiative by the PWSP, which assists NMHSs to improve their communication with users and to produce and deliver an improved range of services according to user requirements. The Association noted the successful implementation of LTD in RAs I and III, and agreed that a similar approach should be adopted in Region V. It therefore requested the Secretary-General to develop projects for the Region using the LTD concept.

4.7.11 The Association commended its Members for their support and participation in the WMO Website 'World Weather Information Service (WWIS), http://worldweather.wmo.int, which won the Stockholm Challenge Award – Environmental Category in 2008. It noted that 17 out of 22 Members of RA V were participating in WWIS, and that of these, 13 Members were providing both climatological and daily forecasts for 303 cities, while four Members were providing climatological information. The Website, which is coordinated by Hong Kong, China, currently provides information in Arabic, Chinese, English, French, German, Italian, Portuguese and Spanish languages. It records a total of over 10 million visits per month. The Association urged its Members to promote the use of the information on the Website, as well as increase the number of cities for which they provided forecasts and information for display on the Website.

4.7.12 The Association expressed its satisfaction with the important role of the Severe Weather Information Centre (SWIC) Website, which covers all cyclone-prone basins including the Indian and Pacific Oceans in RA V. It noted that SWIC was making it possible for the media and other users to access warnings associated with tropical cyclones, heavy rain and thunderstorms, as issued by Regional Specialized Meteorological Centres (RSMCs) and Tropical Cyclone Warning Centres (TCWCs), and official warnings issued by NMHSs. The Association thanked the Australian Bureau of Meteorology, RSMC Nadi-Tropical Cyclone Centre in Fiji, Malaysian Meteorological Department and the New Zealand TCWC in Wellington, for their respective roles in SWIC. In 2009, the number of page visits to the SWIC Website remained high at around 13 million. The Association encouraged its Members to continue participating in the SWIC and to take maximum advantage of the Website.

4.7.13 The Association noted the increasing demand for seasonal forecasts by the public and other users in the Region. It recommended that attention be paid to developing communication methods for monthly and seasonal forecasts to the public. In this regard, it welcomed the publication and distribution of the *Examples of Best Practice in Communicating Weather Information*, PWS-17, WMO/TD-No. 1409, and urged its Members to make full use of it, as it was freely accessible on the WMO PWS Website.

Socio-economic issues related to weather, climate and environmental applications

4.7.14 The Association welcomed the "WMO Forum: Social and Economic Applications and Benefits of Weather, Climate, and Water Services" set up by the Secretary-General under the PWSP, to provide knowledge on service delivery and socio-economic benefits of meteorological and hydrological services, as a useful mechanism for assisting Members in developing service delivery by NMHSs, as well as carrying out economic assessment of benefits of services to society. It encouraged its Members to avail themselves of the results of the work of the Forum.

4.7.15 The Association welcomed the development of the WMO Social-Economic Website (http://www.wmo.int/socioec), which serves as a resource for users including NMHSs, emergency managers, governments, and weather and climate agencies to access decision-support tools and case studies that would assist them in building capacity to assess, quantify and demonstrate benefits of

weather, climate and water services to user sectors. The Association encouraged its Members to use the Website and also to contribute decision-support tools and case studies for uploading to the Website. It noted that such contributions by Members would add greatly to the utility and relevance of the Website to RA V as it would contain tools and case studies readily applicable in the Region.

Capacity-building and training

4.7.16 The Association welcomed the training activities in public weather services that had taken place since its last session in 2006. These included a training workshop on communication with users of meteorological services; two workshops on public weather services for participants from the Southern Hemisphere; and a workshop on warnings of real-time hazards by using nowcasting technology. The Association expressed its appreciation to those Members that had hosted the events. The Association further welcomed the production and distribution of the WMO PWS publication of *Guidelines on Capacity Building Strategies in Public Weather Services*, PWS-15, WMO/TD-No. 1385. It requested its Members to make full use of the publication which was provided on the WMO PWS Website.

4.7.17 The Association observed that training in PWS should be availed to trainees at various levels on a regular basis so that future members of staff of NMHSs attain basic service delivery skills. As a first step, the Association agreed that training of trainers on subjects related to PWS should be included in the curricula of WMO training centres. It therefore requested the Secretary-General to take the necessary actions accordingly.

Future considerations

4.7.18 The Association welcomed the recommendations of the Fifth Technical Conference on the Management of Meteorological and Hydrological Services in RA V (Kuala Lumpur, Malaysia, April 2009), that are applicable to the future enhancement of the PWS Programmes in RA V including:

(a) Building strong partnerships between NMHSs, governments and other stakeholders as a critical element to the success of warning systems;

(b) The sustainability of the Radio Internet Communication Project (RANET) in view of the tangible benefits delivered by the system to developing countries;

(c) Closely reviewing the frequency of the occurrence of extreme weather events, and help improve warning messages, in particular, for locations where the time period between extreme hazard events is long.

The Association requested the Secretary-General to ensure that these recommendations were taken care of in activities related to future implementation of PWS in the Region.

Agricultural Meteorology (AGM)

User focus

4.7.19 The Association noted that climate change and extreme climatic events are a major production risk and uncertainty, impacting agricultural systems performance and management. It therefore welcomed the strategies proposed at the International Workshop on Agrometeorological Risk Management: Challenges and Opportunities (New Delhi, India, October 2006), and encouraged the Members to use a combination of locally adapted traditional farming technologies, seasonal weather forecasts and warning methods for improving yields and incomes.

4.7.20 The Association acknowledged the collaboration between the CAgM Expert Team on Content and Use of Agrometeorological Products by Farmers and Extension Services (ETCUAP) and the Expert Team on Communication of Agrometeorological Products and Services (ETCAPS) during the International Workshop (University of Southern Queensland, Australia, May 2009). The principal

workshop recommendations included, among others, that countries and institutions with highly developed skills should share their knowledge with developing countries to develop better weather and climate forecasts for farming communities worldwide. The Association encouraged its Members to implement the workshop recommendations in order to serve users more effectively.

4.7.21 The Association appreciated the outcome of the Farmer's Roundtable Session with six Australian farmers who represented a range of activities and interests including: the Australian grain and peanut industry, the Queensland Farmers Federation, organic farming, horticulture, cattle ranching, and wheat farming. During this roundtable session, the farmers indicated that they would prefer free and accurate climate forecasts over free seed and free fertilizer. The Association encouraged the Secretary-General to incorporate farmer roundtables or forums in future WMO meetings and workshops.

Improved products and services

4.7.22 The Association noted that the fourteenth session of the Commission for Agricultural Meteorology was held in New Delhi, India, from 28 October to 3 November 2006, and that the Commission had adopted "Agricultural products, services and coping strategies to sustain agricultural development for both effective short-term daily operational farming decisions and proactive long-term strategic agricultural planning measures", as the theme upon which to focus its activities during the next intersessional period.

4.7.23 The Association agreed that the application of meteorology to agriculture continues to be of high importance to the Region. Hence, the activities in Agricultural Meteorology should be continued, taking into account the developments in the Region.

4.7.24 The Association noted that meetings of the CAgM Expert and Implementation and Coordination Teams were held in conjunction with other institutions or organizations in order to produce quality technical advice in agrometeorology and, when applicable, to disseminate this information though publications. It requested the Secretary-General to continue this collaboration with RA V institutions, projects, universities, Asia-Pacific Network (APN), Secretariat of the Pacific Community (SPC), etc.

Service delivery

4.7.25 The Association noted that the World Agrometeorological Information Service (WAMIS) Website (http://www.wamis.org/) continued to assist Members to disseminate their products. Products from 50 countries or institutions were available on WAMIS, and there were over 90,000 visits to the Website in 2009, with a monthly average of 11,400 visits. The Association urged its Members to take advantage of WAMIS to disseminate their products.

4.7.26 The Association supported the proposal of the WMO Commission for Agricultural Meteorology to organize an International Workshop on Climate and Oceanic Fisheries in the Cook Islands in October 2010. The workshop will aim at reviewing the effects of climate variability on seasonal to decadal timescales on oceanic fisheries, among other objectives. It will be jointly sponsored by WMO, the Government of the Cook Islands, and the University of Auckland. Other sponsors such as the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), the SPC and the National Oceanic and Atmospheric Administration (NOAA) are currently under consideration.

Marine Meteorology and Oceanography (MMO)

User focus

4.7.27 The Association recognized the importance of direct interaction with, and feedback from, the marine users and welcomed the results of the JCOMM survey on monitoring the effectiveness of the

marine meteorological and oceanographic information produced and transmitted by NMHSs. The results demonstrated the increased demand for user-focused marine meteorological and oceanographic products and services, and showed that there remained considerable room for improvement with regards to both the quality and content of services, and their coverage and timeliness in some oceanic regions. The Association urged its Members concerned to take the appropriate actions to improve marine meteorological and oceanographic services within their areas of responsibility, especially on the identified weaknesses, in order to meet marine user requirements.

Improved products and services

4.7.28 The Association recalled that forecasts of ocean wave period and probabilistic forecasts of wave height are essential tools in the generation of warnings of remotely generated swell, which is a major marine weather-related threat for the Small Island Developing States (SIDSs). It therefore urged its Members in the Region, including LDCs and SIDSs, to make maximum use of these products in fulfilling their services' duties in support of the requirements of users in the whole range of maritime activities and in the disaster risk reduction.

4.7.29 The Association recalled the continuing importance to mariners at sea in receiving graphical products, the gradual demise of HF radiofax as a means of disseminating these products, and the WMO Executive Council's request at its sixtieth session (EC-LX, Geneva, June 2008) that JCOMM continue researching methods for transmitting high-quality graphical products to marine users. The Association also noted the successful development, in accordance with International Hydrographic Organization (IHO) standards, of product specification for sea ice information in Electronic Navigation Chart Systems (ENC), and the request by JCOMM-III (Marrakech, Morocco, November 2009) to develop similar standards for other met-ocean variables, based on experience and knowledge gained, and guidance from the International Maritime Organization (IMO) through its E-Navigation strategy.

Service delivery

4.7.30 The Association commended its Members for their contributions to and participation in the GMDSS-Weather Website, which is managed and hosted by Météo-France. Noting the current expansion of this Website to include products prepared for International NAVTEX dissemination, the Association urged its Members to disseminate these products through the GTS and to provide to the WMO Secretariat and Météo-France the appropriate metadata, including the bulletin headers, in compliance with the WMO Information System (WIS).

4.7.31 The Association stressed the need to improve marine meteorological services in Antarctic waters and requested JCOMM to cooperate closely with the Executive Council Working Group on Polar Observations, Research and Services (EC-PORS), the Antarctic Treaty Consultative Meeting (ATCM), and its Members concerned, in the development of met-ocean services in Antarctic waters, including specialized services in support of national interests such as ship routeing, as well as in the training of specialized personnel for that purpose.

Capacity-building and training

4.7.32 The Association recognized the importance of enhancing capabilities among Members to access, understand and use ocean wave and storm surge forecast and warning information. In this context, it stressed the value of the fifth JCOMM/TCP training workshop on wave and surge forecasting, specifically focussed on the requirements of Pacific Island Countries, which took place in Melbourne in December 2008, hosted by the Australian Bureau of Meteorology. It expressed its appreciation to the Bureau for this workshop, and hoped that appropriate follow-up actions would be taken, and that similar workshops might be organized in the future.

Quality Management (QM)

4.7.33 Noting that IMO resolution A.705(17) states that common standards and procedures are to be applied to the collection, editing and dissemination of maritime safety information, the Association recognized the need for the development of a Quality Management System (QMS) that includes the provision of marine meteorological services for international navigation. The Association therefore urged its Members to implement QMS for the provision of marine meteorological services for international navigation and to document the process in order to share with other NMHSs, with a view to facilitating and expanding QMS implementations. The Association was pleased to note that a Workshop on Maritime Safety Services including Quality Management Procedures would be held in Melbourne, Australia, in May 2010.

Aeronautical Meteorology (AEM) Programme

Quality Management (QM)

4.7.34 The Association also noted the urgency of implementing a QMS that includes meteorological services to aviation, which is mandated by the International Civil Aviation Organization (ICAO) in its forthcoming Amendment 75 to Annex 3, with an applicability date of 2012. It strongly recommended that Members who may not yet be compliant with these regulations to immediately take the initial compliance steps, and to make best use of the current FMI-SPREP Project helping Pacific Islands States on QMS.

4.7.35 The Association encouraged its Members to adopt a practical, cost-effective and simple approach in QMS implementation, limited to the scope of essential services to aviation and basic infrastructure. The Association also encouraged Members of the Region to:

(a) Make best use of the results of the Pilot Project on QMS implementation in the United Republic of Tanzania;

(b) Approach Members who have implemented QMS in the Region for suitable documentation, sharing experiences and expertise;

(c) Form subregional alliances for mutual pre-audits and exchange of templates and process descriptions.

Improved products and services

4.7.36 Several changes will occur in the next 1 to 3 years with regards to improvements to aviation products and services including the emergence of experimental graphical Significant Meteorological Information (SIGMET) products, and the planned 2012 transition in World Area Forecast System (WAFS) data and products from a Satellite-based delivery system, the International Satellite Communications System (ISCS), to an Internet-based system (World Area Forecast Center (WAFC) Internet File Server (WIFS). This transition should allow more users to access the WAFS data since a satellite receive system will not be needed.

4.7.37 The Association also noted the WAFC centres are transitioning to GRIB2 from GRIB1 with a planned implementation date of 2013. GRIB2 can be used by NWP centres to provide hazards analysis and forecast guidance products for icing, turbulence, and convection which some are already producing. This should improve the provision for and usage of these products in RA V. GRIB2 data can be accessed on the WAFC Internet File Server (WIFS) by registered ISCS users.

4.7.38 The Association noted the outcomes of CAeM-XIV concerning plans proposed by the ICAO Meteorological Warnings Study Group (METWSG) to establish a trial for the provision of advisory messages prepared by lead States. Such trial advisories could support the issuance of SIGMET for convection, turbulence and icing in a similar way as existing advisories on volcanic ash and tropical

cyclones currently provided by the relevant Volcanic Ash Advisory Centres (VAACs) and Tropical Cyclone Advisory Centres (TCACs), respectively. Recognizing the safety implications of documented deficiencies in the provision of SIGMET, the Association strongly requested its Members to ensure full cooperation with relevant bodies in the Region such as national volcanic observatories, in operating the tests planned to take place in 2011. The Association noted the pressure from aviation stakeholders to establish a regional SIGMET system in response to the non-issuance of SIGMETS in some areas. It considered that if such changes were to achieve operational status this could have profound implications for existing aeronautical forecast centres of Members of the Region, and so urged every Member to fully meet its existing aeronautical meteorological service requirements and requested the Secretary-General to focus capacity-building efforts in this area.

Capacity-building

4.7.39 The Association noted that the question of aeronautical forecaster and observer qualifications needed to be resolved in the light of Resolution 9 (EC-LXI), as several Members in the Region may have some difficulty in demonstrating the required competencies and/or academic qualifications outlined in WMO Publication No. 258 and its Supplement No. 1. Aeronautical meteorological competencies were approved by the fourteenth session of the Commission for Aeronautical Meteorology in Recommendation 1 (CAeM-XIV) and will be submitted to EC-LXII for approval in June 2010. Aeronautical meteorological competencies would then be included in the next revision of WMO-No. 49, Volume II, in late 2010, but with an applicability date of late 2013 to allow sufficient time for Members to become compliant. Thus, the Association urged Members to make the best use of existing training material to be found at the AEM training Website and those in a position to do so, to offer to host training seminars and workshops, to ensure that staff can demonstrate the required competencies and qualifications.

4.7.40 The Association was pleased to note that RA V Members would be given sufficient time to act and respond to the requirements to ensure a synchronized approach between WMO and ICAO, the timeframe being explicitly tied to the governing update cycle for ICAO Annex 3 and the associated WMO-No. 49, Volume II.

Atmospheric Environment Research (AER)

Improved products and services

4.7.41 Noting that there is a need to improve air quality-related products and services in parts of the Region, the Association welcomed the plans to organize a joint Global Atmosphere Watch (GAW) Urban Research Meteorology and Environment (GURME) and Acid Deposition Monitoring Network in East Asia (EANET) workshop on chemical transport modelling in 2010 for the EANET member countries, which include Indonesia, Malaysia and the Philippines.

4.7.42 The Association recognized that the expanded interest on Ultra Violet (UV) radiation from health threatening consequences (skin cancer, cataracts, etc.) to beneficial ones through vitamin D, would require revisiting the delivery of the UV Index (UVI), and recommended its Members to work with health authorities for improving the UVI products and services and to collaborate and expand gained experiences on this issue with Members in other Regions. This would entail collaboration between the PWS and GAW Programmes.

4.8 BROADER USE OF WEATHER-, CLIMATE- AND WATER-RELATED OUTPUTS FOR DECISION-MAKING AND IMPLEMENTATION BY MEMBERS AND PARTNER ORGANIZATIONS *(agenda item 4.8)*

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

4.8.1 The Association noted with satisfaction that the cooperation between WMO and the regional bodies of the United Nations (UN) system had been strengthened through active support and

participation in relevant events including regular sessions of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) 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.

4.8.2 The Association also noted with appreciation that WMO cooperation within the UN system has been enhanced at the regional, subregional and country levels through the Regional Office for Asia and South-West Pacific and the WMO Office for the South-West Pacific. It acknowledged the Offices participation in the activities of the UN system in the Region, including collaboration with the UN International Strategy for Disaster Reduction (UNISDR) and the Intergovernmental Oceanographic Commission of UNESCO in the development and implementation of DRR-related and GOOS projects, as well as collaboration with the UN Resident Coordinators Offices (UNRCOs) in Apia, Port Moresby and Suva in the implementation of the United Nations Chief Executive Boards (UNCEB) decisions on global policies relating to climate change, disaster risk reduction, oceans, water and energy at the subregional and country levels. The Association encouraged the Offices to continue strengthening partnership and collaboration with the UN system in the Region.

4.8.3 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 was pleased to note that the Offices had participated in the various activities of 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 Secretariat of the Pacific Geoscience Commission (SOPAC), the Pacific Islands Forum Secretariat (PIFS) and the Asian Disaster Preparedness Center (ADPC) relating to weather, climate, water resources and disaster risk reduction. The Association encouraged the Offices to continue strengthening partnerships and collaboration with such regional organizations and requested the Secretary-General and Members to provide support for the Offices to ensure strengthening existing and expanding strategic partnerships to other potential partners in the Region. The Association further encouraged Members to continue supporting, actively participating in and becoming involved in programmes of regional organizations relating to weather, climate, water and natural disaster risk reduction.

