

Nassau
24 April–1 May
2009

Regional Association IV (North America, Central America and the Caribbean)

Fifteenth session



**World
Meteorological
Organization**

WMO-No. 1041

Weather • Climate • Water

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Abridged final report with resolutions

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This report contains the text as adopted by Plenary and has been issued without formal editing.

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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 Commonwealth of the Bahamas, the fifteenth session of Regional Association IV (North America, Central America and the Caribbean) was held in Nassau, Bahamas, from 24 April to 1 May 2009. The session was declared open by Mrs Luz Graciela de Calzadilla (Panama), acting president of the Association, at 2 p.m. on Friday, 24 April 2009, at the Wyndham Nassau Resort.

1.2 Mrs Calzadilla expressed her appreciation to the Government of the Commonwealth of the Bahamas, represented by the Department of Meteorology of Bahamas, for hosting the session in Nassau and for the excellent arrangements made.

1.3 Mrs Calzadilla extended her gratitude to Mr Carlos Fuller (Belize), former president of RA IV, the chairpersons and members of the working groups and rapporteurs, and to Members who hosted regional events during the intersessional period.

1.4 The president also thanked Mr Michel Jarraud, Secretary-General of the World Meteorological Organization (WMO) and his staff for their valuable contribution to the activities of the Association.

1.5 Mrs Calzadilla mentioned that Members in the Region were highly vulnerable to natural disasters, particularly Hurricanes. She stressed that various new challenges, including the climate change, oblige the Members to have a dynamic and strategic role in the prevention and adaptation to face severe climate and weather phenomena, which had significant impacts on socio-economic development in the Region. Referring to the cooperation with national communities, she underlined the necessary strengthening of the capacities and visibility of National Meteorological and Hydrological Services (NMHSs) through the permanent improvement of the weather forecasts, warnings, climate prediction, as well as the hydrological forecasting and assessments.

1.6 The president stressed that the Region presents an uneven development as regards the capacities of NMHSs, therefore it is essential to intensify the solidarity amongst Members, as well as increase the cooperation from developed countries, through strategic associations, basic infrastructural support, capacity building and resources mobilization in the Region. The president also highlighted the importance of discussions during the session, indicating that the documents submitted to Members are intended to align the RA IV Regional Strategic Plan with the WMO Strategic Plan. She finally underlined the need of an agreement for the most efficient Working Groups Structure in RA IV.

1.7 Mr Arthur Rolle, Permanent Representative of the Bahamas to WMO, extended a welcome to all the participants and observers. In his introductory remarks he stressed the importance of information sharing in terms of future survival of the Caribbean islands. He also underlined the importance of the observational networks to help to further understand the climate and to address the adaptation actions.

1.8 On behalf of the Government of the Commonwealth of the Bahamas, Mr T. Desmond Bannister, Minister of Youth, Sports and Culture reminded that since 1997, when Bahamas hosted the twelfth session of RA IV, many climate-related changes have taken place globally and locally. He stressed that stronger storms, more coastal erosion and flooding of low-lying areas, as well as the degradation of ecosystems on which many Bahamians depend, are expected to increase in relation to the global warming. He mentioned that the Government of Bahamas joined 76 other countries and the European Commission as a member of the Group on Earth Observations (GEO). He also mentioned that Bahamas equipped its National Meteorological Service with an observational network satisfying the requirements of the Global Climate Observing System (GCOS) and answering the national needs referred to the assessment of variability and climate

change impacts, as well as the development of adaptation actions to address those impacts. In this regard he stressed that the guidance and monitoring of WMO for the improvement of hydrological warning systems and the Integrated Water Resources Management were becoming of special importance.

1.9 Mr M. Jarraud, Secretary-General of WMO, in his address, expressed the deep appreciation of WMO to the Commonwealth of the Bahamas for their kind invitation to host the fifteenth session of Regional Association IV as well as the thirty-first session of the RA IV Hurricane Committee, which has just concluded in Nassau. He thanked Mr A. Rolle, Director of the Department of Meteorology of Bahamas and Permanent Representative of the Bahamas to WMO for the warm hospitality and excellent arrangements. He expressed WMO's appreciation to Mr Carlos Fuller, who successfully presided the Region IV for several years, and to Mrs Luz Graciela de Calzadilla, for her leadership during the period since she assumed this post. He expressed WMO's appreciation to all the chairpersons, members of the Region's expert teams and rapporteurs over the intersessional period, for their key services.

1.10 The Secretary-General reminded that since the last session of RA IV, natural disasters in different forms such as floods, landslides and droughts have continued to disrupt the socio-economic situation for several Members of the Region, WMO has participated in the efforts for building a multi-hazard early warning system for the Caribbean and adjacent regions. He recalled that the 2008 Atlantic Hurricane Season was one of the most active on record, since it produced sixteen named storms, of which eight became hurricanes and five developed into major hurricanes. The season was devastating for Haiti, which suffered four consecutive tropical cyclones. However, the WMO's global system of warnings of extreme weather events and especially the RSMC Miami-Hurricane Center, helped to reduce the loss in lives and property in the Caribbean Countries. Once more, successful collaboration among WMO Members has reiterated the advantages of borderless cooperation in meteorology. In this respect, he stressed that the United States of America have provided essential assistance in supporting some members of the Region, which required an update in their telecommunications facilities, in order to adapt to the new two-way satellite system.

1.11 The Secretary-General thanked the European Union for the generous support in funding new Doppler radars for a number of Caribbean countries to fully operate their respective S-band meteorological radars. He also expressed his gratitude, on behalf of WMO, to Finland for the funding and technical support to the SIDS-Caribbean Project which achieved significant results through the development of a pilot project of automated weather service system, and to Spain for its trust fund for the Cooperation Programme in Meteorology and Hydrology in the Iberoamerican countries.

1.12 The Secretary-General emphasized that this session is organized according to the new WMO Strategic Plan, which was adopted by the Fifteenth World Meteorological Congress (May 2007). He was pleased to note that the Association had developed a draft Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in RA IV (2010–2013), taking into account the previous RA IV Strategic Plan (2006–2009) as well as additional proposals developed by RA IV Members. The Secretary-General informed the session that a new WMO Secretariat structure had been implemented in 2008 to better align with the decision of Congress, as well as to improve the integration of plans and programmes, optimize the use of resources and streamline management and decision-making. He recalled that in the documents prepared for this meeting the key issues are now referenced to the 11 expected results, rather than to the traditional WMO Programmes.

1.13 The Secretary-General informed that in order to support policy formulation and decision-making, as well as to underpin capacity building in climate risk management, WMO will hold a Third World Climate Conference (WCC-3) in Geneva from 31 August to 4 September 2009, under the theme "Climate Prediction and Information for Decision Making". He expressed that he look forward to the fullest participation of RA IV countries in this key Conference.

1.14 He wished all the participants fruitful discussions at this session and success in the future activities of the Association.

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

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

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

2.1.2 The session was attended by 48 participants from 19 Members of Regional Association IV (North America, Central America and the Caribbean), 4 observers from 2 Members from outside the Region and 7 from 4 international organizations. The list of participants is given in the [appendix to the present report](#).

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

The provisional agenda for the session was unanimously adopted, as contained in XV-RA IV/Doc. 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 in plenary sessions to deal with the various agenda items as follows:

- (a) General Plenary chaired by Mrs Luz Graciela de Calzadilla (Panama), acting president of the Association, assisted by Mr Miguel Rabiolo Director of the WMO Office for the Americas;
- (b) Plenary A chaired by Mr Arthur Rolle (Bahamas) assisted by Mr Robert Masters, Director of the WMO Development and Regional Activities Department and Mr Andres Orias, Programme Officer for the Americas;
- (c) Plenary B chaired by Mr Juan Carlo Fallas (Costa Rica) assisted by Mr Geoff Love (Australia) Director of the WMO Department of Weather Disaster Risk Reduction and Services and Mr Oscar Arango WMO Representative, Office for North America, Central America and the Caribbean.

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

Nomination Committee

2.3.3 A Nomination Committee was established, chaired by Mr Tyrone Sutherland (British Caribbean Territories) assisted by Mr Albert E. Martis (Netherlands Antilles and Aruba).

Coordination Committee

2.3.4 A Coordination Committee was established, comprising the president, the representative of the Secretary-General, the chairs and assistants of plenaries.

2.4 OTHER ORGANIZATIONAL MATTERS (*agenda item 2.4*)

2.4.1 The Association established its working hours for the duration of the session.

2.4.2 The Association agreed to waive 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 IV 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 North America, Central America and the Caribbean; the future working mechanism of the Association; and other priority activities, including the formal establishment of the Regional Climate Centre (RCC) network in North America, Central America and the Caribbean.

3.2 The president pointed out that capacity-building and training was a major priority for the Region, in light of staff turnover and the impending implementation of an ICAO certification requirement. The president requested that adequate financial and technical resources be provided to ensure that the appropriate training events be organized and funded and fellowships be provided in the different NMHS in RA IV.

3.3 As another priority for the Region, the president identified the need to continue providing training workshops and meetings for the Tropical Cyclone Programme (TCP) and the Public Weather Services Programme (PWSP), specially those related to tropical cyclone forecasting and warning.

3.4 The Association commended its former president, Mr C. Fuller (Belize), for the dedication, enthusiasm and initiative with which he had conducted the affairs of the Association, thus contributing to the further development of weather, climate and water services in the Region. The Association also commended the vice-president, Mrs Luz Graciela de Calzadilla (Panama), for her valuable contribution to the work of the Association. It also expressed its appreciation to the chairpersons and members of the working groups and rapporteurs, who had effectively collaborated in carrying out the activities of the Association.

3.5 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.

3.6 The Association acknowledged the activities related to disaster risk reduction that have been carried out in the Region for the benefit and with the participation of Member countries such as the "Program for the Reduction of Vulnerability and Environmental Degradation" (PREVDA), implemented by CRRH and active participation of WMO, which concentrates on institutional strengthening focusing on human capacity building and technology innovation in the field of climate forecasting; strengthening the existing regional institutions (CRRH, CCAD and CEPREDENAC) on their capacity to face hydrometeorological disasters; harmonizing the legal framework on water; and acting in identified priority watersheds around the water resource triangle of watershed-climate-disasters. Other activities include the WMO Central American Project on Multi-Hazard Early Warning System which is the first step to develop an end-to-end early warning system for Central America and the contribution made by the SIDS Caribbean project to the NMSs of the Caribbean Region through the provision of automatic weather stations, the upgrading of the telecommunications system and training of personnel allowing the NMSs to be better prepared for disaster risk management. For the SIDS-Caribbean project the ACS acted as chair of the supervising Board along with CARICOM, CMO, WMO and the Government of Finland.

3.7 The Association agreed with the President of the Region in that the priorities of the Region were:

- Capacity building;
- Disaster Risk Reduction;
- Climate change and adaptation;
- Integrated water management;

- Aeronautical meteorology;
- WIGOS (WIS, its observations and data exchange);
- Hurricanes.

3.8 Finally, regarding the work of the Regional Office for the Americas and the WMO Office for North America, Central America and the Caribbean, the president expressed his gratitude and appreciation to the Secretary-General of WMO and to the Secretariat for the support received to carry forward his duties as president and acknowledged the actions taken by the Secretariat to allow him to conduct his job more effectively.

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)

4.1.1 The Association noted the importance of the Global Data-Processing and Forecasting System (GDPFS), which represents the function of weather forecasting including the production of alerts and warnings of severe and high impact weather. It includes a network of operational meteorological centres that produce numerical weather prediction (NWP), and forecasters that produce forecasts and warnings, and is a part of a global early warning system for meteorological and environmental hazards. The GDPFS provides a strong basis for Public Weather Services and other meteorological services, contributes to other Expected Results, and supports programmes of relevant international organizations.

4.1.2 The Association noted that the Severe Weather Forecasting Demonstration Project (SWFDP) has achieved significant results and benefits as a part of the GDPFS and Public Weather Service (PWS) programmes through its implementation in Africa, and requested the relevant RA IV working group to consider extending the Region's Flash Flood Forecast Guidance Project (FFFGP) to include elements of the SWFDP as a method for enhancing the GDPFS and PWS and further contributing to disaster risk reduction goals in affected countries.

4.1.3 The Association noted the progress made in the North American Ensemble Forecast System (NAEFS) including the National Centers of Canada, Mexico, and the United States, whereby outputs from ensemble prediction systems of CMC (Canada) and NCEP (United States) are combined to produce, on a daily basis, a wide variety of products over the North America region. These products represent an extension of the lead-time of predicting meteorological conditions to up to 14 days, and could provide valuable information of possible severe or high impact weather, in a probabilistic fashion. Canada indicated that were the FFFGP extended to include elements of a SWFDP for South and Central America and the Caribbean, as a part of such a Project, upon request from the participants, it could provide EPSgrams for an additional 25 to 40 sites in that area. Canada advised that NAEFS products can be viewed at: http://www.weatheroffice.gc.ca/ensemble/naefs/EPSgrams_e.html.

4.1.4 The Association encouraged Members that run NWP including Ensemble Prediction Systems (EPS), and specialized NWP in applications such as for sea-state prediction, to continue to make available their products and guidance on their use, to NMHSs especially of developing countries, and at the same time encouraged verification and feedback on their quality and usefulness.

4.1.5 The Association requested that Members and the WMO Secretariat make every effort to include within training courses for forecasters in the Region materials on how to make best use of the output from ensemble forecast systems.

4.1.6 The Association expressed much appreciation that ECMWF has provided additional products to WMO Members, in particular its EPS products including marine products. In addition it noted that ECMWF has agreed in principle to increase the resolution of products made available to WMO Members and requested the WMO Secretariat to coordinate its implementation in a practical way that would further enhance their relevance and usefulness in forecasting severe weather and extreme wave events.

4.1.7 The Association requested Members 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". Members are encouraged to also include information on areas of specialized NWP in applications such as for sea-state prediction.

GDPFS – Long-Range Forecasts

4.1.8 The Association noted the significant progress made by Global Producing Centres (GPC) of Long-Range Forecasts, including in RA IV GPCs Montreal and Washington, which have been designated as part of the GDPFS, and requested these centres to collaborate with climate information and prediction centres to meet their needs. The Association noted with appreciation that GPC Washington collaborates with GPC Seoul on LRFMME and that GPC Montreal collaborates with GPC Melbourne on "Standardized Verification System for Long-Range Forecasts" (SVSLRF), and requested that these centres continue to support the needs of Regional Climate Centres (RCCs) and NMHSs of RA IV and the world in these important activities.

4.1.9 The Association noted with appreciation the involvement of Canada and the United States, as well as CBS and CCI in development of the draft amendment to the WMO *Manual on the Global Data-Processing and Forecasting System* (WMO-No. 485), Volume 1, Global Aspects, on designation of Regional Climate Centres. The Association urged its Members to continue to support the joint CBS-CCI efforts, in order to ensure successful implementation and operation of RCCs and to foster improved coordination of all aspects of climate prediction (monthly, seasonal and longer). The Association urged all GPCs, including those in RA IV, to continue and reinforce their inputs to RCCs and Regional Climate Outlook Forums (RCOFs) (data products and predictions, as well as guidance on effective use of these products), and to provide verification information and advice.

4.1.10 The Association noted that GPCs have a critical role to play in the new WMO initiative to support adaptation to climate variability and change, endorsed by EC-LX (2008), and urged the RA IV GPCs (Washington and Montreal) to be closely involved in development of the GPC-RCC-NMHS-RCOF framework for operational climate prediction and services around the world.

Tropical cyclone forecasting and warning services

4.1.11 The Association recognized ensemble prediction techniques continue to improve the level of accuracy in tropical cyclone track forecasting and at the same time there is an increasing need for including uncertainty information in the forecasts for more effective disaster risk assessment. It recommended that greater emphasis should be given to the use of ensemble techniques and probabilistic forecasting in tropical cyclone warning operations in order to improve their utility. In this respect, the Association noted with satisfaction that RSMC Miami – Hurricane Center began operationally issuing graphical and text products in 2006 that provide the wind speed probabilities out to five days for 34, 50 and 64 kt to the public. The Association encouraged the RSMC and NMHSs to further exploit the use of ensemble techniques in tropical cyclone forecasting and probabilistic forecasts and requested the WMO Secretariat to increase efforts to assist Members to this end.

4.1.12 The Association noted with appreciation that the annual training Workshop on Hurricane Forecasting and Warnings, and Public Weather Services at RSMC Miami Hurricane Centre had made a significant contribution to a sustained augmentation of the hurricane forecasting and warning services provided by NMHSs in the Region, and is therefore in high demand among the members of the RA IV Hurricane Committee. It stressed that such a training

event should be continued, and requested the Secretary-General to continue to provide the necessary resources and any other support to the training activity.

4.1.13 The Association recognized operational tropical cyclone forecasting, particularly intensity forecasting, is still a serious challenge to many NMHSs and that technology transfer and transition from research to operational forecasting is essential. Noting that the International Workshop on Tropical Cyclones (IWTC) serves as a key forum to bring together forecasters and researchers to interact and maximize opportunities for transferring research results into operational application, the Association encouraged its Members to send as many tropical cyclone forecasters and researchers as possible to the IWTC VII to be held in 2010.

4.1.14 The Association noted with satisfaction the excellent work being done by the RA IV Hurricane Committee through their Hurricane Operational Plan and Coordinated Technical Plan, respectively, to promote the strengthening of the tropical cyclone, storm surge and flood warning services and related disaster risk reduction in the Region in accordance with Resolution 14 (IX-RA IV) – RA IV Hurricane Operational Plan and Resolution 8 (X-RA IV) – RA IV Hurricane Committee's Technical Plan and Implementation Programme.

Forecasting services for aviation

4.1.15 The Association noted with appreciation the development of many aviation-specific forecast and warning products by NOAA, which are based both on high-resolution model output and remote-sensing data. Such products, although mainly designed for use over the US, provide also guidance over the entire Region by web access. The Association further expressed appreciation for the on-the-job training provided to forecasters from RA IV through their secondment to the International Tropical Desk of NCEP (United States), and encouraged maintaining and strengthening of this activity.

4.1.16 In view of the industry's need for higher accuracies and longer lead times for severe weather events affecting the safety and regularity of aviation in the Region, the Association requested Members in a position to do so to expand available data and products in support of aviation for use by Developing Country Members. In particular, the Association requested that Members be informed of progress in the US NextGen project where such progress was expected to affect flights towards the United States and within the Region.

4.1.17 The Association was informed of a planned workshop on new gridded products of turbulence, icing and convection that would be held in 2009 jointly by ICAO and WMO, following which guidance material on the use of these products and first verification and evaluation results would be made available.

Marine meteorological forecasting, products and services

4.1.18 The Association recalled that the second session of JCOMM took place in Halifax, Canada, in September 2005, noted that the third session of JCOMM is scheduled to take place in Marrakech, Morocco, 4–12 November 2009, and encouraged all RA IV Members to attend the JCOMM-III session.

4.1.19 The Association recognized that probabilistic forecast of wave height exceeding specific thresholds 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. The Association expressed its appreciation to the advanced centres in the Region (Environment Canada, NCEP and FNMOC), and the ECMWF (password protected for WMO Members) for making freely available on their Websites a broad range of global and regional wave products and datasets. Noting that NCEP also provides access to spectral data and to the wave model source code, the Association encouraged its Members to make maximum use of these tools, including for downscaling purposes.

4.1.20 Noting the difficulties in achieving reliable forecasts of sea state and extreme wave events the Association requested Members to improve the availability of oceanographic data, such as bathymetry and inundation risk maps, to support the assessment of coastal hazards via numerical modelling and verification.

4.1.21 The Association recalled that the last time a specific training workshop on wave and storm surge analysis and forecasting held in the Region was in June 2003, and recognized that these training events would aim to provide NMHSs, especially those from developing countries, with open source and transferable numerical models for waves and storm surges, and access to existing products worldwide. The Association therefore requested the Secretariat to support capacity building workshops in RA IV similar to those organized jointly by TCP/JCOMM which were held in Australia in December 2008 for the South Pacific. Such workshops should be coordinated with existing training activities in the Region.

4.1.22 The Association was informed of a planned 11th International Workshop on Wave Hindcasting and Forecasting and 2nd Coastal Hazard Symposium that would be held in October 2009 in Canada, on which participants would receive information on new technologies and research results on wave and storm surge modelling and forecasting, including its combined effect leading to coastal inundation. The Association therefore encouraged Members of RA IV to participate in this event and requested the Secretariat to keep Members informed of these developments.

Research in forecasting

4.1.23 The Association welcomed the progress of the Sand and Dust Warning Advisory and Assessment (SDS-WAS) Project, particularly for movement toward creating regional nodes for Asia and the Europe-Northern Africa-Middle East. The Association encouraged NMHSs to examine these experimental products and both provide feedback to the participants on their quality and, where appropriate, consider using these products as guidance in operational prediction. The Association also notes the relevance of the Europe-Northern Africa-Middle Eastern node to issues of concern to RA IV since Sahara Dust is hypothesized to play a role in modifying the genesis and intensity of tropical cyclones and the ecology of the Atlantic Ocean and Caribbean Sea. The members of RA IV are encouraged to collaborate with the SDS-WAS project on this topic.

4.1.24 The Association noted that the THORPEX Interactive Grand Global Ensemble (TIGGE) archive contains the database for both the deterministic forecasts and the ensemble members produced daily by ten global NWP centres. Preliminary research suggests significant improvements in using a bias corrected multi-model over any single ensemble output for certain forecast variables (surface temperature, heavy rainfall, ensemble behaviour in the tropics). The Association encouraged the movement of TIGGE from a research phase to a Global Interactive Forecast System (GIFS) demonstration phase. GIFS would entail the generation of suitable deterministic and ensemble-based products in real-time from the TIGGE database to provide advanced warnings of major weather hazards. The Association supports the proposal of the GIFS-TIGGE working group that the first demonstration project should be focused on tropical cyclone tracks which are already being produced in real-time with broad participation. The Association recognized the synergies between GIFS-TIGGE demonstration projects and the severe weather forecasting demonstration projects and requested that planning begin for demonstration projects associated with the prediction of heavy rainfall. The Association requested that the WMO organize the appropriate training such that these projects would be a collaboration between CAS and CBS.

4.1.25 The Association expressed appreciation for the extended efforts by Members of this Region along with those of Europe, Australia and Asia to improve the prediction of high impact weather over East Asia with a focus on tropical cyclones and winter storms during the Tropical Cyclone Structure (TCS-08), and the summer phase of T-PARC (THORPEX Pacific Asian Regional Campaign). The Association also noted the importance of winter T-PARC to this high impact weather prediction over this Region and to the design of the global observing system. The NMHSs are encouraged to maintain their participation in this project beyond the field phase to

ensure relevant results are transferred to operational use and contribute to improving forecasts and warnings.

4.1.26 The Association encouraged Members to provide their perspectives of operational needs into the design of upcoming research efforts to ensure these efforts contribute to the development of the next generation of forecasting and assessment systems: these upcoming experiments include the Year of Tropical Convection (YOTC), the Winter Phase of T-PARC, Nowcasting, and the Global Ocean Data Assimilation Experiment (GODAE) OceanView. The Association noted that collaboration between atmosphere and ocean community for GODAE and between weather-climate communities for YOTC is an efficient mechanism for moving prediction capacity forward.

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

4.2.0 Introduction

4.2.0.1 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, 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.), partnerships with organizations in climate-sensitive sectors and the enhancements of the capacity of the Members, particularly in developing and least developed countries. The Association noted that the WMO's climate activities are duly presented with respect to Expected Results 2, 5, 6, 7, 8 and 9.

4.2.0.2 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 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.

4.2.1 Coordination and Guidance for ER 2

4.2.1.1 Noting that climate activities that fall under ER 2 are guided by a number of WMO and co-sponsored constituent bodies, including CCI, CAgM, CBS and WCRP JSC, the Association urged enhanced interaction and coordination between these bodies, including those at regional and national levels.

4.2.1.2 The Association recognized that climate adaptation is an emerging priority, and that considerable effort and coordination will be required across the Region to establish operational climate services that will support effective decision-making on matters of adaptation to climate variability and change. The Association agreed that the existing rapporteurs and working groups related to climate and agrometeorology would be consolidated in an RA IV Working Group on Climate Services, Adaptation and Agricultural Meteorology.

4.2.2 Climate Monitoring and Assessment

4.2.2.1 The Association was informed on the CLIMSOFT training workshop held at the Caribbean Meteorological Organization (CMO) headquarters in Trinidad and Tobago (May/June 2006), and the Advanced CLIDATA Training for countries in the Caribbean (Caribbean Institute of Meteorology and Hydrology (CIMH), 19–30 May 2008), and it 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 Members to undertake a similar collaborative approach in Region IV.

4.2.2.2 The Association appreciated the efforts of the Joint CCI/CLIVAR/JCOMM Expert Team of Climate Change Detection and Indices (ETCCDI) to promote cooperative development of indices on extremes. The Association called on Members to sustain and further develop this work to become a part of a new climate monitoring product for decision- and policy-makers.

4.2.2.3 The Association noted with appreciation the continuous contribution of RA IV Members in the WMO statements on the status of the global climate system as well as in the WMO climate review publications. The Association agreed that all Members should contribute to provide relevant climate information based on their monitoring activities to enhance the coverage of WMO's annual statements on the status of the global climate system, particularly with respect to extremes.

4.2.2.4 The Association, noting that a process was underway to evaluate the feasibility of a WMO Global Cryosphere Watch (GCW), expressed support for the GCW concept, and urged the Secretary-General to strengthen the relevant mechanisms to guide GCW development and potential implementation.

4.2.3 Climate Prediction and Modelling Research

4.2.3.1 The Association expressed satisfaction with the continuing WCRP's progress 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 time scales, and development of coupled climate system models. The Association noted with interest the outcomes of the World Modelling Summit for Climate Prediction (Reading, United Kingdom, May 2008), the WCRP Seasonal Prediction Workshop (Barcelona, Spain, June 2007), and the GCOS, WCRP and IGBP Workshop "Learning from the IPCC Fourth Assessment Report" (Sydney, Australia, October 2007). It requested WCRP to ensure full and active participation of scientists from RA IV in the emerging Climate Prediction Project.

4.2.3.2 The Association noted with satisfaction the progress in predicting and modelling of the North and South American monsoons through the WCRP CLIVAR Variability of the American Monsoon Systems project and encouraged Members to continue their support for the archiving and analysis of the resulting data and for the associated field experiments.

4.2.3.3 The Association recognized the many contributions of the WCRP Global Energy and Water Cycle Experiment (GEWEX) and noted with particular appreciation the recent analysis of global precipitation products. The Association urged Members to continue their support for the collection, processing and analysis of the precipitation, cloud and radiation data from satellite and in situ measurements.

4.2.4 Operational Climate Prediction

4.2.4.1 The Association recognized the need for Members to develop/improve their national capabilities in climate prediction, in order to improve their ability to support applications of climate information to key socio-economic sectors for adaptation to climate variability and change. Further recognizing a need to foster the transition of results from climate research to the operational practices of regional and national centres, the Association urged the Secretary-General, CCI and the WCRP JSC to facilitate the development and operational implementation by Members of new or improved climate prediction techniques, and to provide technical guidance to NMHSs through closer coordination of their activities at the regional and national levels.

4.2.4.2 The Association was informed of WMO activities relevant to Climate Watches and noted the urgent need for NMHSs and regional climate institutions to make use of best practices in the delivery, provision and evaluation of Climate Watches, and in managing efficiently and seamlessly the interaction among regional institutions, NMHSs and end-users. The Association

agreed on the benefits of early warnings of extreme weather and climate, and urged Members and the Secretariat to help developing countries in the Region to implement Climate Watches.

4.2.4.3 The Association expressed deep appreciation to Members for their support and leadership in the establishment of Regional Climate Outlook Forums (RCOFs) for Central America (Foro del Clima de América Central (FCAC)), and noted the growing benefits of RCOFs in fostering networking amongst climate experts, and in development of consensus-based forecasts for the subregion. The Association noted with satisfaction that FCAC participated in the international expert review meeting on RCOFs organized by WMO and shared its experiences with the global RCOF community (Arusha, United Republic of Tanzania, November 2008). The Association agreed that the RA IV RCOF efforts need to be expanded to establish additional subregional RCOFs as needed, and to expand the process to include assessments of climate change for the Region. The Association urged Members to support these initiatives, and to seek low-cost options and user support to enhance their sustainability.

4.2.4.4 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.

4.2.4.5 The Association expressed appreciation to Members contributing to developing consensus-based updates of El Niño and La Niña issued by WMO. The Association noted the urgent need for consistent analysis and forecast techniques related to El Niño and La Niña, and requested that the CCI Expert Team on El Niño and La Niña continue its efforts to develop a common understanding of, and a common public relations approach to, El Niño and La Niña as a high priority. In addition, the Association urged expansion of this process by the CCI and WCRP CLIVAR to include development of updates on other major oscillations that affect climate of the Region.

4.2.4.6 The Association noted the importance of the activities of the Global Producing Centres for Long-range Forecasts (GPCs) and the joint Lead Centre for the Standard Verification System for LRF (LC-SVSLRF), and the importance of verification of operational LRF techniques to the work of RCCs, RCOFs and NMHSs. The Association urged all Members in the Region to optimally utilize the GPC products.

4.2.4.7 RA IV Members reaffirmed their support for the implementation of the WMO CLIPS project, and agreed to support the initiation and conduct of regionally-organized CLIPS activities including any required resource mobilization; to enhance coordination of climate information and services in the Region, and to ensure close collaboration between CLIPS activities and eventual RCC activities in the Region. The Association urged its Members to each identify a national focal point that would be responsible for monitoring and reporting on CLIPS-relevant activities in the country, to provide the focal point with the facilities and support necessary to fulfil this responsibility, and to inform the WMO Secretariat of the names and contact information for each national focal point for CLIPS, and of any subsequent changes within the upcoming intersessional period. Noting the establishment of a new RA IV Working Group on Climate Services, Adaptation and Agrometeorology (WGCAA), the Association urged all national CLIPS focal points to collaborate closely with and support the activities of the Theme Leader on 'CLIPS including RCCs and RCOFs' of the WGCAA sub-group on Climate Applications and Services (CAS).

4.2.5 Regional Climate Centres (RCCs)

4.2.5.1 The Association noted the significant progress made by WMO, through the joint efforts of the Commission for Climatology (CCI) and the Commission for Basic Systems (CBS) towards development of a formal designation process for Establishment and Implementation of Regional Climate Centres. Recalling the early efforts taken within RA IV (2003) to establish a regional Advisory Group on RCCs (AG-RCCs), and noting with appreciation the launch of the RA IV RCC Pilot Project sponsored by the United States of America and implemented by the Central American

Regional Committee of Hydrological Resources (2005) and of a project in 2007 to initiate RCC activities for Central America (supported by the Inter-American Development Bank and the European Union), the Association urged Members to take into account the latest WMO Guidance on Establishment and Implementation of RCCs, and to ensure that all mandatory requirements for formal designation as 'WMO RCCs' are fulfilled by the potential centres in the Region interested in seeking such designation.

