

**WORLD METEOROLOGICAL ORGANIZATION**

**REGIONAL ASSOCIATION I  
(AFRICA)**

**THIRTEENTH SESSION**

**MBABANE, 20–28 NOVEMBER 2002**

**ABRIDGED FINAL REPORT WITH RESOLUTIONS**

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## REPORTS OF RECENT WMO SESSIONS

### Congress and Executive Council

- 883 — Executive Council . Fiftieth session, Geneva, 16–26 June 1998.  
902 — Thirteenth World Meteorological Congress . Geneva, 4–26 May 1999.  
903 — Executive Council . Fifty-first session, Geneva, 27–29 May 1999.  
915 — Executive Council . Fifty-second session, Geneva, 16–26 May 2000.  
929 — Executive Council . Fifty-third session, Geneva, 5–15 June 2001.  
932 — Thirteenth World Meteorological Congress . Proceedings, Geneva, 4–26 May 1999.  
945 — Executive Council . Fifty-fourth session, Geneva, 11–21 June 2002.

### Regional associations

- 891 — Regional Association I (Africa). Twelfth session, Arusha, 14–23 October 1998.  
924 — Regional Association II (Asia). Twelfth session, Seoul, 19–27 September 2000.  
927 — Regional Association IV (North and Central America). Thirteenth session, Maracay, 28 March–6 April 2001.  
934 — Regional Association III (South America). Thirteenth session, Quito, 19–26 September 2001.  
942 — Regional Association VI (Europe). Thirteenth session, Geneva, 2–10 May 2002.  
944 — Regional Association V (South–West Pacific). Thirteenth session, Manila, 21–28 May 2002.

### Technical commissions

- 893 — Commission for Basic Systems . Extraordinary session, Karlsruhe, 30 September–9 October 1998.  
921 — Commission for Hydrology . Eleventh session, Abuja, 6–16 November 2000.  
923 — Commission for Basic Systems . Twelfth session, Geneva, 29 November–8 December 2000.  
931 — Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology . First session, Akureyri, 19–29 June 2001.  
938 — Commission for Climatology . Thirteenth session, Geneva, 21–30 November 2001.  
941 — Commission for Atmospheric Sciences . Thirteenth session, Oslo, 12–20 February 2002.  
947 — Commission for Instruments and Methods of Observation . Thirteenth session, Bratislava, 25 September–3 October 2002.  
951 — Commission for Agricultural Meteorology . Thirteenth session, Ljubljana, 10–18 October 2002.  
953 — Commission for Aeronautical Meteorology . Twelfth session, Montreal, 16–20 September 2002.

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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 Swaziland, the thirteenth session of Regional Association I (Africa) was held in Royal Swazi Sun Hotel, Ezulwini, from 20 to 28 November 2002. The session was opened by His Excellency, the Minister of Public Works and Transport, Prince Guduza.

**1.2** Mr E. Dlamini, Director of the Swaziland National Meteorological Service and Permanent Representative of Swaziland with WMO, welcomed the participants.

**1.3** On behalf of the Members of the Association, Mr M.S. Mhita, President of RA I, expressed his sincere appreciation to the Government of the Kingdom of Swaziland for hosting the session. He expressed appreciation for the excellent facilities put at the disposal of the session and for the warm welcome accorded to the participants. Mr Mhita reviewed the activities of the Association since its previous session in 1998, and observed that important developments had taken place in the development of meteorological and hydrological services in Africa. In particular, he informed the Association that a strategy had been developed for the implementation of the WWW in RA I, and that WMO had identified project areas for resource mobilization. He noted that a number of Permanent Representatives from RA I had attended the World Summit on Sustainable Development in South Africa in August and September of 2002. He took the opportunity to thank the Permanent Representative of South Africa with WMO for the warm hospitality accorded to the meteorology and hydrology participants attending the Summit. Mr Mhita reported on the outcomes of the WMO Technical Conference on the Management of Meteorological Services held in Abuja, Nigeria in 2000. He expressed his appreciation to WMO for the continued support to NMHSs, especially in response to natural disasters.

**1.4** Mr Mhita urged the Members to take advantage of the NEPAD Initiative for the development of NMHSs in Africa. He reminded the Association that there were still many challenges facing NMHSs, including the closing of technological gaps, improvement of observing systems, improvement of service delivery and quality management. He also reminded the Association of the upcoming Fourteenth Congress in May 2003, at which important issues were to be discussed, including the appointment of the WMO Secretary-General. The president launched a strong appeal to the RA I Members to work together for the development of meteorology and hydrology in Africa. He concluded by acknowledging the support he had received in carrying out his duties as president of RA I from the WMO Secretary-General, Professor G.O.P.

Obasi; the WMO staff; the vice-president, Mr I. Also; and the Members.

**1.5** Professor Obasi expressed the Organization's deep gratitude to the Government of the Kingdom of Swaziland for the generous offer to host the session. He thanked Mr E. Dlamini and his staff for the excellent arrangements made to ensure the success of the session. He noted that one factor that would influence the management and development of NMHSs in Africa was globalization. As meteorology and hydrology continued to play increasingly important roles in socio-economic development, it was conceivable that the commercialization of the services would be a continuous concern to the NMHSs in the context of the changing world. He noted that WMO had collaborated with Members of the Association, development partners and stakeholders in the implementation of relevant programmes and activities, in particular those approved by Thirteenth Congress. The Secretary-General emphasized that the WWW Programme remained a unique global operating system for collecting, exchanging and accessing information on weather, climate and the environment. He informed the meeting that WMO facilitated the development of a Strategy for Enhancement of the WWW-Basic Systems in Africa. In implementing the Strategy, several project areas had been identified which included measures that would enhance the availability of weather, climate and environmental data. The Strategy would be implemented in collaboration with the subregional economic groupings in Africa.

**1.6** The Secretary-General pointed out that the outcomes of the WSSD would require increased contributions from WMO and NMHSs for the protection of the global commons. He further noted that in regard to NEPAD, one of the major challenges during the first few decades of the 21st century that would have to be addressed was the problem of dwindling water resources. He noted that there was an urgent need to strengthen hydrological infrastructure in the Region. He stressed the importance of the availability of well-trained personnel with specialized training in various fields. He expressed his optimism that the Association would address the concerns of its Members with foresight and determination. In conclusion, Professor Obasi expressed his gratitude to Prince Guduza for honouring the session with his presence and wished the participants a most successful session.

**1.7** His Excellency Prince Guduza, Minister for Public Works and Transport in Swaziland, welcomed the participants to the Kingdom of Swaziland. He noted that choosing Swaziland to host the session showed the



confidence WMO had in the Kingdom and gave assurance that Swaziland would continue to give high priority to the programmes and activities of WMO. He noted that the session was being held at a time when most of the countries in the SADC region were experiencing severe food shortages and lack of clean water, mainly because of drought conditions. He said that the major challenge was to find strategies to minimize impacts of natural disasters such as droughts and floods. He expressed satisfaction and encouragement because meteorologists were working towards production of early warnings that would help countries put together preparedness measures. He noted that providing timely and reliable information to the general public on weather, climate and water-related events was a major function of NMHSs. These, he said, were the most visible and appreciated functions, as they contributed to socio-economic development and were critical to making informed decisions. He acknowledged WMO assistance to Swaziland in the establishment of its NMS. He said that Swaziland advocated collective regional and international collaboration for sustainable development and environmental conservation. He urged the Members to support regional initiatives such as the African Union and NEPAD.

**1.8** In conclusion, Prince Guduza paid tribute to Professor Obasi for leading WMO and promoting the goals and mandate of the Organization. He wished the session fruitful deliberations.

**1.9** There were 84 participants at the session from 39 Members of the Association, three participants representing three other Members of WMO and 11 participants from other regional and international organizations. The list of participants, which also indicate their official capacity at the session, is reproduced in [Appendix A](#) to this report.

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

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

**2.1** At the first plenary meeting, the representative of the Secretary-General presented a list of participants whose credentials were found to be in order. The Association accepted the list as the first report on credentials. In accordance with Regulation 22 of the WMO General Regulations, it was agreed not to establish a Credentials Committee.

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

**2.2.1** The Association adopted the agenda, which is reproduced in [Appendix B](#) to this report.

### **2.3 ESTABLISHMENT OF COMMITTEES** (agenda item 2.3)

In accordance with Regulation 24 of the WMO General Regulations, the Association established the following committees for the duration of the session:

#### **NOMINATION COMMITTEE**

**2.3.1** The Association established a Nomination Committee composed of the principal delegates of Libyan Arab Jamahiriya, Mozambique, Rwanda, Senegal and Sudan. Mr A. Ndiaye (Senegal) was elected chairperson of the Committee.

**2.3.2** The Association established two working committees, A and B, to examine the various agenda items as follows:

- (a) Working Committee A was assigned agenda items 4.1, 4.2, 4.3, 4.4, 4.5, 6.1, 6.2, 6.3, 6.4, 6.5, 7.1, 7.3, and 7.4. Mr M.L. Bah (Guinea) and Mr D. Kamdonyo (Malawi) were elected as co-chairpersons.
- (b) Working Committee B was assigned agenda items 5.1, 5.2, 5.3, 5.4, 5.5, 7.2, 8, 9, 10, and 11. Mr Bwango-Apuuli (Uganda) and Mr F. Ounnar (Algeria) were elected co-chairpersons.
- (c) The Association elected Mr B. Kassahun (Ethiopia) as rapporteur for agenda item 19 - Review of the Previous Resolutions and Recommendations of the Association and of Relevant Resolutions of the Executive Council.
- (d) The other agenda items were examined by the Committee of the Whole.

#### **COORDINATION COMMITTEE**

**2.3.3** The Association established a Coordination Committee composed of the president and the vice-president of the Association, the co-chairpersons of the Working Committees and the representative of the Secretary-General.

#### **OTHER SUBCOMMITTEES**

**2.3.4** The Association established a subcommittee to examine the 6LTP. The sub-committee was composed of the principal delegates of Botswana, Burkina Faso, Egypt, Mauritius, Nigeria, Rwanda and Swaziland. Ms G.K. Ramothwa (Botswana) was elected chairperson of the subcommittee.

### **2.4 OTHER ORGANIZATIONAL MATTERS** (agenda item 2.4)

**2.4.1** The necessary arrangements were agreed to concerning the working hours and the allocation of agenda items to plenary meetings, meetings of the Committee of the Whole and the Working Committees.