4.8.4 With regard to enhancing collaboration and partnership with SPREP, the Association recalled the recognition of the Executive Council at its sixtieth session of the effectiveness of the biennial meeting of Regional Meteorological Service Directors (RMSD) in the Pacific Subregion, co-organized by SPREP and WMO as well as the need for the development of a formal arrangement for co-sponsorship with SPREP. The Association requested the Secretary-General to take the initiative to implement such an arrangement with SPREP and provide support for organization of future RMSD meetings. The Association acknowledged the progress of the SPREP work of a comprehensive review of regional meteorological services in the Pacific region, as requested by the Pacific Islands Forum Leaders at its thirty-ninth meeting in Niue in August 2008 and subsequently by SPREP Officials at their eighteenth meeting in September 2008. It expressed its appreciation to SPREP and RA V Members concerned for their support and participation in the review, and requested its Members and the Secretary-General to keep close track and make the necessary arrangements to address the outcomes.

Communication and Public Affairs

4.8.5 The Association was pleased to note the numerous activities and products implemented under the WMO Global Communication Strategy with its objectives of projecting a unified and consolidated image of WMO and NMHSs; strengthening constituencies both at the national and regional levels; spreading key messages giving a local voice to a global undertaking and vision; fostering strategic alliances with the media; and promoting a communication culture throughout WMO. The Association urged Members and the Secretary-General to further implement the Strategy with the aim to position WMO and NMHSs in a manner which highlights their unique strengths and raises the

Organization's visibility as a key player in international cooperation and in contributing to sustainable development of Members.

4.8.6 The Association noted that the revamped Website had enhanced WMO communications. It called on Members to establish a link to the WMO Website, to identify them as an integral part of the WMO system and to make full use thereof. The Association was pleased with the concept of featuring a WMO front-page link to the NMHS of an area struck by natural disaster to create more awareness and provide relief organizations with critical meteorological data. In this context, it invited Members to provide the Secretariat with timely notifications of extreme weather events and other newsworthy activities for attracting the attention of the international media and the public. It further encouraged Members to continue to develop NMHSs' Websites, including an e-library dedicated to disaster information, with reference to WMO and linked to the WMO Website and to highlight major WMO events with appropriate linkage.

4.8.7 The Association expressed its appreciation to the Secretary-General for assisting NMHSs in the celebration of World Meteorological Day (WMD) as a significant instrument for increasing the visibility of NMHSs. It encouraged Members to provide extrabudgetary resources to the IPA trust fund and in kind support to enable the production of public information materials including those for the WMD.

4.8.8 The Association recalled that Fifteenth Congress called for a greater involvement of NMHSs in developing strategic alliances with the national media for the purpose of disseminating key messages and providing greater visibility for all activities of the NMHSs, and further called on NMHSs for a closer interaction with United Nations Offices in the field in order to increase recognition of NMHSs' contribution to disaster prevention and mitigation and other areas.

4.8.9 The Association noted that WMO would participate in the World Exposition 2010 "Better City, Better Life" (Shanghai, China, May–October 2010). The WMO MeteoWorld Pavilion will seek to enhance public awareness of the work undertaken by WMO and NMHSs and their contribution to people's daily life. The Association requested Members to support participation of WMO in the 2010 World Expo and to contribute extrabudgetary resources, in kind support and public information materials for the WMO Pavilion.

4.8.10 The Association noted with appreciation the work of the Regional Office for Asia and the South-West Pacific and the WMO Office for the South-West Pacific as information focal points in the WMO Secretariat for the Region. In order to enhance WMO's information and Public Affairs Programme in the Region, it requested the Offices to further strengthen its links with the Members of the Association to better meet expressed needs for information.

4.9 ENHANCED CAPABILITIES OF NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN DEVELOPING COUNTRIES, PARTICULARLY LEAST DEVELOPED COUNTRIES, TO FULFIL THEIR MANDATES *(agenda item 4.9)*

4.9.1 The Association recognized the improved coordination resulting from the restructuring of the WMO Secretariat and the establishment of the Development and Regional Activities (DRA) Department, bringing together the key WMO Secretariat Offices responsible for working with Members at a regional level on NMHSs development issues. Furthermore, the Association welcomed the further engagement of key partners and donors aimed at improving the capabilities of NMHSs in developing countries.

Resource mobilization and development cooperation and partnerships

4.9.2 The Association thanked its Members for their ongoing support and assistance to the WMO resource mobilization efforts and the efforts aimed at development of NMHSs, with particular emphasis on the LDCs and SIDS and countries emerging from conflict. The Association welcomed the progress made in the main areas of focus: (1) VCP and Strategic Development Partnerships; (2) assisting

NMHSs to find financing opportunities at national level, especially through capacity-building; (3) demonstration of socio-economic benefits of NMHSs products and services; and (4) advocacy and marketing of WMO and NMHSs. The Association expressed its appreciation concerning its Members' actions to increase the extrabudgetary resources attracted to WMO and noted that these funds supplemented assessed contributions and directly assisted in achieving results.

4.9.3 The Association welcomed the success of, and supported the approach taken by, the Resource Mobilization Office (RMO) and Regional Offices of the DRA Department in focusing strongly on the establishment of strategic partnerships with key organizations including the World Bank (WB), UN System partners, in particular UNISDR and UNDP, and the Asia Pacific Network Foundation, and also with WMO Members and the delivery of development projects.

4.9.4 The Association expressed its appreciation for the significant and strategic work being undertaken by Members in the Region in respect to capacity enhancement of NMHSs in the South-West Pacific. In this respect, the Association noted the financing of new and continuing development projects secured through various modalities with the facilitation of WMO. These capacity development programmes are delivered in cooperation with a number of WMO Members (Australia, China, Finland, Japan, New Zealand, United States) and with the major partners mentioned above. The Association welcomed the strong trend in other Regions and the emerging trend in Asia and the South-West Pacific regions towards support for major development programmes through WMO by Members and other development agencies, and encouraged the Secretary-General and RA V Members to increasingly focus on such an approach.

4.9.5 The Association noted the commendable efforts made by RA V Members and the Secretary-General to assist NMHSs of LDCs and SIDS in the Region, in comprehensive needs analysis/assessment, management skill building, preparation of NMHS development plans and emergency assistance. Noting that further efforts were required in these areas, the Association requested the Secretary-General to pursue strategies for raising the profiles of NMHSs concerned through sharing best practices in the integration of weather-, climate- and water-related information and services into national and regional development planning frameworks.

Infrastructure and operational facilities

4.9.6 Noting with concern that many NMHSs of developing countries in the Region, in particular LDCs and SIDS, do not yet have the comprehensive infrastructure, operational facilities and human resources necessary for providing meteorological information, products and services in support of the socio-economic development of their respective countries, the Association urged the Secretary-General, RA V Members and development partners to address these priority areas, in particular observing systems, telecommunications and information technology, through coordinated capacity-building initiatives and aid projects. Improved regional infrastructure and services ultimately benefit the economic well being of all Members in the Region as it allows better coordination and delivery of data and products thus positively impacting upon the ability of Members to provide relevant services and protect the safety of the community.

4.9.7 The Association stressed that in addition to enhancing technical capabilities of NMHSs of LDCs and SIDS, support was also required to strengthen their abilities in advocacy and in the marketing of their products and services to users, including government officials, decision-makers and funding agencies. Noting that this would contribute towards enhancing their visibility and access to funding both from internal and external sources, the Association requested the Secretary-General to give priority to assisting RA V Members to train senior and middle level managers of NMHSs concerned in social-marketing and effective communication with government officials, decision-makers and development partners.

4.9.8 The Association noted with satisfaction that assistance was provided to some LDCs in the Region in the preparation, review and/or updating of their NMHS's development and modernization

plans through expert missions and the organization of national consultation workshops. It requested the Secretary-General to provide appropriate assistance in the implementation of these plans.

4.9.9 Noting that the Fourth UN Conference on the LDCs (LDC-IV) is scheduled to be held in 2011, the Association requested the NMHSs concerned to pay specific attention to the preparatory process of the Conference at national level, and WMO to provide advice as appropriate.

Human capacity development

4.9.10 The Association noted with pleasure the wide range of training activities provided to and by its Members, among others Australia, China, Finland, France, India, Japan, New Zealand, Republic of Korea, the United Kingdom and the United States, during the intersessional period. The Association encouraged other Members to open their training events to all Members within the Region where there was capacity. The Association was encouraged to learn of the growing use of e-learning in the training activities being offered to and by its Members. The Association encouraged its Members and partner organizations, such as COMET (United States), EUMETCAL (Europe) and EUMETSAT, to strengthen their use of e-learning and support to such activities, particularly in high priority areas such as aviation and marine forecasting and observations, disaster risk reduction, communications and application of climate data and products.

4.9.11 The Association expressed its appreciation to the Secretary-General for the increased communication provided to its Members through the Education and Training Office regarding education and training opportunities and the active collaboration and coordination between the WMO Programmes and institutions such as the WMO Regional Training Centres and Member training institutions. The Association noted the increased coordination and collaboration offered its Members more and improved training opportunities. The Association noted the development of competence assessment frameworks such as that undertaken by the CAeM Task Team on the competence assessment tool kit (TT-CAT).

4.9.12 The Association also expressed its appreciation to RA V Members for their direct and indirect contributions to the WMO Fellowship Programme and encouraged its Members to continue and, where possible, increase their support for this important long-term aspect of human capacity development. In addition to increased financial contributions to the VCP(F) Programme or secondment opportunities and support, the Association requested its Members to liaise with the aid agencies in their countries to seek opportunities for fellowship for LDCs and SIDS funded through other Government and aid agencies through National Missions and other facilities.

4.9.13 The Association requested the Secretary-General to provide further information on the human capacity development and institutional implications of the decision by the Executive Council at its sixty-first session (EC-LXI) regarding the qualifications of meteorological personnel involved in the supply of meteorological services to air navigation. The Association noted the proactive approach to these issues being taken by a number of Members (Australia; France; Finland; Hong Kong, China; Japan; New Zealand; United Kingdom and United States) and called upon them to assist the Secretary-General and other Members in the Region to deal with the issue prior to the November 2013 deadline through the provision of training opportunities and competency assessment of material and resources.

4.9.14 The Association recognized the important role that the Global Atmospheric Watch (GAW) Training and Education and Centre (GAWTEC) in Germany plays in improving the capabilities of the Members to maintain their GAW stations. The Association urged its Members to fully implement the training in order to further enhance the quality and availability of data and recommended continued support for GAWTEC by all sponsors.

Enhancing voluntary cooperation activities

4.9.15 The Association recalled the discussion by EC-LXI on enhancing voluntary cooperation activities and noted that a number of RA V Members were very active in supporting development projects inside and outside the Region. The Association welcomed the strong trend in other Regions and the emerging trend in Asia and the South-West Pacific Regions towards support for major development programmes through WMO by Members as complementary and significant contributions to development cooperation activities overall, and encouraged the Secretary-General and Members to increasingly focus on such an approach. The Association recognized that the VCP(F) and VCP(ES) mechanisms provide very valuable and fairly immediate short-term support to countries to enable them to maintain operations while also moving towards the development of strategic plans for longer-term development. Noting the generally constant level of support to these mechanisms, the Association expressed concern that these mechanisms not be abandoned by donor Members and urged its Members to join, continue and increase their support in these areas which are a necessary complement to broader development activities. In that respect, the Association adopted Resolution 5 (XV-RA V) – WMO Voluntary Cooperation Programme.

Country Profile Data Base

4.9.16 The regional association reviewed the progress towards the development of an integrated Country Profile Data Base (CDB) requested by Cg-XV and EC-LX and expressed its appreciation for the progress to date including the purchase of needed survey and collaboration software. Recognizing the potential for such a capability to improve coordination, as well as the efficiencies for surveys and knowledge management across programmes and regions, while noting the delays in the implementation of the first phase due to changes in hardware and parallel delays in WMO Publication 5 software development, and the need to complete the review requested by EC-LXI, the Association agreed with the importance of continuing the development of the CDB with the involvement of the EC Working Group on Capacity-building, and the assistance of those Members willing to do so.

5. EFFICIENT MANAGEMENT AND GOOD GOVERNANCE *(agenda item 5)*

5.1 INTERNAL MATTERS OF THE ASSOCIATION *(agenda item 5.1)*

Internal matters of WMO

5.1.1 The Association took advantage of the Secretary-General's presence at the session to hold a discussion on internal matters of WMO of concern to Members of the Region, particularly in connection with reorganization of the WMO Secretariat and budget preparation for the sixteenth financial period.

5.1.2 In the context of the WMO Strategic Plan for 2012–2015, the Association noted the proposed key priorities of WMO for 2012–2015: Global Framework for Climate Services (GFCS); Capacity-building; WIGOS/WIS development; Disaster Risk Reduction; and Communication. With reference to the WMO budget evolution from 1996 to 2015, the Secretary-General introduced a possible integrated budget strategy to move from a regular budget to an integrated budget strategy with 50% regular and 50% of voluntary contributions. The strategy is similar to that of other UN organizations, which allows members to pledge funding to specific high priority initiatives beyond assessed contributions.

5.1.3 The Association was further informed by the Director of the Development and Regional Activities (DRA) Department that, within the process of reorganization of the Secretariat, the DRA Department was restructured to implement programme activities towards Expected Results 7 (Enhanced capabilities of Members to provide and use weather, climate, water and environmental applications and services) and 9 (Enhanced capabilities of NMHSs in developing countries, particularly Least Developed Countries, to fulfil their mandates). The DRA Department includes the Resource

Mobilization Office (RMO), the Office for the Least Developed Countries (LDCs), the Regional Offices and the Education and Training Office.

5.1.4 The Association was pleased to note the emphasis which the restructured DRA has provided for capacity-building and expressed its appreciation to the Secretary-General for the renewed efforts to organize the Secretariat in line with the approved WMO Strategic Plan.

5.1.5 The Association welcomed the further harmonized approach for capacity development activities for Members including technical cooperation, regional activities and human resources development activities expected to be carried out by the Regional Offices and WMO Field Offices. In this regard, in view of the expected increased workload and the current human resources of the Regional Office for Asia and the South-West Pacific, including the WMO Office for the South-West Pacific compared to other Regions, the Association requested the Secretary-General and potential donor Members to consider providing appropriate funding and human resources support for the enhancement of these Offices' activities.

Report of the Management Group of RA V

5.1.6 The Association noted with appreciation the reports of the sessions of the RA V Management Group (MG). The Association complimented Mr A. Ngari, president of the Association and chair of the RA V MG, and members of the Group for the activities carried out according to its terms of reference, in particular for guiding the development of the Strategic Plan for the Enhancement of NMHSs in RA V, for monitoring the work of RA V working groups and rapporteurs, as well as for the advancement of the WMO Programmes and activities in the Region. The MG also provided guidance for the restructuring of the subsidiary bodies of the Association and for the organization of the fifteenth session of RA V in an efficient and cost-effective manner.

5.1.7 The Association, in recognizing the importance of coordinating its activities, agreed to re-establish the RA V Management Group with a strengthened mandate and with greater flexibility to address intersessional issues. The RA V Management Group was expected to deal with capacity-building and partnership, as well as strategic planning and monitoring issues, and to consider the optimal use of resources that might be allocated or could be made available in connection with the activities of the subsidiary bodies of RA V.

5.1.8 The Association agreed that the active use of the Management Group by the RA V president during the intersessional period was a key aspect of being able to meet these challenges. It was also agreed that the Management Group should be requested to use the guidance provided by the RA V session to identify a number of activities that could be carried out over the next four years by regional working groups with emphasis on addressing the most urgent issues facing the Region.

5.1.9 In this regard, the Association noted that under Agenda item 5.2 (paragraph 5.2.6) it had decided to attach the highest priority for the Region to the following:

(a) Improved end-to-end Multi-Hazard Early Warning Systems (MHEWS);

(b) Improved infrastructure (data and information services) for weather, climate and water;

(c) Better climate services;

(d) Sustainable aviation services;

(e) Capacity-building.

Review of the Subsidiary Bodies of the Association

5.1.10 The Association noted with appreciation the information provided by the president on the activities of the RA V subsidiary bodies during the intersessional period. It expressed its appreciation with the activities performed by the working groups and rapporteurs, but noted with concern that some had not been able to perform satisfactorily for various reasons. The Association encouraged Members

to provide necessary support to the designated members of the Tropical Cyclone Committee (TCC) and other subsidiary bodies to allow them to discharge their responsibilities efficiently. The Association 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.

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

(a) The Tropical Cyclone Committee had been an important regional body and should be reinstated;

(b) The intersessional work of the Association could be more efficiently accomplished through changing the nature of its established working groups to be action-oriented and focused on specific tasks;

(c) These action-oriented working groups should be provided clear and time bound objectives by the Management Group, taking into consideration the priorities reflected in the considerations at this session, any emerging issues and the regional Strategic Operating Plan and the WMO Strategic Plan;

(d) Members of these working groups should be selected by the president in consultation with the Management Group from nominations provided by RA V Members;

(e) The president, in consultation with the Management Group, should have an active role in creating, reviewing, guiding and coordinating resources for the work of the Tropical Cyclone Committee and working groups and disbanding those which have completed their work or areas no longer needed;

(f) The Tropical Cyclone Committee and working groups should actively coordinate with the Management Group and pursue the priorities of the Region broadly captured in the WMO Strategic Plan and the RA V Strategic Operating Plan with a view to preparing for the sixteenth Congress in 2011 and beyond.

5.1.12 The Association agreed to establish the following RA V subsidiary bodies:

(a) Management Group (MG);

(b) Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean (TCC);

(c) Working Group on Hydrological Services;

(d) Working Group on Climate Services;

(e) Working Group on Weather Services (with an immediate focus on sustainable aviation weather services);

(f) Working Group on Infrastructure.

The working groups will be encouraged to conduct their business in a cost-effective manner (e.g., use of e-mail, video and teleconference).

5.1.13 The chair of RA V Tropical Cyclone Committee and leads of working groups are listed in Annex III to the present report. Members in the Region were requested to nominate experts to these subsidiary bodies. The MG will review the membership of each of the subsidiary bodies. The lead of each Working Group was requested to develop initial terms of reference by the end of July 2010 for priority activities to be undertaken, for approval by the Management Group. The Association noted that there would be a regular review of the terms of reference by the MG.