4.2.5.2 The Association, noting the urgent need for improved climate information reaffirmed its intent to establish an RCC network to assist RA IV Members in meeting these needs. The Association urged the president of RA IV to assess the needs and capabilities in the Region for climate services (by organizing an appropriate survey, if required), and to encourage Members to participate in RCCs and to develop an implementation plan for the establishment of an RCC network in the Region. The Association urged potential RCC hosts to build, under the guidance of the president) CCI, CBS and the WMO Secretariat, demonstrable and sustainable capacity for all the mandatory RCC functions defined in the proposed amendments to GDPFS Manual and, where possible, the highly recommended functions.

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

4.2.6 World Climate Conference-3 (WCC-3)

4.2.6.1 The Association noted that the World Climate Conference-3 (WCC-3) (Geneva, 1 August–4 September 2009) had a high potential to enhance the visibility of climate change and climate variability, and to contribute to the efforts of Members and users to address both disaster risk reduction and adaptation to climate variability and change, and to highlight WMO's contribution to the implementation of the UNFCCC Bali Action Plan, especially on risk management and adaptation. The Association further noted that skilful seasonal to interannual climate predictions, which form the focus of WCC-3, were essential to national efforts in adaptation to climate variability and change since they provide the society, governments and climate-sensitive sectors with the tools to identify areas and periods of potential risks, activities that could cope with the expected climate conditions and help them take appropriate contingency measures for the benefit of the society and institutions.

4.2.6.2 The Association noted that the proposed outcomes of the conference aimed to bridge the gap between IPCC assessment reports and the sector-specific climate information needs, to support adaptation to climate variability and change at regional and national levels. Furthermore, they should also address the observational and data needs, which influence adaptation strategies, impact assessments, and climate diagnostics and projections. The Association recognized that the conference programme and identification of the expected outcomes in a concrete form were crucial to attracting participation at the ministerial level and for resource mobilization. The Association noted with satisfaction that a number of experts from the Region contributed to the WCC-3 International Organizing Committee (WIOC), and urged Members to give their full support to ensure the success of WCC-3.

4.2.7 Capacity Building for Improved Climate Prediction and Assessments

4.2.7.1 The Association noted with appreciation that RA IV had actively contributed to CLIPS training activities, recalling that the fifth workshop on 'Regional climate prediction and applications – Circum-Indian Ocean' was held at the Cooperative Institute for Mesoscale Meteorological Studies, University of Oklahoma (Oklahoma, United States, 2005). The Association further appreciated the efforts of NOAA in capacity building in both regional and extra-regional projects. Notwithstanding these efforts, Members recognized the special and ongoing technical training needs of developing countries in the Region for provision of a full range of climate predictions and assessments.

4.2.7.2 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 new WGCAA to formulate a coordinated strategy to meet this need.

4.2.8 Adaptation to Climate Variability and Change

4.2.8.1 The Association, noting the great concern the governments in the Region had on climate change and related environmental issues, recognized that NMHSs needed to have the capability to provide relevant advice to their government policy-makers. For this purpose, the Association agreed that NMHSs needed to be closely involved in the development of future climate scenarios in a regional context, and to focus on near-term projections.

4.2.8.2 The Association noted that EC-LX 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 RA IV Members for developing reliable climate scenarios, and assessing the inherent uncertainty, and the vulnerability of Members in the Region to climate-related hazards. The Association therefore urged the Secretary-General to support the initiative, using the financial flexibility that might exist within the programme and budget for 2008–2011, to identify the resources needed to fulfill the proposed objectives, and to identify and make use of extrabudgetary resources.

4.2.8.3 The Association recognized the benefits to the Region of establishment and sustained operation of global and regional mechanisms for climate (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 initiative.

4.2.8.4 The Association further recognized the need to promote climate applications in key socio-economic sectors and appreciated the CCI initiatives to support climate applications in 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 United Nations agencies such as WHO, UNWTO, UNEP and other international organizations. The Association urged Members to complement these efforts by working towards strengthening partnerships between NMHSs and user agencies at the national level.

4.2.8.5 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 urged all RA IV Members to participate in the on-line survey launched in October 2008 by the WMO Secretariat. The Questionnaire facilitated the assessment of current and potential future role of NMHSs in adaptation to climate variability and change in their respective countries. Furthermore, the Association noted that the outcomes of the survey would address key gaps and build on current strengths of efforts for adaptation measures.

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 WMO in the Hydrology and Water Resources Programme given in the Strategic Plan as approved by Fifteenth Congress. It examined those topics in the Plan which required more emphasis and having considered those of higher interest to countries in

Region IV, recommended to take them into account as appropriate in the future work of the Association's bodies in the field of on Hydrology and Water Resources.

4.3.2 The Association noted with appreciation the report of the chairperson of the Working Group on Hydrology (WGH), Mr C. Barrett (United States). It noted the progress made in carrying out activities of particular interest to Members by the coordinators who had been given specific assignments and were supported by other members of the WGH. In particular, it noted with interest that the WGH focused on these prioritized areas and that the results of the activities were reported by the chairman of the WGH. The following coordinators prepared activity reports on:

- (a) Hydrological Warning Systems – Mr Eduardo Planos (Cuba);
- (b) Integrated Water Resources Management – Mr Sadi Laporte (Costa Rica) and Ms Luz Graciela de Calzadilla (Panama);
- (c) Development of CARIB-HYCOS – Ms Ana Deisy Lopez (El Salvador) (On the continental component).

4.3.3 The Association was informed about the outcome of the thirteenth session of the Commission for Hydrology. It took note that the Commission had re-established an Advisory Working Group (AWG) composed of nine members, and five Open Panels of CHy Experts (OPACHE) on five thematic areas: basic systems (hydrometry and hydraulics); water resources assessment and water use; hydrological forecasting and prediction; disaster mitigation – flood and droughts (hydrological aspects); and analysis of hydroclimatological data for variability and trends. The Association noted that one expert of the AWG leading activities associated with the WMO Quality Management Framework – Hydrology is from the United States.

4.3.4 The Association noted with concern that very few delegations included experts in the field of water in the RA IV session. Therefore the Association stressed the important role that the Working Group on Hydrology played in the identification of regional needs in relation to the Hydrology and Water Resources Programme and that this should continue through the relevant body of the association.

4.3.5 The Association was pleased to learn that the *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology*, Volume II: Hydrology (WMO-No. 258) have been published in the five languages approved by Cg-XV and since November 2008 are available on the WMO Website.

4.3.6 The meeting was informed that the Carib-Hycos project for the region of the Caribbean is in the implementation stage. A CaribHycos Subgroup comprised of the project Coordinator and two experts, Spanish- and English-speaking, visited the region of the Caribbean to evaluate the necessities of each country and carry out a survey of capacities. The Association was further informed that a regional meeting was held in Martinique, France, to establish the committee of coordination of this project.

4.3.7 The Chairman of the Regional Working Group on Hydrology informed the session on the establishment of a project to integrate flash flood warnings generated by NMHSs in Central America with Disaster Management agencies to assure response agencies use warnings to save lives. The goal is to use this project as a demonstration for other developing countries on how to establish an effective end-to-end warning system and Standard Operating Procedures for warnings to receive effective response. The Association was further informed that in three countries of the region, these flood forecasting systems are being implemented with the support of the World Bank.

4.4 INTEGRATION OF WMO OBSERVING SYSTEMS (agenda item 4.4)

4.4.1 The Association recalled Resolution 30 (Cg-XV) – Towards Enhanced Integration between WMO Observing Systems, by which Congress had decided to initiate WMO Integrated Global Observing Systems (WIGOS). The Association reiterated that enhanced integration between

the WMO observation systems was being pursued as a strategic objective of WMO and one of the 11 major Expected Results for the fifteenth financial period (2008–2011) as reflected in the WMO Strategic Plan and the Result-based Budget. The Association discussed and agreed with actions initiated towards integration of observing systems supporting overall Members' activities in weather, climate and water.

Weather

Surface-based observations

Regional Basic Synoptic Network (RBSN)

4.4.2 The Association noted that owing to Members' efforts, the RBSN has demonstrated sustainable performance. It appreciated the work done by the Working Group on Planning and Implementation of the WWW in Region IV (RA IV-WG-PIW), through the Rapporteur on Regional Aspects of the Global Observing System, to identify and address deficiencies in the observing programmes. It also appreciated the work done by the Regional Lead Centre on Data Quality Monitoring to improve monitoring procedures and for the presentation and distribution of monitoring results on the availability and quality of surface-based observational data.

4.4.3 The Association confirmed the principles to be applied for the inclusion of stations in the RBSN and agreed to the revisions of the RBSN as compiled by the WMO Secretariat in coordination with the Rapporteur on Regional Aspects of the GOS and circulated among RA IV Members prior to this session. By adopting [Resolution 1 \(XV-RA IV\) – Regional Basic Synoptic Network in Region IV](#), the Association approved the new list of RBSN stations in Region IV as given in the annex to this resolution.

Regional Basic Climatological Network (RBCN)

4.4.4 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 GCOS Technical Support Projects, the CBS Lead Centres for GCOS Data, 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.

4.4.5 The Association noted that the proposed list of RBCN stations was compiled by the WMO Secretariat in coordination with the Rapporteur on Regional Aspects of the GOS and circulated among RA IV Members prior to this session. By adopting [Resolution 2 \(XV-RA IV\) – Regional Basic Climatological Network in Region IV](#), the Association approved the list of RBCN stations in Region IV as specified in the annex to this resolution.

Designation of National Focal Points

4.4.6 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 Members, through their NFP, to make sure that Volume A correctly describes respective national observing stations.

Aircraft Observations

4.4.7 The Association noted the increasing role of AMDAR data in the Region, with currently two operational AMDAR programmes in Canada and the United States. It also noted interest from areas in the Caribbean, Central America, including Mexico towards implementing their own

AMDAR programmes. The Association encouraged Members to enter into negotiations with the domestic airline companies to further extend AMDAR coverage in the Region.

4.4.8 The Association welcomed that the eleventh AMDAR Panel meeting discussed further promotion of AMDAR in the Region including the development of a set of guidelines to assist NMHSs in developing their national AMDAR programmes. It supported proposal that the national AMDAR operational programmes should consider additional coverage of AMDAR data outside the national territory to be provided to the GTS as a contribution to WWW Programme. The Association requested Members to support the development and implementation of a standard suite of AMDAR software and hardware solutions that could be made available to all NMHSs.

Marine and Oceanographic Observations

4.4.9 The Association recalled and endorsed the following recommendations from the sixtieth session of the Executive Council:

- (a) Urging Members to commit resources for the implementation of the JCOMM's Observations Programme Area (OPA) strategic work plan for Building a Sustained Global Ocean Observing System;
- (b) The development, in cooperation with IOC, of an ocean Observing Programme Support Centre (OPSC) and the request to Members to commit resources through voluntary contributions to support the implementation and operations of the Centre;
- (c) Members to consider providing assistance with regard to the development of the JCOMM Catalogue on Best Practices and Standards;
- (d) JCOMM to promote cooperation between the DBCP and the International Tsunami Partnership (ITP) in support of the IOC Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS), and the IOC Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS);
- (e) Urging Members to establish a system of national ocean centres or services dedicated to implementation and maintenance of ocean observing systems and to improve cooperative support and coordination through the JCOMM.

4.4.10 The Association recalled that the concerns of ship owners and masters regarding availability of VOS ship position and identification data on public websites ç mainly for ship security reasons for VOS recruited by Members of the Association √ had been addressed quite effectively through Resolution 27 (EC-LIX) as complying masking schemes have been implemented. However, the Association noted the concerns expressed by marine climate users, through JCOMM, regarding some limitations concerning access in delayed mode of unmasked VOS reports that may impact the quality of marine climatology products made available to end-users. The Association urged its Members to work out a solution in cooperation with the maritime authorities in order for the unmasked VOS data to be eventually released after a period of time to be agreed upon.

4.4.11 The Association recommended that its Members work closely with the DBCP, the Global Drifter Programme, and Argo for providing deployment opportunities for drifting buoys and profiling floats in data sparse areas. The Association urged its Members to install barometers on all drifters they are planning to deploy in the North-West Atlantic, and North-East Pacific Ocean.

Space-based observations

4.4.12 The Association appreciated that nine geostationary satellites and seven low-Earth orbit satellites provided essential operational continuity of space-based observations, while nineteen R&D satellites also contributed to the GOS. It expressed in particular its appreciation to the United

States for ensuring operational coverage of the Region with its GOES-East, GOES-West and NOAA/POES satellites, its contribution to the METOP mission and to the ocean surface topography Jason-2 mission, in cooperation among US and European partners, and for the NASA R&D missions, including TRMM, Quikscat, Aqua and Terra which were of great support for operational activities.

4.4.13 The Association welcomed the new Vision for the GOS, adopted by CBS-XIV, fostering new satellite missions in response to global needs. It noted that the Executive Council had encouraged the proposed operation of hyperspectral infrared sounders, from low-Earth and geostationary orbits, and underscored the benefit expected from an operational constellation of radio-occultation sounders. It stressed the need to ensure continuity of altimetry and of surface wind measurements over the oceans, notably in support of tropical cyclone prediction, and encouraged the plans for a constellation of sensors for global precipitation measurements.

4.4.14 With respect to the biennial enquiry on availability and use of satellite data and products in WMO Members, the Association, along with a significant increase in the access and the use of satellite data in 2006–2007, noted a low response rate from RA IV Members. The Association reaffirmed the importance of space activities to meet evolving regional needs. Actions related to user information and training, data accessibility, product availability, and the analysis of user feedback were considered of particular relevance for the regional level. The Association agreed to nominate a Rapporteur on the Space Programme to facilitate activities in this area in collaboration with the Centres of Excellence located in Barbados and Costa Rica.

Implementation Plan for the Evolution of Surface- and Space-Based Sub Systems of the Global Observing System (EGOS-IP)

4.4.15 The Association recognized the importance of the Implementation Plan for the Evolution of Surface- and Space-Based Sub Systems of the Global Observing System (EGOS-IP) for the evolution of the GOS in the Region and requested Members to nominate National Focal Points for reporting progress and plans related to EGOS-IP and to report annually to WMO on the status of and plans for evolution of national components of the Surface- and Space-Based Sub Systems of the GOS. The information compiled in these reports would be also used to assess the effectiveness of the GOS within the Region.

GOS-related regulatory material (regional aspects)

4.4.16 The Association noted the activities undertaken on updating the regional entry to the *Manual on the Global Observing System* (WMO-No. 544), Volume II – Regional Aspects, Region IV (North America, Central America and the Caribbean), in response to evolving requirements and adopted [Resolution 3 \(XV-RA IV\) – Amendments to the Manual on the Global Observing System \(WMO-No. 544\), Volume II – Regional Aspects, Region IV \(North America, Central America and the Caribbean\)](#).

Climate

Atmosphere

GCOS Technical Support Project in the Caribbean and Central America

4.4.17 The Association noted with appreciation the activities undertaken in the GCOS Technical Support Project in the Caribbean and Central America between 2004 and 2006, which led to a significant increase in GSN and GUAN network performance in the region through station renovation, capacity building of station operators, and improved data management and dissemination. It specifically welcomed the support by the United States to these activities, which also helped improve the performance of the RBCN, and encourages their continued support.

GCOS Reference Upper-Air Network (GRUAN) GRUAN

4.4.18 The Association noted that the GCOS Reference Upper-Air Network (GRUAN) has been designed to provide high-quality observing sites for the atmospheric profile, including surface and upper-air measurements, in support of climate applications, validation of satellite products and climate research. The “Report of the GRUAN Implementation Meeting” Germany, February 2008 (GCOS-121) provides the basis for a list of 13 initial GRUAN candidate sites, including four sites located in the US and three sites in RA V, but funded through US programmes. All candidate sites have been recommended because of their significant expertise in observing the atmospheric column, their ability to share expertise and resources with other site operators, and their great potential to contribute to the development of a wider GRUAN. The Association, therefore, encouraged the US to support the inclusion of those sites in GRUAN and to provide adequate resources for its operation.

WOAP

4.4.19 The Association welcomed deliberations of the third meeting of the WCRP Observations and Assimilation Panel (Boulder, United States, 29 September–October 2008) and supported the upgrade of International Satellite Cloud Climatology Project (ISCCP) to climate data record quality and the transfer of this system from research to operations, with a continuing scientific oversight and evaluation of the ISCCP products.

CEOP

4.4.20 The Association noted the formation in 2007 of the new WCRP GEWEX Coordinated Energy and water cycle Observations Project (CEOP) with its Regional Hydroclimate Projects (RHPs). It welcomed the formation of the US NOAA Climate Prediction Program for the Americas (CPPA), which combined the former GEWEX/GAPP and CLIVAR Pan American Climate Studies (PACS) and serves as a regional CEOP RHP. The Association was pleased to acknowledge that CEOP data policy allows sharing of in situ reference site data, model output data and satellite data and that CEOP data was open to outside groups. It thanked the Earth Observing Laboratory (EOL) of the National Center for Atmospheric Research (NCAR, United States) for archiving of data from the CEOP the reference stations and expressed a hope for continuing support of this process.

Terrestrial

4.4.21 The Association agreed with the WMO/FAO framework to develop standards for terrestrial climate-related observations including the involvement of the GCOS/GTOS TOPC as a technical expert panel.

Cryosphere

4.4.22 The Association noted with appreciation the report of the IGOS Theme on Cryosphere approved by the IGOS Partnership in 2007. It agreed that the report created a framework for coordinated cryospheric observations by WMO Members, satellite agencies and research community and requested its Members to study and implement the recommendations of the Report where appropriate. It underlined the decision of Fifteenth Congress to evaluate the feasibility of a WMO Global Cryosphere Watch (GCW) as a legacy of the IPY. The Association acknowledged the establishment of the ad hoc group to study the feasibility of a WMO GCW and invited Members to contribute to its activities so that it could submit a scoping document on the development and implementation of a GCW within WMO to EC-LXI in June 2009.

Observing Systems under Global Atmosphere Watch (GAW) addressing Climate

4.4.23 In 2007, the GAW-coordinated global total ozone and balloon sonde networks were accepted as GCOS baseline networks. In order to continue to meet the UNFCCC requirements, the Association encouraged Members to support the IGACO-Ozone-UV implementation plan. It also agreed that a GAW initiative to coordinate global aerosol observations was important for

climate, air quality and weather prediction and encouraged Members to enhance aerosol measurements in the Region. The Association recognizes the growing value of the WMO Greenhouse Gas Bulletins, which are prepared and distributed with the assistance of the NOAA Earth System Research Laboratory (ESRL) and are based on the data submitted to the GAW World Data Centre on Greenhouse Gases (WDCGG) in Japan. The Association expressed its appreciation for the continuation of these measurements.

4.4.24 The Association noted that Volatile Organic Compounds (VOCs) are an important component of the IGACO strategy to study chemistry-climate interactions and tropospheric air quality through GAW. The Association encouraged Members to enhance the VOCs network and to consider adding these measurements to their programmes in a few strategic locations in the Region and to submit the data in a timely manner to the WDCGG. The Association welcomed the new GAW Station Information System (GAW SIS) Website (at: <http://gaw.empa.ch/gawsis/default.asp>) with links to the WMO GAW World Data Centres (WDCs). It reminded Members that this useful tool is only as up to date as the information supplied by the station managers and urged for regular notification of changes.

Crosscutting aspects

Climate monitoring from space

4.4.25 The Association noted with appreciation that the new vision for the space-based GOS would address climate observation needs with the high-level goal that there should be no gap in the satellite-based climate records. It encouraged space agencies to pursue their close cooperation with WMO, CEOS and CGMS who had responded very positively to the climate monitoring requirements for sustained, comprehensive satellite-based datasets and products formulated by GCOS.

4.4.26 The Association stressed the importance of ensuring data exchange and inter-calibration of satellite sensors to ensure global consistency of space-based datasets for climate applications and welcomed the progress of the Global Space-based Intercalibration System (GSICS).

GCOS Implementation Progress Report 2009

4.4.27 The Association noted the progress in implementing the global observing system for climate based on the actions identified in the 2004 GCOS Implementation Plan. It also noted that this progress report will be submitted to the UNFCCC in June 2009 and discussed by all Parties of the Convention. National reports on GCOS activities had been requested by the UNFCCC for Annex I countries for delivery by 15 September 2008 as an important source of information for the preparation of 2009 progress report, and by 1 December 2008, a total of 23 reports had been received. The Association urged all Members of RA IV to submit a report to the UNFCCC at their earliest convenience, even though the report is not mandatory for non-Annex I countries.

4.4.28 Noting that the establishment of national GCOS coordinators and committees would greatly facilitate implementing the actions identified in the Implementation Plan and also national reporting on GCOS activities, the Association strongly encouraged its Members to establish such mechanisms if they had not yet done so.

Instrument Standards and Best Practices

Continuous evaluation of Regional Instrument Centres (RICs) and Regional Radiation Centres (RRCs) to verify their capabilities and performance

4.4.29 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 operate RICs to declare their level of capability under the new ToRs and those who operate RICs and RRCs to carry out periodic evaluations, in liaison with CIMO, and to report their outcomes to the next session of the Association. The Association also requested its RICs and RRCs to organize capacity building activities in view of sharing their knowledge, in particular on the procedures to be used for the calibration of meteorological and environmental instruments, with other Members.

Instrument Intercomparisons

4.4.30 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 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.

Test-Bed Instrument Facility

4.4.31 The Association encouraged its Members to participate in the workshops organized in conjunction with the COST Action ES0702 EG-CLIMET “European Ground-Based Observations of Essential Variables for Climate and Operational Meteorology” that addresses integration of ground-based remote sensing and in-situ observations for future upper-air observing networks.

Atmospheric Chemical Composition and UV Measurements

4.4.32 The Association agreed that GAW significantly contributes to quality control/assurance and calibration of atmospheric chemistry observations globally. The Association recognized the vital support given by the United States and Canada to GAW by hosting several GAW World Central Facilities and supporting intercomparisons and calibration activities of instruments. The Association noted with concern that the funding for the UV calibration laboratory at NOAA in Boulder was threatened. Recalling that both WMO Congress and Executive Council sessions have recognized the lack of appropriate facilities for this activity globally, the Association stressed that it is essential that the existing two high quality regional UV calibration centres (recently a new facility is being hosted by Switzerland for Europe) continue their activities. It noted the discontinuation of the activities of the World Data Centre for Precipitation Chemistry (WDPCPC) due to financial difficulties and urged for a solution to be found as soon as possible. The Association encourages the ongoing work on the global assessment of precipitation chemistry that combines observations and model simulations. It noted the importance of precipitation chemistry networks in the RA IV (CAPMoN and NADP). It also recognized the lack of facilities for a halocarbon Central Calibration Laboratory (CCL) in WMO GAW and encouraged Members to offer hosting this CCL with a long-term commitment.

4.4.33 The Association encourages the development of GAW in other parts of the Region, noting the active interest by for example Cuba in pursuing an atmospheric chemistry measurement programme. It also supports combining efforts with other networks for more efficient monitoring of the atmosphere.

4.4.34 The Association was informed on the activities of the GESAMP Working Group 38 in assessing the atmospheric input of chemicals to the ocean. It expressed concern on a strong lack of coastal and open ocean measurements (wet, dry, atmospheric, and ocean water concentrations) needed to improve knowledge on the input and impact of chemicals into the oceans and therefore encouraged Members to continue measurements of precipitation chemistry.

Future development of GEOSS

4.4.35 The Association was informed on the Executive Council decisions related to the Global Earth Observation System of Systems (GEOSS) and its ten-year Implementation Plan. It advised Members to provide full support for the GEO process and resulting GEOSS within WMO’s mandate

and to make available all essential data as defined in WMO Resolution 40 (Cg-XII) through the GEO interoperable arrangements to serve the needs of the global community.

Implementation of the WIGOS concept

WIGOS Development and Implementation Plan

4.4.36 In the light of the decision of EC-LX, the Association reiterated that Members and appropriate regional bodies be involved in the implementation of the WIGOS Development and Implementation Plan (WDIP) (available at http://www.wmo.int/pages/prog/www/wigos/index_en.html) and urged Members to collaborate actively in its implementation. It confirmed the decision of the EC that WDIP be regularly reviewed and updated based on inputs from the technical commissions, regional associations and the advisory/steering bodies of WMO co-sponsored programmes contributing to WIGOS. In this regard, the Association requested its president to submit proposals for reviews and updates of WDIP reflecting regional aspects of implementation and further development of the WIGOS concept on an annual basis. The Association requested its working bodies to include tasks contributing to the appropriate sections and activities of the WDIP relevant to the Region into their work programmes.

WIGOS Concept of Operations

4.4.37 The Association noted with appreciation the development of the WIGOS Concept of Operations (CONOPS) elaborated by the EC Working Group on WIGOS and WIS that described the end state for a fully operational WIGOS; it contained goals, objectives, major characteristics, operational framework, data policy and benefits of WIGOS (available at http://www.wmo.int/pages/prog/www/wigos/index_en.html). Like WDIP, also CONOPS will be regularly reviewed and updated based on the experiences received from the test-of-concept period (2007–2011).

4.4.38 The Association agreed that implementation of the WIGOS concept should offer unprecedented opportunity to include all WMO and WMO-sponsored networks and subsystems in the integration process thus allowing WMO to more effectively respond to new challenges and evolving user requirements. The Association also agreed that integration should ensure the continued partnership and participation of the bodies responsible for these observing systems as they become part of an integrated system of systems with sustained sense of ownership.

WIGOS Pilot Projects

4.4.39 The Association reiterated that undertaking at the earliest possible stage several WIGOS Pilot Projects (PP) would be useful to address major issues in the integration process and would help in elaborating the WDIP. It welcomed activities initiated under the following five Pilot Projects identified by Fifteenth Congress.

WIGOS Pilot Project for CIMO

4.4.40 The Association noted the development of the CIMO Pilot Project on WIGOS addressing the cross-cutting and underpinning role and responsibilities of CIMO within WIGOS, which would provide the requirements for instruments and methods of observations, including tests, calibration and intercomparisons, for a sustained, optimized, end-to-end WIGOS encompassing homogeneity, interoperability, compatibility of observations from all WIGOS constituent observing systems. The Association urged Members that would be carrying out WIGOS Demonstration Projects and/or would be strongly implicated in WIGOS Pilot Projects to actively cooperate with CIMO.

WIGOS Pilot Project for JCOMM

4.4.41 The Association noted the development of the Pilot Project for the integration of marine and other appropriate oceanographic observations into WIGOS in close relationship with the

Intergovernmental Oceanographic Commission. The Association urged Members to participate actively in the Pilot Project through: (i) engaging in active cooperation with the oceanographic data centres in order to ensure the development or interoperable arrangements between their data systems and the WIS; and (ii) offering facilities for running regional marine instrument centres on a trial basis.

WIGOS Pilot Project for AMDAR

4.4.42 The Association noted that the EC Working Group on WIGOS/WIS had approved a draft Pilot Project on Integration of AMDAR into WIGOS and established an ad hoc Steering Group to finalize this Pilot Project. An initiation meeting of this Pilot Project developed six Pilot Project aims and objectives to assist the integration of AMDAR into WIGOS. In addition, the AMDAR Technical Coordinator function has been transferred from the WMO AMDAR Panel into a WMO full staff position funded through the AMDAR Trust Fund.

WIGOS Pilot Project for GAW

4.4.43 Noting that within GAW, for some data types transmission would be required in near real-time (NRT), while for others transmission with considerable time delay would be adequate, the Association recognized the importance of NRT delivery of ozone and aerosol variables and that these should be addressed as a matter of priority. Ozone and aerosol observations from the GAW network are needed for ingestion into atmospheric models, via data assimilation techniques, in support of improved forecasts of weather, surface UV and air quality. The GAW pilot project would contribute to the design of activities that enhance the transfer of GAW data in NRT through WIS. The Association considered that the benefits of WIGOS include the standardization of observing techniques, the routine collection and exchange of essential data as well as the transmission of data in a timely fashion to meet known requirements. It recognized that GAW already had in place activities and central facilities to this effect, but that these needed expansion and would benefit from improved data dissemination through WIS. The Association urged Members to support the efforts to move to NRT delivery of GAW data.

WIGOS Pilot Project for Global Hydrological Network

4.4.44 The Association noted the development of a project proposal for the Hydrological Applications and Run-Off Network (HARON) as a Hydrological Network Pilot Project for WIGOS. It supported recommendations by the thirteenth session of CHy that further steps in the implementation of this WIGOS pilot project should be undertaken. The Association urged Members to actively participate in this Pilot Project and engage in active cooperation with hydrological services and relevant data centres.

WIGOS Demonstration Projects

4.4.45 The Association noted that launching Demonstration Projects (DP) in selected NMHSs, feedback and lessons learnt from these NMHSs will be extremely beneficial in understanding others' expectations of WIGOS concept implementation. The following countries took the initiative and formally agreed to implement DPs in their NMHSs: Kenya, Morocco and Namibia (RA I), Republic of Korea (RA II), Brazil (RA III), United States of America (RA IV), Australia (RA V) and the Russian Federation (RA VI). The Association supported the involvement of regional associations and Members in the practical implementation of WIGOS concept in the operation as crucial to ensuring benefits for all Members.

4.4.46 The Association appreciated the United States agreement to launch a WIGOS Demonstration Project and its suggestion that there be a strong regional focus. Initially, the project was suggested to be "United States of America/RA IV-WIGOS Demonstration Project for an Integrated Atmosphere Observing System". The Management Group discussed the project focus and structure with other key experts from the Region and recommended to the Association that the Project be refocused to the operational exchange of RADAR information as an initial phase of an overarching WIGOS Implementation Strategy. The Association agreed that this was a good

approach, met a strong need within the Region and had significant potential to improve operational forecasting within the Region. The Association identified the WIGOS Project as a priority in the Region and encouraged the Members to actively participate and support the initiative.

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

4.5.1 WIS development and implementation strategy

WIS Implementation Plan, including support to WIGOS

4.5.1.1 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.

4.5.1.2 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 GTS for time-critical and operation-critical data, including its extension to meet operational requirements of WMO Programmes in addition to the World Weather Watch (including improved management of services);
- (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.