**2.4.2** In accordance with the fiftieth session of the Executive Council, the session agreed that no minutes of the plenary meeting should be prepared. Tape recordings of the plenaries would be made and would be retained for record purposes. It was decided, however, that minutes could be taken of delegations' statements if requested.

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

**3.1** The Association examined the report of the president and noted with satisfaction the progress made in the activities of the Association since its previous session. It expressed appreciation to the president for

his initiatives, dedication and contributions to the development of the NMHSs in the Region.

**3.2** The Association noted the actions taken by the president to implement its decisions and recommendations. In particular, it noted the actions taken by the president on its behalf since the twelfth session of the Association.

**3.3** The Association noted with satisfaction the visits made by its president and vice-president to review progress of the regional aspects of WMO programmes and address issues of interest to the Region, as well as to heighten national authorities' awareness of the role of meteorology and hydrology in the countries' social and economic development.

**3.4** The Association expressed its appreciation to the president and vice-president for the visits made to countries in the Region as they contributed to enhancing the visibility of NMHSs. It asked that the list of these countries be attached to the president's report in the future. The Association also agreed that the report should take the vice-president's activities into account.

**3.5** The Association commended the president and vice-president for their effective representation of the Association at sessions of Congress, the Executive Council and other regional and interregional meetings. It suggested that the president should take part, as appropriate, in relevant subregional meetings.

#### **4. WORLD WEATHER WATCH (WWW) PROGRAMME - REGIONAL ASPECTS** (agenda item 4)

##### **4.1 WWW PLANNING AND IMPLEMENTATION PROGRAMME, RA I STRATEGY FOR ENHANCEMENT OF THE WWW-BASIC SYSTEMS, INCLUDING THE REPORT OF THE CHAIRPERSON OF THE WORKING GROUP ON PLANNING AND IMPLEMENTATION OF THE WWW (WG/PIW) IN REGION I** (agenda item 4.1)

**4.1.1** The Association noted with appreciation the report of Mr W. Nyakwada (Kenya), chairperson of the WG/PIW in Region I. It noted that details of the status of implementation were available in *World Weather Watch – Twentieth Status Report on Implementation* (WMO-No. 922) published in 2001, and were also posted on the WMO Web site ([www.wmo.ch](http://www.wmo.ch)). The Association noted the progress achieved in the implementation of the WWW in the Region, but also noted significant deficiencies identified through annual global monitoring of the operation of the WWW available on the WMO Web site and expert surveys. The Association commended the efforts and resources put in the development and completion of the RA I Strategy to address the deficiencies and enhance the Basic Systems detailed below, and considered related opportunities and means under the relevant WWW components and supporting functions.

**4.1.2** The Association agreed that in the light of the many tasks and issues raised in the report of the

chairperson of the WG/PIW in RA I, it would be necessary to re-establish the working group. It adopted [Resolution 1 \(XIII-RA I\)](#).

#### **RA I STRATEGY FOR ENHANCEMENT OF THE WWW-BASIC SYSTEMS**

**4.1.3** The Association endorsed the integrated WWW strategic plan for improvement of infrastructure and services of meteorological services, as approved by the president of RA I and circulated to Members. The plan focused on identified gaps, proposed solutions and justifications, and was based on the strategic plan developed at the Cairo meeting and field survey reports. The Association emphasized the fact that addressing these deficiencies would improve the meteorological services not only of the Region but also of the entire globe with regard to safety, climate monitoring, disaster reduction, poverty alleviation and economic growth. It agreed that the strategies for providing sustainable solutions should focus on:

- (a) Implementation of AWSs in remote areas and in existing stations not operating at night;
- (b) Use of satellite data and products and their applications;
- (c) Rehabilitation of current station networks;
- (d) Production of basic equipment and consumables, and establishment of maintenance facilities;
- (e) Implementation and improvement of telecommunication facilities;
- (f) Provision of Internet facilities of observatories close to rural communities;
- (g) Development of GDPS capabilities in NMCs for NWP Research and Development, as well as operational application of NWP to weather, climate and water resources forecasts;
- (h) Improvement of LRF using regional NWP models;
- (i) Enhancement of R&D facilities and capacity of regional and subregional centres and NMCs;
- (j) Building capacity for GDPS, PWS and DM, including systems for data processing and forecasting, product interpretation, verification and use of NWP model output, presentation and data management.

**4.1.4** The Association strongly endorsed the view that the WWW Basic Systems and PWS should be taken as an integrated entity because a failure of any component would affect the entire system. Furthermore, it was noted that deficiencies in the system affected the communities in the Region and the global community as a whole with regard to safety of life and property, as well as monitoring and prediction of weather and climate for the benefit of socio-economic activities.

**4.1.5** The Association endorsed the strategic vision that solutions that included implementation and improvement of the Basic Systems and PWS at the national and regional levels needed national, regional and global attention to ensure enhanced safety and sustainable development of humankind.

**4.1.6** The Association took into account analyses of current deficiencies of the components of the Basic Systems, PWSs and DM systems, and proposed solutions and implementation strategies to address identified gaps and enhance the systems. It considered the need for improvement of GOS with priority given to existing GCOS stations and others meeting the GCOS criteria, and expansion of RBSN and RBCN to improve regional climate studies. It noted in particular that the current GOS included GCOS networks, and took into account requirements to support other applications programmes, but had significant deficiencies needing urgent attention through the installation of AWSs. The Association emphasized the need to improve the collection, quality control and processing of data, and the exchange and dissemination of information to the user communities, through overall GTS improvements and the use of dissemination systems based on strengthening the existing resources, IP techniques and cell phone technologies. It emphasized the need for legally enforceable types of service agreements with TSPs, assuring full-time service availability, in particular for the last mile (i.e. between the TSP and the point of presence).

**4.1.7** The Association endorsed the strategies for improving GDPS, PWS and DM. These focused on automation of processing and forecasting functions, and integration of IT facilities using LAN and WAN, provision of facilities for R&D and NWP operational forecasting, climate modeling, data rescue and implementation of databases. Others included intensive use of satellite data and products, and ICT for efficient service delivery to end-users.

**4.1.8** The Association was informed of results and conclusions of a workshop on approaches for implementation of short-range NWP in Africa hosted by the South African Weather Service with the support of Météo France, the Met Office (United Kingdom) and the National Weather Service (United States). It endorsed, subject to capacity and human resources of a national Centre, a three-phase implementation:

- (a) Acquiring and running a local NWP model without data analysis;
- (b) Running a local model, without data analysis, fine-tuning the system for the local region; and/or
- (c) Running a local model with local analysis of data.

The Association noted with satisfaction the guidance developed by the workshop on communications requirements, hardware and NWP staff resources and training needed for the above three-phase NWP options. It agreed that guidance be taken into account in detailed project implementation of the Strategy for Enhancement of the WWW-Basic Systems in the Region. With regard to recommendations on a coordination mechanism and pilot project, the Association agreed that formal funded project management and execution procedures consistent with

the implementation of the Strategy would be more appropriate.

**4.1.9** The Association supported the proposal of a common bulk procurement policy for meteorological equipment and consumables for NMSs. It felt that subregional economic groupings (EAC, ECOWAS, CEMAC, IOC, IGAD, SADC, etc.) and institutions (WMO, ACMAD) could act as procurement centres for Member states, irrespective of source of funding.

**4.1.10** The Association agreed with the proposed capacity building strategies. These focused on training in operations and maintenance of systems, use of new procedures and techniques, provision of postgraduate training in modeling and facilities for R&D, operational running of NWP, use of GIS, and presentation of climate modeling and weather and climate services to end-users and the public.

#### ONGOING PROJECTS

**4.1.11** The Association took note of relevant ongoing projects to ensure that there was no overlap in the Strategy's proposed project areas. It noted progress in the implementation of the EU-funded PUMA project for provision of MSG ground satellite receiving systems covering supply of equipment, training and networking with end-users. It was also noted that Internet connectivity was essential for the industry for remote maintenance of this ground receiving equipment, thus emphasizing the need for all NMHSs in the Region to have Internet connectivity.

**4.1.12** The Association noted the developments of the ASECNA SATCOM project. In addition to upgrading the RMTN in western and central Africa, the procurement of VSATs, routers and mini-switches could affect the programme of exchange of data and products between ASECNA and non-ASECNA centres. The Association recommended that ASECNA be a full partner in the Strategy, establish an awareness campaign for its member and non-member states in the relevant subregions on its SATCOM project, and establish a plan of action for implementation of facilities and human resources.

**4.1.13** The Association noted that AMDAR provided automated observations (wind and temperature) from commercial aircraft, using a character-based code (FM 42) to exchange data on the GTS. AMDAR used on-board sensors and avionics, with an aviation industry standard system for transmitting in-flight data to the aircraft operating company. It was noted that modern aircraft were fitted with the sensors as standard equipment. The addition of a software package enabled generation of messages and transmission to the airline offices, from where they were sent to the GTS. More than 200 aircraft were reporting, and more than 10 million observations were expected in 2002. The airlines were providing the service under repayment contracts; 14 European NMSs were jointly funding the EUMETNET AMDAR project. The Association noted the need to enable access to the AMDAR data for NMHSs in Region I, while allowing them to select only the data relevant to their areas.

**4.1.14** The Association noted that a project intended to increase the availability of data in Africa by using amateur radio operators was being implemented with the support of the National Weather Service (United States) in eastern Africa, with plans for similar implementation in western Africa. The two strong justifications for the collaboration between NMHSs and amateur radio operators included the dedication of the amateur radio operators to saving lives during occurrences of disasters, and their capability to communicate from diverse and remote areas where the collection and dissemination of meteorological data and products was difficult. The Association encouraged meteorologists, volunteer weather observers and amateur radio operators to forge close partnerships to realize the objectives of the project.

**4.1.15** The Association noted the RETIM-AFRICA project, which France proposed to the NMHSs of Region I. The purpose of this project was to implement a satellite data distribution system using IP through DVB technology. This system used general public television channels, allowing both high bit rates (up to several mb/s) and low cost for the channel and for the reception systems.

**4.1.16** The Association noted that RETIM-AFRICA would allow distribution of all kinds of meteorological data. It could be particularly well suited for local and provincial stations of the NMSs (see also paragraphs 4.3.16-4.3.18).

**4.1.17** The Association noted that the RANET project had been initiated by ACMAD in Niamey, Niger. It noted that this was an important complementary facility to WWW, especially in regard to the dissemination of weather and climate information warnings to rural communities.

**4.1.18** The Association noted the Aladin Northern Africa project that Morocco and ACMAD, with the agreement of France and the 14 member countries of the Aladin Consortium, proposed to NMHSs in northern Africa (north of the equator). This regional model was to provide 24- and 48-hour forecasts to the relevant NMHSs and also make it possible to provide boundary conditions to limited-area local models.