5.1.14 The Association agreed on the terms of reference of the MG and the TCC. In that connection, the Association adopted Resolutions 6 (XV-RA V) – Management Group of Regional Association V (South-West Pacific) and 7 (XV-RA V) – Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean.

Volunteerism in the work of Regional Association V

5.1.15 The Association recalled that the Executive Council at its sixtieth session (June 2008) agreed in principle with the suggestions of the presidents of the Commission for Basic Systems (CBS) and the Commission for Hydrology (CHy) to award recognition to the experts who volunteered to devote their time to undertake the activities planned by technical commissions and regional associations. It urged the Secretary-General to propose a common scheme for awarding such recognition. The Council also urged Permanent Representatives to facilitate the participation and voluntary contribution of experts, not only from the NMHSs but also from other institutions, to the activities of WMO.

5.1.16 In that regard, the Association decided that volunteerism in the work (nomination, performance monitoring and recognition) of the working groups and task teams should receive the required attention as portrayed in Annex IV to the present report.

5.1.17 In this context, the Association expressed its deep appreciation to the chairs and members of the working groups and rapporteurs, 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.

5.2 EFFECTIVE AND EFFICIENT MANAGEMENT PERFORMANCE AND OVERSIGHT OF THE ORGANIZATION *(agenda item 5.2)*

WMO Strategic Planning – Regional Aspects

5.2.1 The Association welcomed the decision of EC-LXI on the WMO Strategic Plan, Operating Plan, and Monitoring and Evaluation. It noted that the Global Societal Needs (GSN) endorsed by EC-LXI as the drivers of the strategic planning for the period 2012–2015 and the Strategic Thrusts (STs) together with the Expected Results (ERs), addressed the needs and capacity of the Region.

5.2.2 The Association also welcomed the decision of EC-LXI to involve regional associations (RAs) in the WMO Strategic Planning Process with highlights of the region priority. It appreciated the progress made in developing the WMO Strategic Plan 2012–2015 and the steps taken to get inputs from RAs. The Association encouraged the WMO Secretary-General to continue to seek inputs from RAs that can improve the clarity of the strategic direction of the Organization for 2012–2015, together with the achievement of the Expected Results.

5.2.3 The Association requested its president and its Management Group to remain engaged in the planning process during the intersessional period and increase the visibility of the region within WMO.

5.2.4 The Association agreed to align activities with the WMO Strategic Plan, to develop its Regional Operating Plan for the period 2012–2015 and to contribute to the WMO Monitoring and Evaluation process.

Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association V (South-West Pacific)

Priority areas of concern for Region V

5.2.5 The Association recalled that the fourteenth session of RA V (Adelaide, Australia, May 2006) had agreed on the priority areas of concern for Region V, and decided to develop a

Strategic Plan for the Enhancement of NMHSs in RA V that focuses on the specific needs and requirements within the Region.

5.2.6 The Association reviewed the priority areas which had been identified by the fourteenth session of RA V. It agreed that it was important to focus on a small number of key priorities in its future work, and decided to attach the highest priority for the Region to the following:

(a) Improved end-to-end Multi-Hazard Early Warning Systems (MHEWS);

(b) Improved infrastructure (data and information services) for weather, climate and water;

(c) Better climate services;

(d) Sustainable aviation services;

(e) Capacity-building.

Development of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association V (South-West Pacific) (2010–2011)

5.2.7 The Association recalled that the Executive Council at its sixtieth session urged regional associations to complete the development of their Regional Strategic Plans taking into account the WMO strategic planning cycle and specific regional needs and requirements; and to prepare related Regional Operating Plans, that would feed into the WMO Strategic Plan.

5.2.8 In this respect, the Association was pleased to note that a draft Strategic Plan for the Enhancement of NMHSs in RA V (2010–2011) was developed by the Task Team on Strategic Planning, established by the fourteenth session of the Association, and in consultation with Members and with guidance by the Management Group, to provide a dynamic process to enable RA V Members to progress together to meet the evolving needs of the Region in weather, climate, water and related environmental issues, and to contribute to the delivery of the WMO Strategic Plan for the benefit of all WMO Members. The draft Strategic Plan has taken into account the Strategic Goals identified in the 2007 RA V Regional Seminar (Kuala Lumpur, April 2007), the WMO Strategic Plan (WMO-No. 1028), the WMO Secretariat Operating Plan 2008–2011 (WMO/TD-No. 1417), and suggestions from Members of the Region. In particular, the WMO Secretariat Operating Plan addresses the interaction among the WMO Programmes and other regional and international programmes in support of NMHSs in the various Regions, under the context of WMO's Top-level Objectives, Strategic Thrusts and corresponding Expected Results.

5.2.9 The Association expressed its appreciation to the Task Team on Strategic Planning for its work for identifying a set of deliverables, which were further streamlined through the discussions and survey on high-priority, realistic and achievable deliverables during the Fifth Technical Conference on Management of Meteorological and Hydrological Services in RA V (Kuala Lumpur, April 2009). These 87 deliverables are action-oriented and categorized under 35 Regional Expected Results in accordance with WMO's set of Expected Results.

5.2.10 The Association examined the draft Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association V (South-West Pacific) 2010–2011, and agreed to adopt the Plan and Resolution 8 (XV-RA V) – Strategic Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association V (South-West Pacific) (2010–2011). The Association requested the Secretary-General to provide assistance to Members in the implementation of the Strategic Plan.

5.2.11 The Association, in view of the usefulness of the survey to monitor and evaluate the progress on the implementation of the Strategic Plan, requested the Management Group and the Regional Office for Asia and the South-West Pacific to develop and conduct a survey questionnaire, and invited its Members to send the WMO Secretariat the completed survey on the basic capability of NMHSs in RA V by the end of each year from 2010 to 2011.

Development of the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association V (South-West Pacific) (2012–2015)

5.2.12 The Association noted with appreciation that the Task Team for Strategic Planning also initiated development of the RA V Strategic Operating Plan for 2012–2015, by mapping the deliverables under Regional Expected Results identified in the RA V Strategic Plan 2010–2011 into the new five Strategic Thrusts and eight Expected Results of the draft WMO Strategic Plan 2012–2015. The Association considered that the preliminary draft needs further streamlining of the deliverables into achievable priority areas during 2012–2015 and further development of key performance indicators/targets and concrete activities that would constitute the Operating Plan.

5.2.13 The Association agreed on the necessary processes for the development and adoption of a new RA V Strategic Operating Plan (SOP) for 2012–2015, and endorsed the proposed roadmap towards development, refinement and endorsement of the RA V SOP for 2012–2015, including: development and finalization of the general description by the end of March 2011; the refinement of the preliminary draft SOP with general description, regional expected results and deliverables by April 2011; its adoption by the president through discussions at a side meeting during the Sixteenth World Meteorological Congress (Geneva, May 2011); the development of key performance indicators/targets and concrete activities by October 2011; and endorsement of full SOP documents during the Regional Seminar planned for October/November 2011 for final approval by the president by the end of November 2011.

Sixth Technical Conference on Management of Meteorological and Hydrological Services in Regional Association V (South-West Pacific)

5.2.14 The Association expressed its appreciation to the Secretary-General for assisting Members in developing their NMHSs by organizing regional events including technical conferences on management to enable them to exchange views on, and share experience in the management and operation of the Services. The Association noted with appreciation that the Fifth Technical Conference on Management of Meteorological and Hydrological Services in RA V had been held in Kuala Lumpur, Malaysia, from 20 to 24 April 2009 at the kind invitation of the Government of Malaysia. It expressed its satisfaction that the Conference was attended by 24 Directors and senior officials of NMHSs from 16 Members, a representative of an international organization and an invited lecturer. They presented lectures or case studies on eight topics: Strategic planning and management of NMHSs; Socio-economic benefits of weather, climate and water services; Building partnerships with stakeholders and public relationships; Human resources development and training opportunities; Emerging technology including information and Communication Technology (ICT); Quality management practices; Disaster risk reduction; and Climate prediction and information for decision making.

5.2.15 The Association noted with satisfaction that Fifteenth Congress acknowledged the importance of organization of regional technical conferences, regional seminars and workshops. Considering that constant improvement on management techniques and practices is needed for NMHSs to increase efficiency of their Services and to improve the ability to address challenges facing them under financial and other constraints, the Association recommended that the Sixth Technical Conference on Management of Meteorological and Hydrological Services in RA V be held during the next financial period and recommended that topics be formulated taking into full consideration the regional priorities as given in paragraph 5.2.6.

5.2.16 The Association noted with appreciation that a WMO Regional Seminar on Enhancing Service Delivery by NMHSs in RA V had been held in Kuala Lumpur, Malaysia, from 2 to 6 April 2007 at the kind invitation of the Government of Malaysia. The Association expressed its satisfaction that the Seminar was attended by 21 Directors and senior officials of NMHSs from 18 Members, three representatives from non-Members in the Region, two representatives from international organizations, and four invited lecturers. They presented lectures or case studies on five topics: Social and economic benefits of weather, climate and water services; New initiatives for observations and communications; Delivery of accurate and timely weather, climate and related information to end-users; Strategic

planning; and Resource mobilization. The first two days of the Seminar was jointly held with the UNESCO Intergovernmental Oceanographic Commission (IOC) Seminar on Tsunami Warning Operations under the Pacific Tsunami Warning and Mitigation System (PTWS), with the theme "Building Capacities of National Meteorological Services and National Disaster Management Offices as Principal Stakeholders for the Timely Issuance of Tsunami Warnings to Prepared Communities".

5.2.17 The Association also expressed its appreciation to the Secretary-General for planning to organize a Regional Seminar during the current financial period. It agreed that the topics of the Seminar could include the following subjects taking into full consideration of regional priorities of RA V as given in paragraph 5.2.6:

(a) Strategic planning and management;

(b) Climate risk insurance;

(c) Climate prediction and disaster risk reduction;

(d) Flood and drought forecasting to prepare early warning system;

(e) Perspective and water resources management;

(f) The follow-up on Task Force on GFCS;

(g) Aviation services including training package for aviation forecasters;

(h) Improvement of service delivery and cost recovery.

5.2.18 The Association requested the Management Group to select, as appropriate, the topics of the above-mentioned technical conference and seminar.

6. EMERGING ISSUES AND SPECIFIC CHALLENGES *(agenda item 6)*

Sustainable operation of observing systems to support weather, climate and water services

6.1 The Association noted that a lack of traceability of meteorological instrument calibration and measurements to international standards had been revealed by a WMO survey on Calibration and Maintenance and was concerned that the quality of observations would not be appropriate to support activities, such as climate variability, climate change monitoring and disaster risk reduction. Quality observations are indeed the basic building blocs of all the services provided by Members to user communities. The Association noted that improvements in the meteorological instrument calibration and measurement traceability could be expected from the broader use of instrument travelling standards that can be purchased at reasonable prices and regularly calibrated at the Regional Instrument Centres (RICs). The Association therefore urged its Members to do their utmost to improve the traceability of their meteorological instrument calibration and measurements to international standards and to set up and maintain calibration laboratories. The Association recalled that it had established two RICs: one in Manila (Philippines) and the other in Melbourne (Australia) to provide support to its Members in calibrating their reference instruments and ensuring their traceability to international standards. The Association requested its RICs to improve their communication with Members in the Region and support the Members to enhance their sensitivity to the importance of meteorological instrument calibration and measurement traceability as well as carrying out relevant capacity-building activities.

6.2 The Association requested Members to conform strictly to the WMO regulatory material, such as the Manual and Guide on the GOS and the CIMO Guide, follow the Statements of Guidance (gap analysis in the observing systems) provided by CBS and make available information needed for the preparation of the new Implementation Plan for evolution of the global observing systems, as a response to the new Vision for the GOS in 2025 and WIGOS.

6.3 The Association noted the updated versions of the WIGOS Development and Implementation Plan (WDIP), the WIGOS Concept of Operations (CONOPS) and the Development and Implementation Strategy (WDIS) elaborated by EC-WG/WIGOS-WIS-3 (Geneva, 24–26 March 2010) for EC-LXII approval. In this regard, the Association agreed that WIGOS implementation activities be incorporated into the strategic plan/work programme of the Association and that this planning address, inter alia, the continuing deterioration of the in situ observing network. The Association also agreed to develop and coordinate with Members their regional WIGOS implementation plans, including the WIGOS Pilot Implementation Projects as specified by WDIS.

Quality management for weather, climate and water services with emphasis on aeronautical and marine meteorological services

6.4 The Association was informed of the conclusions of a Quality Management Framework (QMF) workshop held in Geneva on 7–11 December 2009, which proposed several options for the future direction of the QMF. The special emphasis of WMO on service delivery including climate services requires a renewed effort in documenting that all relevant processes from physical measurements in observations to forecasts and warnings issued to all user and customer groups are subject to a rigorous quality management. In particular, the aviation and marine user community are formulating clear requirements for the implementation of Quality Management Systems in the delivery of services to them.

6.5 The Association recognized that services to specific sectors, such as aviation or marine, however, depend to a large extent on the basic observing, data exchange and processing as well as basic forecasting systems of NMHSs. The Association thus concluded that in addition to the specific measures addressed in paragraph 4.7.35, an all-encompassing approach to Quality Management was required. The Association appreciated the good progress in the Pilot Project for QMS implementation in the Tanzania Meteorological Agency, which was well documented for use by all Members, but in particular those from developing countries, LDCs and SIDS. The Association further noted with appreciation the recommendations of the QMF workshop and agreed with the main conclusions, namely, enhancing the QMF implementation process will need to be considered by WMO senior management in the overall WMO strategic and operational planning process, and may be to some extent reflected in future revisions of such planning documents submitted to the Executive Council.

6.6 In order to make best use of existing guidance, the Association agreed with the concept of rewriting and "converting" the *Guide on the Quality Management System for the Provision of Meteorological Services for International Aviation* (WMO-No. 1001) into a "generic guide" fit for the purpose for all WMO Programmes. Additional sections to be provided could include, but would not be restricted to, the following topics:

(a) Selecting a quality management consultant;

(b) Developing and producing a quality manual;

(c) Developing procedures;

(d) Conducting internal audits;

(e) Selecting an organization to perform the ISO compliance certification.

Additional attachments could include, among others, National Meteorological or Hydrometeorological Service (NMS) Quality Manuals as best practice examples.

6.7 The Association recognized that the wide range of size and organizational setup of Members' NMHSs in the Region, including many SIDS and some LDCs, would require a cooperative and mutually supportive approach to the implementation of QMS. The Association thus sought to identify and obtain a commitment from Members operating a mature QMS to form twinning partnerships with Members currently planning or developing a QMS, based on the following steps:

(a) Identify Members commencing or contemplating adopting a QM approach;

(b) Establish whether or not assistance from WMO would be required, and, if so, whether or not a twinning partnership would be welcomed;

(c) Identify suitable Members with mature QMSs prepared to enter into a twinning partnership by Region;

(d) Develop a comprehensive protocol for engagement of partners.

6.8 The Association noted the cost for external audits carried out by commercial consultancy companies would be relatively higher for the NMHSs in small countries that did not have qualified auditors available nationally, and that these potential costs served to discourage countries from implementing QMSs. To this end, the Association noted the recommendation by the workshop to identify highly experienced and competent auditors amongst Members who are prepared to participate in ad hoc WMO Audit Team(s).

6.9 The Association noted that for the exchange of existing resource material, such as documentation examples, templates, sample Quality Objectives and suitable contents for Quality Manuals, the existing QMF Website could be used and enhanced. The Association therefore requested the Secretary-General to initiate a review and enhancement of the current WMO-QMF Website, to provide a comprehensive resource list for the use by Members and to accelerate the support to Members looking to implement QMS systems to meet the ICAO mandated target date of November 2012.

Mainstreaming climate change adaptation into disaster risk reduction

6.10 The Association was briefed on the progress with the implementation of the Disaster Risk Reduction (DRR) Programme over the past four years with a particular emphasis on national/regional projects. Specifically, the Association noted:

(a) The six-phased WMO DRR Project Management Framework, and criteria considered for the initiation of projects;

(b) The two types of DRR cooperation projects, including:

First type: National and regional disaster risk management and adaptation projects with the World Bank, UN-ISDR and UNDP focused on comprehensive governance and institutional development in Disaster Risk Management (DRM), in which WMO is a key partner for addressing capacity developments of the NMHSs, their partnerships and cooperation with various DRM stakeholders. This type of project has been initiated in eight countries in Southeast Europe, eight countries in Central Asia and Caucuses, and five countries in Southeast Asia;

Second type: Comprehensive end-to-end multi-hazard early warning system (MH-EWS) projects, which addresses the development of effective end-to-end early warning systems (EWS) built upon technical capacity development of NMHSs by WMO Technical Programmes in countries that have institutional capacities for emergency preparedness and planning;

(c) The projects include training programmes utilizing relevant training materials and guidelines developed (or being developed) by various Technical Programmes and Commissions, DRR Programme and partners engaged in DRM;

(d) Linkage of these projects to the Regional Association Working Group on DRR to clarify the role of the regional association in the long-term development and scaling up on the DRR Projects.

6.11 The Association was informed of the emerging opportunities for development of climate services for disaster risk management, particularly on major initiative for the development of climate services for insurance and reinsurance sector, with significant implications for other segments of disaster risk management stakeholder.

6.12 The Association was invited to provide advice on a number of issues including:

(a) DRR Project Management Framework particularly pertaining to the role of the regional associations and alignment of their activities towards more coordinated approach in the context of DRR Project implementation to benefit the Members;

(b) Documentation of the lessons learnt from both types of the demonstration projects undertaken with partners, evaluation and development of guidelines for roles and responsibilities of WMO Programmes, constituent bodies, Members and partners;

(c) Realizing opportunities for the development of climate services for DRM as a critical step towards contribution to the Global Framework for Climate Services (GFCS) generally, and also noting the related initiatives for development of climate services for insurance and reinsurance involving the industry, leading climate centres, and NMHSs.

7. WMO REGIONAL OFFICE FOR ASIA AND THE SOUTH-WEST PACIFIC INCLUDING THE WMO OFFICE FOR THE SOUTH-WEST PACIFIC *(agenda item 7)*

7.1 The Association reviewed the activities of the Regional Office for Asia and the South-West Pacific including the WMO Office for the South-West Pacific in Apia since its fourteenth session. It recognized that, through the reorganization of the WMO Secretariat and in particular of the Development and Regional Activities (DRA) Department in January 2008 aiming at further harmonized implementation of capacity-building activities for Members, the Offices were strengthening their functions as an integral part of the WMO Secretariat. The Association was pleased to note the effective assistance 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, and requested the Secretary-General to continue his efforts to strengthen the Regional Office for Asia and the South-West Pacific and the WMO Office for the South-West Pacific to meet the requirements of Members in the Regions and to address emerging WMO programmes with relevant regional organizations.