4.5.1.3 The Association noted the considerable progress that occurred in the development of WIS and, in particular, the major steps taken towards the implementation of the first operational Global Information System Centre (GISC) in 2009. It expressed great appreciation for the development efforts made by some RA IV Members through participation in national and/or international pilot projects. It emphasized that all these experiences should be shared among Members planning to be GISCs and/or Data Collection or Production Centres (DCPCs). It urged RA IV Members to focus special efforts and resources on further development of the following key projects:

- (a) Implementation of operational GISCs: 2009–2011;
- (b) Implementation of DCPCs, i.e., WIS interfaces at centres with agreed international responsibilities within WMO Programmes for collecting and/or generating related data and products: 2009–2011.

The Association emphasized the crucial importance of effective communication and outreach efforts to ensure NMHSs understanding of WIS and its benefits to all potential user groups and entities, and it urged the Secretariat and Members involved in the early phase of WIS implementation to invest special efforts to this effect.

4.5.1.4 The Association noted the progress made in the development of the comprehensive WIS Project Plan, including an Implementation Plan. It urged RA IV Members and technical commissions to provide early interaction and contribution at the regional level to the development and consolidation of the WIS Project Plan and WIS Implementation Plan. Noting the financial and

human resources that were further needed for ensuring the proper development of WIS, the Association invited RA IV Members and partner organizations to contribute to the WIS Trust Fund. In noting the contributions made by seconded staff, even for a limited duration, to WMO as a whole as well as to individual Members, the Association encouraged Members to provide suitable staff to the Secretariat through secondments.

4.5.1.5 The Association noted that WIGOS was 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 IV Members to contribute, in coordination with ICG-WIS, the EC Working Group on WIGOS-WIS and relevant TCs activities, to ensure that the WIS elements and components required respectively for the implementation of the WIGOS pilot projects were developed and coordinated to meet the respective projects' aims and requirements.

Regulatory and guidance documentation

4.5.1.6 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 for GISC DCPC and NCs 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.

Involvement of Regional Association IV and NMHSs

4.5.1.7 The Association stressed that the support and involvement of the Region in the WIS development was a crucial factor for ensuring a successful implementation and a shared ownership of the system. It requested its relevant regional working group to take a leading role in the regional WIS development and planning. It 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.

4.5.1.8 Noting the progress made in WIS requirements from WMO Programmes, as reviewed in the 'Report on the WIS Rolling Review of Requirements', the Association urged its relevant working groups to actively pursue their contributions to the refinement of WIS Rolling Review of Requirements to ensure that the regional programmes requirements on WIS are taken into account.

GISC and DCPC designation process

4.5.1.9 The Association fully concurred with the Executive Council in stressing the crucial importance of an early identification of GISCs and DCPCs for the planning and implementation of WIS. It recalled that Fifteenth Congress endorsed in principle WIS procedures for the designation of GISCs and DCPCs and encouraged Members to adhere to them. It noted that, upon the request from the sixtieth session of the Executive Council, the Secretariat has 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 Region IV Members (United States and Canada) have identified WMC/RTH Washington as a potential GISC and several potential DCPCs associated to RA IV Centres that 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 fully supported these 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 (2010), with a view to a formal designation by Cg-XVI in 2011.

Coordination with related international projects (GEOSS)

4.5.1.10 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 interoperability arrangements between 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.

4.5.2 Operation-critical data exchange and management

GTS implementation and plan

4.5.2.1 The Association expressed its deep appreciation to Members for their continued efforts in upgrading and improving GTS components, including point-to-point circuits, managed data-communication networks (e.g., for the Improved MTN), satellite-based telecommunication systems (the ISCS) and data-distribution systems via satellite (e.g EMWIN). It noted with satisfaction that the International Satellite Communication System (ISCS) operated by the United States was providing effective TCP/IP-based communication services for the RMTN, supplemented by the Emergency Managers Weather Information Network (EMWIN) services which were crucial for meteorological Offices in small islands. It was also pleased that RTH Washington had the firm plan to join the Improved MTN MPLS-based Network II, leading to significant improvement in capacity, flexibility and connectivity for global and inter-regional exchange, and evolving towards the WIS core communication network. The Association reaffirmed that, as emphasized by Fifteenth Congress, the sustained GTS progress through dedicated telecommunication means was essential to WIS implementation as the core communication component for exchange and delivery of operation-critical data and products. It urged Members to pursue their fruitful efforts, and emphasized the importance of CBS continuing to provide updated technical guidance and further recommended practices, and to facilitate sharing experience gained by NMHSs, to benefit early from rapidly evolving technologies.

4.5.2.2 The Association agreed that improvement of the WIS/GTS communication infrastructure, and especially the Regional Meteorological Telecommunication Network (RMTN) should be continued taking early benefit from the fast evolution of Information and Communication Technologies (ICTs), especially data-communication technology and services, through a seamless process. The Association stressed the need for coordination between Members in managing current and new technical and contractual arrangements, and it urged Members, with the assistance and support of the Secretariat, to facilitate implementation-coordination meetings. The Association emphasized the benefit from technical coordination between the WMC/RTH and its associated NMCs for the implementation, operation and improvement of data communication techniques and procedures, including sharing experience and advice between the data-communication experts of the RTH and of the NMCs.

4.5.2.3 With respect to the use of the Internet, the Association re-affirmed the importance of CBS updated technical guidance for the efficient use of the Internet with minimized operational and security risks. It emphasized that the Internet plays an increasingly important role for access to and delivery of a wide range of data and products and for complementing the GTS. With particular importance for smaller NMHSs, the Internet provides the means to use the WIS Data Discovery, Access and Retrieval service. The Association urged all NMCs to implement the required facilities for accessing the Internet, including VPN connections with other WWW centres, in particular the RTH.

IGDDS development and implementation

4.5.2.4 The Association supported 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 operational component of the WIS architecture. These services were facilitating wide access to satellite data and it expressed its appreciation for efforts made for expanding the service over the Region. The Association emphasized the importance of appropriate mechanisms to ensure that RA IV Members' requirements for space-based data and products are considered by the respective operators of IGDDS infrastructure components for possible inclusion in the dissemination programmes and requested its relevant regional working group to follow up. The Association noted that such dissemination means 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 also recalled the important role of the GTS and the complementary role of the Internet to meet the various operational and other needs and ensure overall robustness.

4.5.2.5 The Association welcomed the progress made in expanding the Regional ATOVS Retransmission Service (RARS) global network, which resulted in a significant benefit for Numerical Weather Prediction.

Support to early warning systems and operations

4.5.2.6 The Association emphasized the effective support currently provided by the GTS for the exchange and distribution of early warning and watch messages and related data, as particularly demonstrated for hurricanes. It concurred that CBS pursue the further review of GTS exchange mechanisms with a view to improving exchange of high priority data and products in support of a virtual all hazards network within the WIS-GTS, as requested by Fifteenth Congress. The Association emphasized the usefulness of operation-oriented workshops on the GTS for effective exchange of warnings and related information and strongly encouraged donors to sponsor and organize, with Secretariat assistance, such events in areas exposed to multi-natural hazards (e.g., the Caribbean).

4.5.2.7 The Association re-affirmed the effective capabilities of the WIS-GTS, including the essential operational role of NMCs of NMHSs, as a crucial WMO contribution to the effective exchange and distribution of early warning and related information. It invited donors and RA IV Members concerned to strengthen the WIS-GTS for the benefit of all user communities. It recognized that many of the national agencies involved operationally in the provision of warning services were not NMHSs, but still required access to the GTS to effectively implement their responsibilities. The Association also agreed that the detailed GTS routing plan for early warning and related information, including for the emerging Tsunami Watch Information (TWI), should be developed, regularly reviewed and made available to all centres concerned, including on the relevant WMO Web pages. It also emphasized the importance of the role of RTH Washington in regular operational tests of the distribution of early warning and related information over the GTS with their associated NMCs.

Climate-related data exchange

Monthly CLIMAT and CLIMAT TEMP reports

4.5.2.8 The Association urged Members to further increase their efforts in providing monthly surface reports from all CLIMAT stations in a timely and regular manner as stipulated by WMO regulation standards and practices, as well as their cooperation in providing historical daily data sets needed for the compilation of the World Weather Records Data Sets.

4.5.2.9 The Association noted the thirteenth session of GCOS/WCRP AOPC-XIII (Geneva, Switzerland, April 2007) conclusion that CLIMAT TEMP have very limited value for ongoing climate research purposes and was no longer required for GCOS purposes, taking into account improvements in collection, exchange and quality control of the daily TEMP messages; the Hadley GUAN Monitoring Centre (MC) had already ceased its CLIMAT TEMP monitoring activities in 2007. The sixtieth session of the Executive Council requested CCI to assess all the impacts of a possible discontinuation of CLIMAT TEMP and, if a decision on discontinuation were reached, to notify CBS for required operational arrangements and NMHSs, users and instrument manufacturers.

Water-related data exchange

4.5.2.10 The Association noted the potential benefits that can be brought to the hydrological community by WIS and was pleased to learn of the possible use of a WHYCOS project as a pilot project for integrating hydrological data through WIS. Data and information flows under the Flash Flood Guidance System (FFGS) may also be considered as part of a WIS pilot project.

Data representation and Metadata

4.5.2.11 As regards the migration to Table-Driven Code Forms (TDCF), the Association urged all RA IV Members to finalize and implement plans for the migration in accordance with the International Migration Plan approved by Congress. Members should benefit from recent guidance, encoder-decoder software, training, and pilot projects that were developed by CBS and Members and promoted by the Secretariat to facilitate the migration. The Association stressed the need to use TDCF to fully utilize new observing systems' capabilities, in particular with a view to satisfying the requirements of advanced Numerical Weather Prediction Systems. The Association fully supported CBS activities in assessing data representation systems and consolidating a comprehensive WIS data representation systems policy, addressing both data exchange among NMHSs, and from NMHSs to outside, in view of the increasing demands of the NMHSs' user community for the use of modern industry standards for data representation (e.g., XML), including aeronautical meteorology. It urged all WMO technical commissions, and CBS as the lead Commission, to participate actively.

4.5.2.12 Noting that metadata is absolutely critical for handling data by the emerging WIS centres and enabling the use and interoperability of data, the Association supported the inter-programme Metadata activities of the CBS for further development and implementation of the WMO core profile of the ISO metadata standard, and it urged RA IV Members to actively contribute to these activities.

Operational Information Services, including Monitoring

4.5.2.13 The Association supported the continuous efforts made in improving Operational Information Services, and encouraged NMHSs in Region IV to access the updated WWW operational information, including WMO Publications Nos. 9 and 47, and monitoring results on the WMO Web server for its use, review and updating. It also urged WMC/RTH Washington to join the pre-operational phase of the Integrated WWW monitoring (IWM), as developed by CBS.

4.5.3 Non real-time data exchange and management

GISC and DCPC Data Discovery, Access and Retrieval services

4.5.3.1 With respect to the Data Discovery, Access and Retrieval services, based on request/reply "pull" mechanism operated essentially through the Internet, that were the salient extension 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.

4.5.3.2 The Association noted with appreciation the several mechanisms for data exchange, access and retrieval that were already available to NMHSs in RA IV through the use of the Internet, that were implemented by RTH Washington, including HTTP and FTP Servers, and also E-mail Data Ingest System, RTH Web-based Bulletin Input and FTP Input Service. The Association agreed that the implementation of WIS functions was expected to provide a significant enhancement in the versatility of these data access and retrieval services.

Data Management Applications

Interfacing Climate Data Management System with WIS

4.5.3.3 The Association was pleased to note that WMO is promoting and facilitating the interfacing of Climate Data Management Systems with WIS. This should enable NMHSs to achieve inter-operable interface for climate 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 Climate Data Management Systems (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 climate data management and services.

Data Rescue and Digitization of Climate Records

4.5.3.4 The Association reiterated the importance of the WMO Data Rescue project (DARE) 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 both existing and future Regional Climate Centres (RCCs) to provide, where acceptable to Members, an alternative secure database system for duplication of Members' data as recommended by CCI. The Association took note with appreciation of the progress in rescuing and digitizing historical climate records in the Region.

Requirements from special programmes and projects

THORPEX Interactive Grand Global Ensemble

4.5.3.5 The Association recognized that the THORPEX Interactive Grand Global Ensemble (TIGGE) was paving the way towards the next generation operational forecast system and that the data transfers required to utilize TIGGE presented significant challenges for the development and implementation of WIS. It agreed that WIS should take into account the needs of TIGGE.

International Polar Year

4.5.3.6 The Association recognized and appreciated the scope of the effort during the International Polar Year to advance understanding and prediction of the components of the Earth System. It requested that RA IV Members continue to exchange appropriate IPY data sets and legacy measurements through the GTS and to archive observations, given that many of the special measurement campaigns were of short duration.

WIS and WIGOS

4.5.3.7 The Association emphasized that the successful introduction of WIS into RAIIV required the implementation of specific activities as an urgent priority. These would include:

- (a) Development of documentation to clarify WIS and WIGOS benefits to the NMHSs and Members in general, plans and guidance materials to assist in implementation and development activities and the organization of workshops, briefings and activities to move forward the development and implementation of WIS and WIGOS;
- (b) Accelerate the migration to table-driven code forms (TDCF) with related capacity-building support;
- (c) The development of a regional mechanism for improving metadata development and availability;
- (d) The improvement of data exchange mechanisms including development of a WIS Virtual Private Network (VPN) pilot project for RAIIV (similar to RA II and RA V);

- (e) Maintain active and effective coordination between the RA and CBS; the CBS to keep the RA and its Members aware of activities and evolution of WIS and WIGOS in particular actions or activities the RA should undertake; the RA to keep CBS aware of its needs and requirements for observation and data exchange programs and activities; both the RA and the CBS to work together to achieve results as defined by the RA Management Group.

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 the Fifteenth Congress approved the strategic goals of WMO in disaster risk reduction, derived from the Hyogo Framework for Action (HFA). The Association further noted that the Fifteenth Congress approved the Disaster Risk Reduction (DRR) Programme implementation framework, built upon five major thrusts: (i) modernization of NMHSs and observing networks; (ii) implementation of national operational multi-hazard early warning systems; (iii) strengthening of NMHSs capacity for maintaining hazard databases, analysis in support of hydrometeorological risk assessment tools; (iv) strengthening NMHSs cooperation with civil protection and disaster risk management agencies; 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 country-level fact-finding DRR survey conducted in 2006, which provided a benchmark on Members' capacities, requirements and priorities in disaster risk management, indicated that tropical cyclones (hurricanes), drought, flood, land slide and mudslide, thunderstorm and lightning, storm surge, forest or wild fire, tornados and earthquakes were the top ten hazards that concerned RA IV Members the most. The survey confirmed that over 89% of NMHSs responding to the survey in RA IV needed guidance on standard methodologies for monitoring, archiving, analysis and mapping of hazards. Nearly 94% of NMHSs require technical advice for the implementation of early warning systems with a multi-hazard approach

Strengthening NMHS' role in governance and institutional coordination in DRR

4.6.3 With reference to the WMO guidelines on "Opportunities and Contributions of NMHSs to Disaster Risk Management", the Association noted the completion and publication of this Secretariat initiative and invited NMHSs to utilize and share the guidelines with relevant national and regional stakeholders to enhance NMHSs' contributions to disaster risk management.

4.6.4 The Association noted WMO's efforts in the establishment of a partnership with the World Bank and its newly established Global Facility for Disaster Reduction and Recovery (GFDRR) and the United Nations Development Programme (UNDP) for implementation of national and regional projects for strengthening contributions of NMHSs in disaster risk management and linkage to climate change adaptation and development strategies. It urged the Members and the Secretary-General to explore opportunities for benefiting from these funding opportunities at global to national levels.

Provision of hazard information and analysis for risk assessment and planning

4.6.5 Concerning the preparation of statistical reports on hydrometeorological and climate-related hazards and their impacts for use by specialized agencies of the UN System [ref. Resolution 25 (Cg-XV)], the Association noted the results of WMO DRR survey and the request from the Members for the development of guidelines on standardization of tropical cyclones, storm surge, floods, drought and other meteorological hazard databases, metadata and mapping to support risk assessment and risk management projects. The Association noted initiatives of CHy and CAgM for development of such projects for floods and droughts respectively. Furthermore, the Association recognized the contribution of Canada to supporting a project for documentation of some of the existing methodologies for meteorological hazards. It reiterated the importance of

completion of these guidelines and development of a framework for provision of hazard information from NMHSs in RA IV to support risk assessment projects and other statistical analysis and reporting.

4.6.6 The Association recalled that disaster impact database development and probabilistic risk modelling projects were being carried out by the World Bank through the Central America Probabilistic Risk Assessment Project (CAPRA) and the UNDP Global Risk Identification Programme (GRIP). It further noted that CAPRA projects have been initiated in Costa Rica and Nicaragua with plans to expand to the entire Central America and GRIP projects in Guatemala and Nicaragua. In recognizing the importance of risk assessment for disaster risk management, the Association:

- (a) Encouraged Members to ensure that their NMHSs establish mechanisms and cooperation for the provision of hazard data and metadata, analyses, value-added information and technical expertise using the guidelines to be provided by WMO;
- (b) Requested the Secretary-General to inform the president and RA IV Members of opportunities emerging in these areas;
- (c) Requested the president to promote participation of NMHSs in risk assessment pilot projects of CAPRA and GRIP through the provision of hazard data, analysis and mapping, in which the contribution of NMHSs could be demonstrated.

4.6.7 The Association noted that some Members around the world are exploring plans for renewing their nuclear energy plans. In this connection, the NMHSs could be requested to contribute DRR-related services and hydrometeorological information for improving safety, selection of location and operations of nuclear facilities. Stressing the need for continuing collaboration with the International Atomic Energy Agency (IAEA), the Association confirmed the need to review and update as required the relevant WMO technical publications and to arrange training on disaster risk reduction in this area.

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

4.6.8 The Association acknowledged that development and sustainability of national EWS capabilities in the Region would require: (i) availability of basic core observations, data management and 24 hourly/year-round forecasting infrastructure; (ii) technical capacity development of NMHSs to deliver analysis, forecasts and warning of key hazards, under their mandate; (iii) cooperation with disaster risk management authorities (DRMA); and (iv) development of Concepts of Operations (ConOps) based on Standard Operational Procedures (SOP) linking NMHSs' services to disaster risk management agencies operationally.

4.6.9 The multi-hazard approach is being developed in Central America through building on the Central America Flash Flood Guidance System Project (FFGSP) and linking to disaster management organizations. This World Bank funded project will be applied to three countries and result in the generation of best practice guidelines that can be shared with RA IV countries.

4.6.10 The Association was advised of NASA's Caribbean Flood Project that provides high technology satellite products to national disaster management organizations. The association considers that these satellite products would enhance warnings and other services provided by NMHSs. The Association requested the president to explore ways of coordinating with NASA to include NMHSs of the Region in the project.

4.6.11 In regards to technical capacity development of the NMHSs to support EWS, the Association:

- (a) Was informed on the present status of the development of the Central American Flash Flood Guidance System (CAFFGS), which covers the seven countries, and that it is now an important component of the WMO Flood Forecasting Initiative approved by Cg-

XV. The Association urged the replication of such a system in other RA IV Member countries;

- (b) Acknowledged progress in the implementation of the WMO Flood Forecasting Initiative at global level, in particular the support of the United States that would be provided through the involvement of the National Weather Service (NWS), the Hydrologic Research Center (HRC) and US AID. The Association was informed on the participation of WMO in the Regional Training Course on Integrated Flood Management that took place in Tuxtla Gutierrez, Mexico in November 2006;
- (c) Welcomed the organization of a series of training workshops on storm surge and wave analysis and forecasting, by the joint effort of TCP and JCOMM, and requested that such training be implemented for RA IV in the near future. With reference to the JCOMM Guide to Storm Surge Forecasting, the Association urged the completion and publication of the Guide for the benefit of all Members exposed to these risks;
- (d) Noted that specifically, EWS and services related to coastal risk management including observations, telecommunications, detection, forecasting and warning systems related to tropical cyclones, storm surge, dangerous and extreme waves, sea level, tsunami and coastal flooding depend on the crosscutting cooperation of several scientific disciplines and programmes with specific attention being given to the needs and capabilities of LDCs and SIDS. The Association therefore requested the RA IV Hurricane Committee, based on technical advice of technical commissions concerned, foremost JCOMM, CHy, CAS and CBS, and in consultation with UNESCO/IOC, to set up or strengthen existing collaboration mechanisms for developing and improving the service delivery in coastal risk management;
- (e) Recalled the environmental catastrophes during the past intersessional period resulting from tropical cyclones and their associated coastal marine hazards, including the hurricane Katrina that caused major devastation and loss of lives along the Gulf coast from central Florida to Texas. The most severe damage was observed in New Orleans, Louisiana, much of it due to the storm surge, in August 2005. The Association recognized that while storm surge warnings are national responsibilities it appreciated that some tropical cyclone RSMC advisories included storm surge information. It therefore agreed that a storm surge watch scheme would help increase advisory lead-time and thus, contribute to saving lives and property, and would be an important step towards a comprehensive and integrated marine multi-hazard forecasting and warning system for improved coastal risk management. Noting that RA IV RSMC with specialization in hurricanes (Miami) has been providing storm surge information within the Region, the Association requested the RSMC-Miami and other storm surge forecast producing centres, based on the technical advice of JCOMM, to consider participation in a regional storm surge watch scheme, and to develop a proposal for consideration primarily by the RA IV Hurricane Committee and the Association;
- (f) Recognized that sea level observations are critical for enhancing storm surge forecasting and invited the Members in the Region to continue efforts to routinely collect and share such observations. The Association encouraged Members operating real time gauges that sample once per hour to upgrade these to once per minute sampling to assist in detecting potential Tsunami and storm surge events;
- (g) Recognized that storm surges are not only caused by tropical cyclones but may also be originated by extra-tropical systems and other causes. Furthermore, the severity of impacts could be amplified due to river flooding. In this regard, the Association requested its Members working with JCOMM, CAS and CHy and in close cooperation with other relevant regional UNESCO/IOC subsidiary bodies, to implement the scientific/ technical recommendations from the First JCOMM Scientific and Technical Symposium on Storm Surges (Seoul, October 2007), including coastal inundation and linkages to storm surge forecast and warning operations.

4.6.12 The Executive Council at its fifty-eighth session (2006) agreed to use several demonstration projects to, among other objectives, determine whether economies and synergies could be achieved through a multi-hazard approach to EWS. In order to keep track of these demonstration projects and to ensure the objectives are being kept in focus, the Association requested:

- (a) The Secretary-General to publish by 2010 a preliminary report on the status and results that would have been achieved by then through the demonstration projects;
- (b) The president to assist as appropriate, transboundary operational cooperation and exchange of forecasts, warnings and other information on a real-time basis through the GTS and other mechanisms be addressed in relevant Multi-Hazard Early Warning demonstration projects in RA IV;
- (c) The president to assess the emerging results and conclusions as regards their viability for other RA IV Members and to make recommendations to the Association for further development of this area through national and regional cooperation projects in the Region;
- (d) The president to explore options for developing, in collaboration with JCOMM, a storm surge watch demonstration project for the Region.

4.6.13 The Association recalled Fifteenth Congress and EC-LVIII requests for development of EWS demonstration projects for development of sustainable operational partnerships with disaster risk management agencies and authorities from national to local levels. In this regard, the Association noted the outcomes of the WMO First International Expert Symposium on Multi-Hazard Early Warning (May 2006) and appreciated the initiatives undertaken by Cuba, France, Bangladesh and China/Shanghai with the WMO Secretariat for the documentation of these good practices in EWS with focus on the role of NMHSs. It was also informed of the 2nd Expert Symposium on Multi-Hazard Early Warning Systems to be hosted by Météo-France in 2009 that would develop the first WMO guidelines on "The Role of NMHSs in Multi-Hazard Early Warning Systems with focus on Institutional Coordination and Cooperation". In this regard, the Association:

- (a) Urged its Members to utilize these guidelines with their disaster risk management partners towards strengthening of their cooperation in EWS;
- (b) Requested that these guidelines be used actively in the training programmes of WMO and for the initiation of EWS projects in the Region.

4.6.14 The Association was informed of a new initiative for development of a multi-hazard EWS project in Central America for meteorological, hydrological and climate-related hazards. This project addresses the role of the NMHSs in governance and institutional issues as well as EWS' ConOps on the basis of SOP for collaboration of the NMHSs with disaster risk management agencies and other key partners. The Association requested the Secretary-General to keep the president of RA IV informed of the progress and facilitate the documentation of the outcomes and lessons learned for development of a strategy for expansion to other countries in the Region.

4.6.15 The Association noted that the RA IV Hurricane Committee had served as a very important platform for strengthening linkages with relevant regional and national agencies involved in the area of DRR. In view of the significance of the Central America Multi-hazard Early Warning Systems Project to strengthen the operational EWS in this region, the Association requested the Hurricane Committee monitor, and as appropriate provide guidance to this project.

4.6.16 The Association recognized strengthened collaboration between WMO and UNESCO-IOC following the 2004 Indian Ocean Tsunami, for the development of tsunami warning systems. It acknowledged that WMO initiatives in Multi-Hazard Early Warning Systems demonstration projects, for strengthening the operational cooperation of NMHSs with disaster risk management agencies, would be instrumental in strengthening tsunami early warning system capacities in

countries in RA IV, where NMHSs were formally designated as the national tsunami warning focal point.

4.6.17 In light of commonality between assessment of the hazards associated with storm surge and tsunami, the Association requests that wherever possible and appropriate, Members make bathymetric and oceanographic data available for the reduction of disaster risk associated with coastal hazards.

4.6.18 The Association refers the Members to the draft Final Report of the 31st session of the Hurricane Committee, regarding the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG). The ICG thanked the Hurricane Committee for its support and collaboration, and hopes that the two groups may maintain a good working relationship, in the interests of the protection of life and property in our region. The next ICG/CARIBE EWS meeting will be 2–4 June 2009 to which the ICG urges the WMO Members to send representatives.

Catastrophe insurance and weather risk management within financial risk transfer markets

4.6.19 The risks of economic damage associated with hydrometeorological and climate-related hazards can be hedged through catastrophe insurance services and financial risk transfer 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” involving NMHSs with experience in this area, the World Bank, the World Food Programme, the reinsurance sector and Weather Risk Management Association (WRMA), 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 requested:

- (a) The Secretary-General to continue with collaboration and development of an action plan with relevant partners to assist NMHSs with serving markets;
- (b) The Secretary-General to facilitating relevant fora and mechanisms for NMHSs to share their experiences and transfer their knowledge, as well as to ensure the timely development of useful guidance for the NMHSs on identification of requirements and how best to meet them for these markets;
- (c) NMHSs to monitor these developments and related emerging requirements in their countries and provide relevant information to the Secretariat, as appropriate, to assist in determining further activities of WMO in this field.

4.6.20 The Association noted the work of the Caribbean Institute for Meteorology and Hydrology (CIMH) in working with the Caribbean Catastrophe Risk Insurance Facility to develop risk transfer mechanisms for communities potentially facing adverse flooding. It was informed that CIMH was working closely with the emergency management community and carrying out disaster management training.

International, Regional and National Cooperation and Partnership in DRR

4.6.21 The Association reaffirmed the importance and the benefits WMO has gleaned from its institutional collaboration and partnerships with the ISDR System, the UNDP, IASC, the World Bank’s GFDRR and other development and humanitarian programmes and agencies, which have been manifested through coordinated regional and national projects, leveraging activities of WMO and external partners, such as the “Central America Pilot Project on Early Warning Systems for Hydrometeorological Hazards” and the Project for “Climate Observations and Regional Modelling

in Support of Climate Risk Management and Sustainable Development” in Africa. The Association agreed that the participation in, contributions to, and joint planning with newly emerging partner projects at the regional level, should be continued through coordinated provision of technical advice and services, including from RSMCs and NMHSs, and efforts should be enforced towards roll-out of such projects in other regions.

4.6.22 The Association noted the request of international humanitarian agencies such as OCHA and WFP for the need to establish operational linkages between NMHSs, RSMCs and Regional Networks of these agencies to provide analysis, bulletins and forecasts to these agencies for improving their contingency planning and humanitarian response in case of disasters. The Association expressed its interest in establishment of such partnerships and in this regard:

- (a) Requested the Secretary-General to inform the president of such opportunities;
- (b) Requested the president to facilitate implementation of such projects engaging key partners in the Region and leveraging projects and other related activities.

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

User focus

Public Weather Services (PWS)

4.7.1 The Association noted that the Public Weather Service is the “public face” of the NMHS and that if the community is to support the NMHS then the NMHS must make clear the socio-economic benefits that flow from its operations. It further stressed that middle and senior managers of NMHSs should receive training to assist them in identifying and communicating the socio-economic benefits that their services deliver.

4.7.2 The Association observed that NMHSs should work to enhance interactions with users through user requirement assessments and the creation of feedback mechanisms to gauge user satisfaction with their products and services thus enabling them to better focus on their needs.

4.7.3 The Association considered the outcome of the PWS Survey on Severe Weather Warning Services, which was carried out by the PWS Expert Teams in 2006. The Survey had indicated that the main obstacles in the provision of alerts and warnings for all hazards were insufficient accuracy of forecasts and insufficient understanding of warnings by the public. The Association requested the WMO Secretariat to pay particular attention to assisting NMHSs in the Region to improve in these areas.

4.7.4 With regard to hazards that have been faced by the Region, the Association noted it is often the case that flood warnings are issued by different national authorities to those issuing the weather warnings, and that there is a need for greater integration of these different warnings. This need was seen as being most acute when the weather warnings are for hurricanes.

Agricultural Meteorology (AGM)

4.7.5 The Association observed that climate change and extreme climatic events increase agricultural production risks and uncertainty, thus impacting the performance of agricultural systems and management. It therefore welcomed the strategies proposed at the International Workshop on Agrometeorological Risk Management: Challenges and Opportunities (New Delhi, 2006), and encouraged Members to use a combination of locally adapted traditional farming technologies, seasonal weather forecasts and warning methods for improving yields and incomes, as a means of meeting end-user needs.

4.7.6 The Association encouraged its Members to use the outcomes of the Workshop on Management of Natural and Environmental Resources for Sustainable Agricultural Development

(Portland, United States, 2006). The outcomes of the workshop included recommendations on assessment and reporting on the appropriate agrometeorological criteria to conserve and manage natural and environmental resources for the benefit of agriculture, rangelands, forestry and fisheries; to document case studies of successful measures on land use management and to establish practical agrometeorological guidelines for the conservation of natural and environmental resources in harmony with agricultural production systems.

4.7.7 The Association noted the outcomes of the Symposium on Climate Change and Biodiversity in the Americas (Panama City, Panama, 25 to 29 February 2008) whose focus was to address regional themes on climate change and biodiversity as well as approaches, techniques and integrated studies. It urged its Members to collaborate with users especially managers of climate and forest biodiversity monitoring networks, share local strategies, learn latest advances in adaptation and thus gain an understanding of threats and impacts to biodiversity, so as to better respond to user needs.