#### PROPOSED PROJECT AREAS

**4.1.19** The Association endorsed the project area as given in the Strategy. The essential elements are given in [Annex I](#) to this report.

**4.1.20** The Association considered and identified a short list of institutions and organizations that could be interested in becoming partners in these initiatives (EU, WB, GEF, UNDP, Commonwealth and National Aid and Development Agencies). It supported the vision and expectation that resources and mobilization efforts be coordinated through the African subregional economic groupings (EAC, CEMAC, ECOWAS, IGAD, IOC, SADC and COMESA).

#### IMPLEMENTATION ACTION PLANS

**4.1.21** The Association noted with satisfaction actions taken on the development and follow-up for implementation of the Strategy, in particular the approval of the Strategy by the president of RA I;

submission of the Strategy by the president of RA I, the WMO Secretary-General and Members of RA I for implementation; completion of project formulations based on the Strategy; and resource mobilization and commencement of implementation of projects according to availability of funds.

#### 4.2 OBSERVING SYSTEMS, INCLUDING INSTRUMENTS AND METHODS OF OBSERVATION PROGRAMME (IMOP) AND WMO SATELLITE ACTIVITIES (WMOSA) (agenda item 4.2)

##### SURFACE-BASED SUBSYSTEM

##### REGIONAL BASIC SYNOPTIC NETWORK (RBSN)

**4.2.1** The Association noted with satisfaction the report of M. Saloum (Niger), the Rapporteur on Regional Aspects of GOS, in particular those parts concerning the implementation of the *in-situ* observing systems and climatological observations in Africa. It noted that in accordance with Resolution 2 (XII-RA I), the RBSN in the Region consisted of 593 surface and 113 upper-air stations. It further noted with appreciation the activities of Members to implement the RBSN in compliance with recommendations of XII-RA I. It also appreciated the work done by the Lead Data Quality Monitoring Centre in Nairobi for improving the procedures for monitoring and for the presentation and distribution of monitoring results on the availability and quality of surface-based observational data.

**4.2.2** The Association noted that of the 122 silent RBSN stations, 83 per cent belonged to the national components of countries at war or experiencing civil unrest (Angola, Democratic Republic of the Congo, Guinea-Bissau, Liberia, Sierra Leone and Somalia). However, the study also showed that the implementation of surface observation programmes at RBSN stations had improved noticeably in a number of countries, especially those in northern Africa, the ASECNA member states and southern Africa. The study revealed that a reception rate at an MTN of 60 per cent to 94 per cent indicated that the station was producing the SYNOPs but was experiencing telecommunication data collection problems between 0000 and 0600 UTC. Reception rates below 50 per cent indicated serious problems with transmission over the HF/SSB and incomplete and irregular observation programmes associated with cuts in observing personnel. Suspended or closed observation programmes were mainly due to war or social upheaval. A non-operational GTS link between NMC Addis Ababa and RTH Nairobi was also identified as cause for non-availability of data.

**4.2.3** The Association noted that 42 of the 93 upper-air stations were silent, leading to large gaps in central and eastern Africa, with some gaps also in western Africa (Ghana, Nigeria and northern Mali), northern Africa (central and southern Algeria, Libyan Arab Jamahiriya, southern Egypt and Sudan) and southern Africa (northern and western sectors). It also noted that missing or poorly operating RAOB stations could be attributed to shortages of necessary equipment and high

cost of consumables associated with budgetary constraints and maintenance problems encountered by NMSs in Region I. To facilitate the accomplishment of tasks assigned to the Rapporteur on Regional Aspects of GOS, the Association urged Members to nominate focal points within each NMS who would inform the Rapporteur and the Secretariat of all changes in the national observing networks, with a view to the timely updating of the RBSN and of *Weather Reporting* (WMO-No. 9), Volume A – Observing Stations.

**4.2.4** The Association agreed that more objective criteria for inclusion of stations were necessary, taking into account spatial distribution and availability of data according to monitoring results. Also, the Association noted that the frequency of the observational programmes and related performance depended on the presence of a sufficient number of observers. It noted the following requirements and characteristics considered in the proposal for inclusion or exclusion of a station in the RBSN:

- (a) The TRQs, the desired characteristics of the network of stations, were defined in accordance with those listed in the *Manual on the Global Observing System* (WMO-No. 544). These could be regarded as the level of performance that should be aimed at for all stations;
- (b) MRQs referred to the threshold characteristics which were decisive for the inclusion or exclusion of a station;
- (c) FLG requirements referred to an isolated station candidate for filling a gap in areas with no station (this requirement was related to spatial distribution).

**4.2.5** The Association agreed with the proposal of the Working Group to use the amended criteria for inclusion of stations in the RBSN, which is contained in [Annex II](#) to this report. The Association felt that these criteria should ensure a network with an optimum composition regarding the observing programme, reliability of reception and spacing of stations. In particular, it was felt that the criteria should allow for including stations with reduced observing programmes in data-sparse areas. Included in the annex to this paragraph are examples of TRQs and MRQs for RBSN stations, their classification and spatial distribution.

**4.2.6** The Association reviewed the proposal for a revised RBSN in Region I developed by the Rapporteur based on the above objective criteria, and adopted [Resolution 2 \(XIII-RA I\)](#).

#### OTHER OBSERVING SYSTEMS

**4.2.7** The Association noted that three airlines – South African Airways, Air Namibia and Air Mauritius – were participating in the only AMDAR programme in Africa. It agreed that the degraded state of the network of upper-air stations in Africa significantly increased the need for Members to urge their national airlines to join in providing AMDAR data, since they would be among the major beneficiaries of improved forecast quality. In order to do so, the Association urged Members concerned to submit requests for

assistance to the AMDAR Panel through the WMO Secretariat.

**4.2.8** The Association was informed that there were some large-scale projects studying atmosphere-ocean interaction, with participation by a number of African countries. These included PIRATA, which included scientists from Cape Verde, Côte d'Ivoire, Guinea, Mauritania, Morocco and Senegal. Another was WIOMAP, which included the riparian members of the western Indian Ocean, namely the Comoros, Kenya, Madagascar, Mozambique, Réunion (France), Seychelles, Somalia, South Africa and the United Republic of Tanzania.

**4.2.9** To assure cross-programme coordination between CBS and JCOMM on maritime observing systems implementation programmes at the regional oceanic basin level, the Association recommended that the regional rapporteurs for GOS and for maritime meteorological services closely interact and coordinate their work.

#### GLOBAL CLIMATE OBSERVING SYSTEM (GCOS)

**4.2.10** The Association noted that the GCOS networks had been formally operationally implemented as from 1 January 2000. The monitoring results on the performance of the RA I GCOS stations provided during the meeting had shown that the availability of climate data continued to be insufficient. The Association invited the Rapporteur on Regional Aspects of GOS to monitor the GCOS networks using reports produced by the GSN and GUAN monitoring centres, as recommended by CBS-XII. It was noted that these reports could be made available via the Internet or other means.

#### CLIMAT TEMP REPORTING

**4.2.11** The Association noted that in many countries of RA I, the list of stations providing CLIMAT TEMP reports was not identical to the national contribution to the RBSN, and that timeliness, content and coding procedures for climate messages still provided significant problems in the reporting process. Following the positive experience gained in Regions II, III, IV, V and VI, the Association considered and agreed on a concept to define a separate RBCN for the Region. The Association strongly supported the opinion expressed by the fifty-fourth session of the Executive Council, which emphasized that the WWW's GOS provided the foundation on which the capacity for climate monitoring in the Regions continued to be built, and that most WWW observing stations would function as part of both the RBSN and RBCN. The Association reiterated in this connection its willingness to adopt a unified network and observational programme for both RBCN and GCOS stations. Taking into account similar practices of other RAs and CBS recommendations, the session reviewed the proposed list of stations developed by the rapporteur using agreed principles and density criteria. The Association then adopted [Resolution 3 \(XIII-RA VI\)](#) on establishing the RBCN in Region I.

**SPACE-BASED SUBSYSTEM**

**4.2.12** The Association was informed of the status of the space-based component of GOS, including both geostationary and polar-orbiting satellites. With regard to geostationary satellites, EUMETSAT maintained its operational geostationary meteorological satellites (Meteosat series), and had plans for future geostationary (MSG series) and polar-orbiting (Metop series) systems. EUMETSAT was currently operating three satellites, Meteosat-5, 6 and 7. The 0° service was provided by Meteosat-7, with Meteosat-6 as an in-orbit spare at around 9.5°W. Meteosat-5 was located over the Indian Ocean at 63°E, providing IODC service. Details of Meteosat Operations could be found at the EUMETSAT Web site (<http://www.eumetsat.de>). Meteosat-5 had been used to support IODC service following EUMETSAT's support to the INDOEX experiment, which commenced in July 1998. No DCP or MDD services were provided via Meteosat-5. Meteosat-6 had been used both as an in-orbit spare at around 9.5°W, to support Rapid Scan trials, and to support validation of the re-engineered Meteosat-6 correction system (in addition to or in place of routine weekly imaging). During the reporting period, Meteosat-7 had been used to provide the nominal 0°. Operational Service Black body calibrations were performed once per day on slot 24. With regard to polar-orbiting satellites, the Association noted that NOAA/NESDIS, CMA and ROSHYDROMET all had operational systems. NOAA-16 was launched on 2 September 2000. By March 2001, NOAA-16 had been designated the operational replacement for NOAA-14. As such, it was operating in an orbit with a 13:53 p.m. ascending node (afternoon orbit), utilizing a similar set of instruments as NOAA-14. On 13 November 2000, the VHF transmitter (VTX) failed, preventing the APT broadcast. Data Recorder DTR#5 failed on 2 February 2000, and was no longer being used due to a failure within its electronics. NOAA-15 was launched on 13 May 1998. By July 1998, it had been designated as the operational replacement for NOAA-12. As such, it was operating in an orbit with a 7:30 a.m. descending node (morning orbit), utilizing the same set of instruments as NOAA-16, except for the SBUV. NOAA-15 had anomalous instrument behavior in the HIRS and AVHRR and the on-orbit failure of three high-gain downlink antennae. The AVHRR was being re-phased once a day to assist the scan motor to maintain synchronization. CMA's polar orbiting meteorological satellite FY-1C was launched on 10 May 1999. This three-axis stabilized satellite had been operating since that time. FY-1D was launched on 15 May 2002. The 10-channel imager on board FY-1C and FY-1D represented an improvement over the five channels of the AVHRR. Two ROSHYDROMET satellites of the METEOR-2 and METEOR-3 series were operating in circular orbit inclined at approximately 82° as shown in Table 1. These satellites were operating far beyond their expected lifetimes and their capabilities were limited.