7.2 The Association noted with appreciation that the WMO Office for the South-West Pacific had continued to play a key role in collaboration, coordination and communications with Members in the Region by identifying requirements for the development of their respective NMHSs. The Office developed and maintained close working relationship with other UN agencies including Resident Coordinators' Offices (UNRCOs) in Apia, Port Moresby and Suva and regional organizations such as SPREP, SOPAC and PIFS. The Association expressed its appreciation to the Government of Samoa and SPREP for their considerable support to the operation of the WMO Office for the South-West Pacific. In this connection, the Association recognized the need to further strengthen the Office, particularly to improve its ability to assist Members with resource mobilization.

7.3 The Association noted the increasing role of the Regional Office as a focal point and an information centre for regional activities, and in assisting Members to develop their NMHSs and implement WMO Programmes and other activities that had a regional focus. It recognized the efforts of the Regional Office to contribute to the new high-priority needs in the areas of science and technology, capacity development, climate adaptation, water resources management and disaster risk reduction as well as other environmental issues that had been identified by Members. The Association requested

the Secretary-General to continue his efforts to strengthen the Regional Office in order to respond appropriately to the growing needs of Members in the Region.

7.4 The Association expressed its satisfaction at the commendable efforts of the Offices in maintaining close contact with Members through visits; in supporting regional events; and in developing and implementing technical cooperation projects in order to ensure the enhanced Members' capabilities in providing weather, climate and water services at national and regional levels. The Association encouraged the staff of the Offices to continue to further strengthen contact with Members and facilitate the implementation of regional activities.

7.5 The Association, recognizing the efforts of the Offices in maintaining a close liaison and collaboration with regional partners such as UNESCAP and ASEAN as well as SPREP, SOPAC and PIFS, invited the Offices to continue that type of activity and to utilize those institutions to promote weather-, climate- and water-related issues and to increase the awareness of policy makers of the role of NMHSs and WMO in contributing to sustainable development.

7.6 The Association, noting that the Website on Regional Activities in the South-West Pacific provided a vehicle for the exchange and dissemination of regional news and a means of maintaining a close liaison between the Regional Office and Members, emphasized that the website should be enhanced with a focus on issues of interest to the Region. In that connection, it urged Members to actively contribute news items and articles to the Regional Office on a regular basis. The Association requested the Secretary-General to include, in the relevant web pages under the WMO Website, information on the activities and programmes being undertaken by Members in the Region.

7.7 The Association recognized that Members continued to benefit from development cooperation activities carried out within the framework of various funding sources. The Association further recognized the considerable support provided to 13 projects for nine Members within the framework of the WMO Voluntary Cooperation Programme (VCP) during the period from 2006–2009, in particular for strengthening WWW operational facilities and for climatological activities. The Association expressed its appreciation to Australia, Japan and United States for their support to the restoration of the surface observing network in Kiribati, the restoration of the GTS Message Switching System for the Philippines and the provision of the Low-rate Information Transmission (LRIT) receiving equipment for the Pacific Island States, respectively, and urged potential donor and recipient Members to participate more actively in VCP.

7.8 The Association also expressed its appreciation to the Secretary-General, the Regional Office and the WMO Office for the South-West Pacific for immediate actions taken after the occurrence of disasters that had seriously affected the NMHSs, in particular the Tsunami in September 2009 affecting Samoa and Tonga; and the tropical cyclones Pat and Rene affecting Cook Islands and Tonga, respectively in early 2010. The Association, in this context, requested that Secretary-General to continue to take proactive and immediate response and actions to meet the urgent requirements of affected Members for the restoration of key operational facilities and for human resources development.

7.9 The Association highlighted the key results obtained in the development of the RA V Strategic Plan for the Enhancement of the NMHSs in Region V and commended the Regional Office and the WMO Office for the South-West Pacific for being instrumental in achieving the substantial results. The Association emphasized the important role of the Offices in the coordination of the implementation of the RA V Strategic Plan, and requested the Regional Office and the WMO Office for the South-West Pacific to work closely with the Management Group on the further development of the RA V Strategic Operating Plan for 2012–2015 with concrete tasks and timelines for achieving the planned deliverables and outcomes in accordance with the established regional priorities and expected results.

7.10 Noting the advantages of having the WMO Office closer to the Members concerned, and with the co-location with SPREP and the support of the Government of Samoa, the Association

expressed the view that the WMO Office for the South-West Pacific should continue to be located in Apia (Samoa). The Association also requested that every opportunity be taken for an even closer working relationship with SPREP.

8. SCIENTIFIC LECTURES AND DISCUSSIONS *(agenda item 8)*

8.1 The following scientific lectures were presented during the session:

(a) Benefiting from the Latest Developments in NWP, by Dr Neil Gordon (New Zealand);

(b) Factors Influencing the Response of the Maritime Continent Climate to ENSO, by Dr Edvin Aldrian (Indonesia);

(c) Proper Data Management Responsibilities to Meet Global Ocean Observing System (GOOS) Requirements, by Dr Bill Burnett (United States).

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

9. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS *(agenda item 9)*

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

9.2 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, a previous resolution was still required to be kept in force.

9.3 The Association accordingly adopted Resolution 9 (XV-RA V) – Review of previous resolutions and recommendations of the Association.

9.4 The Association recommended to the Executive Council that Resolution 8 (EC-LVIII) on the report of the fourteenth session of the Association did not need to be kept in force.

10. ELECTION OF OFFICERS *(agenda item 10)*

The Association elected Mrs Sri Woro B. Harijono (Indonesia) as president and Mr ‘Ofa Fa’anunu (Tonga) as vice-president of WMO Regional Association V (South-West Pacific).

11. DATE AND PLACE OF THE SIXTEENTH SESSION *(agenda item 11)*

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

12. CLOSURE OF THE SESSION *(agenda item 12)*

12.1 The principal delegates of Members of the Region, including Australia, Fiji, Malaysia, New Caledonia, New Zealand, Niue, Papua New Guinea, Philippines, Singapore, Tonga, United Kingdom, United States of America, expressed their gratitude to the Government of Indonesia for having hosted the session, and for the excellent arrangements and the warm hospitality extended to all participants. The Association expressed its appreciation to the WMO Secretariat and the local secretariat for the support that was instrumental in the smooth running of the session. Ms Sri Woro B. Harijono and Mr 'Ofa Fa'anunu were congratulated on their election as president and vice-president, respectively. The Association extended special thanks and acknowledgement to Mr Arona Ngari, president of RA V by presenting Certificate of Outstanding Services, in recognition of his strong leadership and significant contributions in implementing the activities of the Association.

12.2 Mr Robert O. Masters, the representative of the Secretary-General, highlighted the major outcomes of the session including the strong participation of RA V Members and other organizations in the session; the identification of high priority areas in the Region; the adoption of the RA V Strategic Plan for 2010–2011; the establishment of the new working structure of RA V; commitments by Members for capacity building; and opportunities for new technology. He thanked the Government of Indonesia, as well as Ms Sri Woro B. Harijono, Permanent Representative of Indonesia with WMO, and her staff for the excellent arrangements and their warm hospitality. He extended his appreciation to all the delegates and supporting staff for their considerable contributions, which had led to an excellent session and expressed his high expectations for future activities in the Region.

12.3 Ms Sri Woro B. Harijono, Permanent Representative of Indonesia with WMO, on behalf of the host country, expressed the hope that the participants had enjoyed a comfortable and memorable stay in Bali. She thanked the outgoing president of RA V for his leadership and dedication and congratulated the new vice-president on his election and thanked the participants for the support for her election as president of the Association. She also thanked all delegates and the WMO Secretariat in ensuring the success of the session. She wished all participants a safe journey home.

12.4 In closing, Mr A. Ngari, outgoing president of RA V, expressed his appreciation to participants, the host country and co-chairs for their valuable contributions, and hoped that the activities of the Association would be further strengthened in light of the newly adopted RA V Strategic Plan. He also thanked Mr M. Jarraud, Secretary-General of WMO and his staff, in particular those of the Regional Office for Asia and the South-West Pacific and the WMO Office for the South-West Pacific, for their close cooperation and valuable support to the work of the Association and himself during his tenure as the president of the Association. He congratulated the newly elected president and vice-president and wished them every success in the coming years.

12.5 The fifteenth session of Regional Association V (the South-West Pacific) closed at 12.40 p.m. on 6 May 2010.

RESOLUTIONS ADOPTED BY THE SESSION

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: The present resolution replaces Resolution 10 (X-RA V), which is no longer in force.

Resolution 2 (XV-RA V)

ESTABLISHMENT OF REGIONAL CLIMATE CENTRES

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) The *Abridged Final Report with Resolutions of the Fifteenth World Meteorological Congress* (WMO-No. 1026),

(2) The *Abridged Final Report with Resolutions and Recommendations of the Fourteenth Session of the Commission for Basic Systems* (WMO-No. 1040),

(3) The *Abridged Final Report with Resolutions of the Sixty-first Session of the Executive Council* (WMO-No. 1042),

(4) The *Report of the World Climate Conference-3* (Geneva, 31 August–4 September 2009) (WMO-No. 1048),

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

(6) The report of the RA V Working Group on Climate Matters,

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 endorsement by the Executive Council at its sixty-first session (in 2009) of the amendment to the *Manual on the Global Data-processing and Forecasting System* (WMO-No. 485), Volume I – Global Aspects, embedding the process for formal WMO designation of Regional Climate Centres (RCCs) and RCC Networks in WMO Technical Regulations,

Decides:

(1) To work towards the establishment of RCCs in the Region, through assessment of current RCC-related functions being performed in the region vis-à-vis the mandatory and highly recommended RCC functions and subsequent gap analysis, with the guidance and support provided from time to time by the presidents of RA V, the Commission for Climatology (CCl) and the Commission for Basic Systems (CBS), and the Secretary-General;

(2) To implement an RCC Network in RA V on a pilot basis;

(3) To keep the RA V RCC operational activities flexible during the pilot phase, allowing them to evolve based on Members' requirements and within WMO regulations;

(4) To seek formal WMO designation of the RA V RCCs, through the CCl–CBS process described in the latest edition of the *Manual on the Global Data-processing and Forecasting System* and to mandate the president of RA V to initiate this process, following satisfactory evaluation of capability to fulfil the mandatory functions and demonstration of this capability to CCl and CBS;

(5) That the implementation of RA V RCCs, as well as the pilot phase prior to formal designation, be coordinated by the Working Group on Climate Services as a subsidiary body of RA V under the overall guidance of the president of RA V;

(6) To regularly review RA V Members' requirements for climate information, products and services, and to ensure a state-of-the-art service provision to Members to meet their priority needs;

Urges:

(1) The Secretary-General to ensure that the Members are informed of the latest designation criteria for the establishment and designation of WMO RCCs;

(2) The Working Group on Climate Services to use the WMO template and questionnaire on climate services in assessment of the needs of the Region and invite Members to report on the RCC-related functions they are performing;

(3) RCC 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 concerned subsidiary body of RA V for their assessment and advice on commencing a pilot phase;

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

(5) RCCs 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) RCCs 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 RCCs to keep themselves apprised of the outcomes of the World Climate Conference-3, 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) The president of RA V to consult with CCl, CBS and the WMO Secretariat in the effective implementation of RCCs and in determining the eligibility of new RCC proponents;

(9) All Global Producing Centres of Long-range Forecasts (GPCs) to support the efforts of and collaborate with the RA V RCCs;

(10) All RA V Members to support RA V RCC activities, use the products and provide feedback to RCCs and GPCs on their effectiveness for further improvement and tailoring to user needs;

Requests:

(1) The presidents of CCl and CBS 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 RA V to facilitate coordination within RA V on all matters related to RCC implementation;

(3) The Working Group on Climate Services 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 3 (XV-RA V)

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

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) Resolution 2 (XIV-RA V) – Regional Basic Synoptic Network,

(2) Resolution 3 (XIV-RA V) – Regional Basic Climatological Network in Region V,

(3) The *Manual on the Global Observing System* (WMO-No. 544), Volume I, Part III, Regulations 2.1.3.1–2.1.3.5, and the definition of the Regional Basic Synoptic and Climatological Networks,

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

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

Considering:

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

(2) That the Fourteenth World Meteorological Congress welcomed the establishment of the Regional Basic Climatological Network (RBCN) in all WMO Regions and the Antarctic and urged Members to ensure that their operational observing stations compiled and transmitted the CLIMAT and CLIMAT TEMP 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 WMO *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, minor 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).

Note: The present resolution replaces Resolution 2 (XIV-RA V) and Resolution 3 (XIV-RA V), which are no longer in force.

Annex 1 to Resolution 3 (XV-RA V)

LIST OF STATIONS COMPRISING THE REGIONAL BASIC SYNOPTIC NETWORK IN REGION V

INDEX	*STATION NAME*	*OBSERVATIONS*
AMERICAN SAMOA		
91764	CAPE TAPUTAPU AWS	S
91765	PAGO PAGO	S
91765	PAGO PAGO	R
91766	CAPE MATATULA AWS	S
91767	OFU MANUA ISLAND	S
91768	TA'U AWS	S
AUSTRALIA		
94102	TROUGHTON ISLAND	S
94103	BROWSE ISLAND AWS	S
94120	DARWIN AIRPORT	S
94120	DARWIN AIRPORT	R
94122	POINT FAWCETT	S
94131	TINDAL RAAF	S
94147	CAPE WESSEL AWS	S
94150	GOVE AIRPORT	S
94150	GOVE AIRPORT	R
94151	NORTH EAST ISLAND	S
94170	WEIPA AERO	S
94170	WEIPA AERO	R
94183	COEN AIRPORT	S
94200	MANDORA AWS	S
94203	BROOME AIRPORT	S
94203	BROOME AIRPORT	R
94206	FITZROY CROSSING AERO	S
94207	ROWLEY SHOALS AWS	S
94211	MOUNT ELIZABETH	S
94212	HALLS CREEK AIRPORT	S
94212	HALLS CREEK AIRPORT	W
94216	KUNUNURRA AERO	S
94236	ELLIOTT	S
94238	TENNANT CREEK AIRPORT	S
94238	TENNANT CREEK AIRPORT	W
94248	CENTRE ISLAND AWS	S
94255	CAMOOWEAL TOWNSHIP	S
94266	NORMANTON AIRPORT	S
94268	KOWANYAMA AIRPORT	S
94274	GEORGETOWN AIRPORT	S
94287	CAIRNS AIRPORT	S
94287	CAIRNS AIRPORT	W
94290	FLINDERS REEF	S
94294	TOWNSVILLE AIRPORT	S
94294	TOWNSVILLE AIRPORT	R
94296	LIHOU REEF	S
94298	MARION REEF	S
94299	WILLIS ISLAND	S
94299	WILLIS ISLAND	R
94300	CARNARVON AIRPORT	S
94300	CARNARVON AIRPORT	W
94302	LEARMONTH AIRPORT	S
94302	LEARMONTH AIRPORT	R
94312	PORT HEDLAND AIRPORT	S
94312	PORT HEDLAND AIRPORT	R
94313	WITTENOOM	S
94317	NEWMAN AERO	S
94319	TELFER AERO	S
94324	YUENDUMU	S
94326	ALICE SPRINGS AIRPORT	S

INDEX	STATION NAME	OBSERVATIONS
94326	ALICE SPRINGS AIRPORT	R
94327	JERVOIS AWS	S
94332	MOUNT ISA AIRPORT	S
94332	MOUNT ISA AIRPORT	R
94333	BOULIA AIRPORT	S
94341	RICHMOND AIRPORT	S
94346	LONGREACH AIRPORT	S
94346	LONGREACH AIRPORT	W
94363	EMERALD AIRPORT	S
94366	BOWEN AIRPORT	S
94367	MACKAY MO	S
94367	MACKAY MO	W
94374	ROCKHAMPTON AIRPORT	S
94374	ROCKHAMPTON AIRPORT	R
94388	LADY ELLIOT ISLAND AWS	S
94393	FREDERICK REEF	S
94394	CATO ISLAND	S
94403	GERALDTON AIRPORT	S
94403	GERALDTON AIRPORT	R
94429	MT MAGNET AERO	S
94430	MEEKATHARRA AIRPORT	S
94430	MEEKATHARRA AIRPORT	R
94449	LAVERTON AERO	S
94451	CARNEGIE	S
94461	GILES METEOROLOGICAL OFFICE	S
94461	GILES METEOROLOGICAL OFFICE	R
94462	YULARA AERO	S
94477	MARLA POLICE STATION	S
94488	WINDORAH POST OFFICE	S
94500	CUNNAMULLA POST OFFICE	S
94510	CHARLEVILLE AERO	S
94510	CHARLEVILLE AERO	R
94515	ROMA AIRPORT	S
94552	OAKEY AERO	S
94578	BRISBANE AIRPORT	S
94578	BRISBANE AIRPORT	R
94584	DOUBLE ISLAND POINT LIGHTHOUSE	S
94601	CAPE LEEUWIN	S
94610	PERTH AIRPORT	S
94610	PERTH AIRPORT	R
94637	KALGOORLIE-BOULDER AIRPORT	S
94637	KALGOORLIE-BOULDER AIRPORT	R
94638	ESPERANCE	S
94638	ESPERANCE	R
94642	BALLADONIA	S
94643	BALGAIR	S
94647	EUCLA	S