Marine Meteorology and Oceanography (MMO)

4.7.8 The Association stressed the need for user-focused marine meteorological and oceanographic products and services and urged RA IV Members to enhance collaboration with marine users at national and regional levels by collecting and assessing marine users' requirements. This would allow the expansion and improvement of the service delivery functions of NMHSs to meet user requirements, including those for increased safety and efficiency of marine operations and better protection of the marine environment.

Improved products and services

PWS

4.7.9 The Association welcomed the PWS strategy for improvement of products and services as proposed by the PWS Implementation and Coordination Team which emphasized capacity building, public outreach activities; improving the reach of NMHS products and services, and promoting the application of the science meteorology and related technologies to improve products and services. It urged RA IV Members to apply these strategies in the implementation of their PWS plans.

4.7.10 The Association agreed that there were emerging information technology systems used to deliver PWS products. It pointed out that mobile communication devices effectively aid delivery of PWS products. Similarly, next-generation forecast workstations enable easy retrieval of observations, nowcast and prognostic information from databases, and assist in PWS product preparation and delivery through multiple communication pathways. It urged its Members to apply such emerging technology in order to continuously improve on products and services.

4.7.11 The Association noted the increased application of probabilistic forecasts and stressed the need to develop probabilistic forecast skills. It emphasized the need for effective communication of uncertainty of the forecast to users in order to allow them make better decisions. In this regard, it urged RA IV Members to make maximum use of the recently published WMO *Guidelines on Communicating Forecast Uncertainty* (WMO/TD-No. 1422).

4.7.12 The Association agreed that verification results are a powerful tool for assessing performance and encouraged its Members to use them to improve PWS products and services.

4.7.13 The Association expressed the need to improve nowcasting services and products and welcomed steps taken by WMO in this regard, including the formation of the PWSP/WWRP JOint Nowcasting Applications & Services (JONAS) Steering Committee, and the establishment of the PWS Nowcasting Applications Framework whose overall mission is to increase the capacity of NMHSs to deliver reliable nowcasts to enable informed decision-making in mitigating the effects of high-impact weather. It encouraged RA IV Members to participate and take advantage of these WMO initiatives in order to enhance their nowcasting capabilities.

4.7.14 The Association requested that results of the Shanghai Multi-Hazard Early Warning Services (MHEWS) project, which is designed to demonstrate how nowcasting applications can enhance short-range forecasts of high-impact weather, using the opportunity afforded by the Shanghai World EXPO 2010, be availed to its Members so that they can benefit from the experience.

4.7.15 The Association requested that results and lessons learned in improved service delivery to users from the Severe Weather Forecasting Demonstration Project (SWFDP) be available to Members in RA IV with a view to initiating a similar project as required by Members. The PWS component of the project had resulted in improved coordination with the media, public education and outreach activities, public understanding of the products and their application, and coordination between the NMHSs and disaster management authorities.

Atmospheric Research and Environment (ARE)

4.7.16 The Association recommended that its Members develop Air Quality Forecasting (AQF) and dissemination skills as part of expanding and improving their products to decision-makers and the general public. It requested the Secretary-General to continue the GAW Urban Research Meteorology and Environment (GURME) project and to assist Members in developing capability in air quality forecasting and delivering related services to users.

AGM

4.7.17 The Association urged its Members to make maximum use of the quality deliverables including special issues of four scientific journals and two books, which were authored by Commission members following the fourteenth session of the Commission for Agricultural Meteorology (New Delhi, 2006).

4.7.18 The Association encouraged climate experts to collaborate with local, national and international food providers, to develop sustainable food production strategies. It further urged its Members to use outcomes of the Workshop on Climate Change Impacts and Adaptation to Agriculture, Forestry and Fisheries at The National and Regional Levels (Orlando, United States, 2008) which was organized to discuss how the integration of climate information can improve land-resource management and secure food supply.

4.7.19 The Association observed that efforts to develop fire danger rating systems have been driven by a concern about large fires, especially in the context of managing agricultural and forest ecosystems within a changing climate. The International Workshop on Advances in Operational Weather Systems for Fire Danger Rating, and the Commission for Agricultural Meteorology Expert Team on Agrometeorological Aspects of Sustainable Agricultural Development (Edmonton, Canada, 2008) developed several useful recommendations. In this regard, the Association urged its Members to make maximum use of the WMO Operational Guidelines for Fire Weather Agrometeorology and Proceedings of the Workshop.

Service delivery

PWS

4.7.20 The Association observed that several of its Members had attended the "International Symposium on Public Weather Services: A Key to Service Delivery" (Geneva, 2007). It urged its Members to implement the recommendations resulting from the event and to use its outcomes which were intended to guide future evolution of their public weather services, especially in the implementation of the Madrid Action Plan (http://www.wmo.int/pages/prog/amp/pwsp/PWS_Symposium_en.htm).

4.7.21 The Association welcomed the new approach initiated by the PWSP to implement projects within the framework of 'Learning through Doing' concept. The initiative involves building

capacity of NMHSs using a coordinated training and mentoring programme. It is implemented with the aim of developing new and/or improved range of products and services to benefit targeted social and economic sectors identified by the countries themselves. The Association noted that the approach was endorsed by the sixtieth session of the Executive Council (June 2008), and that projects are already underway in other Regions. It requested the Secretary-General to initiate projects based on the concept in RA IV according to their individual requirements.

4.7.22 The Association commended the WMO Website 'World Weather Information Service (WWIS)' (<http://worldweather.wmo.int/>), for winning the Stockholm Challenge Award - Environmental Category in 2008. The Website which is in Arabic, Chinese, English, French, Portuguese and Spanish languages, is coordinated by Hong Kong, China. The Association agreed that this Website provided a useful source of official weather forecasts from NMHSs and urged its Members to promote the use of the information on the Website, as well as increase their contribution of information to the Website.

MMO

4.7.23 The Association recalled the coordinated initiative by WMO, the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO) to expand the Global Maritime Distress and Safety System (GMDSS) and the World-Wide Navigational Warning Service (WWNWS) into the Arctic waters. In this context, the Association noted that the sixtieth session of the Executive Council (June 2008) had approved the establishment of five new METAREAs for the Arctic region with the same boundary limits as the corresponding NAVAREAs. The Association further noted the commitment by the Environment Canada to serve as METAREA Issuing Service for METAREA XVII and XVIII, and the potential interest of NOAA to act as Preparation Service for portions of the proposed Arctic METAREA XVII and possibly METAREA XVIII. It requested the Environment Canada, in collaboration with NOAA, to report on the progress of the implementation of Maritime Safety Information Services to the next RA IV session.

4.7.24 The Association noted with appreciation the expansion of the GMDSS-Weather Website to include navigational warnings in the various NAVAREAs (<http://weather.gmdss.org/navareas.html>), and the establishment of the Sea Ice Services Website (<http://ipy-ice-portal.com/>) for the global sea ice operational information, as an initiative for IPY. The Association thanked all the contributors from the Region and encouraged Members to make optimum use of these tools. It requested the Secretary-General to promote resource mobilization to ensure continued operation and development of these portals.

4.7.25 Noting the continuing importance to mariners at sea of receiving graphical products, the gradual demise of HF radiofax as a means of disseminating those products, including for the Arctic region, and the request by the Executive Council to JCOMM to continue researching methods for transmitting graphical products to marine users, the Association noted with appreciation the successful development of standards for ice information in Electronic Navigation Chart Systems by RA IV Members, especially the Canadian Ice Service (Environment Canada), under the general direction of JCOMM. The Association encouraged its Members to make use of these essential tools in order to enable NMHSs to develop products specifically for Electronic Navigation Chart Systems. The Association stressed the need to develop similar standards for other met-ocean variables and requested the WMO Secretariat to address this issue as a matter of priority. It urged Members of RA IV to consider participating in the development of standards for other met-ocean variables), under the general guidance of JCOMM.

Aeronautical Meteorology (AEM)

4.7.26 The Association encouraged Members to develop and improve the working relationships with all relevant partners and user groups, and to cooperate closely in the development of future service provision. The Association noted the availability of a new Draft WMO *Guide on Aeronautical Meteorological Services Consultation and User Focus*, prepared under the leadership of the CAeM Expert Team on Customer Relations now available on the CAeM training Website (<http://www.caem.wmo.int/moodle/>).

AGM

4.7.27 The Association noted that the World AgroMeteorological Information Service (WAMIS-www.wamis.org) has products from over 40 countries and provides tools and resources to help countries improve their AgroMeteorological bulletins and services. It urged Members to disseminate their products to the global community through these bulletins in both real-time and from a historical perspective. The Association appreciated the support of NOAA and the US Department of Agriculture to the WAMIS project.

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

PWS

4.7.28 The Association welcomed the setting up by the Secretary-General of a 'Task Force on Social and Economic Applications of Meteorology and Hydrology' (subsequently renamed as "WMO Forum: Social and Economic Applications and Benefits of Weather, Climate, and Water Services"). The purpose of the Forum is to improve interactions between providers and users of weather, climate and water services, and to contribute to the implementation of the Madrid Action Plan, which was a product of the Madrid Conference (Madrid, 2007). The Forum membership covers a wide spectrum including NMHSs, government departments, NGOs, the World Bank, academia and the media. The United States and Canada participate in the work of the Forum. The Association encouraged its Members to participate in the Forum as a mechanism to address socio-economic applications of their services.

4.7.29 The Association recognized that with respect to assessing, quantifying and demonstrating benefits of weather, climate and water services to user sectors such as health, energy, tourism, transport and urban environment, many NMHSs would require assistance and guidance. In this regard, it recommended that its Members make optimum use of the decision-support tools provided at: <http://www.wmo.int/pages/prog/amp/pwsp/socioeconomictools.htm>. The Association further requested that training workshops on the assessment of socio-economic benefits of meteorological and hydrological services which had been organized in other Regions also be organized in RA IV.

Quality management

AEM

4.7.30 The Association requested both developing and developed Members in RA IV to make best use of the Pilot Project for the Implementation of a Quality Management System, recently started in the United Republic of Tanzania, where templates and relevant software for the formulation and documentation of processes would be made available at no cost, in their own implementation of this ICAO required system. Further information on the subject of ISO compliant Quality Management Systems is given under agenda item 6.

Human resource capacity building in service delivery

PWS

4.7.31 The Association recognized that NMHSs need to strengthen their abilities in communicating information and knowledge to user communities including government officials and decision-makers. It requested the Secretary-General to provide opportunities to managers of NMHSs to benefit from training in effective communication with government officials, politicians and decision-makers in different user communities; educate NMHS staff on better communication skills with end-users; and educate users on understanding products, services and information provided by NMHSs and their application to decision-making. The Association expressed satisfaction with the annual PWS workshop held in Miami, Florida and thanked the United States for hosting them.

AEM

4.7.32 The Association noted with concern the need to organize and support training and capacity building events for the Region given the continued decrease in staff members due to staff retirement and lack of training institutions providing academic training in aeronautical meteorology in both languages of the Region. It strongly encouraged all the Members to follow examples of some Members who organize such training events. The initiative by the CAeM Expert Team on Education and Training to build a web-based training library both in English and Spanish with the support of the UCAR COMET/MetEd programme was warmly welcomed, but the Association requested Members to consider providing translation resources to this end.

4.7.33 The issue of the required qualifications for aeronautical meteorologists as defined by WMO No. 258 Supp. 1 is dealt with in detail in agenda item 6.

4.8 BROADER USE OF WEATHER, CLIMATE AND WATER 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 reviewed the cooperation between WMO and the various economic and technical organizations in RA IV for the development and implementation of programmes and projects related to meteorology and hydrology.

4.8.2 The Association expressed its satisfaction for the World Bank project “Central American Probabilistic Risk Assessment (CAPRA)”, in cooperation with WMO and with the participation of the regional intergovernmental organizations CEPREDENAC and CATHALAC. The meeting took note of the cooperation of WMO with ECLAC in the area of water resources and natural disasters and on the outstanding cooperation with UNESCO in RA IV in the field of hydrology and water resources.

4.8.3 The representative of UNESCO informed the meeting that UNESCO is extremely satisfied with the cooperation between WMO and UNESCO’s International Hydrological Programme (IHP) in the field of water, and in particular with the activities of and results obtained by the RA IV Working Group on Hydrology. He also reported on:

- The IHP activities in the region that are being coordinated with WMO;
- The participation of UNESCO in the sessions of the Association and in the sessions of its Working Group of Hydrology has facilitated considerably the IHP activities in the region;
- The FRIEND project, which includes the administration of hydrological databases and hydrological monitoring;
- The International Flood Initiative, in which UNESCO is following the concept developed by WMO;
- The joint UNESCO/WMO workshops on the application of the publication prepared by the two organizations *Water Resources Assessment – Handbook for review of national capabilities*;
- The two workshops that were held in Bogota in 2006 for Spanish-speaking countries and in Havana in 2007 for English-speaking countries, allowing all Members of RA IV to have trained experts on the application of the Handbook.

Finally, he expressed that UNESCO is looking forward to continue cooperating with WMO in the field of water.

4.8.4 The meeting was informed that the cooperation with regional entities included activities with ACS, CARICOM, SICA, CRRH, IO-Caribe, CMO and CEPREDENAC. The Association invited the WMO Secretariat to continue to collaborate with these intergovernmental and other bodies

4.8.5 The pilot project on Automated Weather Service Production System for the Caribbean Area in Jamaica and Trinidad and Tobago, which was implemented in coordination with the Association of Caribbean States, the Government of Finland, the Caribbean Meteorological Organization and WMO, was completed in 2006. The Association felt the project was a good example of cooperative activities that contribute to the sustainability, visibility and development of the Meteorological Services and the establishment of partnerships with end-users.

4.8.6 The Association also highlighted the cooperation between WMO, the IDB and the CRRH in the organization of the Regional Climate Forum and their work on developing a Central American Regional Data Base in the NMHSs.

4.8.7 The Association further noted with satisfaction that the Office for North America, Central America and the Caribbean had participated in the various regional activities including the RA IV Hurricane Committee meetings, the Caribbean Meteorological Organization meetings, sessions of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions and Conference of Directors of Ibero-american NMHSs. The Association encouraged the Office to continue and strengthen its participation in such regional forum and requested the Secretary-General and Members to provide support for the Office to ensure expanding strategic partnerships to other potential partners in the Region. The Association further encouraged Members in the Region to actively participate in the activities of regional organizations related to weather, climate, water and natural disaster risk reduction.

Communication and Public Affairs

4.8.8 The Association was pleased with the numerous activities and products implemented under the WMO Global Communication Strategy with the objective 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 plays to their unique strengths and raises the Organization's visibility as a key player in international cooperation and in contributing to sustainable development of Members.

4.8.9 The Association felt the redesigned WMO 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, with reference to WMO and linked to the WMO Website and highlight major WMO events with appropriate linkage.

4.8.10 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.

4.8.11 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.

4.8.12 The Association noted that WMO would participate in the World Exposition 2010 “Better City, Better Life” (Shanghai, China, May–October 2010). The WMO Pavilion “Meteoland” 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 contribute extrabudgetary resources, in-kind support and public information materials for the WMO Pavilion.

4.8.13 The Association noted with satisfaction the efforts of the Office for North America, Central America and the Caribbean 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 Office to further strengthen its links with the Members of the Association.

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 felt the restructuring of the WMO Secretariat that resulted in the establishment of the Development and Regional Activities Department (DRA) served to bring together key WMO Secretariat Offices responsible for working with Members at a regional level on NMHS development issues. The Association requested the Secretariat to continue to improve coordination between these Offices and their associated programmes as well as strengthening engagement with key partners and donors aimed at improving the capabilities of NMHSs in developing countries in the Region.

Strategic partnerships and development cooperation activities

4.9.2 The Association appreciated the strong partnerships between the WMO Education and Training Programme and the two Regional Training Centres (University of Costa Rica and Caribbean Institute of Meteorology and Hydrology) as well as the support from many Members in providing education and training opportunities for other Members within the Region. The Association commended the expert input into the ETR Programme through the EC Panel on Education and Training and the various Task Teams created by the Panel. Considering that the two RTCs had been reviewed in the last twelve months, the Association strongly recommended that EC reconfirm them as RTCs at its next session. The Association welcomed notification from the United States of America of the continuation of the US International Desk fellowship opportunities and the closer cooperation between the US and WMO in implementing these fellowships.

4.9.3 The Association agreed that the partnership established between WMO and the Spanish Agency for Meteorology (AEMET) in support to the development of Iberoamerican NMHSs in the Region had achieved significant results, noting in particular the organization of workshops on operation and maintenance of AWS; installation and training on the use of EUMETCast Reception Stations in the NMHSs of Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama; the regional workshop for NMHSs and the media organized in Santo Domingo, Dominican Republic in 2008; the training course on climate change - regional scenarios in Colombia in 2008; the pilot projects on socio-economic benefits of hydrometeorological information and services in Panama and Mexico, and the significant development projects for the NMHSs of Guatemala, El Salvador, Honduras, Costa Rica, Nicaragua, Dominican Republic, Haiti and Panama.

Enhancing Resource Mobilization for development support to the Region

4.9.4 The Association welcomed WMO’s continued efforts to assist the NMHSs, and in particular the steps taken by the Secretary-General regarding the establishment of the Resource Mobilization Office (RMO), with the main focus to support the National Meteorological and Hydrological Services to enhance the level of in-country and external support, and funding to activities aimed at development of NMHSs to reach the levels of services needed to support the

protection of life, property and food security, with particular emphasis on the developing countries, Least Developed Countries (LDCs) and Small Island Developing States (SIDS).

4.9.5 The Association appreciated the progress made with the Inter-American Development Bank (IDB) in the areas of climate change and natural disasters, leading to the development of a cooperation programme with concrete activities in support to common Members in the Americas Region, and also the discussions underway with Finland for Capacity Building support to NMHSs of the Great Caribbean in partnership with the Association of Caribbean States.

Human resource capacity and operational facilities development activities

4.9.6 The Association noted with appreciation the range and number of training activities held since the last session and requested Members to provide the Education and Training Programme with updated information on the training events and opportunities by 1 September each year so they could be included in the WMO training plans and schedule for the following year. The Association thanked the Regional Rapporteur on Education and Training for her strong support and interest in representing the Members education and training needs within the WMO Education and Training Programme and the various regional forums.

4.9.7 Noting the ongoing need for fellowship opportunities in the development of staff and sustainability of many NMHSs, the Association requested Members to advise the Secretary-General of further opportunities to increase the number of WMO Fellowships or training opportunities offered to RA IV Members through either increased VCP contributions or in-kind contributions.

4.9.8 The Association noted the low response from RA IV to the 2006 Education and Training Programme Survey on "Members Training Requirements, Opportunities and Capabilities in Meteorology and Hydrology". With only six Members from RA IV completing the survey it was not possible to provide any reliable insight into overall Regional training needs or priorities, apart from noting the minimum qualifications of the aviation forecasting staff for five of the six respondents did not meet the current criteria outlined in WMO Publication 258 4th ed. The Association requested Members to complete the 2010 WMO Education and Training to enable a more complete identification of Member training needs and capabilities to be identified for planning, implementation and reporting purposes.

4.9.9 The Association gave its full support to the priorities related to the WMO scientific and technical programmes which focus on specific needs and requirements of the Region and new priority areas such as natural disasters prevention and mitigation, climate change and related environmental issues. The Association expressed its concern on the problem of human resources in the NMHSs which remains in spite of the efforts made; on the need for maintenance and further development of the existing basic observing networks, meteorological telecommunications and data-processing facilities in the Region; and for developing climate change scenarios in a regional context and on a short timescale by NMHSs, in order to enable Members to provide relevant advice to their government policy-makers.

4.9.10 Noting the January 2008 meeting in Belize jointly organized by the Global Climate Observing System Secretariat (GCOS) and the Caribbean Community Climate Change Center (CCCCC) to consider how to implement the priority projects contained in the GCOS Regional Action Plan for Central American and the Caribbean (CAC), the Association expressed its appreciation to the two organizers in bringing together representatives of regional climate organizations, funding agencies, and countries with a commitment to improved climate observations in the CAC region and Mexico with the aim of securing resources for implementing the proposals contained in the Action Plan. The Association recommended implementation of the project proposals contained in the report of the meeting and also of actions designed to provide stronger leadership, enhanced coordination, and increased momentum for GCOS implementation in the Region. These actions include establishment of a regional coordination committee, development of terms of reference for a regional GCOS coordinator, appointment of such a coordinator if a source of funding can be identified, and the holding of an annual implementation

coordination meeting. The Association appreciated the offer of the CCCCC to provide assistance in facilitating implementation of these actions and requested that actions be initiated as appropriate. As a follow-up to the Belize meeting and in response to a request by the Caribbean Meteorological Organization (CMO), a GCOS expert undertook a technical assessment of the surface and upper-air stations and metadata availability in several English-speaking Caribbean countries in order to determine those suitable for possible inclusion in the GCOS networks.

Specific Capacity Building projects for developing countries, particularly LDCs and SIDS

4.9.11 The Association was pleased with WMO support to NMHSs during the period from 2005 to 2008, assisting them in emergency situations as well as in the development of projects and NMHS development plans for the improvement of hydrometeorological observing networks and telecommunications and for the delivery of better services and information to the community.

4.9.12 The Association reaffirmed the important role of the Voluntary Cooperation Programme in the Region noting that six Member countries in RA IV received assistance from the WMO Voluntary Cooperation Programme aimed at facilitating their effective participation in the World Weather Watch and other scientific and technical programmes of WMO.

4.9.13 The Association acknowledged the efforts made to assist the development of the NMHSs of the Region making use of the various ongoing programmes and projects, in particular assistance to Haiti as the only LDC in the Region. The Association noted that WMO, through the VCP Programme, is assisting Haiti in the short term with two AWS, training on weather forecasting, computer equipment and telecommunications improvement and requested that the Region support the project proposal for Haiti and the Dominican Republic for the development of an Early Warning System and welcomed the interest of AECID (Spain) to facilitate its implementation.

4.9.14 The Association appreciated the response of the Secretary-General to the floods that impacted Haiti and the Dominican Republic in 2008, noting that a joint WMO/AEMET mission was organized to the Dominican Republic and Haiti (31 March–4 April 2008) to discuss with national authorities and funding agencies (AECID, IDB and UNDP) and that an Early Warning System Project Proposal, prepared under the framework of the Iberoamerican Programme of Cooperation is in the negotiation process with funding agencies and national institutions. At the request of several Members, a side meeting was held during the RA IV session to further discuss opportunities for assistance to Haiti.

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

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

5.1.1 Internal matters of WMO

5.1.1.1 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 ongoing reorganization of the WMO Secretariat.

5.1.1.2 In his presentation, the Secretary-General informed the Association that the WMO Secretariat structure and organizational changes took place on 1 January 2008, with the goals to: align Secretariat structure to WMO strategic direction; improve integration of plans and programmes; optimize use of resources; and streamline management and decision-making; increase flexibility through clustering; promote synergies and crosscutting coordination; and minimize the need for micro entities.

5.1.1.3 The Secretary-General, in referring to the WMO Strategic Plan (2008–2011) with three Top-level Long-term Objectives, five Strategic Thrusts and 11 Expected Results, emphasized the need to work closely with Regional Associations and Technical Commissions.

5.1.1.4 In that connection, the Association was informed by the Director of the new 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). In addition to the six regional offices, the DRA Department manages the Technical Cooperation Programme including resource mobilization, the WMO Voluntary Cooperation Programme (VCP); the WMO Programme for the Least Developed Countries (LDCs); the Regional Programme; and the Education and Training Programme.

5.1.1.5 The Association was pleased to note that the emphasis the restructured DRA provides for capacity building and appreciated renewed efforts to organize the Secretariat in line with the approved WMO Strategic Plan.

5.1.1.6 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 Offices in the Region. In this regard, in view of the expected increased workload and the current human resources of the Regional Office for North America, Central America and the Caribbean, the Association requested the Secretary-General and potential donor Members to consider providing additional funding and human resources for Regional Office activities.

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

5.1.2 Report of the Management Group of RA IV

5.1.2.1 The Association acknowledged with appreciation the work of the RA IV Management Group. The Association complimented Mr C. Fuller, former president and chairperson of the RA IV Management Group, Mrs Luz Graciela de Calzadilla, current acting president and chairperson of the RA IV Management Group, and members of the Group for the activities carried out according to its terms of reference, in particular for the follow-up actions on the implementation of the Strategic Plan for the Enhancement of NMSs in North America, Central America and the Caribbean (2005–2008), the work of RA IV working groups and rapporteurs, as well as the implementation of the WMO Programmes and activities in the Region. The Management Group made a number of recommendations concerning assistance to the NMHSs of developing countries in the implementation of high-priority projects and arrangement of training events. The Management Group also provided guidance for updating and revising the current RA IV Strategic Plan for the enhancement of NMHSs, as well as for the organization of the fifteenth session of RA IV in an efficient and cost-effective manner.

5.1.2.2 The Association, in recognizing the importance of coordinating its activities, agreed to re-establish the Management Group of Regional Association IV with a strengthened mandate and with greater flexibility to address intersession issues. The RA IV Management Group was expected to deal with capacity building and partnership as well as strategic planning issues and to consider the optimal use of resources that might be allocated or could be made available in connection with the activities of the subsidiary bodies of RA IV. The Association agreed that the active use of the Management Group by the RA IV president during the intersessional period was a key aspect of being able to meet these challenges. It was also agreed that rather than establish a number of standing working groups, the Management Group should be requested to use the guidance provided by the RA IV session to identify a number, of activities that could be carried out over the next four years by regional task teams with emphasis on addressing the most urgent issues facing the region.

5.1.3 Review of the Subsidiary Bodies of the Association

5.1.3.1 The Association noted with appreciation the information provided by the president on the activities of the RA IV subsidiary bodies during the intersessional period. It expressed its satisfaction for the working groups' activities, but noted with concern that some had not been able to perform satisfactorily for various reasons. The Association encouraged Members to assist in ensuring that the designated members of the Hurricane Committee, task teams or other bodies established during the intersessional period discharged their responsibilities efficiently.

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

- (a) The Hurricane Committee (HC) has been an important regional body and should be reinstated;
- (b) The intersessional work of the region could more efficiently be accomplished through the establishment of ad hoc teams that would focus specific tasks rather than through the creation of a new set of working groups;
- (c) These task teams be provided clear and time-bound objectives by the Management Group taking into consideration the priorities reflected in the regional Operating Plan and the WMO SP;
- (d) Members of these task teams should be selected by the president in consultation with the Management Group from nominations provided by RA IV Members;
- (e) The president, in consultation with the Management Group, should have an active role in creating, reviewing, guiding and providing resources for the work of the HC and task teams and disbanding those which have completed their work or are no longer needed;
- (f) The HC and Task Teams should actively coordinate with the Management Group and pursue the priorities of the region broadly captured in the WMO Strategic Plan and the Operating Plan of the RA IV, especially those of the next two years, and with a view to preparation for Congress XVI in 2011 and beyond.

5.1.3.3 The Association agreed to establish the following RA IV subsidiary bodies and coordination mechanisms:

- (a) Management Group;
- (b) Hurricane Committee;
- (c) Task Teams to address regional priorities to be created by the president in consultation with the Management Group. Task Teams will be encouraged to conduct their business in a cost-effective manner (for example, use of email, video and teleconference). The Association discussed as examples the creation of Task Teams to focus on, among other priorities:
 - (i) The development of a WIS/WIGOS Regional Radar Demonstration Project on Tsunami and storm surge
 - (ii) The development of a Regional Climate Center
 - (iii) RA IV DRR Pilot project
 - (iv) ICAO requirements for Aviation Meteorology
 - (v) The RA IV input to the WMO Strategic Plan and development of the RA IV Operating Plan.
 - (vi) Identification of RA IV training needs and the gaps in available resources to meet these needs.
- (d) In addition to the establishment of activity oriented Task Teams, the Association also considered that the region needed to maintain linkages with WMO constituent bodies, the Secretariat, and other organizations in topical and program areas. As such, the Association asked the president in consultation with and with the concurrence of their

PRs to identify focal points who can serve in areas to be determined by the Management Group.

5.1.3.4 Directors of NMHSs in the Region were requested to nominate experts that the Management Group can call on to serve on these subsidiary bodies and to serve as Focal Points in selected areas. The membership of RA IV Task Teams will be nominated experts who are selected by the president, in consultation with the Management Group, with the desirable skills to serve as chairpersons and conduct the work. The chairpersons of each of the bodies will determine procedures and sub-structures that will assist in accomplishing the work.

5.1.3.5 The Association adopted [Resolution 4 \(XV-RA IV\) – Management Group of Regional Association IV \(North America, Central America and the Caribbean\)](#) and [Resolution 5 \(XV-RA IV\) – RA IV Hurricane Committee](#).

5.1.4 Volunteerism in the work of Regional Association IV

5.1.4.1 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 and the Commission for Hydrology 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.

5.1.4.2 In that regard, the Association decided that volunteerism in the work (nomination, performance monitoring and recognition) of the working groups, sub-groups and theme leaders should receive the required attention (as portrayed in [Annex I to the present report](#)).

5.1.4.3 In this context, the Association expressed its deep appreciation to the chairpersons and members of the working groups and theme leaders, 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 noted that WMO has adopted the Results-based Management approach and that Strategic Planning, the WMO Operating Plan as well as Monitoring and Evaluation are an integral part thereof. It further noted that EC-LX had endorsed the schedule for delivering the draft WMO Strategic Plan for the period 2012–2015 by the end of 2008. It however observed that more time would be needed for final delivery.

5.2.2 The Association recalled Resolution 11 (EC-LX) which, inter alia, urged regional associations to ensure their active and timely engagement in the preparatory process of the next WMO Strategic Plan to ensure the delivery of the draft WMO Strategic Plan by the end of 2008 and the draft WMO Operating Plan by the end of 2009.

5.2.3 The Association agreed with the overall structure of the revised Strategic Plan and urged the Secretariat to ensure that the revised edition takes due cognizance of the evolving societal needs.

5.2.4 Taking into account the presentation of the WMO Strategic Planning process, the Association sees the value in having three documents. The first is the WMO Strategic Plan, the second is the WMO Operational Plan that aggregates the activities undertaken through WMO's constituent bodies (for example, the Executive Council, regional associations and technical

commissions) and facilitated by the Secretariat. The third is a specific WMO Secretariat operational plan that is aligned with a results-based budget. This approach offers the flexibility to the Secretary-General to adjust budgets as is the current practice while maintaining clear key outcomes and indicators that pertain to the WMO at large.

5.2.5 Under this arrangement, the Association requests the Secretary-General to build and develop the activities and budget on the basis of inputs from the regional associations, who better reflect the needs and priorities of Members, and technical commissions, who help engineer the solutions. The Regional Association will ensure close coordination of its key outcomes with relevant technical commissions under the Expected Results.

Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association IV (North America, Central America and the Caribbean)

Implementation of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association IV (North America, Central America and the Caribbean) (2006–2009)

5.2.6 The Association recalled that the fourteenth session of RA IV (San José, Costa Rica, April 2005) had established its Management Group to, among other mandates, assist the president of RA IV to develop the Regional Strategic Plan for the Enhancement of the National Meteorological and Hydrological Services in North America, Central America and the Caribbean (2006–2009) and to prepare the draft Regional Strategic Plan for 2010–2013.

5.2.7 The Association reminded Members that good strategic planning involves input from all stakeholders. Therefore the development of the Regional Strategic Plan must be driven by the contributions from the national strategic plans of Members. The Association was pleased to note that some countries had reported successful enhancement of their weather, climate and water services subsequent to the development of their weather, climate and water services subsequent to the development of the Regional Strategic Plan. The Association expressed its appreciation and gratitude to all those Members who provided technical and expert support for the implementation of the Strategic Plan.

5.2.8 The Association expressed its appreciation and gratitude to all those Members who provided technical and expert support for the implementation of the Regional Strategic Plan (2006–2009). Recalling that the Management Group of RA IV encouraged Members to consider the Strategic Plan, as appropriate, in the development of their respective national plans, the Association was pleased to note that some developing countries had reported successful enhancement of their weather, climate and water services in line with the Strategic Plan.

Development of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association IV (North America, Central America and the Caribbean) (2010–2013)

5.2.9 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.

5.2.10 In this respect, the Association was pleased to note that a draft Strategic Plan for the Enhancement of NMHSs in RA IV (2010–2013) was developed in consultation with Members and with guidance by the RA IV Management Group. The draft Strategic Plan has taken into account the previous Strategic Plan for NMSs (2006–2009), 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.

5.2.11 The Association noted that the Strategic Plan has been developed by analysing the likely trends, developments, evolving needs and deficiencies of the Region, to identify a set of deliverables. These deliverables are action-oriented and categorized under Regional Expected Results in accordance with WMO's set of Expected Results.

5.2.12 The Association reviewed the draft Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association IV (North America, Central America and the Caribbean) 2010–2013 and agreed on the approach and approval process for the development of the integrated Regional Strategic Plan for RA IV. It requested the Secretariat to finalize the Strategic Plan on behalf of the Association based on the discussions during the session and requested the president of RA IV to approve the Plan in due course in consultation with the Management Group members.

Sixth Technical Conference on Management of Meteorological Services in Regional Association IV (North America, Central America and the Caribbean)

5.2.13 The Association expressed its appreciation to the Secretary-General for assisting Members in developing their NMHSs particularly 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 that the Fifth Technical Conference on Management of Meteorological Services in RA III and RA IV had been held in Brasilia, Brazil, from 11 to 14 July 2006 at the kind invitation of the Government of Brazil. The Conference was attended by 40 Directors or senior officials of 30 NMHSs in Regions III and IV, one representative from a regional organization, and seven invited lecturers. Many Directors and senior officials of NMHSs as well as invited users had presented lectures or case studies on social and economic benefits of weather, climate and water services.

5.2.14 Considering that constant improvement on management techniques and practices is needed for NMHSs to increase efficiency of their Services and to improve the ability to address challenges facing them under financial and other constraints, the Association agreed that the Sixth Technical Conference on Management of Meteorological Services in Regional Associations III and IV be held during the fifteenth financial period. The Association pointed out that given the challenges and priorities that would arise in the near future, which in many cases could be common to the RA III, an appropriate date that would not coincide with the hurricane season should be agreed on to hold that conference. To that end, it agreed to:

- (a) Set the first half of the year 2010 as the potential date for the conference;
- (b) Submit proposals to the Secretariat within 2 months and in consultation with all NMHSs in RA IV on topics for its consideration so that they could also be agreed on with RA III;
- (c) Request that the budgetary provisions originally planned for 2009 in relation to the conference be maintained during 2010.

5.2.15 The Association requested the Management Group to select, as appropriate, the topics of the technical conference and seminar.

6. EMERGING ISSUES: CRITICAL CHALLENGES FOR AERONAUTICAL METEOROLOGY (agenda item 6)

Quality Management for Weather, Climate and Water Services with an emphasis on Aeronautical Meteorological Services

6.1 Having been informed of recent developments in the implementation of the WMO Quality Management Framework and a Pilot Project for QMS for services to aviation in the United Republic of Tanzania, the Association endorsed the QMF plan and requested the president to follow and support the implementation of QMS making best use of the (interim and final) results of the Pilot Project.

6.2 The Association welcomed the revised plans of ICAO regarding the implementation of a recognized QMS for meteorological services to civil aviation, which will likely become a Standard by the forthcoming Amendment 75 to Annex 3 of ICAO with an implementation date of November 2010. The Association advised Members to pursue this implementation along the lines of ISO 9001–2008, even though certification according to ISO 9001–2008 will most probably remain a recommended practice for at least another 3 years.

Required qualifications of aeronautical meteorologists

6.3 The Association noted with concern the implementation of the two-tier WMO personnel classification as described in the Fourth Edition of WMO-No. 258 *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology* (2002). The 2006 WMO Education and Training (ETR) survey and other information suggested that many WMO Members (in particular those in the developing countries and LDCs) will have difficulty demonstrating that their Aeronautical Meteorological Forecasters (AMF) meet the ICAO personnel qualification requirements as described in WMO-No. 258 and its Supplement No. 1 *Training and Qualification Requirements for Aeronautical Meteorological Personnel* (available at: http://www.caem.wmo.int/_pdf/wmo/SuppNo1_to_WMOno258_10May06.pdf). EC-LX strongly supported the work done by the EC Panel of Experts on Education and Training on this issue at its twenty-third meeting in Costa Rica in March and endorsed the establishment of two task teams to:

- (a) Review the proposed implementation time lines suggested by the EC Panel;
- (b) Provide clarification of the meaning of relevant items of text contained in WMO-No. 258, and Supplement 1, including the term “or equivalent” and its application in Supplement 1, and recommend revisions as necessary; and
- (c) Investigate means of enhancing the availability of university-level education opportunities for meteorological personnel.

EC-LX further requested that the status of Supplement 1 to WMO-No. 258 be reviewed by appropriate WMO bodies, and the implementation plan and any revision recommendations should be presented to EC-LXI for consideration of adoption. This work will accordingly be closely monitored by the CAeM Management Group, with the necessary inputs to be provided to the team.

6.4 The first Task Team on Aviation Forecaster Qualifications (TT-AFQ) met from the 9th to the 13th of February 2009, in Exeter at the UK Met Office. The TT-AFQ accomplished the objectives set forth by EC-LX. The TT-AFQ recommended, inter alia, that three possible pathways be available for those wishing to become a WMO meteorologist. These pathways are shown in [Annex II to the present report](#).

6.5 The TT-AFQ made a number of significant recommendations including:

- The WMO Secretariat seek approval from EC LXI that the term “or equivalent” in the 4th edition of WMO-No. 258 be understood to mean ‘or equivalent to the relevant professional qualifications’ rather than “or equivalent to a degree”.
- The WMO Secretariat to advise the EC Panel of the Task Team’s recommendation to include a pathway for non-degreed personnel to become a WMO Meteorologist. This recommendation is based on the clarification of ‘or equivalent’ in the current edition of WMO-No. 258 (Section 1.1 Basic Assumptions (c) and (d)).
- The WMO Secretariat to advise the EC Panel that the terms “Aviation Meteorological Forecaster” or “Aviation Meteorological Observer” used in WMO-No. 258 be replaced with the terms “Aeronautical Meteorologist” and “Aeronautical Meteorological Technician” to better reflect the changing nature of the job, and the level of education and training associated with these roles.
- The WMO Secretariat to seek approval from EC-LXII to publish this revised 5th edition of WMO-No. 258 as soon as practicable.
- The WMO Secretariat to include the required competencies (i.e. knowledge, skills and work attitudes) of Aeronautical Meteorologists, as currently specified in WMO-No. 258

Supplement 1 (Sections 2.2 to 2.4) and updated by CAeM ET/ET, as Standards and Recommended Practices in WMO-No. 49 Vol. II for approval by EC.

6.6 The Association endorsed these recommendations of the TT-AFQ and requested that EC-LXI adopt the overall proposal for the three pathways to become a WMO Meteorologist while recognizing that there may be changes to the fine detail.

6.7 The TT-AFQ advised that the following key dates were expected to apply to WMO meteorologists providing aeronautical forecasts:

- **2013** Aeronautical Meteorological personnel (Aeronautical Meteorologists and Aeronautical Meteorological Technicians) to meet the competencies to be described in WMO-No. 49 Vol. II.
- **2016** Aeronautical Meteorologists to meet the education and training requirements as defined in WMO-No. 49 Vol. II and WMO-No. 258.

6.8 While EC would consider the recommendations of the TT AFQ at its sixty-first session in June 2009, the Association urged Members to check whether their traditional Class II forecasters, who did not possess a university-level degree (or equivalent education), had received the necessary training and possess the appropriate competencies and experience. Any knowledge and/or competency shortfall could thereby be identified and corrected, ensuring that the quality of service delivery by those forecasters meets the relevant provisions of ICAO and WMO. In this connection, RA IV Members were reminded of the CAeM training Website at <http://www.caem.wmo.int/moodle/> which provides access to the best available aeronautical training and guidance material sourced from around the world.

6.9 Members were also invited to submit aviation meteorology training materials and aviation weather related case studies for potential inclusion and sharing with other Members on the website and to look to the possibility of creating a “work desk” in the region for exchanging experiences amongst operational aeronautical meteorologists.

Provision of SIGMET messages in line with ICAO requirements

6.10 The representative of ICAO briefed the Association of recent ICAO initiatives in the Region. He noted:

- ICAO organized workshops for aeronautical meteorological services are planned to be held in Nicaragua in June 2009 (focused on SIGMETS) and Jamaica in November 2009 (focused on Quality Management Systems) and urged participation by the NMHSs of the Region;
- The monitoring of TAFS and METARS at the Brasilia Op Met centre, with immediate feedback through the air traffic management system when errors are detected, which has resulted in fewer complaints from airlines operating in the Region. The Association requested the Secretariat to liaise with ICAO to have the NMHSs of the Region regularly appraised of the results of this monitoring as well as any monitoring relating to the quality and timeliness of SIGMETS; and,
- That more work needs to be done on cost recovery.

6.11 The Association noted that ICAO was studying the re-structuring of the provision of SIGMET by regional or international centres to overcome the deficiencies of a number of Meteorological Watch Offices (MWOs) in the provision of SIGMET. These developments would have an impact on the role of NMHSs in delivering aeronautical meteorological services and also possibly on their revenue, as aviation services were providing an important part of their overall funding. In the light of the regional cooperation demonstrated by the RA IV Pilot Project to Develop Support for Developing Countries in AeMP, the Association agreed that the model of provision of technical assistance to developing countries through cooperation and collaboration between neighbouring countries, on a regional or subregional level, should be extended to address these issues without delay.

7. WMO REGIONAL OFFICE FOR THE AMERICAS AND THE WMO OFFICE FOR NORTH AMERICA, CENTRAL AMERICA AND THE CARIBBEAN (*agenda item 7*)

7.1 The Association requested the Secretary-General to continue his efforts to strengthen regional and technical cooperation activities for meeting the requirements of Members in the Region. It expressed satisfaction as regards a number of measures undertaken by the Secretary-General in the structural and organizational areas of the Secretariat, particularly those referred to regional WMO Offices and the Department on Development and Regional Activities (DRA) with the view to improving delivery of services to Members and enhancing partnership with national and regional institutions and organizations. In that regard, this Department had been established, in order to ensure the smooth and efficient implementation of activities, within the framework of the Regional Programme and Technical Cooperation Programme.

7.2 The Association highlighted the important results obtained in the implementation of technical cooperation projects in RA IV in assistance to NMHSs of countries in the Region. During the period 2005–2008 WMO continued developing initiatives and projects responding to national and regional requirements of NMHSs of RA IV countries, in particular of Central America and the Caribbean region. The Caribbean radar networking system project will provide early warnings on hurricanes and severe weather, supported by the European Union and the Caribbean Meteorological Organization (CMO) and the valuable assistance provided to the Ibero-american countries, through the Iberoamerican Programme of Cooperation supported by Spain.

7.3 The Association took note of hurricane activity and its impacts in the Region underlining the important role played by NMHSs in weather observations, data exchange and the preparation and distribution of warnings. The meeting recognized the support received for the organization of the Hurricane Committee's annual meetings, the annual tropical workshops organized by RTC Miami, and the attachments at RTC Miami and WMC Washington. The Association hoped that this support would continue in the future.

7.4 The Association appreciated the joint WMO/AEMET mission that went to the Dominican Republic and Haiti (31 March–4 April 2008) in response to the floods which have impacted Haiti and the Dominican Republic in the last few years, and to discuss with national authorities and funding agencies (AECID, IDB and UNDP), an Early Warning System Project Proposal, prepared under the framework of the Iberoamerican Programme of Cooperation. The Project received support by national institutions in both countries. The representative of AECID in the Dominican Republic expressed interest in providing financial support for the implementation of the project. The Project components include the establishment of an Early Warning System to be shared by the Dominican Republic and Haiti, the development of a common hydrometeorological database, improvement of telecommunications and observing meteorological networks, as well as training of professional and technical staff.

7.5 The Association decided to reinforce the links with regional intergovernmental organizations particularly relating to the regional Tsunami Warning System and GCOS regional coordination. The Association requested that WMO invite the Intergovernmental Coordination Group for Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG) to meetings of the Hurricane Committee, create synergy and prevent duplication of resources and effort.

7.6 Action taken by the Regional Office jointly with the Resource Mobilization Office (RMO) on behalf of the flood affected countries of Haiti and the Dominican Republic as well as the continuing contact with the Members affected by the passage of Hurricanes was noted by the Association. It invited the Offices to continue working with regional intergovernmental organizations and to use those forums to promote meteorology and hydrology and environmental issues and raise policy-makers' awareness of the role of the NMHSs and WMO in contributing to sustainable development.

7.7 The Association reaffirmed the important role of the Voluntary Cooperation Programme in the Region. Six Member countries in RA IV received assistance from the WMO Voluntary

Cooperation Programme aimed at facilitating their effective participation in the World Weather Watch and other scientific and technical programmes of WMO.

7.8 The Association requested the Secretary-General to maintain the efforts to assist the NMHSs of the Region in matters of Education and Training, underlining that during the period from 2006 to 2008 about 390 person x month fellowships were implemented, under the WMO Regular Budget and VCP. The countries that benefited from the programme included Antigua and Barbuda, Bahamas, Belize, Cayman Islands, Costa Rica, El Salvador, Grenada, Jamaica, Panama and Saint Lucia.

7.9 The Association highlighted the contribution and support of the United States of America to NMHSs in RA IV, in particular the development of the project on Satellite Meteorological Applications for Central American countries and the support to training events in the RA IV.

7.10 The Association also highlighted the support from Finland to the SIDS-Caribbean Project (Preparedness to Climate Variability and Global Change in Small Island Developing States of the Caribbean Region), for the installation and upgrading of meteorological equipment and staff training, contributing to the reinforcement of the National Meteorological Services in the Region and helping to improve the database management systems and the telecommunications of the participating countries.

7.11 The Association requested the Secretary-General to make extra efforts to assist the NMHS of Haiti by making the necessary arrangements for the attendance of representatives of this country in future regional meetings. Furthermore, considering that Haiti is the only LDC country in the American Continent, the Association strongly recommended that all efforts be made to improve the current situation.

7.12 The Association recognized that it will have to work closely with the WMO Department of Regional Activities to ensure success in implementing its flexible structure and to adapt to emerging issues in the region.

7.13 The Association noted that the most effective and efficient modality would be to work closely with the DRA through the Subregional Office in San Jose. To this end, the Association urged the Secretary-General to review and strengthen the role of the SRO in keeping with Members' needs.

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

8.1 The following scientific lectures were presented during the session:

- (a) Qualifications of meteorologists working in aeronautical meteorology, by Mr Carr McLeod (president of CAeM);
- (b) Activities of Disasters Risk Reduction, presented by Mr Geoff Love (WMO, Director of Weather and Disaster Risk Reduction Services);
- (c) World Climate Conference-3, Mr Hong Yan, (WMO, Deputy Secretary-General);
- (d) WISDOM Feasibility Study Results and Future Plans by Justyna Nicinska (Program Manager, NOAA).

An additional lecture was presented about the GEOSS Environmental Data Dissemination System-GEONETCast Americas by Martin Medina (NOAA-NESDIS).

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

Secretary-General, in consultation with the president of RA IV, 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, some of the previous resolutions were still required to be kept in force.

9.3 The Association accordingly adopted [Resolution 6 \(XV-RA IV\) – Review of previous resolutions and recommendations of the Association](#).

9.4 The Association considered that Resolution 8 (EC-LVII) 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 unanimously elected Mr Arthur W Rolle (Bahamas) as president and Mrs Luz Graciela de Calzadilla (Panama) as vice-president of WMO Regional Association IV (North America, Central America and the Caribbean).

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

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

11.2 The Association noted with appreciation the kind offer extended by Mr Albert A.E. Martis, Permanent Representative of Netherlands Antilles and Aruba, to host the next session.

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

12.1 The principal delegates of Members of the Region, including Barbados, British Caribbean territories, Canada, Costa Rica, France, United States, United Kingdom, and Netherlands Antilles and Aruba, expressed their gratitude to the Government of the Bahamas for having hosted the session, and for the excellent arrangements and the warm hospitality extended to all participants. The Association also expressed its appreciation to the WMO Secretariat and the local secretariat for the support that was instrumental in the smooth running of the session.

12.2 Mr Hong Yan, the representative of the Secretary-General, thanked the Government of the Bahamas, as well as Mr Arthur Rolle, Permanent Representative of the Bahamas with WMO, and his 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 Mr Rolle, Permanent Representative of the Bahamas with WMO, on behalf of the host country, expressed the hope that the participants had enjoyed a comfortable and memorable stay

in Nassau. He congratulated the new vice-president on her election and thanked the participants for the support for his election as president of the Association. He also thanked all those who had taken part in ensuring the success of the session. He wished all participants a safe journey home.

12.4 In her closing remarks, Mrs Luz Graciela de Calzadilla, acting president of RA IV, expressed her appreciation to participants, the host country and co-chairpersons for their valuable contributions, and hoped that the activities of the Association would be further strengthened in light of the newly adopted RA IV Strategic Plan and Working Groups Structure. She also thanked Mr M. Jarraud, Secretary-General of WMO and his staff, in particular those of the Regional Office for the Americas, for their close cooperation and valuable support to the work of the Association.

12.5 The fifteenth session of Regional Association IV (North America, Central America and the Caribbean) closed at 12.35 p.m. on 1 May 2009.

RESOLUTIONS ADOPTED BY THE SESSION

Resolution 1 (XV-RA IV)

REGIONAL BASIC SYNOPTIC NETWORK IN REGION IV

REGIONAL ASSOCIATION IV (NORTH AMERICA,
CENTRAL AMERICA AND THE CARIBBEAN),

Noting:

- (1) Resolution 2 (XIV-RA IV) – Regional Basic Synoptic Network,
- (2) The *Manual on the Global Observing System* (WMO-No. 544), Volume I, Part III, Regulations 2.1.3.1–2.1.3.5, and the definition of the Regional Basic Synoptic Network,
- (3) The *Manual on the Global Telecommunication System* (WMO-No. 386), Volume I, Part I, Attachment 1-3, Section 3,

Considering 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,

Decides that the stations and the observational programmes listed in the annex to this resolution constitute the Regional Basic Synoptic Network in Region IV;

Urges Members:

- (1) To secure, at the earliest date possible, full implementation of the network of the stations and observational programmes set forth in the annex to this resolution;
- (2) To comply fully with the standard times of observation, the global and regional coding procedures and data collection standards, as laid down in the *WMO Technical Regulations* (WMO-No. 49) and the *Manual on the Global Observing System* (WMO-No. 544), *Manual on Codes* (WMO-No. 306) and *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 stations in accordance with the procedures laid down in the *Manual on the Global Observing System* (WMO-No. 544), Volume II – Regional Aspects, Region IV (North America, Central America and the Caribbean).

Note: This resolution replaces Resolution 2 (XIV-RA IV), which is no longer in force.

Annex to Resolution 1 (XV-RA IV)**LIST OF STATIONS COMPRISING THE
REGIONAL BASIC SYNOPTIC NETWORK IN REGION IV**

(March 2009)

INDEX	STATION NAME	OBSERVATIONS
ANTIGUA AND BARBUDA		
78862	VC BIRD INT'L AIRPORT ANTIGUA	S
BAHAMAS		
78062	FREEPORT, GRAND BAHAMA	S
78065	MARSH HARBOR, ABACO	S
78069	SOUTH BIMINI, BIMINI	S
78073	NASSAU AIRPORT, NEW PROVIDENCE	S
78073	NASSAU AIRPORT, NEW PROVIDENCE	R
78075	NORTH ELEUTHERA, ELEUTHERA	S
78080	ROCK SOUND, ELEUTHERA	S
78086	THE BIGHT, CAT ISLAND	S
78089	COCKBURN TOWN, SAN SALVADOR	S
78091	MOSS TOWN, EXUMA	S
78094	DEADMAN'S CAY, LONG ISLAND	S
78101	DUNCAN TOWN, RAGGED ISLAND	S
78120	MATTHEW TOWN, INAGUA	S
BARBADOS		
78954	GRANTLEY ADAMS	R
BELIZE		
78583	BELIZE/PHILLIP GOLDSTON INTL. AIRPORT	S
78583	BELIZE/PHILLIP GOLDSTON INTL. AIRPORT	R
78596	HUNTING CAYE	S
BERMUDA		
78016	BERMUDA INTERNATIONAL AIRPORT	S
78016	BERMUDA INTERNATIONAL AIRPORT	R
CANADA		
71043	NORMAN WELLS A, NWT	S
71043	NORMAN WELLS UA, NWT	R
71045	TESLIN, YT	S
71050	PUNTZI MOUNTAIN, BC	S
71066	HIGH LEVEL A, ALTA	S
71068	PEACE RIVER A, ALTA	S
71069	SLAVE LAKE A, ALTA	S
71076	URANIUM CITY, SASK	S
71078	LYNN LAKE A, MAN	S
71079	THOMPSON A, MAN	S
71081	HALL BEACH UA, NU	R
71082	ALERT, NU	S
71082	ALERT UA, NU	R
71090	CLYDE A, NU	S
71091	LONGSTAFF BLUFF, NU	S

INDEX	STATION NAME	OBSERVATIONS
71093	CAPE HOOPER, NU	S
71094	CAPE DYER, NU	S
71095	POND INLET A, NU	S
71101	SANDSPIT A, BC	S
71104	WILLIAMS LAKE A, BC	S
71109	PORT HARDY A, BC	S
71109	PORT HARDY UA, BC	R
71114	HOPE, BC	S
71119	EDMONTON STONY PLAIN, ALTA	S
71119	EDMONTON STONY PLAIN, ALTA	R
71120	COLD LAKE A, ALTA	S
71122	BANFF CS, ALTA	S
71123	EDMONTON INT'L A, ALTA	S
71125	MEADOW LAKE A, SASK	S
71129	KINDERSLEY A, SASK	S
71130	NIPAWIN A, SASK	S
71131	EASTEND CYPRESS, SASK	S
71135	ROCKGLEN, SASK	S
71137	VAL MARIE SOUTHEAST, SASK	S
71141	NORWAY HOUSE A, MAN	S
71145	ISLAND LAKE A, MAN	S
71182	CHURCHILL FALLS, NFLD	S
71185	DANIELS HARBOUR, NFLD	S
71187	BAIE COMEAU A, QUE	S
71196	BONAVISTA, NFLD	S
71197	PORT AUX BASQUES, NFLD	S
71199	WATSON LAKE A, YT	S
71207	SQUAMISH, BC	S
71397	GREENWOOD A, NS	S
71400	BADGER, NFLD	S
71403	BEAVER ISLAND, NS	S
71411	WESTERN HEAD, NS	S
71421	LAC EON, QUE	S
71433	CARIBOU ISLAND, ONT	S
71435	UPSALA, ONT	S
71441	GRETNA, MAN	S
71443	SWAN RIVER, MAN	S
71447	MELITA, MAN	S
71467	SACHS HARBOUR, NWT	S
71470	LUPIN CS, NU	S
71474	CLINTON, BC	S
71510	ROSETOWN EAST, SASK	S
71600	SABLE ISLAND, NS	S

INDEX	STATION NAME	OBSERVATIONS
71600	SABLE ISLAND, NS	R
71603	YARMOUTH A, NS	S
71603	YARMOUTH UA, NS	R
71607	ST STEPHEN, NB	S
71610	SHERBROOKE A, QUE	S
71621	TRENTON A, ONT	S
71624	TORONTO LESTER B. PEARSON INT'L A, ONT	S
71625	PETAWAWA A, ONT	S
71627	MONTREAL/PIERRE TRUDEAU INT'L A, QUE	S
71628	OTTAWA MACDONALD-CARTIER INT'L A, ONT	S
71630	MUSKOKA A, ONT	S
71633	WIARTON A, ONT	S
71705	MONCTON A, NB	S
71706	CHARLOTTETOWN A, PEI	S
71707	SYDNEY A, NS	S
71709	ILES DE LA MADELEINE A, QUE	S
71711	CHARLO A, NB	S
71715	RIVIERE DU LOUP, QUE	S
71719	MISCOU ISLAND, NB	S
71722	MANIWAKI UA, QUE	R
71725	VAL D'OR A, QUE	S
71726	PARENT, QUE	S
71728	ROBERVAL A, QUE	S
71730	SUDBURY A, ONT	S
71731	NORTH BAY A, ONT	S
71733	GORE BAY A, ONT	S
71735	EARLTON A, ONT	S
71738	WAWA A, ONT	S
71739	TIMMINS A, ONT	S
71749	THUNDER BAY A, ONT	S
71799	VICTORIA INT'L A, BC	S
71800	CAPE RACE, NFLD	S
71801	ST JOHN'S A, NFLD	S
71801	ST JOHN'S UA, NFLD	R
71802	ST LAWRENCE, NFLD	S
71803	GANDER INT'L A, NFLD	S
71808	BLANC SABLON A, QUE	S
71810	PORT MENIER, QUE	S
71811	SEPT-ILES UA, QUE	R
71813	NATASHQUAN A, QUE	S
71814	CHEVERY, QUE	S
71815	STEPHENVILLE A, NFLD	S
71815	STEPHENVILLE UA, NFLD	R
71816	GOOSE A, NFLD	S
71816	GOOSE UA, NFLD	R
71817	MARY'S HARBOUR, NFLD	S
71818	CARTWRIGHT, NFLD	S

INDEX	STATION NAME	OBSERVATIONS
71821	MATAGAMI, QUE	S
71822	CHIBOUGAMAU, QUE	S
71823	LA GRANDE IV UA, QUE	R
71825	WABUSH LAKE A, NFLD	S
71827	LA GRANDE RIVIERE A, QUE	S
71828	SCHEFFERVILLE A, QUE	S
71831	KAPUSKASING A, ONT	S
71832	NAGAGAMI, ONT	S
71834	GERALDTON A, ONT	S
71836	MOOSONEE A, ONT	S
71836	MOOSONEE UA, ONT	R
71841	ARMSTRONG A, ONT	S
71842	SIOUX LOOKOUT A, ONT	S
71844	BIG TROUT LAKE READAC, ONT	S
71845	PICKLE LAKE A, ONT	S
71845	PICKLE LAKE UA, ONT	R
71850	KENORA A, ONT	S
71854	RED LAKE A, ONT	S
71855	DAUPHIN A, MAN	S
71856	GIMLI INDUSTRIAL PARK, MAN	S
71858	GRAND RAPIDS, MAN	S
71861	BROADVIEW, SASK	S
71862	ESTEVAN A, SASK	S
71864	MOOSE JAW A, SASK	S
71865	WYNYARD, SASK	S
71866	SASKATOON A, SASK	S
71867	THE PAS A, MAN	S
71867	THE PAS UA, MAN	R
71868	HUDSON BAY, SASK	S
71869	PRINCE ALBERT A, SASK	S
71870	SWIFT CURRENT A, SASK	S
71871	LLOYDMINSTER A, ALTA	S
71872	MEDICINE HAT A, ALTA	S
71874	LETHBRIDGE A, ALTA	S
71876	NORTH BATTLEFORD A, SASK	S
71876	NORTH BATTLEFORD A, SASK	R
71877	CALGARY INT'L A, ALTA	S
71878	RED DEER A, ALTA	S
71880	CRANBROOK A, BC	S
71881	EDSON A, ALTA	S
71882	REVELSTOKE, BC	S
71883	BLUE RIVER CS, BC	S
71889	PENTICTON A, BC	S
71892	VANCOUVER INT'L A, BC	S
71893	COMOX A, BC	S
71894	ESTEVAN POINT CS, BC	S
71896	PRINCE GEORGE A, BC	S
71897	MCINNES ISLAND, BC	S

INDEX	STATION NAME	OBSERVATIONS
71898	PRINCE RUPERT A, BC	S
71899	LANGARA, BC	S
71902	NAIN A, NFLD	S
71905	KUUJJUARAPIK A, QUE	S
71906	KUUJJUAQ A, QUE	S
71906	KUUJJUAQ UA, QUE	R
71907	INUKJUAK A, QUE	S
71907	INUKJUAK UA, QUE	R
71908	PRINCE GEORGE UA, BC	R
71909	IQALUIT A, NU	S
71909	IQALUIT UA, NU	R
71910	CAPE DORSET A, NU	S
71911	SHEPHERD BAY A, NU	S
71912	GILLAM A, MAN	S
71913	CHURCHILL A, MAN	S
71913	CHURCHILL UA, MAN	R
71915	CORAL HARBOUR A, NU	S
71915	CORAL HARBOUR UA, NU	R
71917	EUREKA, NU	S
71917	EUREKA UA, NU	R
71922	LA RONGE A, SASK	S
71924	RESOLUTE CARS, NU	S
71924	RESOLUTE UA, NU	R
71925	CAMBRIDGE BAY A, NU	S
71925	CAMBRIDGE BAY UA, NU	R
71926	BAKER LAKE A, NU	S
71926	BAKER LAKE UA, NU	R
71931	LAC LA BICHE, ALTA	S
71932	FORT MCMURRAY A, ALTA	S
71933	FORT CHIPEWYAN A, ALTA	S
71934	FORT SMITH A, NWT	S
71934	FORT SMITH UA, NWT	R
71935	HAY RIVER A, NWT	S
71936	YELLOWKNIFE A, NWT	S
71937	LADY FRANKLIN POINT A, NU	S
71938	KUGLUKTUK A, NU	S
71943	FORT ST JOHN A, BC	S
71944	MACKENZIE A, BC	S
71945	FORT NELSON A, BC	S
71945	FORT NELSON UA, BC	R
71946	FORT SIMPSON A, NWT	S
71948	CAPE PARRY A, NWT	S
71949	FARO, YT	S
71950	SMITHERS A, BC	S
71957	INUVIK A, NWT	S
71957	INUVIK UA, NWT	R
71958	DEASE LAKE, BC	S
71964	WHITEHORSE A, YT	S