Satellite series and number	Launch date	APT radio signal characteristics			
		Carrier frequency, MHz	Modulation	Allocated bandwidth, kHz	Radio transmitter output power, W
METEOR-2 N21*	31/08/1991	137.3	FM	100	5
METEOR-3 N5	15/08/1991	137.85	FM	100	5
RESURS-01 N4**	10/07/1998	137.75	FM	100	5

Table 1

\* Meteor-2 N21 limited APT transmission of visible images.

\*\* Resurs-01 N4 was temporarily out of operation.

**4.2.13** The Association also noted the decision by the fifty-third session of the Executive Council to expand the space-based component of GOS to include appropriate research and development satellites. At the time, three research and development space agencies (NASA, ESA and Rosaviakosmos) had made firm commitments such that the following satellites were part of the space-based component of GOS: NASA's Aqua, Terra, TRMM, GPM, NPP and QuickSCAT; ESA's ENVISAT; and Rosaviakosmos' research instruments on METEOR-3M N1.

**4.2.14** The Association noted that several of the Region's NMHSs possessed satellite image reception equipment. The percentage of Members with such equipment was: APT, 80 per cent; HRPT, 25 per cent; WEFAX, 82 per cent; and HR, 34 per cent. With implementation of the MSG series of satellites, the Association felt that two factors would come into play in Africa. The first was the conversion of the low-resolution APT analogue services from the polar-orbiting satellites and WEFAX from the geostationary satellites, to new digital services called LRPT and LRIT, respectively. The new digital services would provide more capabilities than existed from the HR data of the satellite systems then in orbit. In fact, the new LRPT and LRIT services could accommodate most of the observations and products required by an NMHS. The second factor that was believed to contribute to a major impact within NMHSs in the Region was the installation of HR receivers in most NMHSs. This was to be accomplished by the PUMA Project MSG-1, due to be launched in August 2002 and entered into service in 2003. This project was to provide NMHSs with much more data and ensure that the latest receiving and processing systems were available throughout the Region. In this connection, the Association urged its Members to prepare relevant human resources to efficiently exploit these new facilities.

## **INSTRUMENTS AND METHODS OF OBSERVATION PROGRAMME (IMOP)**

**4.2.15** The Association noted with interest the results of CIMO-XIII (Bratislava, Slovakia, 25 September-3 October 2002) that underlined the importance of the standardization of sensors and instruments used at surface-based meteorological stations. In this respect, the Association was pleased that a draft update (sixth edition) to the *Guide to Meteorological Instruments and Methods of Observation* (WMO-No. 8), reflecting the progress achieved by the rapid development in techniques and technology, had been prepared. The Association also recognized the high value of other technical publications prepared by CIMO, containing the results of intercomparisons, specific studies and status reports on various instrument systems for achieving homogeneity and high quality in meteorological and related geophysical and environmental measurements.

**4.2.16** The Association was informed that the fifty-fourth session of the Executive Council had approved the request of the newly established (in September 2001) Association of Hydro-Meteorological Equipment Industry to be granted consultative status with WMO. In this regard, the Association underlined the need for close collaboration with manufacturers, as this would also help in creating possibilities to set up fabrication facilities for conventional instruments in developing countries, with the aim to facilitate technology transfer, decrease production cost and make the countries more self-reliant with respect to spare parts and consumables.

**4.2.17** The Association was informed that, due to prompt actions by CIMO and CBS addressing the higher operational failure rate of GPS radiosonde systems, introduced widely during 1998, manufacturers were able to better identify the origins of production faults of radiosondes. A survey carried out by CIMO in 2001 on some 23 000 GPS radiosonde launches showed a marked improvement in system performance. However, significant operational problems still remained, compared with the average failure rate of non-GPS-based radiosondes. The Association also noted the usefulness of the Instrument Catalogue, which had been produced by CMA, under the auspices of CIMO, for assisting Members in selecting the most suitable instruments for application within their operational networks.

**4.2.18** The Association stressed the importance of capacity building in the field of instruments and methods of observation. In this regard, it regretted that training workshops for instrument specialists could not be held to the extent required by the developing countries, mainly due to budgetary constraints. In underlining the importance of training for securing an uninterrupted operation of instruments and the generation of high-quality data, it urged Members as well as private industry to sponsor IMOP training events; support RICs, instrument intercomparisons and technical conferences; and make available experienced experts to participate in the challenging work of the various bodies of CIMO. In this regard, the Association

also recognized the need for developing countries to become more self-reliant, and therefore urged Members concerned to further build their capacities by strengthening RICs, providing training to instrument specialists, and holding calibration workshops and seminars.

## **REPORT OF THE RAPporteur ON REGIONAL ASPECTS OF INSTRUMENT DEVELOPMENT, RELATED TRAINING AND CAPACITY BUILDING**

**4.2.19** The Association noted with appreciation the report of Mr F.D. Molotsi (Botswana), the Rapporteur on Regional Aspects of Instrument Development, Related Training and Capacity Building, and noted his efficient cooperation with RA I's RICs, located in Algeria, Egypt, Kenya and Botswana, with the objective to enhance capacity building matters in the field of instruments and methods of observation.

**4.2.20** The Association noted the difficulties in the maintenance of the observing network that affected negatively the availability of data in Africa. It was noted with concern that within the Region a great variety of different types of instruments were in operation, posing extra difficulties in terms of operating, repairing, maintaining and calibrating them, due to the need for the enlarged variety of spare parts and correspondingly trained personnel. In cases of unsatisfactory performance of instruments, inadequate funds to rehabilitate and replace the obsolete instruments and a lack of properly trained instrument specialists were often reported. The Association also noted with concern that the high cost of consumables continued to adversely affect performance, especially of upper-air observing stations.

**4.2.21** The Association recognized the needs of its Members for assistance in areas such as maintenance support, expert advice, provision of consumables and spare parts at reasonable cost, and replacement of obsolete instruments or equipment damaged during natural disaster events. In this regard, the Association appreciated efforts being made in South Africa towards the cost reduction of the upper-air observations. Similarly, it was noted that the AWS being developed by South Africa might help in reducing purchase and running costs.

**4.2.22** The Association recognized continuous difficulties experienced by the RICs in calibrating national standard instruments and in supporting the training of experts. It agreed that RICs were instrumental in satisfying the needs of the Region for regular calibration, standardization, instrument comparisons and evaluation, and for the training of instrument experts. It supported further strengthening of the RICs and invited CIMO to suggest steps to strengthen their role and performance. In this regard, the Association urged Members and invited donors to place highest priority on the provision of basic calibration facilities so that they would become available at or accessible to all NMHSs. It appreciated the outcome of the missions of experts from China and India aimed at providing assistance to Nigeria in

setting up its fabrication and calibration facility of meteorological instruments. The Association also appreciated that the RIC in Region VI, operated by Météo France in Trappes, provided calibration support to Members of Region I, namely to Cameroon, Madagascar and Senegal.

**4.2.23** The Association underscored the importance of technical conferences and the related exhibitions organized by WMO in collaboration with CIMO as excellent means for fostering the exchange of experience between experts and the transfer of technology to the developing countries. It especially appreciated that China (Beijing, October 2000) and Slovakia (Bratislava, September 2002) had hosted TECO/METEOREX 2000 and 2002, respectively.

**4.2.24** Since the gap between developing and developed countries related to the application of instruments was still considerable, the Association felt that measures for capacity building, especially in better using endogenous resources, should be developed, with the assistance of the Rapporteur. In this regard, the Association also underlined the important role of the four RICs within the Region. It urged them to coordinate their activities and to inform Members concerned on their services and plans according to the terms of reference.

**4.2.25** The Association noted with satisfaction that a CIMO Expert Meeting on Capacity Building Related to Meteorological Instruments and Methods of Observation was organized in Beijing, China, in 1999, which developed recommendations on pertinent collaboration in the Region and for strengthening the role of the RICs.

**4.2.26** The Association further noted that a valuable source of information related to meteorological instrumentation was the Instrument Development Inquiry, accessible through WMO's IMOP/CIMO Web site ([www.wmo.ch](http://www.wmo.ch)). It showed, inter alia, that the automation of observations had progressed in Africa, and that there was a remarkable difference in the levels of application of sophisticated and automated observing techniques in different countries.

**4.2.27** The Association encouraged its Members to make arrangements for continuously reviewing the performance of the common instruments being used in the Region. It felt that particular attention should be given to long-term stability, the need for and ease of maintenance and repair, the requirement for and frequency of calibration, and the development of cost-effective instruments suitable for use in the Region. The Association agreed that the work to study all these problems should be continued by a Rapporteur on Regional Aspects of Instrument Development, Related Training and Capacity Building and adopted [Resolution 4 \(XIII-RA I\)](#).

#### REPORT OF THE RAPPOURTEUR ON SOLAR RADIATION

**4.2.28** The Association noted with appreciation the report of Mr M.A. Darwish (Egypt), the Rapporteur on Solar Radiation.

**4.2.29** The Association noted that Members' difficulties in maintaining the national radiation networks

at the required levels were mainly due to economic constraints and lack of trained radiation specialists. It invited Members to continue modernization of their national radiation stations, establish NRCs where none existed, and make all efforts to establish at least one principal and one ordinary radiation station. The Association expressed the opinion that those Members who operated radiation networks should modernize their equipment by applying digital integrators, data loggers or strip chart recorders, and have access to reliable radiometers for regular calibration.

**4.2.30** The Association noted that some Members regularly calibrated their national standard or reference instruments against standards at the RRCs, while several others were not yet doing this. It therefore invited Members who operated the RRCs (Algeria, Egypt, Nigeria, Sudan, Tunisia and Democratic Republic of the Congo) to offer their facilities for the calibration of national standard instruments and to provide support to other countries in training the personnel involved in the maintenance and operation of solar radiation stations.

**4.2.31** The Association noted that one national and three regional radiation standard instruments were verified against the WRR at IPC-IX held at the WRC in Davos, Switzerland in 2000. The results of IPC-IX were published by the WRC and distributed by WMO for application. The Association welcomed that the Fourth RPC of RA I was carried out conjointly with IPC-IX, allowing comparisons of regional and national standard instruments. It appreciated the support provided to Members of RA I to participate in IPC-IX.