INDEX	STATION NAME	OBSERVATIONS
94647	EUCLA	R
94651	NULLARBOR	S
94653	CEDUNA AMO	S
94653	CEDUNA AMO	W
94659	WOOMERA AERODROME	S
94659	WOOMERA AERODROME	R
94672	ADELAIDE AIRPORT	S
94672	ADELAIDE AIRPORT	R
94691	BROKEN HILL AIRPORT	S
94693	MILDURA AIRPORT	S
94693	MILDURA AIRPORT	W
94700	HILLSTON AIRPORT	S
94703	BOURKE AIRPORT AWS	S
94711	COBAR MO	S
94711	COBAR MO	R
94729	BATHURST AIRPORT AWS	S
94750	NOWRA RAN AIR STATION	S
94750	NOWRA RAN AIR STATION	R
94767	SYDNEY AIRPORT AMO	S
94767	SYDNEY AIRPORT AMO	W
94776	WILLIAMTOWN RAAF	S
94776	WILLIAMTOWN RAAF	R
94791	COFFS HARBOUR MO	S
94791	COFFS HARBOUR MO	W
94802	ALBANY AIRPORT	S
94802	ALBANY AIRPORT	R
94804	NEPTUNE ISLAND	S
94821	MOUNT GAMBIER AERO	S
94821	MOUNT GAMBIER AERO	R
94842	CAPE OTWAY LIGHTHOUSE	S
94850	KING ISLAND AIRPORT	S
94866	MELBOURNE AIRPORT	S
94866	MELBOURNE AIRPORT	R
94875	SHEPPARTON AIRPORT	S
94893	WILSONS PROMONTORY LIGHTHOUSE	S
94907	EAST SALE AIRPORT	S
94910	WAGGA WAGGA AMO	S
94910	WAGGA WAGGA AMO	R
94926	CANBERRA AMO AWS	S
94935	MALLACOOTA	S
94954	CAPE GRIM B.A.P.S.	S
94956	STRAHAN AERODROME	S
94975	HOBART AIRPORT	S
94975	HOBART AIRPORT	R
94983	EDDYSTONE POINT	S
94995	LORD HOWE ISLAND AERO	S
94995	LORD HOWE ISLAND AERO	R

INDEX	*STATION NAME*	*OBSERVATIONS*
94996	NORFOLK ISLAND AERO	S
94996	NORFOLK ISLAND AERO	R
94997	HEARD ISLAND (THE SPIT)	S
94998	MACQUARIE ISLAND	S
94998	MACQUARIE ISLAND	R
95111	PORT KEATS AERO	S
95146	NGAYAWILI	S
95205	DERBY AERO	S
95283	COOKTOWN AIRPORT	S
95322	RABBIT FLAT	S
95448	LEINSTER AERO	S
95458	COOBER PEDY AIRPORT	S
95480	MARREE AERO	S
95481	MOOMBA AIRPORT	S
95482	BIRDSVILLE AIRPORT	S
95485	TIBOOBURRA AIRPORT	S
95492	THARGOMINDAH AIRPORT	S
95527	MOREE AERO	S
95527	MOREE AERO	R
95634	SOUTHERN CROSS AIRFIELD	S
95637	LAKE GRACE	S
95646	FORREST	S
95666	PORT AUGUSTA AERO	S
95719	DUBBO AIRPORT	S
95762	TAMWORTH AIRPORT	S
95839	HORSHAM AERODROME	S
95966	LAUNCESTON AIRPORT	S
96995	CHRISTMAS ISLAND AERO	S
96996	COCOS ISLAND AIRPORT	S
96996	COCOS ISLAND AIRPORT	R
BRUNEI DARUSSALAM		
96315	BRUNEI AIRPORT	S
96315	BRUNEI AIRPORT	R
COOK ISLANDS		
91801	PENRHYN	R
91802	PENRHYN AWS	S
91809	MANIHIKI AWS	S
91812	PUKAPUKA AWS	S
91831	AITUTAKI AWS	S
91841	MAUKE AWS	S
91843	RAROTONGA	S
91843	RAROTONGA	W
91848	MANGAIA AWS	S
DETACHED ISLANDS		
	PITCAIRN	
91964	PITCAIRN ISLAND AWS	S
	WALLIS AND FUTUNA	
91753	HIHIFO (ILE WALLIS)	S
91754	MAOPOOPO (ILE FUTUNA)	S
FIJI		
91650	ROTUMA	S
91652	UDU POINT AWS	S
91659	NABOUWALU	S
91660	YASAWA-I-RARA AWS	S
91670	VIWA AWS	S
91676	VANUA BALAVU AWS	S
91680	NADI AIRPORT	S
91680	NADI AIRPORT	R
91683	NAUSORI	S
91691	LAKEBA AWS	S
91693	VUNISEA	S
91697	MATUKU AWS	S
91699	ONO-I-LAU AWS	S
FRENCH POLYNESIA		
	MARQUESAS ISLANDS	
91925	ATUONA	S
91925	ATUONA	R
	SOCIETY ISLANDS	
91929	BORA-BORA	S
91938	TAHITI-FAAA	S
91938	TAHITI-FAAA	R
	TUAMOTU AND GAMBIER ISLANDS	
91943	TAKAROA	S
91944	HAO AWS	S
91945	HEREHERETUE	S
91948	RIKITEA	S
91948	RIKITEA	R
	AUSTRAL ISLANDS	
91954	TUBUAI	S
91958	RAPA	S
91958	RAPA	R
INDONESIA		
96009	LHOKSEUMAWE/MALIKUSSALEH	S
96011	BANDA ACEH/BLANG BINTANG	S
96035	MEDAN/POLONIA	S
96035	MEDAN/POLONIA	R
96073	SIBOLGA/PINANGSORI	S
96091	TANJUNG PINANG/KIJANG	S
96109	PEKAN BARU/SIMPANGTIGA	S
96145	TAREMPA	S
96147	RANAI	S
96147	RANAI	R
96163	PADANG/TABING	S
96163	PADANG/TABING	R

INDEX	*STATION NAME*	*OBSERVATIONS*
96179	SINGKEP/DABO	S
96195	JAMBI/SULTAN TAHA	S
96221	PALEMBANG/ST. M. BADARUDIN II	S
96237	PANGKAL PINANG	S
96237	PANGKAL PINANG	R
96249	TANJUNG PANDAN/BULUH TUMBANG	S
96253	BENGKULU/PADANG KEMILING	S
96295	TANJUNG KARANG/RADIN INTEN II	S
96509	TARAKAN/JUWATA	S
96581	PONTIANAK/SUPADIO	S
96633	BALIKPAPAN/SEPINGGAN	S
96645	PANGKALAN BUN/ISKANDAR	S
96655	PALANGKA RAYA/TJILIK RIWUT	S
96685	BANJARMASIN/SYAMSUDIN NOOR	S
96749	JAKARTA/SOEKARNO-HATTA	S
96749	JAKARTA/SOEKARNO-HATTA	R
96781	BANDUNG/HUSEIN	S
96805	CILACAP	S
96839	SEMARANG/AHMAD YANI	S
96935	SURABAYA/JUANDA	S
96935	SURABAYA/JUANDA	R
97014	MENADO/ SAM RATULANGI	S
97014	MENADO/ SAM RATULANGI	R
97028	TOLI-TOLI/LALOS	S
97048	GORONTALO/JALALUDDIN	S
97072	PALU/MUTIARA	S
97072	PALU/MUTIARA	R
97086	LUWUK/BUBUNG	S
97096	POSO/KASIGUNCU	S
97120	MAJENE	S
97146	KENDARI/WOLTER MONGINSIDI	S
97180	UJUNG PANDANG/HASANUDDIN	S
97180	UJUNG PANDANG/HASANUDDIN	R
97192	BAU-BAU/BETO AMBARI	S
97230	DENPASAR/NGURAH RAI	S
97260	SUMBAWA BESAR/BRANGBIJI	S
97270	BIMA/M.SALAHUDDIN	S
97300	MAUMERE/WAI OTI	S
97340	WAINGAPU/MAU HAU	S
97372	KUPANG/ELTARI	S
97372	KUPANG/ELTARI	R
97430	TERNATE/BABULLAH	S
97460	LABUHA/OESMAN SADIK	S
97502	SORONG/JEFMAN	S
97530	MANOKWARI/RENDANI	S
97560	BIAK/FRANS KAISIEPO	S
97560	BIAK/FRANS KAISIEPO	R
97580	SARMI/MARARENA	S
97600	SANANA	S
97686	WAMENA	S
97690	JAYAPURA/SENTANI	S
97724	AMBON/PATTIMURA	S
97724	AMBON/PATTIMURA	R
97748	GESER	S
97760	KAIMANA/UTAROM	S
97796	TIMIKA	S
97810	TUAL/DUMATUBUN	S
97876	TANAH MERAH	S
97900	SAUMLAKI/OLILIT	S
97980	MERAUKE/MOPAH	S
97980	MERAUKE/MOPAH	R
ISLANDS IN THE PACIFIC OCEAN NORTH OF THE EQUATOR		
	COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS	
91221	ROTA	S
91222	PAGAN ISLAND AWS	S
91231	TINIAN	S
91232	SAIPAN	S
	FEDERATED STATES OF MICRONESIA	
91203	FALALOP ISLAND, ULITHI ATOLL	S
91204	FALALOP ISLAND, ULITHI ATOLL AWS	S
91317	WOLEAI ATOLL	S
91320	ONOUN	S
91324	POLOWAT ATOLL AWS	S
91328	ULUL AWS	S
91329	FANANU	S
91334	WEATHER SERVICE OFFICE, CHUUK	S
91334	WEATHER SERVICE OFFICE, CHUUK	R
91338	SATAWAN ATOLL AWS	S
91339	LUKUNOCH ATOLL	S
91343	OROLUK ATOLL AWS	S
91348	WEATHER SERVICE OFFICE, POHNPEI	S
91348	WEATHER SERVICE OFFICE, POHNPEI	R
91350	MWOAKILLOA	S
91352	PINGELAP ATOLL AWS.	S
91353	PINGELAP ATOLL	S
91355	KOSRAE AIRPORT AWS	S
91356	KOSRAE AIRPORT VICE LELU, KOSRAE ATOLL	S
91366	LOSAP	S
91411	NGULU ATOLL AWS	S
91413	WEATHER SERVICE OFFICE, YAP	S
91413	WEATHER SERVICE OFFICE, YAP	R

INDEX	*STATION NAME*	*OBSERVATIONS*
91425	NUKUORO ATOLL	S
91434	KAPINGAMARANGI ATOLL	S
	GUAM	
91212	WEATHER FORECAST OFFICE, GUAM	S
91212	WEATHER FORECAST OFFICE, GUAM	R
	HAWAII, JOHNSTON AND MIDWAY ISLANDS	
91066	MIDWAY ISLAND	S
91158	PRINCEVILLE, KAUAI	S
91159	KEKAHA, KAUAI	S
91163	PORT ALLEN AIRPORT, KAUAI	S
91165	LIHUE, KAUAI	S
91165	LIHUE, KAUAI	R
91175	BELLONS AIR FORCE BASE	S
91182	HONOLULU, OAHU	S
91190	KAHULUI AIRPORT, MAUI	S
91194	KAHOOLAWE	S
91285	HILO/GEN. LYMAN	S
91285	HILO/GEN. LYMAN	R
91294	SOUTH POINT	S
	KIRIBATI	
91487	FANNING ISLAND	S
91490	CHRISTMAS ISLAND	S
91610	TARAWA	S
91610	TARAWA	R
91612	TARAWA (AERODROME)	S
91701	KANTON ISLAND	S
	MARSHALL ISLANDS	
91258	UTIRIK ATOLL AWS.	S
91366	KWAJALEIN/BUCHOLZ AAF	S
91366	KWAJALEIN/BUCHOLZ AAF	R
91367	AILINGLAPALAP ATOLL	S
91369	JALUIT ATOLL	S
91371	WOTJE ATOLL	S
91374	MALOELAP ATOLL AWS	S
91376	MAJURO	S
91376	MAJURO	R
91377	MILI ATOLL AWS	S
91378	MILI ATOLL	S
91442	EBON ISLAND AWS	S
	PALAU	
91408	WEATHER SERVICE OFFICE, KOROR	S
91408	WEATHER SERVICE OFFICE, KOROR	R
91410	TOBI ISLAND AWS	S
MALAYSIA		
48601	PENANG/BAYAN LEPAS	S
48601	PENANG/BAYAN LEPAS	R
48615	KOTA BHARU	S

INDEX	*STATION NAME*	*OBSERVATIONS*
48615	KOTA BHARU	R
48620	SITIAWAN	S
48647	KUALA LUMPUR/SUBANG	S
48650	SEPANG	R
48657	KUANTAN	S
48657	KUANTAN	R
48665	MALACCA	S
96413	KUCHING	S
96413	KUCHING	R
96421	SIBU	S
96441	BINTULU	S
96441	BINTULU	R
96449	MIRI	S
96465	LABUAN	S
96471	KOTA KINABALU	S
96471	KOTA KINABALU	R
96481	TAWAU	S
96481	TAWAU	R
96491	SANDAKAN	S
NAURU		
91530	NAURU AIRPORT	R
91531	NAURU	S
NEW CALEDONIA		
91570	ILE SURPRISE AWS	S
91574	CHESTERFIELD	S
91577	KOUMAC	S
91582	OUANAHAM (ILE LIFOU)	S
91592	NOUMEA	S
91592	NOUMEA	R
91598	MATTHEW AWS	S
NEW ZEALAND		
93004	CAPE REINGA AWS	S
93023	PURERUA AWS	S
93069	MOKOHINAU AWS	S
93110	AUCKLAND AERO AWS	S
93112	WHENUAPAI	R
93186	TAURANGA AERO AWS	S
93196	HICKS BAY AWS	S
93245	TAUPO AWS	S
93291	GISBORNE AERODROME	W
93292	GISBORNE AERODROME AWS	S
93308	NEW PLYMOUTH AERODROME	W
93309	NEW PLYMOUTH AWS	S
93373	NAPIER AERODROME AWS	S
93404	PALMERSTON NORTH AWS	S
93417	PARAPARAUMU AERODROME	R
93420	PARAPARAUMU AWS	S
93498	CASTLEPOINT AWS	S

INDEX	*STATION NAME*	*OBSERVATIONS*
93527	FAREWELL SPIT AWS	S
93614	HOKITIKA AERODROME	W
93615	HOKITIKA AERODROME AWS	S
93678	KAIKOURA AWS	S
93709	HAAST AWS	S
93773	TIMARU AERODROME AWS	S
93781	CHRISTCHURCH AERO AWS	S
93800	SECRETARY ISLAND AWS	S
93805	PUYSEGUR POINT AWS	S
93831	QUEENSTOWN AERODROME AWS	S
93844	INVERCARGILL AERODROME	R
93845	INVERCARGILL AIRPORT AWS	S
93891	DUNEDIN AIRPORT AWS	S
93909	SOUTH WEST CAPE AWS	S
93929	ENDERBY ISLAND AWS	S
93947	CAMPBELL ISLAND AWS	S
93986	CHATHAM ISLAND	R
93987	CHATHAM ISLANDS AWS	S
93994	RAOUL ISLAND, KERMADEC IS. AWS	S
93997	RAOUL ISLAND, KERMADEC IS.	R
NIUE		
91824	HANNAN AIRPORT	S
PAPUA NEW GUINEA		
92001	KIUNGA W.O.	S
92003	DARU W.O.	S
92004	WEWAK W.O.	S
92014	MADANG W.O.	S
92014	MADANG W.O.	R
92035	PORT MORESBY W.O.	S
92035	PORT MORESBY W.O.	R
92044	MOMOTE W. O.	S
92044	MOMOTE W. O.	R
92047	NADZAB W.O.	S
92076	KAVIENG W.O.	S
92077	GURNEY W.O.	S
92087	MISIMA W.O.	S
92100	TOKUA W.O.	S
PHILIPPINES		
98134	BASCO	S
98223	LAOAG	S
98223	LAOAG	R
98232	APARRI	S
98325	DAGUPAN	S
98328	BAGUIO	S
98330	CABANATUAN	S
98336	CASIGURAN	S
98429	NINOY AQUINO INTERNATIONAL AIRPORT	S

INDEX	*STATION NAME*	*OBSERVATIONS*
98430	SCIENCE GARDEN	S
98431	CALAPAN	S
98440	DAET	S
98444	LEGASPI	S
98444	LEGASPI	R
98526	CORON	S
98531	SAN JOSE	S
98536	ROMBLON	S
98543	MASBATE	S
98550	TACLOBAN	S
98618	PUERTO PRINCESA	S
98618	PUERTO PRINCESA	R
98630	CUYO	S
98637	ILOILO	S
98646	MACTAN	S
98646	MACTAN	R
98653	SURIGAO	S
98741	DIPOLOG	S
98747	LUMBIA AIRPORT	S
98753	DAVAO AIRPORT	S
98755	HINATUAN	S
98836	ZAMBOANGA	S
SAMOA		
91757	AVAO	S
91759	FALEOLO	S
91760	ASAU	S
91761	LATA	S
91762	APIA	S
91763	CAPE TAPAGA	S
91769	TAFITOALA	S
SINGAPORE		
48698	SINGAPORE/CHANGI AIRPORT	S
48698	SINGAPORE/CHANGI AIRPORT	R
SOLOMON ISLANDS		
91502	TARO ISLAND	S
91503	MUNDA	S
91507	AUKI	S
91517	HONIARA	R
91520	HONIARA/HENDERSON	S
91541	SANTA CRUZ	S
TIMOR-LESTE		
97385	OE-CUSSI	S
97390	DILI/DILI AIRPORT	S
TOKELAU AND SWAINS ISLAND		
91723	NUKUNONU AWS	S
TONGA		
91772	NIUAFOOU/QUEEN LAVINIA AIRPORT	S

INDEX	STATION NAME	OBSERVATIONS
91776	KEPPEL/MATA'AHO AIRPORT	S
91779	VAVAU/LUPEPAU'U INTERNATIONAL AIRPORT	S
91784	HAAPAI/SALOTE PILOLEVU AIRPORT	S
91792	TONGATAPU/FUA'AMOTU INTERNATIONAL AIRPORT	S
TUVALU		
91631	NANUMEA	S
91636	NUI	S
91643	FUNAFUTI	S
91643	FUNAFUTI	R
91648	NIULAKITA	S

INDEX	STATION NAME	OBSERVATIONS
VANUATU		
91551	SOLA (VANUA LAVA)	S
91554	PEKOA AIRPORT (SANTO)	S
91555	LAMAP (MALEKULA)	S
91557	BAUERFIELD (EFATE)	S
91557	BAUERFIELD (EFATE)	R
91565	WHITE GRASS AIRPORT	S
91568	ANEITYUM	S

Legend:
S = Surface observations
W = Radiowind observations
R = Radiosonde observations including radiowind observations

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 3 (XV-RA V)