INDEX	STATION NAME	OBSERVATIONS
71964	WHITEHORSE UA, YT	R
71966	DAWSON, YT	S
71968	SHINGLE POINT A, YT	S
71989	MOULD BAY CS, NWT	S
CAYMAN ISLANDS		
78384	OWEN ROBERTS AIRPORT GRAND CAYMAN	S
78384	OWEN ROBERTS AIRPORT GRAND CAYMAN	R
CLIPPERTON		
78825	CLIPPERTON	S
COLOMBIA (SAN ANDRES AND PROVIDENCIA ISLANDS)		
80001	SAN ANDRES (ISLA)/SESQUICENTENARIO	S
80001	SAN ANDRES (ISLA)/SESQUICENTENARIO	R
80002	PROVIDENCIA (ISLA)/EL EMBRUJO	S
COSTA RICA		
78760	PUNTARENAS	S
78762	JUAN SANTAMARIA INT. AIRPORT	S
78762	JUAN SANTAMARIA INT. AIRPORT	R
78767	PUERTO LIMON	S
78774	DANIEL ODUBER INT. AIRPORT	S
CUBA		
78310	CABO SAN ANTONIO, PINAR DEL RIO	S
78315	PINA DEL RIO	S
78318	BAHIA HONDA	S
78322	BATABANO	S
78324	PUNTA DEL ESTE	S
78325	CASA BLANCA, LA HABANA	S
78328	VARADERO	S
78333	PLAYA GIRON, MATANZAS	S
78344	CANTARRANA	S
78345	JUCARO	S
78348	CAIBARIEN	S
78349	SANCTI SPIRITUS	S
78351	SANTA CRUZ DEL SUR	S
78353	NUEVITAS	S
78355	CAMAGUEY	S
78358	PUERTO PADRE	S
78360	CABO CRUZ, GRANMA	S
78363	CONTRAMAESTRE	S
78365	PUNTA LUCRECIA	S
78369	PUNTA DE MAISI, GUANTANAMO	S
DOMINICA		
78905	MELVILLE HALL AIRPORT	S
78906	CANEFIELD AIRPORT	S
DOMINICAN REPUBLIC		
78458	PUERTO PLATA	S
78460	SANTIAGO	S
78467	SABANA DE LA MAR	S

INDEX	STATION NAME	OBSERVATIONS
78479	PUNTA CANA	S
78482	BARAHONA	S
78486	SANTO DOMINGO	S
78486	SANTO DOMINGO	R
EL SALVADOR		
78650	ACAJUTLA	S
78652	LOS ANDES	S
78655	SANTA ANA/UNICO	S
78662	SAN SALVADOR	S
78663	SAN SALVADOR/ILOPANGO	S
78666	EL SALVADOR INTL. AIRPORT COMALAPA	S
78670	SAN MIGUEL/UES	S
78672	LA UNION/CPI	S
GRENADA		
78958	POINT SALINES AIRPORT	S
GUADELOUPE, ST MARTIN, ST BARTHELEMY (AND OTHER FRENCH ISLANDS IN THE VICINITY)		
78890	LA DESIRADE	S
78894	GUSTAVIA, ST. BARTHELEMY	S
78897	LE RAIZET, GUADELOUPE	S
78897	LE RAIZET, GUADELOUPE	R
GUATEMALA		
78615	TIKAL	S
78627	HUEHUETENANGO	S
78629	QUETZALTENANGO	S
78631	COBAN A. V.	S
78637	PUERTO BARRIOS	S
78639	RETALHULEU	S
78641	AEROPUERTO LA AURORA	S
78647	SAN JOSE	S
78649	LA FRAGUA, ZACAPA	S
HAITI		
78409	CAP-HAITIEN	S
78447	ES CAYES	S
HONDURAS		
78700	AMAPALA	S
78703	ROATAN	S
78704	TRUJILLO	S
78705	LA CEIBA (AIRPORT)	S
78706	TELA	S
78707	YORO	S
78708	LA MESA (SAN PEDRO SULA)	S
78711	PUERTO LEMPIRA	S
78714	CATACAMAS	S
78717	SANTA ROSA DE COPAN	S
78718	NUEVA OCOTEPEQUE	S
78719	LA ESPERANZA	S
78720	TEGUCIGALPA	S

INDEX	STATION NAME	OBSERVATIONS
78724	CHOLUTECA	S
JAMAICA		
78388	MONTEGO BAY/SANGSTER	S
78397	KINGSTON/NORMAN MANLEY	S
78397	KINGSTON/NORMAN MANLEY	R
MARTINIQUE		
78922	CARAVELLE	S
78925	LE LAMENTIN	S
MEXICO		
76055	SAN FELIPE, BCN	S
76225	CHIHUAHUA, CHIH.	S
76225	CHIHUAHUA, CHIH.	R
76243	PIEDRAS NEGRAS, COAH	S
76256	EMPALME, SON.	S
76305	LORETO, BCS	S
76311	CHOIX, SIN.	S
76323	HIDALGO DEL PARRAL, CHIH.	S
76342	MONCLOVA, COAH.	S
76382	TORREON, COAH.	S
76390	SATILLO COAH.	S
76393	MONTERREY, N.L.	S
76394	AEROP INTERNACIONAL MONTERREY, N.L.	R
76402	CIUDAD CONSTITUCION, BCS	S
76405	LA PAZ, BCS	S
76405	LA PAZ, BCS	R
76412	CULIACAN, SIN.	S
76423	DURANGO, DGO.	S
76458	COLONIA JUAN CARRASCO MAZATLAN, SIN	S
76458	COLONIA JUAN CARRASCO MAZATLAN, SIN	R
76471	SOMBRETERE, ZAC.	S
76491	CIUDAD VICTORIA, TAMPS.	S
76499	SOTO LA MARINA, TAMPS	S
76525	ZACATECAS, ZAC.(LA BUFA, ZAC)	S
76539	SAN LUIS POTOSI, S.L.P.	S
76543	TAMUJIN, S.L.P.	S
76548	TAMPICO, TAMPS	S
76556	TEPIC, NAY.	S
76577	GUANAJUATO, GTO.	S
76581	RIO VERDE, S.L.P.	S
76585	MATLAPA, S.L.P.	S
76612	GUADALAJARA, JAL.	S
76640	TUXPAN, VER	S
76644	AEROP. INTERNACIONAL MERIDA, YUC	S
76644	AEROP. INTERNACIONAL MERIDA, YUC	R
76647	VALLADOLID, YUC.	S
76654	MANZANILLO, COL.	S
76654	MANZANILLO, COL.	R

INDEX	STATION NAME	OBSERVATIONS
76656	CIUDAD GUZMAN, JAL.	S
76665	MORELIA, MICH.	S
76675	TOLUCA, MEX.	S
76679	AEROP. INTERNACIONAL MEXICO, D.F.	R
76685	PUEBLA, PUE.	S
76687	JALAPA, VER	S
76692	HACIENDA YLANG YLANG VERACRUZ, VER.	S
76692	HACIENDA YLANG YLANG VERACRUZ, VER.	R
76695	CAMPECHE, CAMP.	S
76698	FELIPE CARRILLO PUERTO, Q.R.	S
76726	CUERNAVACA, MOR	S
76737	ORIZABA, VER	S
76743	VILLAHERMOSA, TAB.	S
76750	CHETUMAL, Q.R.	S
76762	CHILPANCINGO, GRO.	S
76805	ACAPULCO, GRO.	S
76805	ACAPULCO, GRO.	R
76845	S. C. DE LAS CASAS, CHIS.	S
76848	COMITAN, CHIS.	S
76855	PUERTO ANGEL, OAX.	S
76903	TAPACHULA, CHIS.	S
NETHERLANDS ANTILLES AND ARUBA		
78866	JULIANA AIRPORT, ST. MAARTEN	S
78866	JULIANA AIRPORT, ST. MAARTEN	R
78873	ROOSEVELT AIRPORT, ST EUSTATIUS	S
78982	QUEEN BEATRIX AIRPORT, ARUBA	S
78988	HATO AIRPORT, CURACAO	S
78988	HATO AIRPORT, CURACAO	R
78990	FLAMINGO AIRPORT, BONAIRE	S
NICARAGUA		
78730	PUERTO CABEZAS	S
78733	RIVAS	S
78734	JINOTEGA	S
78735	JUIGALPA	S
78739	CHINANDEGA	S
78741	MANAGUA A.C. SANDINO	S
78741	MANAGUA A.C. SANDINO	R
78745	BLUEFIELDS	S
PANAMA		
78792	TOCUMEN	S
78793	DAVID	S
78795	SANTIAGO	S
PUERTO RICO AND US POSSESSIONS IN THE CARIBBEAN AREA		
78526	SAN JUAN/INT., PUERTO RICO	S
78526	SAN JUAN/INT., PUERTO RICO	R
78543	C. AMALIE/TRUMAN, ST. THOMAS	S

INDEX	STATION NAME	OBSERVATIONS
RA-IV AUTOMATIC MARINE STATIONS		
****	41001 (35 00N, 72 00W)	S
****	41002 (32 18N, 75 18W)	S
****	41010 (28 54N, 78 30W)	S
****	42001 (26 00N, 90 00W)	S
****	42002 (25 53N, 93 34W)	S
****	42003 (25 56N, 89 55W)	S
****	42019 (27 54N, 95 00W)	S
****	42036 (28 31N, 84 31W)	S
****	42039 (28 47N, 86 02W)	S
****	44004 (39 00N, 70 00W)	S
****	44011 (41 05N, 66 35W)	S
****	44137 (41 39N, 59 57W)	S
****	44138 (44 16N, 53 37W)	S
****	46001 (56 00N, 148 00W)	S
****	46002 (42 30N, 130 00W)	S
****	46003 (52 00N, 156 00W)	S
****	46004 (51 00N, 136 00W)	S
****	46005 (46 00N, 131 00W)	S
****	46006 (41 00N, 138 00W)	S
****	46014 (39 13N, 123 58W)	S
****	46035 (59 55N, 117 49W)	S
****	46036 (48 21N, 133 55W)	S
****	46059 (37 59N, 130 00W)	S
****	46184 (53 54N, 138 52W)	S
****	46207 (50 52N, 129 55W)	S
SAINT LUCIA		
78947	GEORGE F.L. CHARLES AIRPORT	S
78948	HEWANORRA INT'L AIRPORT	S
SAINT PIERRE AND MIQUELON		
71805	SAINT-PIERRE	S
TRINIDAD AND TOBAGO		
78962	CROWN POINT AIRPORT, TOBAGO	S
78970	PIARCO INT. AIRPORT, TRINIDAD	S
78970	PIARCO INT. AIRPORT, TRINIDAD	R
UNITED STATES OF AMERICA		
72201	KEY WEST/INT., FL	S
72201	KEY WEST/INT., FL	R
72202	MIAMI, FL	S
72202	MIAMI, FL	R
72203	WEST PALM BEACH/ INT. FL	S
72205	ORLANDO/JETPORT FL	S
72206	JACKSONVILLE/INTNL., FL	S
72206	JACKSONVILLE/INTNL., FL	R
72207	SAVANNAH/MUNICIPAL, GA	S
72208	CHARLESTON/MUN., SC	S
72208	CHARLESTON/MUN., SC	R
72210	TAMPA BAY AREA, FL	R

INDEX	STATION NAME	OBSERVATIONS
72211	TAMPA/INT., FL	S
72212	CROSS CITY/CROSS CITY A., FL	S
72214	TALLAHASSEE/MUN., FL	S
72214	TALLAHASSEE/MUN., FL	R
72215	PEACHTREE CITY, GA	R
72217	MACON/LEWIS B.WILSON, GA	S
72218	AUGUSTA/BUSH FIELD, GA	S
72219	ATLANTA/MUN., GA.	S
72220	APALACHICOLA/MUN., FL	S
72223	MOBILE/BATES FIELD, AL	S
72226	MONTGOMERY/DANNELLY, AL	S
72230	SHELBY COUNTY AIRPORT, AL	R
72231	NEW ORLEANS/MOISANT INT., LA	S
72233	SLIDELL/MUN., LA	R
72234	MERIDIAN/KEY, MS	S
72235	JACKSON/ALLEN C. THOMPSON FIELD, MS	S
72235	JACKSON/ALLEN C. THOMPSON FIELD, MS	R
72240	LAKE CHARLES/MUN., LA	S
72240	LAKE CHARLES/MUN., LA	R
72243	HOUSTON/INTERCONTINENTAL, TX	S
72248	SHREVEPORT/REG., LA	S
72248	SHREVEPORT/REG., LA	R
72249	FT WORTH, TX	R
72250	BROWNSVILLE/INT., TX	S
72250	BROWNSVILLE/INT., TX	R
72251	CORPUS CHRISTI/INT., TX	S
72251	CORPUS CHRISTI/INT., TX	R
72253	SAN ANTONIO/INT., TX	S
72254	AUSTIN/CTY, TX	S
72255	VICTORIA/VICTORIA REGIONAL, TX	S
72256	WACO, MADISON-COOPER, TX	S
72259	DALLAS-FORT WORTH/FORT WORTH REG. AIRPORT, TX	S
72261	DEL RIO/INT., TX	S
72261	DEL RIO/INT., TX	R
72263	SAN ANGELO/MATHIS, TX	S
72265	MIDLAND/MIDLAND REG. AIR TERM., TX	S
72265	MIDLAND/MIDLAND REG. AIR TERM., TX	R
72266	ABILENE/MUN., TX	S
72267	LUBBOCK/LUBBOCK INTERNATIONAL, TX	S
72268	ROSWELL/INDUSTRIAL AIR CENTER, NM	S
72270	EL PASO/INT., TX	S
72271	TRUTH OR CONSEQUENCES, NM	S
72274	TUCSON/INT., AZ	S
72274	TUCSON/INT., AZ	R
72278	PHOENIX/SKY HARBOR, INT, AZ	S
72280	YUMA/YUMA INT., AZ	S

INDEX	STATION NAME	OBSERVATIONS
72290	SAN DIEGO/LINDBERGH, CA	S
72293	SAN DIEGO/MIRAMAR, NAS, CA	R
72295	LOS ANGELES /INT., CA	S
72302	WILMINGTON, NC	S
72304	CAPE HATTERAS, NC	S
72305	NEWPORT, NC	R
72308	NORFOLK/INT., VA	S
72310	COLUMBIA, SC	S
72311	ATHENS/MUN., GA	S
72312	GREENVILLE/GREENVILLE SPARTANBURG, SC	S
72314	CHARLOTTE/DOUGLAS, NC	S
72317	GREENSBORO/G.-HIGH PT., NC	S
72317	GREENSBORO/G.-HIGH PT., NC	R
72318	BLACKSBURG, VA	R
72323	HUNTSVILLE/MADISON CO., AL	S
72324	CHATTANOOGA/LOVELL FIELD, TN	S
72326	KNOXVILLE/MUN., TN	S
72327	NASHVILLE/METROPOLITAN, TN	S
72334	MEMPHIS/INTNL.], TN	S
72340	LITTLE ROCK/ADAMS FLD, AR	S
72340	LITTLE ROCK/ADAMS FLD, AR	R
72344	FORT SMITH/MUN., AR	S
72351	WICHITA FALLS/SHEPS AFB/WICHITA FALLS/MUN., TX	S
72353	OKLAHOMA CITY/W. ROGERS WORLD, OK	S
72356	TULSA/INT., OK	S
72357	NORMAN/MAX WESTHEIMER A, OK	R
72360	CLAYTON/MUN., NM	S
72363	AMARILLO/INTL., TX	S
72364	SANTA TERESA, NM	R
72365	ALBUQUERQUE/INT., NM.	S
72365	ALBUQUERQUE/INT., NM	R
72370	KINGMAN/MOHAVE COUNTY A., AZ	S
72371	PAGE/PAGE A., AZ	S
72374	WINSLOW, AZ	S
72376	FARMINGTON/FOUR CORNERS REGIONAL AIRPORT, NM	S
72384	BAKERSFIELD/MEADOWS, CA	S
72386	LAS VEGAS/MCCARRAN, NV	S
72387	MERCURY/DESERT ROCK, NV	S
72387	MERCURY/DESERT ROCK, NV	R
72389	FRESNO/AIR TERM., CA	S
72389	FRESNO/AIR TERM., CA	R
72394	SANTA MARIA, CA	S
72401	RICHMOND/BYRD, VA	S
72402	WALLOPS ISLAND, VA	R
72403	WASHINGTON/DULLES INT., VA	S
72403	STERLING, VA	R
72407	ATLANTIC CITY, NJ	S

INDEX	STATION NAME	OBSERVATIONS
72408	PHILADELPHIA/INT., PA	S
72411	ROANOKE/MUN., VA	S
72412	BECKLEY (RALEIGH CTY. MEMORIAL AIRPORT), WV	S
72414	CHARLESTON/KANAWHA., WV	S
72417	ELKINS/ELKINS-RANDOLPH CO., WV	S
72421	CINCINNATI/GREATER CINCINNATI, OH	S
72422	LEXINGTON/BLUE GRASS, KY	S
72426	WILMINGTON, OH	R
72428	COLUMBUS/PORT COLUMBUS, OH	S
72429	DAYTON/ COX, OH	S
72429	SULPHUR GROVE, OH	R
72432	EVANSVILLE/REG., IN	S
72434	ST.LOUIS/LAMBERT, ST.LOUIS INT., MO	S
72435	PADUCAH, KY	S
72438	INDIANAPOLIS/I.-MUN/ WEIR COOK, IN	S
72440	SPRINGFIELD/MUN., MO	S
72440	SPRINGFIELD/MUN., MO	R
72445	COLUMBIA/REGIONAL, MO	S
72446	KANSAS CITY, INTNL., MO	S
72450	WICHITA/MID-CONTINENT, KS	S
72451	DODGE CITY/MUN., KS	S
72451	DODGE CITY/MUN., KS	R
72456	TOPEKA/MUN., KS	S
72456	TOPEKA/MUN., KS	R
72458	CONCORDIA/BLOSSER MUN., KS	S
72462	ALAMOSA, CO.	S
72464	PUEBLO/MEMORIAL, CO.	S
72465	GOODLAND/RENNER FIELD/ GOODLAND/MUN.KS	S
72469	DENVER/STAPLETON INT., CO	R
72475	MILFORD MUNICIPAL, UT	S
72476	GRAND JUNCTION/WALKER FIELD, CO	S
72476	GRAND JUNCTION/WALKER FIELD, CO	R
72480	BISHOP, CA	S
72486	ELY/YELLAND, NV	S
72488	RENO/INT., NV	S
72489	RENO, NV	R
72492	STOCKTON/METROPOLITAN CA	S
72493	OAKLAND/METROP. OAKLAND INT., CA	R
72494	SAN FRANCISCO/INT., CA	S
72501	UPTON, NY	R
72503	NEW YORK/LA GUARDIA, NY	S
72508	HARTFORD/BRADLEY INTNL., CT	S
72509	BOSTON/LOGAN INT., MA	S
72514	WILLIAMSPORT/LYCOMING COUNTY, PA	S
72515	BINGHAMTON/BROOME CO., NY	S
72518	ALBANY COUNTY AIRPORT, NY	S

INDEX	STATION NAME	OBSERVATIONS
72518	ALBANY, NY	R
72519	SYRACUSE/HANCOCK, NY	S
72520	PITTSBURGH/GREATER PITTSBURGH INT., PA	S
72520	PITTSBURGH/GREATER PITTSBURGH INT., PA	R
72524	CLEVELAND/CLEVELAND-HOPKINS, OH	S
72526	ERIE/INT., PA	S
72528	BUFFALO/GREATER BUFFALO INT., NY	S
72528	BUFFALO/GREATER BUFFALO INT., NY	R
72530	CHICAGO/O'HARE, IL	S
72532	PEORIA/GREATER PEORIA MUN., IL	S
72533	FORT WAYNE/MUN., BAER FLD., IN	S
72537	DETROIT/METROPOLITAN, MI	S
72546	DES MOINES/MUN., IA	S
72547	DUBUQUE/MUN., IA	S
72552	GRAND ISLAND/GR. IS. COUNTY, NE	S
72556	NORFOLK/KARL STEFAN, NE	S
72557	SIOUX CITY/MUN., IA	S
72558	VALLEY, NE	R
72562	NORTH PLATTE/LEE BIRD, NE	S
72562	NORTH PLATTE/LEE BIRD, NE	R
72564	CHEYENNE, WY	S
72565	DENVER INTERNATIONAL AIRPORT, CO	S
72567	VALENTINE/MILLER, NE	S
72569	CASPER/NATRONA COUNTY, INTL, WY	S
72570	CRAIG/CRAIG-MOFFAT A., CO	S
72572	SALT LAKE CITY/INTNL. UT	S
72572	SALT LAKE CITY/INTNL. UT	R
72576	LANDER/HUNT, WY	S
72578	POCATELLO/MUN., ID	S
72582	ELKO, NV	R
72583	WINNEMUCCA/MUN., NV	S
72591	RED BLUFF/MUN., CA	S
72594	EUREKA, CA	S
72597	MEDFORD/MEDFORD-JACKSON COUNTY, OR	S
72597	MEDFORD/MEDFORD-JACKSON COUNTY, OR	R
72606	PORTLAND/INTNL. JET PORT, ME	S
72608	EASTPORT, ME	S
72617	BURLINGTON/INT., VT	S
72632	WHITE LAKE, MI	R
72634	GAYLORD, MI	R
72635	GRAND RAPIDS/KENT CO., MI	S
72636	MUSKEGON/COUNTY, MI	S
72637	FLINT/BISHOP, MI	S
72638	HOUGHTON LAKE/ROSCOMMON COUNTY, MI	S
72639	ALPENA/PHELPS COLLINS, MI	S
72640	MILWAUKEE/GEN. MITCHELL, WI	S

INDEX	STATION NAME	OBSERVATIONS
72641	MADISON/DANE COUNTY REGIONAL WI	S
72644	ROCHESTER/MUN., MN	S
72645	GREEN BAY/A.-STRAUBEL, WI	S
72645	GREEN BAY/A.-STRAUBEL, WI	R
72649	CHANHASSEN, MN	R
72651	SIOUX FALLS/FOSS FIELD, SD	S
72654	HURON/HURON REGIONAL SD	S
72655	ST.CLOUD/WHITNEY, MN	S
72658	MINNEAPOLIS/ST.PAUL INT., MN	S
72659	ABERDEEN/REG., SD	S
72659	ABERDEEN/REG., SD	R
72662	RAPID CITY/REGIONAL AIRPORT, SD	S
72662	RAPID CITY WFO, SD	R
72666	SHERIDAN/COUNTY, W.	S
72672	RIVERTON WY	R
72677	BILLINGS/LOGAN INT., MT	S
72681	BOISE/MUN., ID	S
72681	BOISE/MUN., ID	R
72683	BURNS, OR	S
72688	PENDLETON, OR	S
72693	EUGENE/MAHLON SWEET, OR	S
72694	SALEM/MCNARY, OR	S
72694	SALEM/MCNARY, OR	R
72698	PORTLAND/INT., OR	S
72712	CARIBOU/MUN., ME	S
72712	CARIBOU/MUN., ME	R
72745	DULUTH/INT., MN	S
72747	INT.FALLS/FALLS INT. MN	S
72747	INT.FALLS/FALLS INT. MN	R
72753	FARGO/HECTOR FIELD, ND	S
72764	BISMARCK/MUN., ND	S
72764	BISMARCK/MUN., ND	R
72767	WILLISTON/SLOULIN FIELD INT., ND	S
72768	GLASGOW/INT., MT	S
72768	GLASGOW/INT., MT	R
72772	HELENA/COUNTY-CITY, MT	S
72773	MISSOULA / JOHNSON-BELL FIELD, MT	S
72776	GREAT FALLS, MT	S
72776	GREAT FALLS, MT	R
72777	HAVRE/CITY COUNTY, MT	S
72779	KALISPELL/GLACIER PARK INT., MT	S
72781	YAKIMA/YAKIMA AIR TERMINAL, WA	S
72785	SPOKANE/INT., WA	S
72786	SPOKANE, WA	R

72793	SEATTLE/S.-TACOMA, WA	S
72797	QUILLAYUTE, WA	S
72797	QUILLAYUTE, WA	R
74455	DAVENPORT, IA	R
74560	LINCOLN, IL	R
UNITED STATES OF AMERICA (ALASKA)		
70026	BARROW/W. POST W. ROGERS	S
70026	BARROW/W. POST W. ROGERS	R
70133	KOTZEBUE, RALPH WIEN	S
70133	KOTZEBUE, RALPH WIEN	R
70174	BETTLES	S
70200	NOME	S
70200	NOME	R
70219	BETHEL/BETHEL AIRPORT	S
70219	BETHEL/BETHEL AIRPORT	R
70231	MCGRATH	S
70231	MCGRATH	R
70261	FAIRBANKS/INT.	S
70261	FAIRBANKS/INT.	R
70267	FORT GREELY/ALLEN AAF, AK	S
70271	GULKANA/INTL. FLD.	S
70273	ANCHORAGE/INT.	S
70273	ANCHORAGE/INT.	R
70308	ST. PAUL	S
70308	ST. PAUL	R
70316	COLD BAY	S
70316	COLD BAY	R
70326	KING SALMON	S
70326	KING SALMON	R
70340	ILIAMNA/ILIAMNA AIRPORT	S
70350	KODIAK	S
70350	KODIAK	R
70361	YAKUTAT	S
70361	YAKUTAT	R
70381	JUNEAU	S
70398	ANNETTE ISLAND	S
70398	ANNETTE ISLAND	R
70414	SHEMYA AFB	S
70414	SHEMYA AFB	R
VENEZUELA (ISLA DE AVES)		
80400	ISLA DE AVES BASE CIENTIFICA NAVAL S. BOLIVAR	S

Legend: S = Surface observations
W = Radiowind observations
R = Radiosonde 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>.

Resolution 2 (XV-RA IV)**REGIONAL BASIC CLIMATOLOGICAL NETWORK IN REGION IV**

REGIONAL ASSOCIATION IV (NORTH AMERICA,
CENTRAL AMERICA AND THE CARIBBEAN),

Noting:

- (1) Resolution 3 (XIV-RA IV) – Regional Basic Climatological Network in Region IV,
- (2) The *Manual on the Global Observing System* (WMO-No. 544), Volume I, Part III, Regulations 2.1.3.1 and 2.1.3.2, and the definition of the Regional Basic Climatological Network,
- (3) The *Manual on the Global Telecommunication System* (WMO-No. 386), Volume I, Part I, Attachment 1-3, section 2.4 (i),

Considering that the Fourteenth World Meteorological Congress welcomed the establishment of the Regional Basic Climatological Network 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 that the stations listed in the annex to this resolution constitute the Regional Basic Climatological Network in Region IV;

Urges Members:

- (1) To ensure, at the earliest date possible, full implementation of the network of RBCN stations set forth in the annex to this resolution;
- (2) To comply fully with the global and regional coding procedures and data collection standards in accordance with procedures laid down in the *WMO Technical Regulations* (WMO-No. 49) and the *Manual on the Global Observing System* (WMO-No. 544), *Manual on Codes* (WMO-No. 306) and *Manual on the Global Telecommunication System* (WMO-No. 386) when operating the Regional Basic Climatological Network;

Authorizes the president of the Association to approve, at the request of Members concerned and in consultation with the Secretary-General, minor amendments to the list of 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 IV (North America, Central America and the Caribbean).