**4.2.32** The Association considered the need to carry out regular RPCs, at least once every five years, to guarantee radiation data homogeneity. It felt that RPCs should also be seen as excellent platforms for the exchange of knowledge and for the training of participants in accomplishing radiation measurements and calibration. The Association recommended that the fifth RPC of RA I be carried out conjointly with IPC-X, to be organized in 2005.

**4.2.33** The Association noted with satisfaction that a number of Members had regularly sent their radiation data to the WRDC in St. Petersburg, Russian Federation for publication, and encouraged all other Members to do likewise, according to the agreed procedures.

**4.2.34** Noting the increasing importance of solar radiation data for various operational and research applications, the Association agreed that work in this field should continue, and adopted [Resolution 5 \(XIII-RA I\)](#).

#### 4.3 INFORMATION SYSTEMS AND SERVICES (ISS) INCLUDING OPERATIONAL INFORMATION SERVICE (OIS), DATA MANAGEMENT (DM) AND REGIONAL CODES (agenda item 4.3)

##### TELECOMMUNICATIONS SYSTEM

##### POINT-TO-POINT CIRCUITS

**4.3.1** The Association reviewed the implementation status of the GTS circuits in the Region. The RMTN plan comprised 88 circuits, of which 69 had been



implemented and were in operation. The 69 implemented circuits included:

- (a) Six circuits on the MTN: Two circuits (Nairobi-Offenbach and Algiers-Toulouse) were operating at 64 kb/s; three (Nairobi-Cairo, Dakar-Toulouse and Cairo-Moscow) were leased telephone-type circuits operating at medium speeds (19.2 or 9.6 kb/s) using TCP/IP or X.25 protocol; and one (Cairo-New Delhi) was operating at low speed;
- (b) Twelve interregional circuits: Three (Casablanca-Toulouse (128 kb/s), Nairobi-Toulouse and Pretoria-Washington (64 kb/s)) were digital circuits ; three (Algiers-Madrid, Niamey-Toulouse and Tunis-Toulouse) were telephone-type at medium speed; the other six interregional circuits were low-speed telegraphic circuits;
- (c) Fifty-one regional circuits: Fifteen circuits were operating at high speeds (19.2 to 64 kb/s) and 12 at medium speeds. The three circuits Nairobi-Niamey, Nairobi-Algiers and Nairobi-St. Denis were not physically implemented, but medium-speed virtual circuits were established via RTH Toulouse. Nineteen circuits were still operating at low speeds (50 to 100 baud) and two were being operated through METEOSAT DCPs. In the case of 16 circuits that were not implemented and three that were not operational, the NMCs concerned were exchanging meteorological traffic over AFTN circuits as back-up operational arrangements with the RTH or other NMCs.

**4.3.2** The Association noted with appreciation the significant improvement in the implementation of the RMTN since XII-RA I in October 1998. Several GTS circuits had been upgraded to medium or high speeds via leased lines or public data networks. Several regional circuits were operating at high speeds via leased circuits with RTH Nairobi or via Public Data Network services with RTH Pretoria. Several regional circuits in the western and central part of Africa were upgraded from low speed to high speed through the implementation of the satellite-based network SATCOM, coordinated by ASECNA. There was significant progress in the introduction of the data communication TCP/IP protocol, in compliance with CBS recommendations.

**4.3.3** Despite these significant improvements, the Association noted with concern that many main regional circuits had not entered into service or required improvement. These included the circuits Algiers-Dakar, Algiers-Cairo, Algiers-Niamey, Algiers-Casablanca, Lusaka-Pretoria, Tripoli-Algiers, Tripoli-Cairo (being implemented), Dakar-Bissau, Pretoria-Luanda, Dakar-Freetown, Dakar-Monrovia, Dakar-Lagos, Niamey-Accra, Brazzaville-Kinshasa, Dakar-Banjul, Dakar-Sal, Nairobi-Kigali, Nairobi-Bujumbura, Lusaka-Harare and Sao Tome-Brazzaville.

#### SATELLITE-BASED DISTRIBUTION SYSTEMS

**4.3.4** The Association noted that satellite-based data-distribution systems played a crucial role as

components of the RMTN in the Region and reaffirmed their importance for the efficient dissemination of data and products. Region I was completely covered by several satellite distribution systems. These included MDD, the ISCS (Atlantic) operated by the United States, and the satellite facilities operated by the United Kingdom's UKSF supporting SADIS and a planned WWW data programme. The northern part of Africa was also covered by RETIM, operated by France; and FAX-E, operated by Germany. The Association expressed its appreciation to France for the plan to implement a new RETIM-2000 service providing full coverage of the African continent.

**4.3.5** The DCS, including the DCP DRS and the MDD system, which were being provided via Meteosat-7, were integrated into the RMTN as a complementary means for the national collection of observational data and for the distribution of this data and processed information from RTH RSMCs. The Association noted that, in addition to the DCPs already in operation, a large number of new DCPs were being implemented in the framework of the HYCOS programme. These DCPs provided both hydrological and meteorological data. The Association stressed the crucial importance of the DCS and MDD services for all NMHSs in Africa. It noted with appreciation that several products generated by African RSMCs, ACMAD and DMCs were included in the MDD transmission programmes. In the framework of the EUMETSAT programme for MSG, the current MDD and DRS services were to be replaced by the fully digital LRIT and HRIT transmissions, while the DCS was to be maintained and further extended.

#### RTHS AND NMCs

**4.3.6** The Association noted that all the RTHs in the Region were automated. It was pleased to note that an increasing number of NMCs had also been automated, benefiting from available, affordable and maintainable technologies based on PCs and the TCP/IP stack of data communication protocols. The Association underlined that the rapid development in the field of information and communication technology was providing better opportunities for modernizing NMCs. The automation of NMCs, besides improving the GTS/GDPS functions, also provided a good foundation for the further development of NMHSs.

#### RADIO BROADCASTS

**4.3.7** The Association noted that three RTHs (Nairobi, Dakar and Pretoria) were operating radio facsimile and RTT broadcasts. It emphasized that HF radio broadcasts had high recurrent costs for their operation and maintenance, and limited efficiency. In view of these costs and the aging equipment, several RTHs had already reduced the number of transmitting frequencies and were planning to phase out their HF radio broadcasts in the near future. Noting the progress made in the implementation of the RMTN, the Association confirmed the plan to phase out HF radio broadcasts. It urged NMCs still relying on the reception

of HF broadcasts to implement more effective telecommunications means, with possible cooperation assistance. The Association felt that centres operating HF broadcasts should also identify the remaining users and assist them in identifying other means for receiving information. It highlighted in this regard that satellite-based telecommunication services such as Digital Audio Broadcasting (DAB) data casting services, currently used for RANET, provided a cost-effective solution in terms of recurrent and investment costs for meteorological data distribution with moderate capacity, and could be a valid solution for replacing RTH radio broadcasts.

#### **THE INTERNET**

**4.3.8** The Association noted that an increasing number of NMHSs were being equipped with access to the Internet, which provided considerable advantages in a wide range of activities, including working and coordination arrangements in the framework of regional WWW activities, CBS and other WMO programmes. Complementary data communication means using the Internet were also implemented to address current GTS gaps, in particular in the South-West Indian Ocean. The Association underlined that, for several small NMCs, the Internet was the only affordable telecommunication means for transmitting meteorological information, despite its possible shortcomings (lack of availability and reliability, delays and security problems). The establishment of Internet-based connections between RTHs and NMCs also appeared as a very cost-effective opportunity. The Association noted with appreciation that, with a view to minimizing the inherent operational and security risks, the CBS OPAG on Information Systems and Services had developed recommended practices for collecting observational bulletins via e-mail, and a guidance document on the most appropriate practices and implementation options for VPNs via the Internet. The relevant guidelines and practices would be reviewed by CBS at its extraordinary session in 2002.

#### **GENERAL STATUS**

**4.3.9** Despite the significant improvements in the implementation and operation of the various components of the RMTN, the Association underlined that there were still serious shortcomings in the GTS in some parts of Africa, at the regional and national levels. General telecommunication infrastructure and services were in fast development, including the Internet, but still at costs that were difficult for several NMHSs to afford. Possible remedial actions to overcome the short- and longer-term shortcomings were addressed under the Strategy for Enhancement of the WWW-Basic Systems.

#### **RADIO FREQUENCIES FOR METEOROLOGICAL ACTIVITIES**

**4.3.10** The Association noted with appreciation the very favourable outcome of ITU's WRC-2000 as regards the several items of concern for meteorology. It also noted, however, that the pressure on radio

frequency bands would continue with the increasing development and expansion of new radiocommunication systems. The fifty-fourth session of the Executive Council had re-emphasized the importance of continuing to defend the frequency allocations to meteorological systems and environmental satellites. The Association was informed that the agenda for the next Conference, WRC-2003, included items of importance for meteorology, including the 1683 to 1690 MHz band. It noted that CBS and the Secretariat were pursuing their participation in the relevant ITU-R activities. The Association stressed that it was important that WMO continue informing the NMHSs on the question, and that the NMHSs coordinate these issues with their national telecommunication administrations. It noted with appreciation that a WMO Workshop on Radio Frequencies had been held.

#### **TELECOMMUNICATION TECHNIQUES AND PROCEDURES**

**4.3.11** The Association stressed that NMCs and RTHs should fully comply with the procedures as given in the *Manual on the Global Telecommunication System* (WMO-No. 386), in particular as regards the format of GTS bulletins, in order to ensure that the messages were not rejected, and thus lost, by the automated computer facilities at RTHs. The Association noted with appreciation that two training seminars on telecommunication techniques and procedures in Africa had been held to address this need. The Association invited Members to implement at their NMCs efficient procedures for making updates of reference telecommunication manuals and operational publications available to all operational and technical telecommunications staff and ensure strict adherence to their provisions.

#### **TCP/IP PROTOCOLS**

**4.3.12** The Association was pleased to note that the TCP/IP protocols were rapidly being implemented to support GTS operations. The benefits of this transition included considerable savings in financial and human resources to Members through reduced costs for communications equipment purchase and maintenance. This has enabled many NMCs to be automated.

#### **ROUTING CATALOGUES**

**4.3.13** The Association noted that an increasing number of RTHs were providing their routing catalogues on diskettes, on their FTP servers or via the WMO FTP server. The Association felt that routing catalogues were important for ensuring consistent and efficient GTS data exchange, and for informing NMCs of the bulletins available at RTHs.