LIST OF STATIONS COMPRISING THE REGIONAL BASIC CLIMATOLOGICAL NETWORK IN REGION V

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
AMERICAN SAMOA					
91765	PAGO PAGO	X	X	X	X
AUSTRALIA					
94100	KALUMBURU	X		X	
94120	DARWIN AIRPORT	X	X	X	X
94131	TINDAL RAAF	X		X	
94150	GOVE AIRPORT	X	X	X	
94170	WEIPA AERO	X	X	X	
94203	BROOME AIRPORT	X	X	X	X
94212	HALLS CREEK AIRPORT	X		X	
94238	TENNANT CREEK AIRPORT	X		X	
94260	BURKETOWN AIRPORT	X		X	
94274	GEORGETOWN AIRPORT	X		X	
94287	CAIRNS AIRPORT	X		X	
94294	TOWNSVILLE AIRPORT	X	X		X
94299	WILLIS ISLAND	X	X	X	X
94300	CARNARVON AIRPORT	X		X	
94302	LEARMONTH AIRPORT	X	X	X	X
94312	PORT HEDLAND AIRPORT	X	X	X	
94313	WITTENOOM	X			
94317	NEWMAN AERO	X		X	
94326	ALICE SPRINGS AIRPORT	X	X	X	
94332	MOUNT ISA AIRPORT	X	X	X	
94339	WINTON POST OFFICE	X			
94340	RICHMOND POST OFFICE	X		X	
94346	LONGREACH AIRPORT	X		X	
94367	MACKAY MO	X		X	

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
94374	ROCKHAMPTON AIRPORT	X	X		
94380	GLADSTONE RADAR	X		X	
94403	GERALDTON AIRPORT	X	X	X	
94430	MEEKATHARRA AIRPORT	X	X	X	
94461	GILES METEOROLOGICAL OFFICE	X	X	X	X
94476	OODNADATTA AIRPORT	X		X	
94480	MARREE	X		X	
94485	TIBOOBURRA POST OFFICE	X		X	
94510	CHARLEVILLE AERO	X	X	X	X
94517	ST GEORGE AIRPORT	X		X	
94568	AMBERLY AMO	X			
94570	TEWANTIN RSL PARK	X		X	
94578	BRISBANE AIRPORT	X	X		
94589	YAMBA PILOT STATION	X		X	
94601	CAPE LEEUWIN	X		X	
94602	ROTTNEST ISLAND	X			
94610	PERTH AIRPORT	X	X		X
94616	BRIDGETOWN COMPARISON	X			
94619	DALWALLINU COMPARISON	X			
94635	LAKE GRACE COMPARISON	X			
94637	KALGOORLIE-BOULDER AIRPORT	X	X	X	
94638	ESPERANCE	X	X	X	
94647	EUCLA	X	X		
94653	CEDUNA AMO	X		X	

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
94655	TARCOOLA AERO	X			
94659	WOOMERA AERODROME	X	X		X
94672	ADELAIDE AIRPORT	X	X		
94681	NURIOOTPA VITICULTURAL	X			
94689	BROKEN HILL (PATTON STREET)	X		X	
94693	MILDURA AIRPORT	X		X	
94707	CONDOBOLIN AGRIC RESEARCH STATION	X			
94709	WYALONG POST OFFICE	X			
94711	COBAR MO	X	X	X	
94730	BATHURST AGRICULTURAL STATION	X			
94738	SCONE SCS	X			
94740	GUNNEDAH (DIPNR)	X			
94750	NOWRA RAN AIR STATION	X			
94767	SYDNEY AIRPORT AMO	X			
94776	WILLIAMTOWN RAAF	X	X		
94786	PORT MACQUARIE AIRPORT	X			
94791	COFFS HARBOUR MO	X			
94802	ALBANY AIRPORT	X	X	X	
94812	ROBE	X			
94814	STRATHALBYN RACECOURSE	X			
94821	MOUNT GAMBIER AERO	X	X	X	
94826	CAPE NELSON LIGHTHOUSE	X			
94827	NHILL AERODROME	X			
94842	CAPE OTWAY LIGHTHOUSE	X		X	
94865	LAVERTON RAAF	X			
94866	MELBOURNE AIRPORT	X	X		
94893	WILSONS PROMONTORY LIGHTHOUSE	X			
94907	EAST SALE AIRPORT	X		X	
94910	WAGGA WAGGA AMO	X	X	X	
94917	ORBOST (COMPARISON)	X			
94926	CANBERRA AMO AWS	X			
94937	MORUYA HEADS PILOT STATION	X		X	
94954	CAPE GRIM B.A.P.S.	X			
94967	CAPE BRUNY LIGHTHOUSE	X		X	
94975	HOBART AIRPORT	X	X		X
94983	EDDYSTONE POINT	X			
94995	LORD HOWE ISLAND AERO	X	X	X	X
94996	NORFOLK ISLAND AERO	X	X	X	X
94998	MACQUARIE ISLAND	X	X	X	X
95322	RABBIT FLAT	X		X	
95482	BIRDSVILLE AIRPORT	X		X	
95492	THARGOMINDAH AIRPORT	X		X	
95527	MOREE AERO	X	X		
95529	MILES (CONSTANCE STREET)	X			
95541	INVERELL (RAGLAN STREET)	X		X	
95625	CUNDERDIN AIRFIELD	X		X	
95640	WANDERING	X			
95646	FORREST	X		X	
95670	RAYVILLE PARK	X		X	
95719	DUBBO AIRPORT	X		X	
95753	RICHMOND RAAF	X		X	
95784	TAREE AIRPORT	X		X	
95805	CAPE BORDA	X		X	
95869	DENILIQUIN AIRPORT	X		X	
95908	THREDBO VILLAGE	X			
95916	CABRAMURRA SMHEA	X		X	
95940	PT PERPENDICULAR	X			
95959	LIAWENEE	X			
95964	LOW HEAD	X		X	
95971	GROVE (COMPARISON)	X			
96995	CHRISTMAS ISLAND AERO	X		X	
96996	COCOS ISLAND AIRPORT	X	X	X	X
BRUNEI DARUSSALAM					
96315	BRUNEI AIRPORT	X	X		X
COOK ISLANDS					
91801	PENRHYN		X		
91802	PENRHYN AWS	X		X	
91812	PUKAPUKA AWS	X		X	
91831	AITUTAKI AWS	X		X	
91843	RAROTONGA	X		X	X
91848	MANGAIA AWS	X			
DETACHED ISLANDS					
	PITCAIRN				
91964	PITCAIRN ISLAND AWS	X		X	
	WALLIS AND FUTUNA				
91753	HIHIFO (ILE WALLIS)	X		X	
FIJI					
91650	ROTUMA	X		X	
91652	UDU POINT AWS	X		X	
91680	NADI AIRPORT	X	X	X	X
91683	NAUSORI	X			
91699	ONO-I-LAU AWS	X		X	
FRENCH POLYNESIA					
	MARQUESAS ISLANDS				
91925	ATUONA	X	X	X	X
	SOCIETY ISLANDS				
91929	BORA-BORA	X		X	
91938	TAHITI-FAAA	X	X	X	X
	TUAMOTU AND GAMBIER ISLANDS				
91943	TAKAROA	X		X	
91945	HEREHERETUE	X		X	
91948	RIKITEA	X	X	X	
	AUSTRAL ISLANDS				
91954	TUBUAI	X	X	X	
91958	RAPA	X	X	X	X
INDONESIA					
96073	SIBOLGA/PINANGSORI	X		X	
96109	PEKAN BARU/SIMPANGTIGA	X			
96145	TAREMPA	X		X	
96163	PADANG/TABING	X		X	
96195	JAMBI/SULTAN TAHA	X			
96249	TANJUNG PANDAN/BULUH TUMBANG	X			

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
96253	BENGKULU/PADANG KEMILING	X			
96633	BALIKPAPAN/SEPINGGAN	X			
96645	PANGKALAN BUN/ ISKANDAR	X			
96745	JAKARTA/OBSERVATORY	X		X	
96805	CILACAP	X		X	
96839	SEMARANG/AHMAD YANI	X			
96925	SANGKAPURA/BAWEAN IS.	X		X	
96935	SURABAYA/JUANDA	X	X		X
97014	MENADO/ SAM RATULANGI	X		X	
97072	PALU/MUTIARA	X			
97086	LUWUK/BUBUNG	X			
97120	MAJENE	X			
97146	KENDARI/WOLTER MONGINSIDI	X		X	
97192	BAU-BAU/BETO AMBARI	X			
97230	DENPASAR/NGURAH RAI	X			
97240	AMPENAN SELAPARRANG	X		X	
97340	WAINGAPU/MAU HAU	X		X	
97430	TERNATE/BABULLAH	X			
97502	SORONG/JEFMAN	X		X	
97530	MANOKWARI/RENDANI	X			
97560	BIAK/FRANS KAISIEPO	X	X	X	
97600	SANANA	X			
97686	WAMENA	X		X	
97690	JAYAPURA/SENTANI	X		X	
97724	AMBON/PATTIMURA	X	X	X	
97796	TIMIKA	X			
97900	SAUMLAKI/OLILIT	X		X	
97980	MERAUKE/MOPAH	X	X	X	
ISLANDS IN THE PACIFIC OCEAN NORTH OF THE EQUATOR					
	FEDERATED STATES OF MICRONESIA				
91334	WEATHER SERVICE OFFICE, CHUUK	X	X	X	X
91348	WEATHER SERVICE OFFICE, POHNPEI	X	X	X	
91413	WEATHER SERVICE OFFICE, YAP	X	X	X	
	GUAM				
91212	WEATHER FORECAST OFFICE, GUAM.	X	X	X	X
	HAWAII				
91165	LIHUE, KAUAI	X	X	X	
91182	HONOLULU, OAHU	X	X		
91190	KAHULUI AIRPORT, MAUI	X	X		
91285	HILO/GEN. LYMAN	X	X	X	X
	KIRIBATI				
91487	FANNING ISLAND	X			
91490	CHRISTMAS ISLAND	X		X	
91610	TARAWA	X	X	X	X
91701	KANTON ISLAND	X		X	
	MARSHALL ISLANDS				
91366	KWAJALEIN/BUCHOLZ AAF	X		X	
91376	MAJURO	X	X	X	X
	PALAU				
91408	WEATHER SERVICE OFFICE, KOROR	X	X	X	X

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
MALAYSIA					
48601	PENANG/BAYAN LEPAS	X	X		
48615	KOTA BHARU	X	X		
48620	SITIAWAN	X		X	
48647	KUALA LUMPUR/SUBANG	X			
48650	SEPANG	X	X		
48657	KUANTAN	X	X	X	
48665	MALACCA	X			
96413	KUCHING	X	X	X	
96421	SIBU	X			
96441	BINTULU	X	X	X	
96449	MIRI	X			
96465	LABUAN	X		X	
96471	KOTA KINABALU	X	X		
96481	TAWAU	X	X		
96491	SANDAKAN	X		X	
NAURU					
91531	NAURU	X			
NEW CALEDONIA					
91577	KOUMAC	X		X	
91592	NOUMEA	X	X	X	X
NEW ZEALAND					
93012	KAITAIA	X		X	
93110	AUCKLAND AERO AWS	X			
93112	WHENUAPAI		X		
93119	AUCKLAND AIRPORT	X			
93292	GISBORNE AERODROME AWS	X		X	
93309	NEW PLYMOUTH AWS	X		X	
93417	PARAPARAUMU AERODROME		X	X	X
93420	PARAPARAUMU AWS	X			
93436	WELLINGTON AIRPORT	X			
93615	HOKITIKA AERODROME AWS	X		X	
93678	KAIKOURA AWS	X			
93747	TARA HILLS	X		X	
93780	CHRISTCHURCH	X			
93844	INVERCARGILL AERODROME		X	X	X
93845	INVERCARGILL AIRPORT AWS	X			
93947	CAMPBELL ISLAND AWS	X		X	
93986	CHATHAM ISLAND		X		X
93987	CHATHAM ISLANDS AWS	X		X	
93994	RAOUL ISLAND, KERMADEC IS. AWS	X		X	
93997	RAOUL ISLAND, KERMADEC IS.		X		X
NIUE					
91824	HANNAN AIRPORT	X		X	
PAPUA NEW GUINEA					
92001	KIUNGA W.O.	X			
92003	DARU W.O.	X			
92004	WEWAK W.O.	X			
92014	MADANG W.O.	X		X	
92035	PORT MORESBY W.O.	X	X	X	X
92044	MOMOTE W. O.	X		X	

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
92047	NADZAB W.O.	X			
92076	KAVIENG W.O.	X			
92077	GURNEY W.O.	X			
92087	MISIMA W.O.	X			
PHILIPPINES					
98223	LAOAG	X	X		X
98232	APARRI	X		X	
98430	SCIENCE GARDEN	X		X	
98444	LEGASPI	X		X	
98637	ILOILO	X			
98755	HINATUAN	X		X	
98836	ZAMBOANGA	X		X	
98851	GENERAL SANTOS	X		X	
SAMOA					
91762	APIA	X			
SINGAPORE					
48698	SINGAPORE/CHANGI AIRPORT	X	X		X
SOLOMON ISLANDS					
91503	MUNDA	X		X	
91517	HONIARA		X	X	X
91520	HONIARA/HENDERSON	X			
TIMOR-LESTE					
97385	OE-CUSSIE	X			
97390	DILI/DILI AIRPORT	X			
97395	BAUCAU NUS	X			
TOKELAU AND SWAINS ISLANDS					
91723	NUKUNONU AWS	X		X	
TONGA					
91772	NIUAFOOU/QUEEN LAVINIA AIRPORT	X			
91776	KEPPEL/MATA'AHO AIRPORT	X			
91779	VAVAU/LUPEPAU'U INTERNATIONAL AIRPORT	X		X	
91784	HAAPAI/SALOTE PILOLEVU AIRPORT	X			
91788	TONGATAPU/NUKU'ALOFA	X			
91789	NUKU'ALOFA	X		X	
TUVALU					
91631	NANUMEA	X		X	
91643	FUNAFUTI	X	X	X	X
VANUATU					
91554	PEKOA AIRPORT (SANTO)	X		X	
91555	LAMAP (MALEKULA)	X			
91557	BAUERFIELD (EFATE)		X		X
91568	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 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.

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Note: The present resolution replaces Resolution 13 (XIII-RA V), which is no longer in force.

Resolution 5 (XV-RA V)

WMO VOLUNTARY COOPERATION PROGRAMME

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) That the Voluntary Cooperation Programme is a major element in supporting its Members in the implementation of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association V (South-West Pacific) (2010–2011),

(2) That urgent and essential support has to be provided for the implementation of the World Weather Watch and the other WMO scientific and technical Programmes to Member and non-Member island States in the Region, including institutional capacity development,

Considering the importance of maintaining the basic meteorological and climatological observing networks in the Region for the benefit of all WMO Programmes,

Urges Members**:**

(1) To take more active roles in and contribute to the Voluntary Cooperation Programme (VCP), to the maximum extent possible, in support of funds, equipment and services, including fellowships;

(2) To identify their requirements and to seek, as appropriate, support through the WMO Voluntary Cooperation Programme and associated major regional development projects;

Requests the Secretary-General to make an urgent appeal to potential donors (including donors outside the Region) to provide support specifically for the Region, under VCP and/or other modalities of cooperation.

Resolution 6 (XV-RA V)

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 on emerging issues or matters requiring actions which 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 implementation of the operational 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 fifteenth 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, and ensuring coordination of development efforts;

(2) To invite the president to act as chair 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 chair of the Regional Association V Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean, the 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 chair of the Secretariat of the Pacific Regional Environment Programme Regional Meteorological Service Directors and other Directors of National Meteorological and Hydrological Services to participate in Management Group meetings;

Requests the president to ensure that Members are represented as appropriate on the Management Group and that the Group meets at least annually, or as needed, preferably in conjunction with other meetings or events;

Requests the Management Group, with input from RA V Permanent Representatives with WMO, to finalize the membership of the initial RA V subsidiary bodies not later than October 2010;

Authorizes the president:

(1) To take necessary decisions on behalf of the Association, after consultation with the Management Group, on matters of importance to the Region;

(2) In consultation with the Management Group, to adopt initial terms of reference for the Working Groups as recommended by the leads;

(3) In consultation with the Management Group and Members, to amend the number and remit of Working Groups as appropriate to ensure relevance and attention to the highest priority issues for the Region;

Requests further 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: The present resolution replaces Resolutions 7 (XIV-RA V) to 18 (XIV-RA V), which are no longer in force.

Resolution 7 (XV-RA V)

REGIONAL ASSOCIATION V TROPICAL CYCLONE COMMITTEE FOR THE SOUTH PACIFIC AND SOUTH-EAST INDIAN OCEAN

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) Resolution 6 (Cg-XV) – Tropical Cyclone Programme,

(2) The *WMO Strategic Plan* (WMO-No. 1028),

(3) United Nations General Assembly resolutions on the International Strategy for Natural 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 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 Severe Weather Forecasting and Disaster Risk Reduction Demonstration Project and the Storm Surge Watch Scheme;

(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
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
Tuvalu

(4) To invite the chair 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 chair of the Committee;

Requests the chair 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) (2010–2011), 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 other 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 sixteenth 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: The present resolution replaces Resolution 6 (XIV-RA V), which is no longer in force.

Resolution 8 (XV-RA V)

STRATEGIC PLAN FOR THE ENHANCEMENT OF NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC) (2010–2011)

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

Noting:

(1) The *Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association V (South-West Pacific)* (WMO-No. 1005),

(2) The *Abridged Final Report with Resolutions of the Fifteenth World Meteorological Congress* (WMO-No. 1026), especially its discussion of the Strategic Plan and its Resolution 27 (Cg-XV) – WMO Strategic Plan, as well as its Resolution 28 (Cg-XV) – Preparation of the WMO Strategic Plan for 2012–2015,

Recognizing:

(1) That the WMO Strategic Plan provides a high-level statement of the future direction and priorities of WMO in terms of three top-level objectives, five strategic thrusts and eleven expected results,

(2) That the above framework provides useful guidance in establishing an overall Strategic Plan for the Region,

Considering the usefulness of a Regional Strategic Plan that encompasses the development and/or enhancement of all weather-, climate- and water-related services,

Agrees that the Region's priorities be expressed in terms of Regional Expected Results associated with the eleven WMO Expected Results, with each Regional Expected Result having identifiable deliverables;

Adopts the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services in Regional Association V (South-West Pacific) (2010–2011);

Urges Members to participate actively in the implementation of this Regional Strategic Plan, and take it into account in developing, carrying out and enhancing their national programmes in meteorology, hydrology and related disciplines to better respond to the demand for a widening range of services to meet the sustainable development goals of nations;

Requests the Secretary-General:

(1) To seek partnerships with, and collaboration of, relevant institutions and programmes within the United Nations system, multilateral donors and international agencies, particularly in the provision of technical and financial support for the implementation of the Strategic Plan;

(2) To accord due priority, in collaboration with the president, the Management Group and subsidiary bodies of Regional Association V, to the activities proposed in the Strategic Plan;

(3) To mobilize resources for technical cooperation activities in line with the Strategic Plan and to assist Members to do the same;

(4) To arrange for the dissemination of this Plan to Members of the Association, the presidents of other regional associations and the presidents of technical commissions, among others;

(5) To report to Regional Association V at its sixteenth session on the progress made on the implementation of the Strategic Plan;

Further requests the Secretary-General to take into account the experience gained concerning strategic planning at the regional level in the development of the succeeding WMO Strategic Plan and the associated planning process, as well as in relation to the monitoring and evaluation of these Plans.