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

Annex to Resolution 2 (XV-RA IV)

**LIST OF STATIONS COMPRISING THE
REGIONAL BASIC CLIMATOLOGICAL NETWORK IN REGION IV
(March 2009)**

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN	INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
BAHAMAS						71261	GODERICH	X			
78073	NASSAU AIRPORT, NEW PROVIDENCE	X	X	X		71279	SEPT-ILES A, QUE	X		X	
BARBADOS						71288	CAMBRIDGE BAY GSN	X		X	
78954	GRANTLEY ADAMS	X	X	X	X	71294	BANCROFT AUTO	X			
BELIZE						71296	EGBERT CS	X			
78583	BELIZE/PHILLIP GOLDSTON INTL. AIRPORT	X	X		X	71298	HARROW CDA AUTO	X			
BERMUDA						71299	KAPUSKASING CDA ON	X		X	
78016	BERMUDA INTERNATIONAL AIRPORT	X	X	X	X	71307	RIDGETOWN RCS	X			
CANADA						71309	MOOSONEE RCS	X		X	
71017	STEFANSSON ISLAND	X		X		71310	ST. PETERS	X			
71018	RESOLUTE CS	X		X		71311	NAPPAN AUTO	X			
71026	MEDICINE HAT RCS	X		X		71315	CHARLO AUTO	X			
71028	TATLAYOKO LAKE RCS	X				71317	DEBERT	X			
71029	HOLMON CS	X		X		71318	CORONATION CLIMATE	X			
71043	NORMAN WELLS UA, NWT		X			71320	HALL BEACH CLIMATE	X		X	
71044	OLD CROW RCS	X				71321	IQALUIT CLIMATE	X		X	
71049	WAGER BAY	X		X		71322	ARVIAT CLIMATE	X		X	
71063	OTTAWA CDA RCS	X				71331	ISLAND FALLS	X			
71066	HIGH LEVEL A, ALTA	X		X		71332	KUGLUKTUK CLIMATE	X		X	
71069	SLAVE LAKE A, ALTA	X		X		71350	HARRINGTON CDA CS	X		X	
71074	ISACHSEN, NU	X		X		71352	ELORA RCS	X			
71079	THOMPSON A, MAN	X		X		71355	ALERT CLIMATE	X		X	
71081	HALL BEACH UA, NU		X			71356	BAKER LAKE CLIMATE	X		X	
71082	ALERT, NU	X				71357	QIKIQTARJUAQ CLIMATE	X		X	
71082	ALERT UA, NU		X		X	71358	CLYDE RIVER CLIMATE	X		X	
71101	SANDSPIT A, BC	X		X		71361	HAY RIVER CLIMATE	X		X	
71103	QUESNEL AWOS	X		X		71362	FORT SMITH CLIMATE	X		X	
71109	PORT HARDY A, BC	X		X		71363	GJOA HAVEN CLIMATE	X		X	
71109	PORT HARDY UA, BC		X			71364	INUVIK CLIMATE	X		X	
71119	EDMONTON STONY PLAIN, ALTA		X			71365	FORT SIMPSON CLIMATE	X		X	
71120	COLD LAKE A, ALTA	X		X		71407	KUGAARUK CLIMATE	X		X	
71122	BANFF CS, ALTA	X		X		71434	PEAWANUCK	X		X	
71157	EDMONTON MUNICIPAL CR10	X				71446	SWIFT CURRENT CDA	X		X	
71158	BERENS RIVER CS	X		X		71467	SACHS HARBOUR, NWT	X		X	
71160	FORT RELIANCE, NWT	X		X		71470	LUPIN CS, NU	X			
71185	DANIELS HARBOUR, NFLD	X		X		71480	MORMAN WELLS CLIMATE	X		X	
71197	PORT AUX BASQUES, NFLD	X		X		71490	ROBERTSON LAKE	X		X	
71199	WATSON LAKE A, YT	X		X		71493	PARRSBORO	X			
71200	VICTORIA GONZALES CS	X				71508	TORONTO CITY	X			
71203	KELOWNA UA		X			71533	EARLTON AWOS	X			
71212	FORET MONTMORENCY RCS	X				71550	DAUPHIN CS	X		X	
71222	DEASE LAKE	X		X		71570	GREAT FALLS CLIMATE	X			
						71573	DELHI CS	X			
						71575	CAPE DORSET CLIMATE	X		X	
						71576	POND INLET CLIMATE	X		X	
						71585	FORT MCMURRAY CS	X		X	

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
71586	LA RONGE RCS, SASK	X		X	
71590	EDMUNDSTON	X			
71592	ARCTIC BAY CS	X		X	
71600	SABLE ISLAND, NS	X	X	X	
71603	YARMOUTH A, NS	X		X	
71603	YARMOUTH UA, NS		X		
71622	LONDON CS	X			
71665	NAIN	X		X	
71695	THE PAS CLIMATE	X		X	
71696	CHURCHILL CLIMATE	X		X	
71713	LA POCATIERE CS, QUE	X		X	
71721	MANIWAKI AIRPORT, QUE	X		X	
71722	MANIWAKI UA, QUE		X		
71726	PARENT, QUE	X			
71727	BAGOTVILLE A, QUE	X		X	
71733	GORE BAY A, ONT	X		X	
71741	KAMLOOPS AUT	X		X	
71742	GANDER AIRPORT CS	X		X	
71743	RIVIERE AUX FEUILLES	X		X	
71747	ATIKOKAN	X			
71801	ST JOHN'S UA, NFLD		X		
71811	SEPT-ILES UA, QUE		X		
71813	NATASHQUAN A, QUE	X		X	
71815	STEPHENVILLE UA, NFLD		X		
71816	GOOSE A, NFLD	X		X	
71816	GOOSE UA, NFLD		X		X
71818	CARTWRIGHT, NFLD	X		X	
71823	LA GRANDE IV UA, QUE	X	X	X	
71826	PANGNIRTUNG	X		X	
71827	LA GRANDE RIVIERE A, QUE	X		X	
71828	SCHEFFERVILLE A, QUE	X		X	
71832	NAGAGAMI, ONT	X			
71834	GERALDTON A, ONT	X			
71836	MOOSONEE UA, ONT		X		X
71842	SIOUX LOOKOUT A, ONT	X		X	
71844	BIG TROUT LAKE READAC, ONT	X		X	
71845	PICKLE LAKE UA, ONT		X		
71862	ESTEVAN A, SASK	X		X	
71867	THE PAS UA, MAN		X		
71869	PRINCE ALBERT A, SASK	X		X	
71876	NORTH BATTLEFORD A, SASK		X		
71894	ESTEVAN POINT CS, BC	X		X	
71898	PRINCE RUPERT A, BC	X			
71905	KUUJJUARAPIK A, QUE	X		X	
71906	KUUJJUAQ A, QUE	X		X	
71906	KUUJJUAQ UA, QUE		X		
71907	INUKJUAK A, QUE	X		X	
71907	INUKJUAK UA, QUE		X		
71908	PRINCE GEORGE UA, BC		X		
71909	IQALUIT UA, NU		X		
71913	CHURCHILL UA, MAN		X		
71915	CORAL HARBOUR A, NU	X		X	
71915	CORAL HARBOUR UA, NU		X		
71917	EUREKA, NU	X		X	
71917	EUREKA UA, NU		X		
71923	ENNADAI LAKE	X		X	
71924	RESOLUTE UA, NU		X		
71925	CAMBRIDGE BAY UA, NU		X		X
71926	BAKER LAKE UA, NU		X		
71934	FORT SMITH UA, NWT		X		X
71945	FORT NELSON A, BC	X		X	
71945	FORT NELSON UA, BC		X		
71950	SMITHERS A, BC	X		X	
71957	INUVIK UA, NWT		X		
71964	WHITEHORSE A, YT	X		X	
71964	WHITEHORSE UA, YT		X		
71966	DAWSON, YT	X		X	
71984	PAULATUK	X		X	
71989	MOULD BAY CS, NWT	X		X	
71990	MACMILLAN PASS	X		X	
CAYMAN ISLANDS					
78384	OWEN ROBERTS AIRPORT GRAND CAYMAN	X		X	
COLOMBIA (SAN ANDRES AND PROVIDENCIA ISLANDS)					
80001	SAN ANDRES (ISLA)/ SESQUICENTENARIO	X	X	X	
80002	PROVIDENCIA (ISLA)/ EL EMBRUJO	X			
COSTA RICA					
78762	JUAN SANTAMARIA INT. AIRPORT	X	X		X
78767	PUERTO LIMON	X		X	
CUBA					
78325	CASA BLANCA, LA HABANA	X			
78355	CAMAGUEY	X			
DOMINICAN REPUBLIC					
78458	PUERTO PLATA	X			
78479	PUNTA CANA	X			
78486	SANTO DOMINGO	X	X		
EL SALVADOR					
78650	ACAJUTLA	X		X	
78652	LOS ANDES	X			
78655	SANTA ANA/UNICO	X			
78662	SAN SALVADOR	X			
78663	SAN SALVADOR/ ILOPANGO	X			
78672	LA UNION/CPI	X			
GUADELOUPE, ST MARTIN, ST BARTHELEMY (AND OTHER FRENCH ISLANDS IN THE VICINITY)					
78897	LE RAIZET, GUADELOUPE	X	X	X	
GUATEMALA					
78640	GUATEMALA	X			

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
78615	TIKAL	X			
78627	HUEHUETENANGO	X			
78629	QUETZALTENANGO	X			
78631	COBAN A. V.	X			
78637	PUERTO BARRIOS	X			
78639	RETALHULEU	X			
78647	SAN JOSE	X			
78649	LA FRAGUA, ZACAPA	X			
HONDURAS					
78703	ROATAN	X			
78705	LA CEIBA (AIRPORT)	X			
78708	LA MESA (SAN PEDRO SULA)	X			
78720	TEGUCIGALPA	X			
JAMAICA					
78388	MONTEGO BAY/SANGSTER	X		X	
78397	KINGSTON/NORMAN MANLEY	X	X		X
MARTINIQUE					
78925	LE LAMENTIN	X			
MEXICO					
76055	SAN FELIPE, BCN	X			
76225	CHIHUAHUA, CHIH.	X	X	X	
76243	PIEDRAS NEGRAS, COAH.	X			
76256	EMPALME, SON.	X			
76305	LORETO, BCS	X			
76311	CHOIX, SIN.	X		X	
76323	HIDALGO DEL PARRAL, CHIH.	X			
76342	MONCLOVA, COAH.	X			
76390	SATILLO COAH.	X			
76393	MONTERREY, N.L.	X		X	
76394	AEROP INTERNACIONAL MONTERREY, N.L.		X		
76402	CIUDAD CONSTITUCION, BCS	X			
76405	LA PAZ, BCS	X	X	X	
76412	CULIACAN, SIN.	X			
76423	DURANGO, DGO.	X			
76458	COLONIA JUAN CARRASCO MAZATLAN, SIN.	X	X	X	
76471	SOMBRERETE, ZAC.	X			
76491	CIUDAD VICTORIA, TAMPS.	X			
76499	SOTO LA MARINA, TAMPS.	X			
76525	ZACATECAS, ZAC. (LA BUFA, ZAC)	X			
76539	SAN LUIS POTOSI, S.L.P.	X			
76543	TAMUIN, S.L.P.	X			
76548	TAMPICO, TAMPS.	X			
76556	TEPIC, NAY.	X			
76577	GUANAJUATO, GTO.	X		X	
76581	RIO VERDE, S.L.P.	X			
76585	MATLAPA, S.L.P.	X			
76593	PROGRESO, YUC.	X			

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
76612	GUADALAJARA, JAL.	X			
76640	TUXPAN, VER	X			
76644	AEROP. INTERNACIONAL MERIDA, YUC.	X	X	X	
76647	VALLADOLID, YUC.	X			
76654	MANZANILLO, COL.	X	X	X	X
76656	CIUDAD GUZMAN, JAL.	X			
76665	MORELIA, MICH.	X			
76675	TOLUCA, MEX.	X			
76679	AEROP. INTERNACIONAL MEXICO, DF		X		
76680	MEXICO (CENTRAL), DF	X		X	
76683	TLAXCALA, TLAX.	X			
76685	PUEBLA, PUE.	X			
76687	JALAPA, VER	X			
76692	HACIENDA YLANG YLANG VERACRUZ, VER.	X	X	X	
76695	CAMPECHE, CAMP.	X			
76698	FELIPE CARRILLO PUERTO, Q.R.	X			
76726	CUERNAVACA, MOR	X			
76737	ORIZABA, VER.	X			
76743	VILLAHERMOSA, TAB.	X			
76750	CHETUMAL, Q.R.	X			
76762	CHILPANCINGO, GRO.	X			
76805	ACAPULCO, GRO.	X	X		
76833	SALINA CRUZ, OAX	X		X	
76845	S. C. DE LAS CASAS, CHIS.	X			
76848	COMITAN, CHIS.	X			
76855	PUERTO ANGEL, OAX.	X			
76903	TAPACHULA, CHIS.	X			
NETHERLANDS ANTILLES AND ARUBA					
78866	JULIANA AIRPORT, ST. MAARTEN	X	X		
78988	HATO AIRPORT, CURACAO	X			
78988	HATO AIRPORT, CURACAO		X		X
NICARAGUA					
78741	MANAGUA A.C. SANDINO	X			
PANAMA					
78792	TOCUMEN	X			
PUERTO RICO AND US POSSESSIONS IN THE CARIBBEAN AREA					
78526	SAN JUAN/INT., PUERTO RICO	X	X	X	X
TRINIDAD AND TOBAGO					
78970	PIARCO INT. AIRPORT, TRINIDAD	X	X		
UNITED STATES OF AMERICA					
72201	KEY WEST/INT., FL	X	X	X	X
72202	MIAMI, FL	X			
72203	WEST PALM BEACH/INT. FL	X			
72206	JACKSONVILLE/INTNL., FL	X	X		
72208	CHARLESTON/MUN., SC	X		X	
72211	TAMPA/INT., FL	X		X	

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
72219	ATLANTA/MUN., GA	X			
72226	MONTGOMERY/ DANNELLY, AL	X			
72231	NEW ORLEANS/ MOISANT INT., LA	X		X	
72234	MERIDIAN/KEY, MS	X		X	
72247	LONGVIEW, TX	X	X		
72248	SHREVEPORT/REG., LA	X	X	X	
72250	BROWNSVILLE/INT., TX	X	X		X
72253	SAN ANTONIO/INT., TX	X		X	
72255	VICTORIA/VICTORIA REGIONAL, TX	X			
72261	DEL RIO/INT., TX		X		
72263	SAN ANGELO/MATHIS, TX	X			
72266	ABILENE/MUN., TX	X		X	
72270	EL PASO/INT., TX	X		X	
72274	TUCSON/INT., AZ	X			
72278	PHOENIX/SKY HARBOR, INT, AZ	X		X	
72290	SAN DIEGO/ LINDBERGH, CA	X		X	
72293	SAN DIEGO/MIRAMAR, NAS, CA		X		X
72295	LOS ANGELES /INT., CA	X			
72304	CAPE HATTERAS, NC	X		X	
72306	RALEIGH, NC	X		X	
72312	GREENVILLE/ GREENVILLE SPARTANBURG, SC	X		X	
72315	ASHEVILLE MUN., NC	X			
72324	CHATTANOOGA/ LOVELL FIELD, TN	X		X	
72327	NASHVILLE/ METROPOLITAN, TN	X	X		
72340	LITTLE ROCK/ADAMS FLD, AR	X			
72344	FORT SMITH/MUN., AR	X		X	
72351	WICHITA FALLS/SHEPS AFB/WICHITA FALLS/MUN., TX	X			
72353	OKLAHOMA CITY/W. ROGERS WORLD, OK	X		X	
72360	CLAYTON/MUN., NM	X		X	
72365	ALBUQUERQUE/INT., NM	X		X	
72386	LAS VEGAS/ MCCARRAN, NV	X		X	
72389	FRESNO/AIR TERM., CA	X		X	
72401	RICHMOND/BYRD, VA	X			
72403	STERLING, VA		X		
72405	WASHINGTON NATIONAL, DC	X		X	
72428	COLUMBUS/PORT COLUMBUS, OH	X			
72429	DAYTON/ COX, OH	X			
72432	EVANSVILLE/REG., IN	X		X	
72434	ST.LOUIS/LAMBERT, ST.LOUIS INT., MO	X			
72438	INDIANAPOLIS/I.- MUN/WEIR COOK, IN	X			
72445	COLUMBIA/REGIONAL, MO	X		X	
72451	DODGE CITY/MUN., KS	X	X	X	X
72458	CONCORDIA/BLOSSER MUN., KS	X		X	

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
72476	GRAND JUNCTION/ WALKER FIELD, CO	X		X	
72483	SACRAMENTO EX., CA	X		X	
72486	ELY/YELLAND, NV	X		X	
72488	RENO/INT., NV	X			
72494	SAN FRANCISCO/INT., CA	X			
72501	UPTON, NY		X		
72503	NEW YORK/LA GUARDIA, NY	X			
72507	PROVIDENCE GREEN STATE, RI	X			
72509	BOSTON/LOGAN INT., MA	X			
72519	SYRACUSE/ HANCOCK, NY	X		X	
72520	PITTSBURGH/GREATER PITTSBURGH INT., PA	X	X	X	X
72528	BUFFALO/GREATER BUFFALO INT., NY	X	X		
72532	PEORIA/GREATER PEORIA MUN., IL			X	
72535	SOUTH BEND ST. JOSEP, IN	X			
72546	DES MOINES/MUN., IA	X		X	
72556	NORFOLK/KARL STEFAN, NE	X		X	
72562	NORTH PLATTE/LEE BIRD, NE	X	X	X	
72569	CASPER/NATRONA COUNTY, INTNL, WY	X			
72572	SALT LAKE CITY/ INTNL, UT	X			
72576	LANDER/HUNT, WY	X		X	
72578	POCATELLO/MUN., ID	X		X	
72583	WINNEMUCCA/MUN., NV	X		X	
72594	EUREKA, CA	X		X	
72597	MEDFORD/MEDFORD- JACKSON COUNTY, OR	X	X		X
72613	MT WASHINGTON, NH	X		X	
72617	BURLINGTON/INT., VT	X		X	
72632	WHITE LAKE, MI		X		
72641	MADISON/DANE COUNTY REGIONAL WI	X			
72654	HURON/HURON REGIONAL SD	X		X	
72658	MINNEAPOLIS/ST.PAUL INT., MN	X		X	
72659	ABERDEEN/REG., SD		X		
72662	RAPID CITY/REGIONAL AIRPORT, SD	X			
72666	SHERIDAN/ COUNTY, WY	X		X	
72681	BOISE/MUN., ID	X		X	
72688	PENDLETON, OR	X		X	
72698	PORTLAND/INT., OR	X			
72712	CARIBOU/MUN., ME	X		X	
72743	MARQUETTE, MI	X		X	
72745	DULUTH/INT., MN	X			
72747	INT.FALLS/FALLS INT., MN	X	X		
72764	BISMARCK/MUN., ND	X	X	X	
72772	HELENA/COUNTY-CITY, MT	X		X	
72776	GREAT FALLS, MT	X	X		X
72785	SPOKANE/INT., WA	X			
72786	SPOKANE, WA		X		
72792	OLYMPIA, WA	X		X	

INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN	INDEX	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
72797	QUILLAYUTE, WA	X				70231	MCGRATH	X		X	
74389	GRAY, ME		X			70251	TALKEETHA WSEMO, AK	X		X	
74455	DAVENPORT, IA		X			70261	FAIRBANKS/INT.	X		X	
74492	BLUE HILL/ OBSERVATORY, MA	X		X		70308	ST. PAUL	X	X	X	X
UNITED STATES OF AMERICA (ALASKA)						70316	COLD BAY	X	X	X	
70026	BARROW/W. POST W. ROGERS	X	X	X	X	70326	KING SALMON	X		X	
70086	BARTER ISLAND, AK	X		X		70341	HOMER WSO AP, AK	X		X	
70133	KOTZEBUE, RALPH WIEN	X	X	X		70361	YAKUTAT	X	X	X	
70200	NOME	X	X	X		70398	ANNETTE ISLAND	X	X	X	X
70219	BETHEL/BETHEL AIRPORT	X		X		70414	SHEMYA AFB		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 3 (XV-RA IV)

AMENDMENTS TO THE *MANUAL ON THE GLOBAL OBSERVING SYSTEM* (WMO-No. 544), VOLUME II – REGIONAL ASPECTS, REGION IV (NORTH AMERICA, CENTRAL AMERICA AND THE CARIBBEAN)

REGIONAL ASSOCIATION IV (NORTH AMERICA,
CENTRAL AMERICA AND THE CARIBBEAN),

Noting:

- (1) The *Manual on the Global Observing System* (WMO-No. 544), Volume II – Regional Aspects, Region IV (North America, Central America and the Caribbean),
- (2) The ad hoc session of the Working Group on Planning and Implementation of the WWW in Region IV,

Considering that there is an urgent need to update the regional entry for the *Manual on the Global Observing System* (WMO-No. 544), Volume II, in response to evolving requirements,

Decides that the amended text of section 4 of the *Manual on the Global Observing System* (WMO-No. 544), Volume II – Regional Aspects, Region IV (North America, Central America and the Caribbean), as listed in the annex to this resolution, be adopted with immediate effect;

Requests the Secretary-General:

- (1) To arrange for the inclusion of the amendment in the *Manual on the Global Observing System* (WMO-No. 544), Volume II – Regional Aspects, Region IV (North America, Central America and the Caribbean);
- (2) To bring this modification to the attention of Members of RA IV.

Annex to Resolution 3 (XV-RA IV)

AMENDMENTS TO THE *MANUAL ON THE GLOBAL OBSERVING SYSTEM (WMO-No. 544)*, VOLUME II – REGIONAL ASPECTS, REGION IV (NORTH AMERICA, CENTRAL AMERICA AND THE CARIBBEAN)

REPLACE the text of section 4 – Region IV – North America, Central America and the Caribbean to read:

4.1 Regional Basic Synoptic Network of surface and upper-air observing stations

4.1.1 Composition of the Regional Basic Synoptic Network (RBSN)

4.1.1.1 The RBSN of surface and upper-air observing stations is reviewed and revised at each session of the Association. The list of stations constituting the current RBSN is given in the report of the most recent session of the Association. Changes are announced in the monthly “Operational Newsletter” issued by the Secretariat (see paragraph 4.1.5 below).

4.1.1.2 Manned surface land stations included in the RBSN shall conform to the specifications laid down for land stations in Volume I of this Manual.

4.1.2 Surface synoptic observations

All surface stations included in the RBSN should make surface observations at the four main standard times of observation, i.e., 0000, 0600, 1200 and 1800 UTC, and at the four intermediate standard times of observation, i.e., 0300, 0900, 1500 and 2100 UTC. Any surface station that cannot carry out the full observational programme should give priority to carrying out the observations at the main standard times.

4.1.3 Upper-air synoptic observations

All upper-air stations included in the RBSN should carry out radiosonde and/or radiowind observations up to the 10 hPa level at 0000 and 1200 UTC. Stations which are unable to carry out the full observing programme should give priority to the making of observations at 1200 UTC.

4.1.4 Principles to be applied when revising the RBSN

(a) As a target over land areas the RBSN should have a spatial resolution of 150 km for the surface and 250 km for upper-air stations;

(b) If an RBSN station was ‘silent’ according to monitoring results and another RBSN station located nearby (less than 100 km for surface stations) had regularly reported its observation, the ‘silent’ station should be replaced in the RBSN. If there is no alternative regularly reporting station nearby the ‘silent’ station may remain on the list if there is an intention to restore operations;

(c) In data sparse areas existing stations may be nominated for the RBSN even if there are no plans for them to carry out the full schedule of observations;

(d) The nomination by a Member of a station in the network implies a clear commitment of the Member concerned to make every effort to carry out the schedule.

4.1.5 Arrangements and procedures for updating and amending the Regional Basic Synoptic Network

Certain minor changes in the RBSN of surface and upper-air synoptic stations which do not affect the data requirements of the Region as a whole are inevitable. To provide a simple and rapid means of effecting changes by the Members concerned, the following procedure shall be followed:

- (a) Regional Association IV authorizes the president of the Association to approve, at the request of the Member concerned, on the advice of the Rapporteur on Regional Aspects of the GOS (or Chairperson of a Sub-Group on the GOS), and in consultation with the Secretary-General, minor changes to the RBSN without formal consultation with the Members of the Association, it being understood that any change of substance, i.e., one adversely affecting the density of the network or proposing a change in observational hours, would still require the formal agreement of Members through the adoption of a resolution by postal ballot;
- (b) The Secretary-General shall notify all Members of WMO of changes agreed with the president of the Association;
- (c) Each Member of the Association is encouraged to nominate a national focal point (NFP) for WMO on operational matters related to the RBSN. The nominated NFP should coordinate information with the Rapporteur(s) on Regional Aspects of the GOS and the Secretariat with a view to timely updating information regarding the RBSN.

4.2 Regional Basic Climatological Network (RBCN) of surface and upper-air observing stations

4.2.1 Composition of the Regional Basic Climatological Network (RBCN)

4.2.1.1 The RBCN was established by the Regional Association to provide a comprehensive network of CLIMAT and CLIMAT TEMP reporting stations. It is based primarily on RBSN stations and includes all GCOS (GSN and GUAN) stations, regardless of whether these report CLIMAT or CLIMAT TEMP. RBCN also includes all other stations that report CLIMAT or CLIMAT TEMP needed for description of regional climate features. These other stations should be selected under the same criteria used for GSN and GUAN stations. Non-RBSN stations reporting CLIMAT messages should be considered, particularly those with long records, as well as any Reference Climatological Stations.

4.2.1.2 The RBCN of surface and upper-air observing stations is reviewed and revised at each session of the Association. The list of stations constituting the current RBCN is given in the report of the most recent session of the Association.

4.2.2 Arrangements and procedures for updating and amending RBCN

RA IV authorizes the president of the Association to approve, at the request of the Member concerned, on the advice of the Rapporteur on the Regional Aspects of the GOS (or Chairperson of a Sub-Group on the GOS), and in consultation with the Secretary-General, minor amendments to the list of RBCN stations without formal consultation with the Members of the Association, following similar procedures to those specified for the RBSN.

4.3 Regional arrangements and procedures for observations

4.3.1 Pressure-reduction method

According to the WMO Technical Regulations, Annex V, Manual on the Global Observing System, Volume I, Part III, Regulation 3.3.2.6, the atmospheric pressure at a station shall be reduced to mean sea level. However, pending a worldwide decision on a uniform

pressure-reduction method, the method being used in the United States for reducing atmospheric pressure to mean sea level should be applied in the Region.

4.3.2 Regional comparison of barometers

4.3.2.1 Each Member in the Region should ensure that the barometer of each synoptic station in its territory is traceable to a fixed national barometric standard, through an appropriate series of comparisons at least every two years.

4.3.2.2 National barometric standards should be traceable to an absolute barometric standard recognized by WMO, within or outside the Region, through an appropriate intercomparison at least every 10 years.

4.3.2.3 The barometric standard at the National Bureau of Standards (NBS), Gaithersburg, Maryland (United States) shall be recognized as the absolute standard for Region IV.

4.3.2.4 The barometric standards in Guatemala City, Mexico D.F., Miami, San Juan, Silver Spring, Maryland and Toronto shall be the subregional standard barometers for the Region.

NOTES: (1) The term "barometric standard" is used rather than "standard barometer" since often the standard is not a barometer (e.g. a dead weight tester is a pressure standard, but not a barometer).
(2) There is no standard barometer in Washington D.C. The standard barometer at NWS Headquarters (Silver Spring) is not a national standard, but a working standard traceable to NBS.

4.3.3 Ground weather radar observations

Meteorological radars are important for both operational and research purposes in synoptic meteorology and hydrology, and in improving the accuracy of short-period forecasts (especially those for aviation), while non-meteorological radars, such as aircraft surveillance radars, may often be used advantageously for meteorological purposes and thus fill any temporary gaps in the radar network. Members should, therefore, take all practical steps to encourage the installation of meteorological radars in their own countries, coordinating, where desirable, with neighbouring countries, and should also make maximum use of non-meteorological radars for meteorological purposes.

4.3.4 Regional Instrument Centres (RICs)

4.3.4.1 RICs with full capability should have the following capabilities to carry out their corresponding functions:

Capabilities:

- (a) A RIC must have or have access to the necessary facilities and laboratory equipment to perform the functions necessary for the calibration of meteorological and related environmental instruments;
- (b) A RIC must maintain a set of meteorological standard instruments and establish traceability of its own measurement standards and measuring instruments to the SI;
- (c) A RIC must have qualified managerial and technical staff with necessary experience in fulfilling its functions;
- (d) A RIC must develop its individual technical procedures for calibration of meteorological and related environmental instruments using calibration equipment employed by the RIC;
- (e) A RIC must develop its individual quality assurance procedures;

- (f) A RIC must participate in, or organize inter-laboratory comparisons of standard calibration instruments and methods;
- (g) A RIC must, as appropriate, utilize the resources and capabilities of the Region to the best interest of the Region;
- (h) A RIC must, as far as possible, apply international standards applicable for calibration laboratories, such as ISO 17025;
- (i) A recognized authority must assess a RIC, at least every five years, to verify its capabilities and performance;

Corresponding Functions:

- (j) A RIC must assist Members of the Region in calibrating their national meteorological standards and related environmental monitoring instruments;
- (k) A RIC must participate in or organize WMO and/or regional instrument intercomparisons, following relevant CIMO recommendations;
- (l) According to relevant recommendations on the WMO Quality Management Framework a RIC must contribute positively to Members regarding quality of measurements;
- (m) A RIC must advise Members on inquiries regarding instrument performance, maintenance and the availability of relevant guidance materials;
- (n) A RIC must actively participate in, or assist in the organization of regional workshops on meteorological and related environmental instruments;
- (o) The RIC must cooperate with other RICs in standardization of meteorological and related environmental measurements;
- (p) A RIC must regularly inform Members and report,¹ on an annual basis, to the president of the Regional Association and to the WMO Secretariat on services offered to Members and activities carried out.

4.3.4.2 RICs with basic capabilities and functions should have the following capabilities to carry out their corresponding functions:

Capabilities:

- (a) A RIC must have or have access to the necessary facilities and laboratory equipment to perform the functions necessary for the calibration of meteorological and related environmental instruments;
- (b) A RIC must maintain a set of meteorological standard instruments² and establish traceability of its own measurement standards and measuring instruments to the SI;
- (c) A RIC must have qualified managerial and technical staff with necessary experience in fulfilling its functions;
- (d) A RIC must develop its individual technical procedures for calibration of meteorological and related environmental instruments using calibration equipment employed by the RIC;
- (e) A RIC must develop its individual quality assurance procedures;

¹ Web-based approach is recommended.

² For calibrating one or more of the following variables: temperature, humidity, pressure and others specified by the Region.

- (f) A RIC must participate in, or organize inter-laboratory comparisons of standard calibration instruments and methods;
- (g) A RIC must, when appropriate, utilize the resources and capabilities of the Region to the best interest of the Region;
- (h) A RIC must, as far as possible, apply international standards applicable for calibration laboratories, such as ISO 17025;
- (i) A recognized authority must assess a RIC, at least every five years, to verify their capabilities and performance;

Corresponding functions:

- (j) A RIC must assist Members of the Region in calibrating their national meteorological standards and related environmental monitoring instruments according to Capabilities (b);
- (k) According to relevant recommendations on WMO Quality Management Framework a RIC must contribute positively to Members regarding quality of measurements;
- (l) A RIC must advise Members on inquiries regarding instrument performance, maintenance and the availability of relevant guidance materials;
- (m) The RIC must cooperate with other RICs in standardization of meteorological and related environmental measurements;
- (n) A RIC must regularly inform Members and report,¹ on an annual basis, to the president of the Regional Association and to the WMO Secretariat on services offered to Members and activities carried out.

4.3.4.3 The instrument centres at Mt. Washington, New Hampshire (United States), the Caribbean Institute for Meteorology and Hydrology in Barbados and the RMTTC in San José (Costa Rica) are designated as Regional Instrument Centres.

4.3.5 Regional Radiation Centres (RRCs)

4.3.5.1 A RRC is a centre designated by a Regional Association to serve as a centre for intraregional comparisons of radiation instruments within the Region and to maintain the standard instruments necessary for this purpose.

4.3.5.2 A Regional Radiation Centre shall satisfy the following conditions before it is designated as such and shall continue to fulfil them after being designated:

- (a) It shall possess and maintain a standard group of at least three stable pyrheliometers, with a traceable 95% uncertainty of less than 1 Wm² to the World Standard Group, and in stable clear sun conditions with direct irradiances above 700 Wm², 95% of any single measurements of direct solar irradiance will be expected to be within 6 Wm² of the irradiance;
- (b) One of the radiometers shall be compared through a WMO/CIMO sanctioned comparison, or calibrated, at least once every five years against the World Standard Group;
- (c) The standard radiometers shall be intercompared at least once a year to check the stability of the individual instruments. If the mean ratio, based on at least 100 measurements, and having an 95% uncertainty less than 0.1%, has changed by more than 0.2% and if the erroneous

¹ Web-based approach is recommended.

instrument cannot be identified, then a recalibration at one of the World Radiation Centres must be performed prior to further use as standard;

(d) It shall have, or have access to, the necessary facilities and laboratory equipment for checking and maintaining the accuracy of the auxiliary measuring equipment;

(e) It shall provide the necessary outdoor facilities for simultaneous comparison of national standard radiometers from the Region;

(f) The staff of the centre should provide for continuity and should include a qualified scientist with wide experience in radiation;

(g) It shall be assessed by a National or International agency or CIMO experts, at least every five years to verify traceability of the direct solar radiation measurements.