#### **TRANSMISSION PROGRAMMES**

**4.3.14** The Association stressed the importance of reviewing the transmission programmes of the RMTN elements (point-to-point circuits, radio broadcasts and satellite-based systems) with a view to ensuring that

the requirements of receiving centres and users were actually met, to the largest extent possible. It invited RTHs to review regularly the transmission programmes of point-to-point circuits with their relevant associated NMCs.

#### NMTNs

**4.3.15** The Association noted that serious gaps still existed when it came to data collection at the national level, as revealed by spot checks and deferred checks on the operation of the GTS. Several reasons for these telecommunication problems were detected, including the total or partial lack of the equipment needed for suitable national data collection, breakdown or obsolescence of the equipment used for national data collection, use of inefficient techniques, under-automation of NMCs, ineffective connections or no connections between NMCs and the relevant RTHs, as well as the failure to adhere strictly to the GTS operating procedures at the NMCs.

#### RETIM AFRICA PROJECT

**4.3.16** The Association noted with appreciation the presentation by France of the concept RETIM Africa project which when implemented would allow distribution of meteorological products and observations to national and other centres and major observatories with relevant human resources to make the best use of the information in the provision of services. It commended France for this initiative and welcomed the envisaged demonstration phase.

**4.3.17** The Association noted with appreciation the commitment by France to fund the uplink and connection of the Toulouse Centre. It noted that the financing and implementation of one or several uplinks located in Africa could also be envisaged. It also noted with satisfaction that reception of data would be free of charge for NMSs in Africa.

**4.3.18** The Association endorsed the proposed RETIM Africa demonstration project as a complementary component of the GTS in RA I. The Association noted that the result of the demonstration project could lead to a large-scale project whose funding would have to be sought from partners. To facilitate the project development and implementation, the Association established a Coordination/Steering Committee with the following composition, terms of reference and convener:

#### COMPOSITION:

- (a) Chairperson of the Working Group on Planning and Implementation of WWW in RA I;
- (b) Coordinator of the Subgroup on Regional Aspects of the Global Telecommunication System (GTS);
- (c) Five Experts designated by Members from the five RA I sub-regions as follows:  
Mr P. Ondongo (Congo)  
Mr M.L. Bah (Guinea)  
Mr W. Nyakwada (Kenya)  
Mr Y. Boodhoo (Mauritius)

To be decided:

- (d) An Expert from France  
Mr F. Duvernet
- (e) An Expert from the United Kingdom  
Mr S. Palmer

The Committee may invite other relevant experts, as required, to participate in its meetings.

Terms of Reference:

- (a) Review the RETIM Africa demonstration project proposal to ensure complementarity and compatibility with PUMA and RANET projects.
- (b) Develop related project proposals as part of the integrated Strategic Plan for Enhancement of the WWW-Basic Systems in RA I.
- (c) Define the modalities for implementation of the RETIM demonstration project;
- (d) Make proposals for the selection of the site for demonstration stations;
- (e) Make proposals on the list of products data to be distributed through the RETIM Africa system;
- (f) Organize and supervise the evaluation of the pilot phase of the project;
- (g) Recommend related training activities;
- (h) Propose, subject to successful evaluation, modalities for development and implementation of a regional project as an integral part of the implementation of the GTS component of the RA I Strategic Plan on the Implementation and Improvement of the Basic Systems in RA I – Africa.

The Association invited France in consultation with the WMO Secretariat to organize the first meeting of the Committee to elect its chairperson and noted that funding for such meetings of the Committee would be from this project resource.

#### 4.4 DATA-PROCESSING AND FORECASTING SYSTEMS (DPFS), INCLUDING EMERGENCY RESPONSE ACTIVITIES (ERA) (agenda item 4.4)

**4.4.1** The Association reviewed potential areas where GDPS could contribute in the provision and use of environmental quality monitoring and prediction products, and agreed that regional, subregional and national centres should explore research and development and related capacity building for development of user-oriented application products. This should include the provision of services in the field of air quality modeling, air pollution, and UV-B index. Some areas where the Association felt this could be useful included:

- (a) Refining EPS requirements and making sure that individual requests from NMHSs and interested EPS running centres were acted upon, and regional workshops were organized to explain the EPS approach; and
- (b) Assuring availability and use of NWP guidance on the occurrence of severe weather at NMHSs, through creating or developing further GDPS facilities, developing more expertise, assessing NMC training needs for severe weather

forecasts, and NMHSs conducting research on their own local severe weather.

**4.4.2** The Association noted that there was visible improvement in the field of NWP in RA I, but not all NMCs were running NWP models. The resolution and forecast skill scores of short-range NWP outputs were gradually improving, keeping pace with progress in the data assimilation of synoptic observations and physical parameterization. Some countries were beginning to develop and implement short-range NWP models in the operational phase, and/or were equipped with systems for processing meteorological information and graphic representation of numerical products disseminated from RSMCs or WMCs. The interests of many other countries were for continuous and reliable receptions, as well as the presentation, in easily readable form, of meteorological data and forecast products, especially during severe weather events.

**4.4.3** The Association identified three areas of international cooperation which needed to be addressed, taking into account the rapid changes taking place in the GDPS environment:

- (a) Some countries in the Region needed to build data processing and forecasting capacity and contribute more to the application of GDPS products to the socio-economic sectors;
- (c) Some countries in the Region needed to make more effective use of and benefit from NWP products. The Association urged Members to develop strategies based on identifying user needs and promoting awareness of the potentials of NMHS' services;
- (c) A technological gap existed between countries active in the field of NWP and those not active in the field, while some who were not yet equipped with appropriate data processing and forecasting systems to perform the basic mission of an NMC needed to build their capacities.

**4.4.4** The Association noted and emphasized the need for strong collaboration in research and development among centres, institutions and universities active in the field of NWP. In this connection, major centres in the Region with NWP capability were encouraged to provide leadership in developing and implementing collaborative NWP activities.

**4.4.5** The Association considered that with the products of global and regional NWP models available within the Region, and the prospect that such products could be accessible to most if not all Members, individual NMCs without the potential for NWP capability could achieve great benefits by:

- (a) Focusing on developing the application of NWP products in short-range forecasting and nowcasting;
- (b) Concentrating on post-processing and generating value-added products using tools such as MOS; and

- (c) Using NWP model outputs through locally applied diagnostic tools and objective statistical techniques to derive weather parameters not directly predictable by the NWP models.

**4.4.6** The Association agreed that future or immediate needs could be grouped following the state of the economy, development and climate of each country. The general requirements for many countries in RA I were:

- (a) Equipment for implementation of GDPS functions;
- (b) Technical support for building operational capabilities in NWP models and pre- and post-processing;
- (c) Workshops or training for exchange of information on software development and NWP applications;
- (d) Provision of long-range prediction and seasonal outlook with a verification system to monitor their reliability and improve their accuracy;
- (e) More grid point value data or boundary conditions data generated from global models for centres; and
- (f) Developing and implementing fine-mesh LAMs.

#### **NWP BOUNDARY CONDITIONS STRATEGY**

**4.4.7** The Association felt that the provision of boundary conditions for regional models would be best provided using high-speed GTS circuits or Internet technologies. This could be done in a cascading system with major regional centres running global models (SAWS and Morocco) and regional centres running larger-domain regional models (Algiers, Egypt, Tunisia, Dakar\*, Nairobi\*, ACMAD\*) to NMCs running higher-resolution limited-domain models. The Association felt that those centres providing boundary conditions should establish on their GTS facilities and on their Web sites access areas where relevant NMCs using scripts could access such boundary condition data. The requirements for wide bandwidth for the high speeds required for large volumes at large transfer rates exceeded 256 kb/s as a minimum, and meant that the Internet access speed leased from service providers would need to be of this speed or higher. The Association expressed the opinion that the current arrangements for bilateral provision of boundary conditions from major centres needed to continue, with the requisite upgrade of Internet access speeds of equal to or greater than 256 kb/s as appropriate.

**4.4.8** To enhance the Region's capacity to improve the application of NWP products, the Association agreed:

- (a) To draw the attention of Members in the Region to the benefits of ensemble prediction, but as there was little experience in the Region, education and training about the interpretation and application of ensemble prediction products were required;

\* To be implemented

- (b) To coordinate and implement procedures established by CBS for the exchange of air-dispersion model products during incidents of widespread forest fires and transport of pollutants; and
- (c) To accelerate the application of grid point values data in services to industry and socio-economic sectors by holding frequent international symposiums and workshops on application of meteorological products to these sectors.

**4.4.9** The Association emphasized that the successful development and implementation of the application of NWP products depended on the availability of technical expertise in the use of hardware, as well as software development and maintenance, within an individual centre. There was therefore a need for the Region to intensify training programmes in the form of workshops and courses.

**4.4.10** The Association considered long-range forecasting infrastructure issues and noted that CBS, in collaboration with other commissions, had defined the list of products to be made available by the global producing centres to RCCs and NMSs, and also developed the standard verification system for long-range forecasts.

**4.4.11** Regional requirements for RCCs and their functions are addressed under agenda item 5.3.

**4.4.12** The Association noted and endorsed the view of CBS that the improvement of severe weather forecasting would benefit from products which could be elaborated by three categories of systems:

- (a) EPS information about the probability of the occurrence of severe weather events;
- (b) NWP products that provided useful information about the synoptic environment favourable to strong convective events and identified conceptual models; and
- (c) Products issued by nowcasting tools based on extrapolation techniques, which required all available real-time data.

**4.4.13** The Association noted that NWP techniques allowed for forecasting with some success various severe weather events (storms, heavy precipitation), and by means of some specific derived fields also gave valuable information about the synoptic environment favourable to the development of convective activity. So the implementation at forecast offices of an efficient system able to collect the information coming from observation systems and NWP centres, and to display them on meteorological workstations, was a key condition for an efficient use of the available products for improved severe weather forecasts.

**4.4.14** The Association encouraged NWP centres in the Region to produce additional relevant fields in order to evaluate their skills in forecasting severe weather and extreme events. It invited centres and countries to implement, as recommended by CBS, some cascading systems where, at the first level, the RSMCs provided guidance on the likelihood of severe weather 24 to 48 hours in advance, based on NWP products. This would serve as a tool to NMCs or

forecasters who would monitor the situation and could give some lead-time information to decision makers.

**4.4.15** The Association endorsed the promotion of training to make users aware of recent developments in NWP techniques and improve their skills in the use of additional products. Such training could include:

- (a) Training courses focused on the explanation of the various products which could be made available from the various systems (EPS, deterministic models, nowcasting tools) and their limitations; and
- (b) Workshops gathering modelers and forecasters to study particular cases and propose some methodology aiming to better identify severe weather events, using all the available information in connection with conceptual models, as part of a demonstration project.