Annex to Resolution 8 (XV-RA V)

STRATEGIC PLAN FOR THE ENHANCEMENT OF NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES IN REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC) 2010–2011

This document contains the core of the RA V Strategic Plan. It takes into account the framework of the WMO Strategic Plan (i.e., eleven Expected Results grouped within five Strategic Thrusts under three Top-level Objectives). The regional consideration for each of the five WMO Strategic Thrusts is presented. Thereafter, under the relevant WMO Strategic Plan Expected Results, Regional Expected Results, which will serve as the common regional basis for action, are identified. Listed under each of the Regional Expected Results are the areas where deliverables are expected, through cooperation among Members, especially their NMHSs, for enhanced provision, access, operation or capability. It will be desirable to identify a few priorities among those listed under each Regional Expected Result; this will serve as guidance to Members.

Strategic Plan for the Enhancement of NMHSs in RA V (2010-2011)

WMO Top-level Objective 1 *To produce more accurate, timely and reliable forecasts and warnings of weather, climate, water and related environmental elements*
Strategic Thrust 1 *Science and technology development and implementation*

In order to provide more comprehensive services to satisfy the requirements of end-users – and thus contribute to the safety and well-being of people, sustainable development and environmental protection – there is a need to further the scientific and technological infrastructure in the Region. The Region has some advanced scientific and technological expertise within world-leading institutions, such as NMHSs and academia, and in industry. Improved cooperation among Members can help develop the scientific knowledge and technical infrastructure to meet the requirements for more comprehensive services. Such areas include an improvement in the quality, range and timeliness of the basic data necessary for the production of weather forecasts, climate predictions and hydrological assessments, whether this be through ground-based or satellite observing; the utilization of new technologies to improve the timeliness of the exchange of these data; and improved modelling to forecast a greater range of natural hazards at longer lead times.

RA V will address this through:

(i) Improving the knowledge of meteorological and hydrological processes and understanding of the requirements of the user community regarding the accuracy and usefulness of the analysis, forecasts, warnings and risk assessments of meteorological and hydrological hazards and impacts of environmental changes;

(ii) Further developing and capitalizing on existing infrastructures/organizations in order to better meet users' requirements, e.g., through the involvement of all stakeholders;

(iii) Modernizing the RA V meteorological and hydrological infrastructure, including efforts to combine the capabilities of NMHSs and regional and subregional organizations with those of possible partners, where appropriate;

(iv) Preserving and further developing the hydrological infrastructure for monitoring quantity and quality of both surface water and groundwater;

(v) Ensuring that the Region develops an efficient and effective infrastructure to feed into the global WMO system;

(vi) Ensuring that the Region plays its part in the effective operation and delivery of a global multi-hazard early warning system, including disaster preparedness and climate change.

RA V will try to achieve the following results:

1. WMO Expected Result 1

Enhanced capabilities of Members to produce better weather forecasts and warnings

Regional ER 1(a): Upgrade in Members' capability and infrastructure in respect of numerical weather prediction (NWP) activities, including high-speed computers, use of Ensemble Prediction System (EPS) products and nowcasting of high-impact weather Deliverable: *(Listed under this heading are the areas where deliverables are expected, through cooperation among Members, especially their NMHSs, for enhanced provision, access, operation or capability.)*	
1.1	Automatic data reception and archives
1.2	Automatic data plotting
1.3	Access to relevant NWP products from major centres operationally
1.4	Efficient interpretation and employment of all relevant NWP products
1.5	Operation of nowcasting systems for high-impact weather warning
1.6	Operational use and interpretation of EPS products and probability forecasts
Regional ER 1(b): Enhancement of Members' aeronautical meteorological services, including observations, information exchange and quality management Deliverable:	

1.7	Ensuring that the services are fully equipped to make and transmit aerodrome meteorological observations
1.8	Implementation of a quality management system meeting international standards
Regional ER 1(c): Improvement in Members' capability in marine meteorology services, including forecasts and warnings Deliverable:	
1.9	Production of marine forecasts/warnings for coastal waters, including sea state and wave/swell
1.10	Production of marine forecasts/warnings for high seas
Regional ER 1(d): Encouragement of Members' observation of the principle of free and unrestricted international exchange of data and products among Members and related services Deliverable:	
1.11	Promotion and strengthening of the principle of free and unrestricted international exchange of data and products among NMHSs and related services

2. WMO Expected Result 2

Enhanced capabilities of Members to provide better climate predictions and assessments

Regional ER 2(a): Upgrade in Members' capability in observation and in development of climate services and prediction to meet users' diverse requirements in respect of sustainable development Deliverable:	
2.1	Maintenance of or an increase in the number of climatological stations operated/supervised
2.2	Provision of monthly/seasonal climate prediction
2.3	Performance of observations to monitor climate change and climate variability
2.4	Fulfilment of the needs for climate information of user sectors such as health, tourism, energy and building
Regional ER 2(b): Enhanced capability in the provision of products and advice in support of adaptation strategies and mitigation measures to alleviate the impacts of climate change Deliverable:	
2.5	Maintenance of records of metadata for observation stations
Regional ER 2(c): Establishment of Regional Climate Centres (RCCs) and possibly subregional centres in RA V and involvement of Members in regional climate research projects Deliverable:	
2.6	Wider use of services provided by RCCs; support for the establishment of other planned RCCs
2.7	Systematic increase in the number and quality of products issued by RCCs

3. WMO Expected Result 3

Enhanced capabilities of Members to provide better hydrological forecasts and assessments

Regional ER 3(a): Improvement in Members' capability in observation and development of products and services to the user community, including flood/flash flood and landslide/debris flow warnings Deliverable:	
3.1	Growth in spatial and temporal coverage of hydrological observation network
3.2	Reliability of maintenance procedures for measurement and equipment (gauges) in hydrological stations
3.3	Issuing of flood warnings
3.4	Issuing of flash flood warnings
Regional ER 3(b): Upgrade in Members' capability in monitoring changes in hydrological parameters and in assessing water availability in light of climate change Deliverable:	
3.5	Assessment of basin-wide water/precipitation availability, including use of climate scenarios
Regional ER 3(c): Encouragement of Members to contribute and gain access to appropriate databases, resources and expertise Deliverable:	
3.6	Availability of national joint activities/programmes between hydrologists and meteorologists

4. **WMO Expected Result 4**
Integration of WMO observing systems

Regional ER 4(a): Upgrade in Members' capability in maintaining and developing their meteorological observation networks and in implementation of additional equipment/systems to meet users' needs Deliverable:	
4.1	Sustainable network of synoptic stations in RA V
4.2	Sustainable network of upper-air stations in RA V
4.3	Sustainable programme of maintenance and calibration for observation instruments
4.4	Ensuring reliability of quality management routines and procedures for weather observations
4.5	Availability of qualified maintenance technicians in NMHSs
4.6	Availability of calibration instruments in NMHSs
4.7	Maintenance/enhancement of rainfall stations in RA V
Regional ER 4(b): Upgrade in Members' capability in maintaining and developing their marine and aviation observations and in implementation of additional equipment/systems to meet users' needs Deliverable:	
4.8	Maintenance/enhancement of operational tide gauges in RA V
Regional ER 4(c): Encouragement of Members in the collection and exchange of non-conventional meteorological data for weather applications and disaster mitigation Deliverable:	
4.9	Involvement in planning and implementation of the Global Earth Observation System of Systems (GEOSS)
Regional ER 4(d): More cost-effective operation and better supply of good quality information Deliverable:	
4.10	Existence of monitoring and auditing routines and procedures to minimize inefficiencies and conserve resources
4.11	Ensuring the accuracy of instruments

5. WMO Expected Result 5
Development and implementation of the new WMO Information System

Regional ER 5(a): Upgrade in Members' telecommunications capability, including circuits and connection to broadband Internet Deliverable:	
5.1	Trend in migrating from low-speed Category I (below 9.6 kbps) to higher-speed Category II (9.6 to 64 kbps) and III (over 64 kbps) Global Telecommunication System (GTS) connections to Regional Telecom Hubs (RTHs)
5.2	Connection to Internet by broadband
5.3	Enhanced use of RANET, high-frequency (HF) Radio and the Emergency Managers Weather Information Network (EMWIN)
Regional ER 5(b): Improved data and products exchange for RA V Members under WMO Information System (WIS) implementation Deliverable:	
5.4	Implementation of WIS

WMO Top-level Objective 2
To improve the delivery of weather, climate, water and related environmental information and services to the public, governments and other users

Strategic Thrust 2
Service delivery

Service Delivery is the primary area for achieving the Expected Results. The safety and well-being of people, the security and efficiency of transport and energy production and delivery, sustainable development and/or environmental protection should be the natural result of weather-, climate- and water-related services.

The Region needs to respond to global change and its challenges, which are modifying users' requirements for services and the market in which service providers operate. For example, the expectation that climate change will increase the frequency of weather- and water-related hazards in the Region may require improved early warning services in many Member countries, as well as new or more comprehensive services related to environmental protection (e.g., air quality, water resources). Also, governments and economic sectors will require guidance to respond to climate change. Meanwhile, the increased demand from users is

leading to a greater involvement of private-sector service providers, as well as an expectation for improved services, which both provide opportunities for NMHSs to increase their visibility and improve their effectiveness.

RA V will address this through:

(i) A better understanding of the requirements of governmental bodies, economic sectors, the media and the general public;

(ii) Better use of RA V capabilities, including ensuring the quality and completeness of meteorological and hydrological records for application in development planning and disaster preparedness;

(iii) Working together to provide a broader range of subregional and regional services;

(iv) Working together to implement best practices and optimize the activities of existing capabilities within the Region to improve service production and delivery and the use of resources;

(v) Creation of a mechanism to measure the RA V contribution to sustainable development;

(vi) Establishment of a monitoring process to capture evolving stakes and challenges and to provide adequate references;

(vii) Measurement and documentation of the socio-economic benefits of the RA V activities.

6. WMO Expected Result 6

Enhanced capabilities of Members in multi-hazard early warning and disaster prevention and preparedness

Regional ER 6(a): Upgrade in Members' capability in providing short-range forecast/warning, in disaster risk assessment and in contributing to disaster mitigation and sustainable development Deliverable:	
6.1	Establishment/implementation of disaster risk reduction units in NMHSs
6.2	Provision of nowcasting (0–6 hours ahead) service on high-impact weather
6.3	Establishment of dedicated units for forecasting high-impact weather conditions
6.4	Issuing of short-range forecasts/warnings (6–24 hours ahead)
6.5	Issuing of storm surge warnings
6.6	Provision of support for search and rescue
6.7	Involvement in national risk reduction planning and disaster management processes and activities
6.8	Existence of emergency (fully robust) delivery systems of meteorological products for early warnings
Regional ER 6(b): Encouragement to Members in outreach activities to users through public education and liaison with stakeholders Deliverable:	
6.9	Links with national disaster organizations and other key stakeholders
6.10	Implementation of a public education programme
Regional ER 6(c): Establishment of a Region-wide multi-hazard early warning system, covering in particular hazards coming from the ocean, as well as various airborne hazards Deliverable:	
6.11	Use of graphical products, including Geographical Information System (GIS) platforms, to facilitate early warning, disaster prevention and preparedness
6.12	Participation in a Region-wide multi-hazard early warning system
6.13	Ability to respond to airborne hazards, in particular smoke from wildfires, volcanic emissions, chemical or biological spills, and nuclear accidents

7. WMO Expected Result 7

Enhanced capabilities of Members to provide and use weather, climate, water and environmental applications and services

Regional ER 7(a): Upgrade in Members' capability in cost recovery and in maintaining close liaison with academia, the media and private sector Deliverable:	
7.1	Implementation/enhancement of cost recovery of services

7.2	Maintenance/enhancement of meaningful cooperation with the media
7.3	Maintenance/enhancement of meaningful cooperation with the private sector
7.4	Designation as Meteorological Authority for aviation meteorological services
Regional ER 7(b): Sharing of experience on service delivery techniques among public weather, agricultural and marine sectors Deliverable:	
7.5	Issuing of medium-range forecasts/warnings (1 day–2 weeks ahead)
7.6	Issuing of marine forecasts/warnings for high seas
Regional ER 7(c): Improvement in Members' capability in monitoring key environmental areas, including agrometeorological services and water monitoring Deliverable:	
7.7	Provision of agrometeorological information and forecasts to users
7.8	Monitoring and warning systems for drought

Regional ER 7(d): Encouragement of Members to engage in socio-economic studies of the benefits of weather-, climate- and water-related services Deliverable:	
7.9	Participation in socio-economic studies demonstrating the benefits of Members' meteorological, climatological and hydrological infrastructure and information and service delivery

WMO Top-level Objective 3
To provide scientific and technical expertise and advice in support of policy and decision-making and implementation of the agreed international development goals and multilateral agreements

Strategic Thrust 3
Partnership

Working together both within the Region and with other bodies outside the Region and outside the normal sectors of WMO is a key strategic thrust for the Region. The weather, climate and water communities already have to work together to exchange needed data for forecasting, and the prospect of reduced government funding requires increased collaboration to share resources. While Region-wide organizations or subregional groupings overseeing the research and networking of meteorological observations, meteorological/environmental satellites and NWP activities exist in such Regions as RA VI (e.g., COST, EUMETNET, EUMETSAT and ECMWF), similar organizations/groupings are yet to appear in the fast-growing South-West Pacific Region (RA V). Partnerships can also be developed outside the Region to enable others to take advantage of some of the Region's world-leading expertise. This ensures that the existing infrastructure will be included in any future initiatives or within development projects.

RA V will address this through:

(i) Identifying where opportunities for regional and subregional cooperation are lacking and promote potential bodies for new partnerships;

(ii) Creating the mechanisms to develop the interface and communication with potential new partners;

(iii) Developing a subregional framework to cover RA V requirements and reduce overlap in development efforts and in the deployment of resources;

(iv) Promoting cooperation among meteorological, hydrological and oceanographic services/institutions, where they are separated;

(v) Promoting cooperation with other national bodies that monitor and assess the hydrosphere;

(vi) Promoting regional cooperation involving international river basins;

(vii) Improving the interaction with other sectors and disciplines, including the social sciences, health authorities, and the development planning and disaster preparedness communities;

(viii) Ensuring a fruitful dialogue with other WMO Regional Associations and with WMO Technical Commissions;

(ix) Securing the relevant participation of NMHSs in the operational implementation of research-funded projects.

8. WMO Expected Result 8

Broader use of weather-, climate- and water-related outputs for decision-making and implementation by Members and partner organizations

Regional ER 8(a): Strengthened relationships with key stakeholders Deliverable:	
8.1	Enhanced cooperation with the media, government agencies and weather-sensitive sectors
8.2	Effective interactions with other international agencies, such as the Secretariat of the Pacific Regional Environment Programme (SPREP) in the Pacific, and the Asian Disaster Preparedness Center (ADPC) and ASEAN Sub-committee on Meteorology and Geophysics (ASCMG) in Southeast Asia
Regional ER 8(b): Enhanced cooperation with other service providers in the provision of specific weather services or advice Deliverable:	
8.3	Availability of GIS-formatted products enabling users to combine meteorological and non-meteorological information
8.4	Effective tsunami warnings through strengthened relations with the Pacific Tsunami Warning Center (PTWC), Intergovernmental Oceanographic Commission (IOC), Japan Meteorological Agency (JMA) and Joint Australian Tsunami Warning Centre (JATWC)
Regional ER 8(c): Enhanced cooperation with other sectors (such as social sciences, health, planning and disaster preparedness) in the provision of specific weather services or advice Deliverable:	
8.5	Partnerships with stakeholders to explore socio-economic benefits
8.6	Acquisition of extrabudgetary funds by NMHSs from stakeholders for providing specific services
8.7	Effective involvement in the planning and implementation of functions within GEOSS

WMO Top-level Objective 3 *To provide scientific and technical expertise and advice in support of policy and decision-making and implementation of the agreed international development goals and multilateral agreements*
Strategic Thrust 4 *Capacity-building*

Underpinning all the above is the need for capacity-building. The expertise within the Region is not homogeneous and not all Members can contribute as effectively as they would like to the safety and well-being of people, sustainable development and environmental protection. In order to meet the increasing demand for more comprehensive services across the Region to deliver these benefits, there is a need to build capacity so that the whole Region can effectively utilize the expertise contained within the world-leading centres. This can be done by capitalizing on the training provided by WMO and Members' training centres, Regional Specialized Meteorological Centres (RSMCs) and programmes carried out by consortia, and by addressing the technological gaps that exist. Technology transfer can be facilitated through the subregional networks and other multilateral collaborations. This sharing of best practices should not be limited to technology or to the confines of the Region alone; it is also conducive to institutional capacity-building, including management and strategic planning, harmonization with existing standards (e.g., ISO) and quality management.

RA V will address this through:

(i) Assessing the gaps in knowledge and capabilities, especially in observation infrastructure design, operation and sustainability, to meet requirements;

(ii) Developing appropriate structures and planning to make the best use of the Region's existing capabilities and to establish new structures where appropriate to achieve RA V objectives;

(iii) Setting up the appropriate collective actions/projects to fill the gaps;

(iv) Ensuring that the Region and its NMHSs have the right people with the right skills to achieve their objectives;

(v) Sharing experience and best practices with other WMO constituent bodies.