4.3.5.3 The following National Radiation Centres are designated to serve as Regional Radiation Centres in RA IV: Toronto (Canada), Mexico D.F. (Mexico) and Boulder (United States).

Resolution 4 (XV-RA IV)

MANAGEMENT GROUP OF REGIONAL ASSOCIATION IV (NORTH AMERICA, CENTRAL AMERICA AND THE CARIBBEAN)

REGIONAL ASSOCIATION IV (NORTH AMERICA, CENTRAL AMERICA AND THE CARIBBEAN),

Noting:

- (1) *The Abridged Final Report with Resolutions of the Fifteenth World Meteorological Congress* (WMO-No. 1026),
- (2) *The Abridged Final Report with Resolutions of the Fourteenth Session of Regional Association IV (North America, Central America and the Caribbean)* (WMO-No. 987),
- (3) The report of the RA IV Management Group during the fifteenth session of Regional Association IV,

Considering the proposal of the Management Group of the Association,

Recognizing the need to have a mechanism to address issues of importance to the Association between sessions,

Decides:

- (1) To re-establish a Management Group of Regional Association IV (North America, Central America and the Caribbean) to advise 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 that cannot wait until the next regular session of the Association;
 - (b) To plan and coordinate the work of the Association and its subsidiary bodies;

- (c) To ensure priorities are addressed and advise on appropriate mechanisms for achieving results in accordance with the regional operating plan;
 - (d) To establish and review the structure and work of the subsidiary bodies of the Association, including the implementation of their recommendations, and to disband or reorganize these bodies as needed;
 - (e) To collaborate with the Secretariat on resource mobilization and advise on the alignment of resources with regional priorities and implementation of the operational plan;
 - (f) To coordinate and monitor the implementation of the Strategic Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in Regional Association IV (North America, Central America and the Caribbean), and to provide the Association's input to the WMO Strategic Plan;
 - (g) To finalize the Operating Plan for the remainder of the fifteenth financial period based on the discussions during the fifteenth session of the Association and taking into account input from the Members of the Association and to develop a regional operating plan for the sixteenth financial period;
 - (h) To identify RA IV focal points to ensure coordination with WMO programmes and other organizations as appropriate;
 - (i) To address other issues as they arise, including strengthening of strategic partnerships with regional organizations, development agencies and other partners;
- (2) To appoint Mr Eduardo Planos-Gutierrez (Cuba) as Regional Hydrological Adviser and to serve as regional Focal Point on hydrological matters in the Region;
- (3) To designate the president as chairperson of the Management Group, which is composed of the president, the vice-president and three Permanent Representatives (or their designated Alternates) to be invited by the president. The chairperson of the Hurricane Committee and Hydrological Advisor shall serve as ex-officio members and participate in meetings, when possible. The president is encouraged to invite other Directors of National Meteorological and Hydrological Services and chairpersons of RA IV subsidiary bodies to participate in Management Group meetings as needed and subject to the availability of financial resources;

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 IV Permanent Representatives, to create and populate the initial RA IV subsidiary bodies not later than 18 September 2009;

Authorizes the president to take necessary decisions on behalf of the Association, after consultation with the Management Group, on important matters;

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;

Requests the Secretary-General to prepare a document by 1 September 2009 summarizing the actions and priorities of RA IV discussed during the fifteenth session of the Association.

Resolution 5 (XV-RA IV)
RA IV HURRICANE COMMITTEE

REGIONAL ASSOCIATION IV (NORTH AMERICA,
CENTRAL AMERICA AND THE CARIBBEAN),

Noting:

- (1) Resolution 7 (Cg-XIV) – Tropical Cyclone Programme,
- (2) Resolutions of the General Assembly of the United Nations – International Strategy for Disaster Reduction (ISDR),
- (3) Decisions of the United Nations Global Conference on the Sustainable Development of Small Island Developing States and its resolution concerning the Barbados Programme of Action for the Sustainable Development of Small Island States,
- (4) With appreciation the final reports of the sessions of the RA IV Hurricane Committee,
- (5) Regulations 32 and 35 of the WMO General Regulations,
- (6) Sections concerning the Tropical Cyclone Programme under Chapter 6 (WMO Programmes) of the Sixth WMO Long-term Plan (2004–2011),

Considering:

- (1) The need for the countries affected by tropical cyclones to continue to work together and to increase action to reduce the loss of human life and damage caused each year by tropical cyclones and associated storm surges, floods and landslides,
- (2) The need for coordination in the implementation of the regional cooperation programme elaborated by the Hurricane Committee,
- (3) The view expressed by the Executive Council that such regional cooperation programmes are the basis for the success of the WMO Tropical Cyclone Programme,
- (4) The need to implement projects in the region aimed at achieving the goals of the International Strategy for Disaster Reduction and the Barbados Programme of Action,

Decides:

- (1) To re-establish the RA IV Hurricane Committee with the following terms of reference:
 - (a) To coordinate tropical cyclone forecast and warning operational procedures as a means of minimizing tropical cyclone damage;
 - (b) To coordinate, in carrying out its functions, with the RA IV Management Group;
 - (c) To serve as a forum for exchange of information on new developments in the science and technology of tropical cyclone observation, tracking and forecasting;
 - (d) To make recommendations on improvements in facilities and procedures as needed to ensure efficient and effective early warning systems against tropical cyclones and associated phenomena;
 - (e) To advise the Association on the possible sources of technical and financial support and, where deemed necessary, to initiate positive action in this regard for the development and strengthening of such warning systems and their infrastructures;
 - (f) To engage, in carrying out its function, the appropriate experts in the areas of Integrated Observing System and WMO Information System (WIS); Hydrology; and Disaster Risk Reduction and Service Delivery; as well as other experts or institutions as appropriate;

- (g) To serve as a forum for tropical cyclone disaster prevention and preparedness activities appropriate to meteorological and hydrological services;
 - (h) To provide appropriate community information, education and training, and awareness efforts on meteorological and hydrological effects of tropical cyclones;
 - (i) To encourage governments to adopt measures to mitigate the potential harmful impacts of tropical cyclones;
 - (j) To foster cooperative efforts of WMO and other international bodies in those aspects of tropical cyclone disaster preparedness and prevention that can benefit from meteorological and hydrological assistance;
 - (k) To promote greater emphasis on training activities through the provision of appropriate facilities and financial support as necessary;
 - (l) To serve as a forum to share with RA IV experts on Disaster Risk Reduction and Service Delivery and other experts or institutions as appropriate: (i) best practices on hurricane forecast and warning operational procedures, (ii) recommendations on improvements in facilities and procedures in order to ensure efficient and effective warning systems, as well as (iii) tropical cyclone disaster prevention and preparedness activities appropriate to meteorological and hydrological services;
 - (m) To ensure the deliberations and planning of the Hurricane Committee bear significant relevance to the regional efforts on disaster risk reduction – service delivery, hydrology and the WMO Integrated Observing System and WMO Information System and others as necessary in consultation with the RA IV Management Group;
- (2) That the Hurricane Committee should be composed of the following members:
- (a) Directors of Meteorological, Hydrological and Hydrometeorological Services, or those individuals responsible for tropical cyclone forecasting from all Members of RA IV. The Hydrological Advisor and regional focal points that may be established in areas such as disaster risk reduction, service delivery, and the WMO Integrated Observing System and WMO Information System in Region IV are ex-officio members;
 - (b) In accordance with Regulation 32 of the WMO General Regulations, Mr Bill Read (United States) as chairperson of the Committee;
 - (c) Mr Mark Guishard (United Kingdom) and Mr José Rubiera (Cuba) as vice-chairpersons of the Committee;

Requests the Secretary-General:

- (1) To accord very high priority to the convening of an annual session of the Committee prior to the hurricane season;
- (2) To take the necessary steps to assist the Committee and to ensure the provision of appropriate Secretariat support to its activities;
- (3) To ensure the necessary cooperation with the ISDR Secretariat, the International Federation of Red Cross and Red Crescent Societies, the Caribbean Disaster Emergency Response Agency, the Coordination Centre for the Prevention of Natural Disasters in Central America, the United States Office of Foreign Disaster Assistance, and such other organizations and agencies as may be deemed appropriate;
- (4) To promote strong links with the other regional tropical cyclone bodies under the Tropical Cyclone Programme and relevant scientific bodies.

Note: This resolution replaces Resolution 6 (XIV-RA IV), which is no longer in force.

Resolution 6 (XV-RA IV)

REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION

REGIONAL ASSOCIATION IV (NORTH AMERICA,
CENTRAL AMERICA AND THE CARIBBEAN),

Noting paragraph 3.7.1 of the general summary of the ninth session of the Executive Committee,

Considering:

- (1) That a number of its resolutions adopted before its fifteenth session have been revised and incorporated in resolutions of the fifteenth session,
- (2) That others of its previous resolutions have been incorporated in appropriate WMO publications or have become obsolete,
- (3) That some of the previous resolutions are still to be implemented,

Decides:

- (1) To keep in force Resolutions 25 (VI-RA IV), 7 (VII-RA IV), 9 (VIII-RA IV), 16 (VIII-RA IV), 14 (IX-RA IV), 4 (X-RA IV), 8 (X-RA IV), 4 (XII-RA IV), 11 (XII-RA IV), 13 (XII-RA IV) and 12 (XIII-RA IV);
- (2) Not to keep in force the other resolutions adopted before its fifteenth session;
- (3) To publish the text of the resolutions kept in force in the annex to this resolution.

Note: This resolution replaces Resolution 19 (XIV-RA IV), which is no longer in force.

Annex to Resolution 6 (XV-RA IV)

REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION

Resolution 25 (VI-RA IV)

PARTICIPATION OF NATIONAL METEOROLOGICAL SERVICES IN PLANNING AND DEVELOPMENT BODIES

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 17 (Cg-VI) — Role of meteorology in social and economic development,
- (2) WMO World Weather Watch Planning Reports Nos. 4, 17 and 27,
- (3) Proceedings of the WMO/ECLA Regional Technical Conference on the Role of Meteorological Services in the Economic Development of Latin America,
- (4) Paragraph 5.5.11 of the general summary of the *Abridged Report of the Twenty-fourth Session of the Executive Council*,

- (5) Paragraph 3.3.9.4 of the general summary of the *Abridged Report of the Sixth World Meteorological Congress*,

CONSIDERING:

- (1) The important and decisive role played by meteorology and its applications in human activities dependent on the weather,
- (2) The urgent need for planning and development councils, secretaries of economy and other similar national bodies to receive meteorological advice for performing the evaluation of natural resources, promoting their rational utilization and management as well as protecting the environment,

RECOMMENDS that Members take the necessary steps to ensure:

- (1) That expertise of the national Meteorological Services be taken into account by their countries' national planning and economic and social development bodies; and
- (2) That, when possible, a representative of these Services participates in the activities of these bodies, particularly during the discussions of matters relative to the evaluation and management of natural resources, town and country planning, defense of the environment and other human activities influenced by weather and climate.

Resolution 7 (VII-RA IV)

INTERCHANGE VISITS OF PERSONNEL ENGAGED IN ANALYSIS AND PROGNOSIS ACTIVITIES

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING Resolution 3 (Cg-VII) — World Weather Watch,

CONSIDERING that there is a necessity for exchange of information on the methods of preparation of analyses and prognoses of interest to the Region,

URGES Members of Regional Association IV to encourage interchange visits of meteorological personnel between NMCs and the associated RMCs/WMCs to study and evaluate the analysis and forecast methods in use, in order to achieve efficient preparation and use of the output products of these centres;

REQUESTS the Secretary-General to assist in promoting this form of cooperation.

Resolution 9 (VIII-RA IV)

STRENGTHENING OF NATIONAL METEOROLOGICAL CENTRES

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 6 (VII-RA IV) — Strengthening of National Meteorological Centres,
- (2) Resolution 5 (Cg-VIII) — World Weather Watch,
- (3) The WWW plan and implementation programme 1980–1983,

CONSIDERING:

- (1) That the provision of processed meteorological information tailored to satisfy the requirements set out by various fields of human activities is one of the basic responsibilities of National Meteorological Services,

- (2) That responsibility is critical in those cases where the meteorological information is required for the warning and alerting services related to extreme weather conditions, particularly in the tropical areas of the Region affected by hurricane and other tropical disturbances,
- (3) That these requirements, as well as others related to the social and economic development of the corresponding countries, can best be met through a well-equipped and staffed National Meteorological Centre,

URGES Members to develop their National Meteorological Centres, as necessary, to ensure that they are capable of providing adequate meteorological services on the national level to the various human activities affected by weather and climate;

REQUESTS the Secretary-General to assist the countries, if so requested, in the planning of the expansion and improvement of National Meteorological Services and the upgrading of the National Meteorological Centres.

NOTE: This resolution replaces Resolution 6 (VII-RA IV), which is no longer in force.

Resolution 16 (VIII-RA IV)

INCREASED OBSERVATIONS FROM SHIPS OPERATING IN THE TROPICS AND THE SOUTHERN OCEANS

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 15 (VII-RA IV) — Increased observations from ships operating in the tropics and the southern oceans,
- (2) The recommendation of the Informal Planning Meeting on the Improvement in Observational Data Coverage over the Oceans (Geneva, June 1976), that: "Meteorological Services should continue to select and equip suitable vessels to make weather observations, especially where this would be likely to augment the supply of information from data-sparse areas",
- (3) Recommendation 4 (CMM-VII) — Port Meteorological Services,

CONSIDERING:

- (1) That insufficient progress has so far been made in the implementation of Resolution 15 (VII-RA IV), whereas the need for observations from data-sparse areas in the Region still exists for scientific and operational purposes,
- (2) That the Port Meteorological Officer can play an important role in encouraging ships to report from data-sparse areas,
- (3) That the establishment of Port Meteorological Services will be of particular importance in obtaining increased observations, especially from the tropics and the southern ocean areas,

URGES:

- (1) Members of RA IV collecting ship' weather reports to ensure that all ships' weather reports collected at their centres are regularly disseminated within the Region; and
- (2) Members of RA IV to establish or expand Port Meteorological Services at all ports which are visited by ships operating in the tropics and the southern ocean areas;

REQUESTS the Secretary-General of WMO to assist Members of RA IV in the implementation of this resolution, particularly as regards the training aspects.

NOTE: This resolution replaces Resolution 15 (VI-RA IV), which is no longer in force.

Resolution 14 (IX-RA IV)

RA IV HURRICANE OPERATIONAL PLAN

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 2914 (XXVI) of the General Assembly of the United Nations — International action for the mitigation of the harmful effects of storms,
- (2) Resolution 13 (IX-RA IV) — RA IV Hurricane Committee,

CONSIDERING:

- (1) The need to enhance the cooperative efforts of countries within Region IV in carrying out effectively their roles in preparing for 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 'Hurricane Operational Plan' defining the observing, forecasting and warning responsibilities of all cooperating countries,

DECIDES to adopt the 'Hurricane Operational Plan'*;

AUTHORIZES the president of RA IV to approve on behalf of the Association amendments to this Hurricane Operational Plan, as recommended by the RA IV Hurricane Committee;

REQUESTS the Secretary-General:

- (1) To maintain the WMO publication on the RA IV Hurricane Operational Plan in print and to keep it up to date;
- (2) To inform all Members concerned of any amendments and updating of the publication.

* Published as WMO-No. 524.

Resolution 4 (X-RA IV)

THE FURTHER DEVELOPMENT OF THE GLOBAL OBSERVING SYSTEM

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 25 (Cg-X) — Second WMO Long-term Plan, including the WWW Implementation Programme for RA IV (1988–1997),
- (2) The progress being made in the implementation of the ASDAR, ASAP and drifting buoy programmes,

CONSIDERING:

- (1) That parts of the Region are data-sparse areas,
- (2) The importance of an effective Regional Basic Synoptic Network and the essential need to integrate it with the overall GOS,
- (3) The need to have comprehensive and realistic information on the value of new observing systems, their costs and their interfaces with other parts of the regional programme,

INVITES Members to participate in the deployment and use of new observing systems and, individually or collectively, to evaluate the effectiveness of these systems and their integration in the WWW;

ENCOURAGES Members to seek VCP assistance for the installation of satellite-data ground receiving stations, weather radar and new observing systems such as ASDAR, ASAP and buoys;

URGES Members to:

- (1) Provide additional surface observations in ocean areas using the Voluntary Observing Ship Scheme, buoys and suitable fixed platforms;
- (2) Consider the possibility of deploying ASAP systems on ships and ASDARs or other automated data-collection systems on aircraft flying suitable routes over the ocean;
- (3) Examine the communication facilities and data quality-control procedures to ensure that the data are of high quality and received at the data-processing centres in a timely fashion;

REQUESTS the Rapporteur on the Regional Aspects of the Global Observing System to keep abreast of developments in the implementation of this resolution by Members and to report to the next session of the Association, through the chairman of the working group.

Resolution 8 (X-RA IV)

RA IV HURRICANE COMMITTEE'S TECHNICAL PLAN AND IMPLEMENTATION PROGRAMME

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 5 (Cg-X) — Tropical Cyclone Programme,
- (2) A series of resolutions of the General Assembly of the United Nations calling for international cooperation and action by WMO for the mitigation of the harmful effects of storms,
- (3) Resolution (42/169) of the General Assembly of the United Nations — International Decade for Natural Disaster Reduction,
- (4) With appreciation the final report of the eleventh session of the RA IV Hurricane Committee,
- (5) Resolution 7 (X-RA IV) — RA IV Hurricane Committee,

CONSIDERING:

- (1) The need for the Members affected by hurricanes to join together to develop a regional programme of action to reduce the loss of human lives and damage caused by tropical cyclones and associated phenomena,
- (2) The need to establish a regional plan and an implementation programme,

DECIDES to adopt the RA IV Hurricane Committee's Technical Plan and Implementation Programme given in the annex to this resolution;

AUTHORIZES the president of RA IV to approve on behalf of the Association amendments to the plan as recommended by the RA IV Hurricane Committee;

REQUESTS the Secretary-General:

- (1) To notify all Members concerned of any amendments to the plan adopted by the Association;
- (2) To assist Members concerned in the implementation of the plan.

Resolution 4 (XII-RA IV)

ESTABLISHMENT OF REGIONAL INSTRUMENT CENTRES

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) The evident benefit to Members and the experience gained from the establishment of Regional Instrument Centres,

- (2) Recommendation 14 (CIMO-IX) — Intercomparison of instruments,

CONSIDERING:

- (1) The limited resources of many Meteorological Services for employing experts with a scientific background or technical experience in the field of meteorological instruments and methods of observation,
- (2) The difficulties met by several Members, in particular in developing countries, when attempting to calibrate or compare their meteorological instruments against recognized standard instruments,

RECOMMENDS that WMO Regional Instrument Centres be designated to carry out the following functions:

- (1) To assist WMO in organizing regional training seminars or workshops in the maintenance, calibration and comparison of meteorological instruments, by providing laboratory space, demonstration equipment and expert advisers;
- (2) To advise Members of their Region in their inquiries about the performance of instruments and the availability of related guidance material;
- (3) To maintain a library of texts and periodicals on instrumentation science and practice;
- (4) To maintain a set of meteorological standard instruments traceable to recognized international or national standards, and to keep a continuous record of their performance and traceability;
- (5) To assist Members of their Region to calibrate or compare their national meteorological standard instruments against the standards mentioned under (4) above and to keep the Members of the Region and the WMO Secretariat well informed of the standard instruments available;

APPROVES the establishment of an RA IV Regional Instrument Centre at the Mount Washington Observatory in New Hampshire, United States, at the Caribbean Meteorological Institute and at the RMTTC in San Jose, Costa Rica.

Resolution 11 (XII-RA IV)

INVOLVEMENT IN OPERATIONAL OCEANOGRAPHY

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 16 (Cg-XII) — WMO's involvement in operational oceanography,
- (2) Resolution 2 (EC-XLVIII) — Report of the seventh session of the Joint IOC/WMO Committee for IGOSS,
- (3) Resolution 10 (XI-RA IV) — Participation in the Joint IOC/WMO Integrated Global Ocean Services System (IGOSS),

CONSIDERING that oceanographic observations not only make a significant contribution to operational meteorology and the provision of marine services, but are also essential to global climate studies generally,

RECOGNIZING:

- (1) That many 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,
- (2) That many Members of the Association are also being increasingly required to provide coordinated meteorological and oceanographic services for a large variety of marine user groups,
- (3) That the GTS will continue to be essential for the operational collection and exchange of many types of ocean data, **RECOGNIZING** further that a substantial increase in the amount of ocean data available operationally is needed to satisfy the requirements of operational meteorology, oceanographic services and research and global climate studies for such data,

URGES Members:

- (1) To continue and, where possible, expand their existing operational ocean observing system facilities and activities, as contributions to the WWW, IGOSS and GOOS;

- (2) To participate actively in the planning and implementation of these systems;
- (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 INMARSAT system;
- (6) To collect digitized bathymetry data that can be used to produce storm surge risk maps;

REQUESTS the Secretary-General to take any action considered necessary, and within the available budgetary resources, to assist Members to participate in the development and maintenance of IGOSS and GOOS.

NOTE: This resolution replaces Resolution 10 (XI-RA IV), which is no longer in force.

Resolution 13 (XII-RA IV)

PARTICIPATION OF WOMEN IN THE WORK OF THE REGION

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) The UN Conference on Women (Beijing, 1995) and its recognition of the importance of women and their contributions to science,
- (2) Principle No. 3 adopted by the International Conference on Water and the Environment (Dublin, 1992), namely that: "women play a central part in the provision, management and safeguarding of water",
- (3) The appeals made in Chapter 24 of Agenda 21: Programme of Action for Sustainable Development (Rio de Janeiro, 1992) on: "Global action for women towards sustainable and equitable development",
- (4) The UNDP emphasis and priority on the advancement of women in meteorology and operational hydrology,
- (5) That the forty-eighth session of the Executive Council had requested Members to encourage the advancement of women in meteorology and operational hydrology,
- (6) That the tenth session of the Commission for Hydrology passed a recommendation encouraging increased participation by women in the work of the Commission,

CONSIDERING the projected shortage of trained hydrological and meteorological personnel in the Region,

WELCOMING the very active participation of women delegates at this session,

URGES Members to respond to the questionnaire on women distributed by the Secretariat;

FURTHER URGES Members to identify focal points in their NMHSs for this activity;

RECOMMENDS that Members:

- (1) Actively provide encouragement and support for an increased number to the extent possible of women to work as professional staff and at decision-making levels in NMHSs, other hydrological and meteorological institutions and in regional, national and international cooperation programmes;
- (2) Increase the representation of women in their delegations to sessions of RA IV and participation in RA IV working groups, expert group meetings and training activities to the extent possible;
- (3) Promote the study of meteorology and hydrology in the schools;

REQUESTS the President of the Association to report to the thirteenth session of RA IV on progress in the implementation of this resolution during the inter-sessional period.

Resolution 12 (XIII-RA IV)

SUPPORT FOR JCOMM

REGIONAL ASSOCIATION IV (NORTH AND CENTRAL AMERICA),

NOTING:

- (1) Resolution 14 (Cg-XIII) -Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM),
- (2) IOC Assembly Resolution XX-12 - The Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM),

CONSIDERING that oceanographic and marine meteorological observations not only make a significant contribution to operational meteorology and the provision of marine services, but also are essential to global climate studies generally,

RECOGNIZING:

- (1) That JCOMM is now the 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 Global Telecommunication System (GTS) will continue to be essential for the operational collection and exchange of many types of ocean data;

RECOGNIZING FURTHER that a substantial increase in the amount of ocean data available operationally is needed to satisfy the requirements of operational meteorology, oceanographic services and research and global climate studies for such data,

URGES Members:

- (1) To continue and, where possible, expand their existing operational ocean observing system facilities and activities, as contributions to the WWW, GCOS and GOOS and with international coordination effected through JCOMM;
- (2) To participate actively in the planning and implementation of these systems and in the work of JCOMM;
- (3) To coordinate with appropriate national oceanographic agencies and institutions to ensure the long-term operational maintenance of oceanographic observing systems;
- (4) To coordinate with appropriate national oceanographic agencies and institutions in developing oceanographic data management capabilities and oceanographic services;
- (5) To enhance two-way ship-to-shore telecommunication arrangements for oceanographic data and products, in particular through the greater use of satellite-based telecommunications facilities such as the INMARSAT and Argos systems;

REQUESTS the Secretary-General to take any action considered necessary, and within the available budgetary resources, to assist Members to participate in the development and maintenance of JCOMM.

NOTE: This resolution replaces Resolution 11 (XII-RA IV), which is no longer in force.

ANNEXES

ANNEX I

Annex to [paragraph 5.1.4.2](#) of the general summary

VOLUNTEERISM IN THE WORK OF REGIONAL ASSOCIATION IV (NORTH AMERICA, CENTRAL AMERICA AND THE CARIBBEAN)

General

It is recognized that commitment and volunteerism, with the required support from Members, plays 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:

1. 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;
2. That prospective candidate experts and their Permanent Representatives should be aware of responsibilities and commitments, especially as far as coordination and participation are concerned;
3. That in seeking nomination for membership in the subsidiary bodies of regional association, 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;
4. That working group and sub-group members and theme leaders be chosen in such a way that their volunteer work corresponds to their daily activities in their home institutions;
5. 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;
6. That Permanent Representatives should provide complete and up-to-date expert details, especially working e-mail addresses, to facilitate establishing subsidiary bodies;
7. That candidate experts not selected by nomination committees should be informed, thanked and encouraged to apply again to some other WMO work.

Performance monitoring:

1. That the WMO Secretariat manages 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 is set up accordingly, in order to have work assigned appropriately;
2. That evaluation of each subsidiary body and involved experts is conducted by the chairperson 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;
3. This evaluation is also important for the experts involved, especially for the recognition of their work by their Permanent Representatives;
4. That should an expert not contribute at the expected level, or in case of a totally silent expert, the president of association will consider his/her replacement, for example after one year of insufficient contribution;

5. 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.

ANNEX II

Annex to paragraph 6.4 of the general summary

**THREE POSSIBLE PATHWAYS TO BECOMING AN OPERATIONALLY READY
WMO METEOROLOGIST SPECIALIZING IN ONE OF THE ELECTIVE FIELDS
NOTED IN WMO-No. 258**

<i>Meteorological degree</i>	<i>Non-meteorological degree</i>	<i>No degree</i>
Qualifies as WMO Meteorologist here	Condensed BIP-M	Prerequisite Maths, Physics as set out in WMO-No. 258
Role specific education and training	Qualifies as WMO Meteorologist here	Condensed BIP-M
Closely supervised OJT in operational area, does not independently issue any products (minimum 300 hours)	Role specific education and training	Qualifies as WMO Meteorologist here
Close monitoring, feedback and ongoing assessment prior to finally being 'signed-off' as competent to perform fully independent operations	Closely supervised OJT in operational area, does not independently issue any products (minimum 300 hours)	Role specific education and training
Recommended minimum 6-month period of training and assessment from initial recruitment to fully independent operations	Close monitoring, feedback and ongoing assessment prior to finally being 'signed-off' as competent to perform fully independent operations	Closely supervised OJT in operational area, does not independently issue any products (minimum 300 hours)
	Recommended minimum 12-month period of training and assessment from initial recruitment to fully independent operations	Close monitoring, feedback and ongoing assessment prior to finally being 'signed-off' as competent to perform fully independent operations
		Recommended minimum 24-month period of training and assessment from initial recruitment to fully independent operations.

APPENDIX

LIST OF PARTICIPANTS

1. Officers of the session

Acting president	Ing. Luz G. DE CALZADILLA (Ms)
Vice-president	Vacant

2. Representatives of WMO Members within the Region

Antigua and Barbuda

Glendell De Souza	Delegate
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Bahamas

Arthur W. Rolle	Delegate
Trevor Basden	Alternate
Michael Stubbs	Delegate
Elise Delancy	Delegate
Jeffrey Simmonis	Delegate
Arnold King	

Barbados

Chester Layne	Delegate
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Belize

Dennis Gonguez	Delegate
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British Caribbean Territories

Tyrone Sutherland	Principal Delegate
Fred Sambula	Alternate
Glendell De Souza	Delegate
David Farrell	Delegate
John Tibbetts	Delegate
John Smith	Delegate

Canada

David Grimes	Principal Delegate
Bruce Angle	Alternate
Danielle Lacasse (Ms)	Delegate
John Parker	Delegate

Colombia

Humberto Gonzalez	Delegate
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Costa Rica

Juan Carlos Fallas	Delegate
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Cuba

Eduardo Planos-Gutierrez	
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France

Nicolas Bériot	Principal Delegate
Jean-Noël Degrâce	Alternate

Jamaica

Sylvia McGill (Mrs)	Delegate
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Mexico

Alberto Hernández Uzón	Delegate
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Netherlands Antilles and Aruba

Albert A.E. Martis	Principal Delegate
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Panama

Luz G. de Calzadilla (Ms) Delegate

Saint Lucia

Thomas Auguste Delegate

Trinidad and Tobago

Emmanuel Moolchan Delegate

United Kingdom of Great Britain and Northern Ireland

Mark Guishard Principal Delegate
 Simon Gilbert Alternate (24–29 April)
 Kimberley Zuill (Ms) Delegate

United States of America

John L. Hayes Principal Delegate
 Dan Thompson Alternate
 Curtis B. Barrett Delegate
 Frederick Branski Delegate
 Courtney J. Draggon (Ms) Delegate
 Caroline E. Corvington (Ms) Delegate
 Arun Kumar Delegate
 Bill Proenza Delegate
 Martin Medina Delegate
 Tim Spangler Delegate
 Justyna Nicinska Delegate

3. Representatives of WMO Members outside Region IV**Finland**

Harri Pietarila Observer
 Martti Heikinheimo Observer

Spain

Francisco Cadarso Observer
 Jorge Tamayo Observer

4. Representatives of international organizations**Association of Hydro-Meteorological Equipment Industry (HMEI)**

Mike Ueltzen
 Rick Villavicencio
 Ricardo Rivero
 Ed Figelmano

International Civil Aviation Organization (ICAO)

E. Camarillo

Niger Basin Authority (NBA)

Bréhima Coulibaly

United Nations Educational, Scientific and Cultural Organization (UNESCO)

Eduardo Planos-Gutierrez

5. Invited expert

Carr Mcleod President CAeM
 Gene shaffer

6. Other participants and observers

Lt Col David Borsi United States
 Andres Campusano Dominican Republic

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