**4.4.16** The Association considered integrated strategies to address gaps in infrastructure and services under item 4.1 above.

#### **4.5 TROPICAL CYCLONE PROGRAMME (TCP), INCLUDING THE REPORT OF THE CHAIRPERSON OF THE RA I TROPICAL CYCLONE COMMITTEE (TCC) (agenda item 4.5)**

**4.5.1** The Association expressed its satisfaction with the achievements and progress made in the implementation of both the general and regional components of the TCP towards the mitigation of tropical cyclone disasters in the South-West Indian Ocean region.

**4.5.2** The Association expressed its deep gratitude to Mr R.R. Vaghjee (Mauritius), the former chairperson of the TCC, for his outstanding leadership in guiding the work and the various endeavours of the Committee. It welcomed the chairperson of the Committee, Mr S.N. Sok Appadu (Mauritius), and noted with appreciation his informative report. The Association commended the Members concerned and the RA I TCC for their efforts towards implementation of the committee's Regional Cooperation Programme, in particular for upgrading the tropical cyclone forecasting and warning systems within the Region.

**4.5.3** The Association also expressed its deep gratitude to France for the full and effective functioning of the RSMC La Réunion TCC, which had activity specialization in tropical cyclone analysis, tracking and forecasting. It invited France to continue to make available, on a long-term basis, the specialized products and advisory information services. As a follow-up to the successful attachment by France of one forecaster each from Comoros and Seychelles to the RSMC La Réunion for the 2000-01 cyclone season, the Association invited France, in cooperation with WMO, to continue to host attachment of tropical cyclone forecasters in the South-West Indian Ocean region at the RSMC La Réunion during cyclone seasons.

**4.5.4** The Association invited Members to take advantage of relevant training events such as the

biennial RA I training courses on tropical cyclones, organized by Météo France at the RSMC La Réunion; and the biennial Southern Hemisphere training courses on tropical cyclones, organized by the Australian BOM. The Association was pleased to learn that the third biennial RA I training courses on tropical cyclones would take place in autumn 2003. It urged WMO to continue to co-sponsor such biennial courses, alternatively during the fourteenth financial period (2004-07). The Association requested the Secretary-General to make suitable arrangements for the participation of members of the committee in such courses. The Association was informed that a training seminar on natural disaster reduction matters, including tropical cyclones, would be carried out by the Indian Ocean Commission in the second quarter 2003. In view of the importance of the use of radar data in analysis and forecasting of tropical cyclones, the Association felt that a training seminar on radar calibration would be necessary. It noted with appreciation the offer of France and South Africa to take actions in this regard.

**4.5.5** The Association expressed the opinion that it would be very helpful if some training events were carried out in close cooperation with the RA II Tropical Cyclone bodies, providing the opportunity to share the experiences of some RA II Members regarding their activities on prevention and mitigation of impacts caused by tropical cyclones. In addition, it stressed that more collaboration with the RA IV Hurricane Committee was needed, in particular concerning forecasting of tropical cyclones, since some countries in Western Africa were affected by tropical cyclones which had developed in the Caribbean area.

**4.5.6** The Association noted with interest that a Web site called the Severe Weather Information Centre (SWIC) had been developed by Hong Kong, China as a pilot project to provide official tropical warnings issued by NMHSs in the region covered by the ESCAP/WMO Typhoon Committee. It further noted that it would be desirable to enhance this Web site in order to cover other tropical cyclone regions, including some areas of the Indian Ocean. The Association urged RA I Members concerned to participate in this project.

**4.5.7** The Association recorded its appreciation for the valuable assistance provided by the European Commission, EDF, Indian Ocean Commission (IOC), IFRC, SATCC and WMO's VCP, through bilateral agreements and by other donors.

**4.5.8** In view of the vitally important role of the TCP in the context of the SDSIDS and within the framework of the ISDR, including the work of the RA I TCC in Region I, the Association decided to continue to give very high priority to the TCP in relation to regional priorities in the WMO LTP. It also decided to re-establish the RA I TCC by adopting [Resolution 6 \(XIII-RA I\)](#) — Tropical Cyclone Committee for the South-West Indian Ocean, and to keep in force Resolution 10 (XI-RA I) — Tropical Cyclone Operational Plan for the South-West Indian Ocean.

## **5. WORLD CLIMATE PROGRAMME (WCP) - REGIONAL ASPECTS** (agenda item 5)

### **5.1 CLIMATE PROGRAMME COORDINATION AND SUPPORT ACTIVITIES (CPCSA), INCLUDING THE REPORT OF THE RAPPORTEURS ON CLIMATE CHANGE** (agenda item 5.1)

**5.1.1** The Association was informed of the overall coordination of the WCP. In this regard, it noted with satisfaction the decisions made by Thirteenth Congress and the Executive Council relating to the enhancement of the activities within the framework of the Climate Agenda. The Association also noted the establishment of an EC-AGCE and requested that the Members of the Association be kept informed on its activities.

**5.1.2** The Association was informed that the third session of the EC-AGCE was held at the WMO Secretariat from 30 April to 1 May 2002. The Group addressed a number of important issues, including the interactions between WMO's climate programmes and non-climate programmes in key areas relating to environmental matters. These interactions were categorized into four areas:

- (a) Matters relating to infrastructure, including observations, analysis and prediction;
- (b) Matters relating to services and service delivery to different sectors;
- (c) Matters relating to technical support and training; and
- (d) Matters relating to regional implementation.

**5.1.3** The Association was informed that there were a number of areas that required coordinated approaches across several WMO programmes, including:

- (a) The development of services for timescales relevant to climate, including the provision and application of seasonal prediction;
- (b) Water resource issues; and
- (c) Natural disasters.

**5.1.4** The Association was further informed that the Advisory Group had considered these matters in the light of the forthcoming World Summit on Sustainable Development. It had been noted by the chairperson of the Advisory Group that the results of the Summit could provide an opportunity for a review and assessment of the activities under the WCP, GCOS and the Climate Agenda. The Association was further informed that a fourth meeting of the EC-AGCE was planned for February 2003 in Geneva.

**5.1.5** The Association noted the successful outcome of CCI-XIII (Geneva, 21 to 30 November 2001) and the restructuring into OPAGs, ETs and rapporteurs. The Association commended the Commission on the near completion of the revision of Part I of the *Guide to Climatological Practices* (WMO-No. 100) and on its efforts to begin work on Part II. The Association noted that Part I of the *Guide* contained general information and was currently available on the CCI section of the WMO Web site ([www.wmo.ch](http://www.wmo.ch)). Part II was to contain detailed information for climate applications and their relationship to various socio-economic sectors. The Association was pleased to note the active participation

of many Members from RA I in the CCI session. It further noted that CCI had included Members and scientists from RA I as rapporteurs, members of ETs and as members of its Management Group.

**5.1.6** The Association considered that the regional aspects of the following major areas were of primary concern, not in priority order, within the Region:

- (a) CLICOM/CDMS and DARE – These continued to be high priorities for climate in the Region. The Association felt that efforts must be balanced between DARE, support of existing CLICOM installations, and future CDMSs;
- (b) Observations, networks and GCOS – The Association felt that strengthening of cooperative efforts and links between NMHSs, climate services and GCOS activities was needed. It also felt that best practices should be elaborated on in a number of areas in the observing systems of the Region;
- (c) Monitoring and indices and related support to natural disaster planning – Technical tools (including software) required upgrading to better support disaster mitigation efforts as well as broad-purpose climatic analysis. The Association felt that regional capability should be upgraded through training and capacity building for use of GIS;
- (d) CLIPS and future El Niño events – There was a strong desire by NMHSs to update their skills to enable them to enhance their services to their users. The Association felt that capabilities initiated within the CLIPS project should be expanded, including the CLIPS Focal Points and the RCOFs;
- (e) RCCs – The Association felt that the Region should evaluate the RCC concept to determine how the Region could benefit from it;
- (f) Communications/Internet – Regional and national capabilities in communication and use of the Internet was thought to be fundamental to the ability to upgrade climate services. The Association felt that a consolidated effort with expert and implementation teams of CBS and CCI must be made to get maximum benefit from existing infrastructure and to upgrade systems;
- (g) Education/training/showcasing – The Association expressed the opinion that training should be linked to the six subject areas listed above, and that new efficient training modules and showcase projects should be established on high-priority topics.

## **5.2 WORLD CLIMATE DATA AND MONITORING PROGRAMME (WCDMP) (agenda item 5.2)**

### **CLICOM PROJECT (INCLUDING CLICOM 3.1 SYSTEM, AND FUTURE CDMSs)**

**5.2.1** The Association noted with appreciation the work of the CCI in defining the standards of functionality and capability of future WMO CDMSs. It further noted the progress in the review of the testing and documentation of the various CDMSs being

offered by some Members. The Association urged Members to consider using one of the CDMS systems for their future CDMSs. The Association stressed the critical importance of this activity, especially for developing countries, and noted with appreciation that the fifty-fourth session of the Executive Council had encouraged VCP donors to give a high priority to implementation of future CDMSs, including training.

**5.2.2** The Association noted with satisfaction the offers of Tunisia and Zimbabwe to share their CDMSs with other WMO Members. It expressed its appreciation for their participation at the WMO CDMS Evaluation and Documentation Workshop held in Geneva in May 2002, and encouraged the two countries to incorporate the results and recommendations from the workshop in the finalization of their new systems. The Association was informed that the results of the CCI evaluation of the seven CDMSs was on the WCDMP Web site. A letter was sent to the Permanent Representatives informing them of this and the availability of the results of evaluation.

**5.2.3** The Association noted that the CLICOM data management system was still in use in many countries and recommended that WMO continue to support those Members still using it. The Association noted with appreciation that ASECNA had made available a CLICOM software module to output airport climatological summaries in standard format.

**5.2.4** The Association expressed appreciation to France and the United Kingdom for their support, and noted with satisfaction the successful completion of the project 'Improving the Capacity for National Climate Data Management and Developing Drought Preparedness and Management Strategies in 11 African Countries Affected by Desertification', jointly sponsored by France, the United Kingdom and WMO. The Association noted that the project included two training seminars on climate data that focused on applications for drought preparedness at ACMAD for the French-speaking countries and at the DMC-Nairobi for the English-speaking countries.

**5.2.5** The Association was informed that because of accelerating problems of viruses, the CLICOM e-mail listserv managed by the WMO Secretariat had been suspended. It noted the significant benefit of the nature of the listserv in providing a means to broadcast requests for specific problem assistance and enabling rapid replies from experts, and urged the Secretariat to find a solution to this problem.