9. WMO Expected Result 9

Enhanced capabilities of National Meteorological and Hydrological Services in developing countries, particularly least developed countries, to fulfil their mandates

Regional ER 9(a): Ensuring Members' capability in maintaining a structured training programme for professional, technical and supporting staff and in assisting its staff in acquiring the necessary qualification Deliverable:	
9.1	Maintenance/implementation of a structured training plan for professional, technical and supporting staff
9.2	Availability of sufficient resources to sustain operation of RSMC Nadi
9.3	Availability of expertise from developed NMHSs for the training of staff to encourage self-sufficiency in equipment maintenance programmes
9.4	Encouragement of staff to take actions for professional certification in respect of the latest WMO meteorological personnel classification scheme
9.5	Provision of continuous education programmes and refresher courses for staff
9.6	Provision of training for mid- and high-level personnel in management skills, including nurturing partnerships with stakeholders
9.7	Capability for staff to provide effective media broadcasts
Regional ER 9(b): Enhanced Members' ability in delivering enhanced services through increased technical capacity Deliverable:	
9.8	Operation and updating of a Website for delivering and displaying services and products
9.9	Rescue and digitization of climate records
Regional ER 9(c): Enhancement of Members' capability in self-monitoring through user feedback, public surveys and verification of their own products Deliverable:	
9.10	Verification of the accuracy of forecasts, including public weather forecasts, aviation forecasts (terminal aerodrome forecasts, or TAFs) and warnings
9.11	Obtaining feedback from the public, marine users and aviation users through opinion surveys, user groups, etc.
Regional ER 9(d): Encouragement of Members to conduct public education programmes for outreach to the public and user community Deliverable:	
9.12	Public education programme involving water-related information, including hazards, hydrological forecasts and warnings
9.13	Public education programme involving climate-related information, including climate change and variability, and associated adaption and mitigation issues
Regional ER 9(e): Encouragement of Members to take part in WMO global weather information services, as well as pilot projects in RA V Deliverable:	
9.14	Contribution of operational weather information to the WMO online World Weather Information Service (WWIS)
9.15	Successful execution of the Severe Weather Forecast and Disaster Risk Reduction Demonstration Project (SWFDDP) in the South-West Pacific

WMO Top-level Objective 3 *To provide scientific and technical expertise and advice in support of policy and decision-making and implementation of the agreed international development goals and multilateral agreements*
Strategic Thrust 5 *Efficient management and good governance*

RA V has limited financial resources through the WMO budget and relies on the goodwill and contribution of volunteers from its Members to conduct many of its activities. It is therefore imperative that RA V effectively manage its resources and meet the Members' priorities as articulated in the RA V sessions.

RA V will address this through:

(i) Reviewing subsidiary bodies of RA V and their role in delivering the Strategic Plan's objectives;

(ii) Ensuring interaction within RA V to build up common proposals;

(iii) Liaising with the WMO Secretariat to convey adequate information to other United Nations bodies regarding RA V's expertise and capabilities;

(iv) Sharing experience, knowledge and capabilities with other Regions to help deliver the WMO Strategic Plan objectives;

(v) Enhanced networking with Members, relevant institutions and bodies with a view to pooling the Region's expertise and capabilities to better meet users' requirements.

10. WMO Expected Result 10

Effective and efficient functioning of constituent bodies

Regional ER 10(a): Streamlined Association structure Deliverable:	
10.1	Clearly defined role of the RA V Management Group within the structure of WMO
Regional ER 10(b): Review of the subsidiary working groups of RA V Deliverable:	
10.2	Effectively re-organized RA V subsidiary working groups aligned with the Association's goals

11. WMO Expected Result 11

Effective and efficient management performance and oversight of the Organization

Regional ER 11(a): Increased influence of RA V constituent bodies in regional matters Deliverable:	
11.1	Increased influence of RA V constituent bodies in regional matters
Regional ER 11(b): Intensified and easier access to common resources via electronic means Deliverable:	
11.2	Improvement in access to WMO common resources via electronic means

Resolution 9 (XV-RA V)

REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION

REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC),

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

Considering:

(1) That a number of its resolutions adopted before its fifteenth session have been revised and incorporated in resolutions of the fifteenth session,

(2) That some of its other previous resolutions have been incorporated in appropriate WMO publications or have become obsolete,

(3) That a previous resolution is still to be implemented,

Decides:

(1) To keep in force Resolution 7 (XII-RA V);

(2) Not to keep in force the other resolutions adopted before its fifteenth session;

(3) To publish the text of the resolution kept in force in the annex to the present resolution.

Note: The present resolution replaces Resolution 19 (XIV-RA V), which is no longer in force.

Annex to Resolution 9 (XV-RA V)

RESOLUTION OF REGIONAL ASSOCIATION V ADOPTED PRIOR TO ITS FIFTEENTH 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.

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.

ANNEXES

ANNEX I
Annex to paragraph 4.1.28 of the general summary

RECOMMENDATIONS OF THE REGIONAL ASSOCIATION V TROPICAL CYCLONE COMMITTEE AT ITS THIRTEENTH SESSION

At its Thirteenth Session the RA V TCC recommended that:

(1) WMO fund the sub-committee that has the task of reviewing the Tropical Cyclone Committee Technical Plan (this sub-committee is scheduled to meet in late 2010 in conjunction with the planning meeting of the SWFDDP).

(2) The Jakarta TCWC's Area of Responsibility be extended eastwards to 141E with an alteration to the southern boundary this in turn leads to changes to the boundaries of four warning centres. The boundaries for the four warning centres are now:

Darwin TCWC	15S 125E, 15S 129E, 32S 129E, 32S 138E, 14S 138E, 9S 141E, 9S 128E, 11S 128E, 11S 125E,
Perth TCWC	10S 090E, 36S 090E, 36S 129E, 15S 129E, 15S 125E, 11S 125E, 11S 120E, 10S 120E, 10S 090E
Port Moresby TCWC	EQ 141E, 9S 141E, 09S 144E, 12S 147E, 12S 155E 08S 155E, 05S 160E, EQ 160E, EQ 141E
Jakarta TCWC	EQ 090E, 10S 090E, 10S 120E, 11S 120E, 11S 128E, 09S 128E, 09S 141E, EQ 141E

(3) WMO allocate new funding sources to undertake the following high priority training activities under the TCC Technical Plan *viz*:

- Satellite product interpretation
- Tropical Cyclone forecaster mentor training
- Forecaster attachment to TCWCs/RSMCs
- Media skill training
- Technical maintenance

(4) The pursuit of meteorological instrumentation on open ocean climate observing platforms so as to provide critical observations needed for verifying tropical cyclone genesis, intensity and validating remotely sensed data.

(5) In view of the loss of QuikScat satellite data and the resulting negative impact on forecast and warning services both now and into the future, especially for marine and tropical cyclone applications, Members and the WMO Secretariat pursue actions to mitigate the impacts. These should include quantifying the impacts as well as the value of remotely sensed observations such as ocean surface vector winds and altimetry, identifying alternate data sources from other instruments and satellites, which can be used, and the development and implementation of instruments for future satellite missions and should contribute in parallel to defining "operational" requirements for these data.

(6) In view of the loss of QuikScat satellite data the WMO Secretariat work with satellite data providers, via the WMO Space Programme activities, to encourage the provision of a replacement capability.

(7) A surge model be developed for RA V drawing on the existing modelling capability of other Members. This model should be capable of providing predictions for:

- Storm surges associated with tropical cyclones
- Large waves associated with tropical cyclones
- Long-period waves (remotely generated swell)

Recognizing the significant resources required for this task, including the provision of high-resolution bathymetry data, the RA V TCC further recommended that WMO provide resources so that empirically based look-up table techniques utilized for the island groups in the North-West Pacific be established for the South-West Pacific including training in the utilization of these techniques.

(8) The work programme of the SWFDDP include surges from the three types of surge (tropical cyclone storm surges, tropical cyclone-generated large waves, and long-period waves) and that WMO resource the task team that is tasked to further develop these services to ultimately include all countries in the region, to update the MetConnect Website, and to enhance awareness activities for both the public and Emergency Managers.

ANNEX II
Annex to paragraph 4.4.19 of the general summary

SUMMARY REPORT ON ACTIVITIES OF THE EXECUTIVE COUNCIL PANEL OF EXPERTS ON POLAR OBSERVATIONS, RESEARCH AND SERVICES (EC-PORS)

1. Purpose

To inform RA-V delegates/Member states that EC-PORS exists and is active, that future dialogue between EC-PORS and components of RA V seems desirable, and that the next meeting of EC-PORS will take place in Hobart, Australia, in October 2010.

2. Relevance

There are four broad areas of WMO strategy in which EC-PORS activities intersect with the interests of some RA V member states. In terms of the agenda items for XV-RA V, the most likely points of connection are:

- Enhanced capabilities of Members to produce better weather forecasts and warnings (ER 1)
- Enhanced capabilities of Members to produce better climate predictions and assessments (ER 2)
- Integration of WMO observing systems (ER 4)
- Development and implementation of the new WMO Information System (ER 5)

It is desirable that, for the sub-Antarctic, there be a common approach to the above topics by RA-V delegates/Member States and by EC-PORS.

3. Summary

The First Meeting of EC-PORS was held in Ottawa, Canada, from 13 to 15 October 2009.

The Panel noted that we are seeing accelerated change in the poles, increasing threats (for example, permafrost) and increasing numbers and complexity of users (in areas such as economic

development and tourism). The Panel noted the need for a sustained focus on polar prediction services, integrating International Polar Year observational and scientific efforts.

The Panel established a number of lead members and Framework groups to advance its work in specific areas and assigned responsibilities to develop a plan for action for consideration at its next meeting in October 2010. Examples of these work areas include:

- Antarctic operational responsibilities;
- Building a framework for its work in observations, research and services;
- Exploring the concept for an International Polar Decade;
- Building partnerships.

The following is a list of the key meeting outcomes:

- The Panel recommended the strengthening of the Polar Prediction System. It agreed to implement the system through an operational services framework expanding on the WMO concept of regional centres (such as RSMCs).

- The Panel will develop an implementation plan for the WMO Global Cryosphere Watch for approval as Congress XVI. This will encompass over 100 countries and proceed from observation through research to prediction and services.

- The Panel will investigate how it may interact with the WMO Constituent Bodies, WIGOS, GCW, GEO, SAON and GCOS and with many other organizations and institutions and their programmes (such as the Arctic Council and Antarctic Treaty Consultative Meeting) while avoiding duplication of effort.

- Panel members agreed to explore the concept of an International Polar Decade aimed at being ready to recommend a course of action for Congress XVI.

- The Panel will continue to monitor the development of the Global Framework for Climate Services to ensure the inclusion of the Polar Region through engagement of a Polar champion.

- The next meeting, EC-PORS2, will be hosted by the Australian Bureau of Meteorology in Hobart, Australia, 18–20 October 2010.

ANNEX III
Annex to paragraph 5.1.13 of the general summary

CHAIRS AND LEADS OF SUBSIDIARY BODIES OF REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

Management Group (MG)

The Management Group is composed of the president (chair), vice-president and three Permanent Representatives of Members with WMO being Executive Council members from the Region. Other members are the chair of the Tropical Cyclone Committee; the Hydrological Adviser; the leads of the Working Groups on Climate Services, Weather Services, and Infrastructure as ex officio members; and as appropriate, the chair of SPREP RMSD and other Permanent Representatives of Members with WMO to be invited by the president for each session, subject to the availability of financial resources.

Tropical Cyclone Committee for the South Pacific and South-East Indian Ocean (TCC)

Mr Mike Bergin (Australia) (Chair of the Tropical Cyclone Committee)

Working Group on Hydrological Services

Dr Arie S. Moerwanto (Indonesia) (Lead of Working Group on Hydrological Services and Hydrological Adviser to the president)

Working Group on Climate Services

Mr Erwin E.S. Makmur (Indonesia) (Lead of Working Group on Climate Services)

Working Group on Weather Services

Ms Susan O'Rourke (Australia) (Lead of Working Group on Weather Services)

Working Group on Infrastructure

Mr Russell Stringer (Australia) (Lead of Working Group on Infrastructure)

ANNEX IV
Annex to paragraph 5.1.16 of the general summary

VOLUNTEERISM IN THE WORK OF REGIONAL ASSOCIATION V (SOUTH-WEST PACIFIC)

General

It is recognized that commitment and volunteerism, with the required support from Members, play an important role in the subsidiary bodies of the regional association.

Recommendations

The following is recommended as per nominations, performance monitoring and recognition in order to improve the current situation with volunteerism, especially the declining number of volunteers:

Nominations:

(a) That the work of WMO be better advertised and promoted within National Meteorological and Hydrological Services and other weather, climate, water and environment communities, in order to ensure contributions from a wide spectra of expertise and appropriate geographic coverage;

(b) That prospective candidate experts and their Permanent Representatives should be aware of responsibilities and commitments, especially as far as coordination and participation are concerned;

(c) That in seeking nomination for membership in the subsidiary bodies of regional associations, especially prior to a constituent body session, for the procedure to ensure that the commitment of the Permanent Representatives and the proposed experts are confirmed, as well as the availability of the professional profile, through a brief curriculum vitae of the latter, to help ascertain their specific expertise, and willingness to contribute; and that nomination committees are established early to allow sufficient time to examine all experts' personal information prior to a constituent body session;

(d) That working group and task team members and theme leaders be chosen in such a way that their volunteer work corresponds to their daily activities in their home institutions;

(e) That an indication of time commitment, for example in terms of minimum percentage of overall activity or time slots, might be useful for the agreement of the Permanent Representative to secure the necessary time for WMO work;

(f) That Permanent Representatives should provide complete and up-to-date expert details, especially working e-mail addresses, to facilitate establishing subsidiary bodies;

(g) That candidate experts not selected by nomination committees should be informed, thanked and encouraged to apply again to some other WMO work.

Performance monitoring:

(a) That the WMO Secretariat manage the organization of subsidiary body meetings as early as possible within the intersessional period, in order to finalize action plans drafted following e-mail communication or teleconferences, and that the budget be set up accordingly, in order to have work assigned appropriately;

(b) That evaluation of each subsidiary body and involved experts be conducted by the chair of the working group according to the rules of results-based management, in particular to decide on the continuation of the membership of experts, taking into consideration the need for a balance between continuity and new activities and experts;

(c) This evaluation is also important for the experts involved, especially for the recognition of their work by their Permanent Representatives;

(d) That should an expert not contribute at the expected level, or in case of a totally silent expert, the president of the Association will consider his/her replacement, for example after one year of insufficient contribution;

(e) That peer-reviewed reports produced should be published as soon as possible, at least on subsidiary body websites, preferably in appropriate publication series with the names of contributors, for monitoring purposes and in order to recognize the work of the authors.

Recognition:

That Permanent Representatives should give recognition to their staff of work conducted for WMO activities. As in most National Meteorological and Hydrological Services an individual evaluation procedure is in place for rating staff members, the contribution to WMO work should be included in the list of criteria used.

APPENDIX

LIST OF PARTICIPANTS

1. Officers of the session

President	Mr Arona NGARI (Cook Islands)
Vice-president	Mrs Sri Woro B. HARIJONO (Indonesia)

2. Representatives of WMO Members within Region V

Australia	
Gregory Peter AYERS	Principal Delegate
J. GILL	Alternate
M. BERGIN	Delegate
T. HART	Delegate
Brunei Darussalam	
Muhamad Husaini BIN AJI	Principal Delegate
Haji Yunus MD. TAHIR	Delegate
Cook Islands	
Arona NGARI	Principal Delegate
Fiji	
Rajendra PRASAD	Principal Delegate
Indonesia	
Sri Woro B. HARIJONO (Mrs)	Principal Delegate
Tuwamin MULYONO	Alternate
Soeroso HADIYANTO	Delegate
P.J. HARJADI	Delegate
SUNARJO	Delegate
Antonius Juswanto ENDROJONO	Delegate
Widada SULISTYA	Delegate
Edvin ALDRIAN	Delegate
Nelly Florida RIAMA (Mrs)	Delegate
Rizaldi BOER	Delegate
R. Usman EFFENDI	Delegate
Yuni DARWAHYUNIATI	Delegate
Arie S. MOERWANTO	Delegate
Dodo GUNAWAN	Delegate
Muhsin SYIHAB	Delegate
M. Rawadi PRABOWO	Delegate
Yudha MEDIAWAN	Delegate
Malaysia	
Kok Seng YAP	Principal Delegate
Micronesia, Federated States of	
Johannes BERDON	Principal Delegate
New Caledonia	
Eric PETERMANN	Principal Delegate
New Zealand	
Neil GORDON	Principal Delegate
Penehuro LEFALE	Alternate
John FENWICK	Delegate

Niue
Sionetasi PULEHETOA — Principal Delegate

Papua New Guinea
Samuel MAIHA — Principal Delegate
Tau Ray GABI — Delegate
Jimmy GOMOGA — Delegate

Philippines
Prisco NILO — Principal Delegate

Samoa
Ausetalia TITIMAEA — Principal Delegate

Singapore
Chin Ling WONG (Ms) — Principal Delegate
Lay LIM Eng (Ms) — Delegate

Solomon Islands
David HIRIASIA — Principal Delegate

Timor-Leste
Sebastiao DA SILVA — Principal Delegate
Terencio Ferenandes MONIZ — Delegate

Tonga
'Ofa FA'ANUNU — Principal Delegate

United Kingdom of Great Britain and Northern Ireland
Steve PALMER — Principal Delegate

United States of America
Vickie NADOLSKI (Ms) — Principal Delegate
Edward YOUNG — Alternate
Jennifer LEWIS (Ms) — Delegate
Charles GUARD — Delegate
Bill BURNETT — Delegate

Vanuatu
David GIBSON — Principal Delegate

3. Representatives of WMO Members outside Region V – Observers

Angola
Maria Caetana R. Neto AMADO
Flavio FONSECA

Canada
David GRIMES
Bruce ANGLE

Finland
Petteri TAALAS
Jaakko NUOTTOKARI
Bengt TAMMELIN

4. Representatives of international organizations

Association of Hydro-Meteorological Equipment Industry (HMEI)
Mike UELTZEN
Chris GOODE

Allyson TURNBULL (Ms)
Jim MENARD
Panu PARTANEN
Bruce SUMNER
Christine CHARSTONE (Ms)

International Civil Aviation Organization (ICAO)
C. KEOHAN

International Commission on Irrigation and Drainage (ICID)
Hafied GANY

Secretariat of the Pacific Regional Environment Programme (SPREP)
Kosimiki LATU
Dean SOLOFA

5. Other participants

Fred BRANSKI	President of CBS
Jaumil SITUMEANG	(Indonesia)
Conny AMALIA	(Indonesia)
Irfan SUDONO	(Indonesia)
Rahmat Suria LUBIS	(Indonesia)
SURATNO	(Indonesia)
RAMILAN	(Indonesia)
Yonny KOESMARYONO	(Indonesia)
Fransisca MULYANTARI	(Indonesia)

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