### **DATA RESCUE (DARE) PROJECT**

**5.2.6** The Association stressed the importance of high-quality, homogeneous climate data sets, and urged that the DARE project be extended to more countries. The Association noted that many countries in RA I required urgent assistance in rescuing their data. It endorsed the plan to use digital scanners and cameras to produce computer-accessible images from climate archives (paper, microfilm and microfiche). Noting that many Members in the Region had difficulties in preserving their climatological paper archives, the Association expressed the urgent need to develop

projects using these new technologies as a new method for preserving their data. The Association endorsed the CCI recommendation that efforts should focus on locating and digitizing high-priority climatological and hydrological data and accompanying metadata.

**5.2.7** The Association welcomed the proposal to harmonize DARE in Region I with that of the other Regions, to develop a coherent strategy to create national, regional and global digital archives of climate data, and to undertake needs surveys before developing DARE projects.

**5.2.8** The Association noted the recommendation of the DARE meeting to rescue data held in media that could no longer be read due to the breakdown of hardware and deterioration of media, or incompatibility of hardware and software. The Association urged Members to ensure that data already in computer-compatible media be routinely migrated to new storage media. It requested the Secretary-General to explore ways to provide appropriate assistance to Members, particularly to those whose hardware was no longer operable and/or whose media was no longer readable.

**5.2.9** The Association noted with appreciation the effort by France to rescue from its archive climate data in CLICOM format for 14 African countries. It also expressed appreciation for the project underway with support from the United States on upper-air data rescue in seven African countries. It noted the progress made on these rescue efforts and requested that data rescue activities be expanded to needy countries.

#### **OBSERVING REQUIREMENTS AND STANDARDS**

**5.2.10** The Association recalled the recommendation of the fifty-third session of the Executive Council on CLIMAT reporting performance of the GSN stations. It noted that monitoring results had shown no significant improvement in the percentages of GSN CLIMAT and GUAN CLIMAT TEMP reports received by the Deutscher Wetterdienst and the Japan Meteorological Agency, in comparison with the reception rates for the CLIMAT and CLIMAT TEMP networks as a whole. The Association recalled that the Secretary-General had sent notification of these results to Members, and urged them to work to improve the transmission of their messages. The Association noted that CCI had urged that regular feedback between the monitoring centres and country Focal Points be established to ensure prompt corrective actions on data and transmission errors. The Association noted that the fifty-fourth session of the Executive Council had considered the high cost in many countries of consumable supplies, and had urged donors to assist in solving problems related to observing systems.

#### **CLIMATE SYSTEM MONITORING (CSM)**

**5.2.11** The Association noted that climate issues continued to be high on the international agenda, including the impacts of the 1997-98 El Niño and subsequent La Niña events. The Association recognized that CSM and CCD were increasingly important inputs to high-priority activities such as early warning and disaster prevention planning. It urged that training and capacity building activities address the

incorporation of GIS and satellite information in national and regional climate monitoring, together with statistical analysis and visualization techniques.

**5.2.12** The Association noted the progress on developing indices made by the CCI/CLIVAR Joint Working Group on CCD, reconstituted by CCI-XIII as an ET. It noted with satisfaction that index results were used in the preparation of the IPCC Third Assessment Report. It requested that planned capacity building in developing countries be expanded to all Members of the Region, and supported the proposal to incorporate CCD index information in routine and special climate system monitoring reports.

**5.2.13** The Association welcomed the CCI-XIII decision to accelerate the preparation of a seventh Global Climate System Review for the period of mid-1998 to mid-2001. The Association considered the series of Reviews, along with the annual Climate Statements, important resources on the major climate processes and anomalies.

**5.2.14** The Association was pleased to learn of the effort of the CCI to seek collaboration from other technical commissions in building appropriate data banks for use by the climate community. It endorsed the CCI president's view that phenological data could become an important tool for monitoring the variability in the climate and encouraged the work of the joint CCI-CHy-CAGM expert group on this subject. The Association urged CCI and the Secretary-General to ensure that CSM, CLIVAR and CLIPS activities be more closely linked to maximize the use of available resources and improve the overall coordination of the projects.

#### **DATA HOMOGENEITY**

**5.2.15** The Association noted the results of the survey on homogenization of climatological time series and on metadata. It supported the recommendation of the fifty-fourth session of the Executive Council that the appropriate CCI ET should develop guidelines to help Member countries with climatological time series homogenization, taking into account the concept of an integrated quality control system with well-defined levels. The Association requested CCI to complete these guidelines rapidly, and also requested that a training seminar series on this issue be considered along with the Data Rescue seminars.

#### **5.3 WORLD CLIMATE APPLICATIONS AND SERVICES PROGRAMME (WCASP), INCLUDING CLIMATE INFORMATION AND PREDICTION SERVICES (CLIPS) AND THE REPORTS OF THE RAPPORTEURS (agenda item 5.3)**

**5.3.1** The Association noted the progress made under the WCASP and emphasized the vital importance of further development of this programme, particularly in respect to the CLIPS project, in close cooperation with NMHSs in the Region. It appreciated that an important aspect of the WCASP was to provide assistance to Members in building their capacities to interact with



various sectoral users, including the organization of training workshops and the provision of specialized guidance material, and to promote the application of cost-benefit analyses related to climate services in various sectors. The Association stressed that a major task was the development of methodologies to assess the effects of climate, its variability and potential change on various socio-economic activities. It agreed that, while special focus should be on sectors such as food production, water resources management, energy, land use planning, and urban and building development, the value of CLIPS products to decision-making in many other sectors, as well as to the general public, needed to be studied further, especially the means of disseminating and providing this information as part of operational meteorological services.

#### **URBAN AND BUILDING CLIMATOLOGY**

**5.3.2** The Association recognized the need to develop a training curriculum and building codes in urban and building climatology that could be used by local technicians, taking into account local expertise. It recommended that CCI work with RA I to complete the development of the curriculum and the codes.

**5.3.3** The Association noted with appreciation that CCI had agreed to expand its activities in climate services for energy, to provide more emphasis on renewable energy (climate as a resource). The Association further concurred with the Commission's request to have Members update their instrumentation and enhance or establish networks for solar radiation and wind measurements, including using satellite remote-sensing data.

#### **CLIMATE AND HUMAN HEALTH**

**5.3.4** The Association noted with satisfaction that various aspects of bioclimatology, especially as it related to human health under varying climatic conditions, were emphasized in the development of climate information and prediction services. The Association further noted that a workshop on the impacts of ENSO on human health was held in Nairobi from 11 to 15 February 2002. It was recommended that consideration be given to organizing special 'Showcase Projects' in the Region, with focus on the development of heat wave warning systems and other extreme weather events with health impacts. The Association further noted the need to study impacts of climate on diseases such as malaria, among others, in the Region.

#### **CLIMATE INFORMATION AND PREDICTION SERVICES (CLIPS)**

**5.3.5** The Association noted that the goals set for the implementation of the CLIPS project were to ensure provision of integrated climate information and prediction services. It noted further that CLIPS should also provide a framework for the development of new methods and techniques in response to user needs and requirements for climate information, knowledge and services. The Association supported the idea that this should include development of the capability to provide sector-specific climate prediction products and

methods for reaching a consensus for climate outlooks and related guidance material. It noted that the structure of the CLIPS project included training, pilot and demonstration projects, liaison with research programmes, and networking through the establishment of Focal Points. It noted with satisfaction that various options were being explored for coordination between the advanced global and regional centres that had, or were experimenting with, the development of an operational seasonal prediction capability. The Association noted with appreciation the progress made in Members' nominating CLIPS Focal Points and the subsequent holding of two CLIPS Focal Points Training Workshops for countries in Western, Eastern and Southern Africa. It also noted that plans were underway, funds permitting, to extend these workshops to the remaining subregions.

**5.3.6** The Association noted that major points for discussion included the respective roles of the WMO Secretariat and the major climate prediction centres of its Member countries in responding to climatic extreme events, the lessons learned through the review of the 1997-98 El Niño event, and an appropriate global framework for operational climate information and prediction services. The Association emphasized the importance of focusing on monitoring and diagnostic products and services, in addition to prediction services.

**5.3.7** The Association recalled that Thirteenth Congress had emphasized the need for joint CLIPS activities with the research programmes, particularly WCRP, and noted with satisfaction that the research community was involved in both the development and the implementation of the CLIPS project. In particular, it was noted that this integral role, including researchers in connection with the Climate Outlook Fora, was seen as instrumental in building capacity among the NMHSs. The Association recognized the role these fora had played in connection with the monitoring and prediction of various climatic extreme events in the Region, and recommended that they continue. The Association expressed the need for the highly successful Fora to review the process to ensure that it was providing maximum benefit to Members. It noted with appreciation the role played by the WMO CLIPS office and by ACMAD and the DMCs in supporting the Climate Outlook Fora for different subregions. The Association expressed the need to continue to have researchers from the major climate centre involved in the Climate Outlook Fora process within the Region.

**5.3.8** The Association noted with satisfaction that the CLIPS project gave priority to the issues related to closer interaction with the potential users of climate services, which was considered an important component in developing climate services. As interaction with the users formed an important component of the capacity building efforts of the CLIPS project, Members were urged to give particular attention to strengthening their interactions with users. Members were also encouraged to undertake new

studies of the socio-economic and environmental benefits from climate services, taking care to address the value of information on climate to decision makers, and to quantify the actual or potential value of applying the information, especially at the market sector on regional or national levels. It was considered important to involve the users in the assessment of economic benefits. The Association expressed satisfaction that a series of workshops were being planned that combined climate predictions with various applications (such as agricultural meteorology).

**5.3.9** The Association was pleased to note that the WMO Secretariat had provided leadership in several task forces related to the El Niño phenomenon and climate applications, noting the relevance in the contexts of seasonal to inter-annual climate variability and inter-agency coordination on natural disasters. The Association emphasized the importance of exploiting these opportunities to enhance interaction between the climate research and user communities. This would demonstrate the social and economic benefits of operational climate information and prediction services in their countries, as well as give recognition to the NMHSs as primary voices.

#### **RESULTS OF THE INTER-COMMISSION TASK TEAM ON REGIONAL CLIMATE CENTRES (ICTT/RCC)**

**5.3.10** The Association was informed of the results of the ICTT/RCC, established by the fifty-second session of the Executive Council to develop a systems approach for the provision of seasonal to inter-annual forecasts to Members, and advise them on suitable mechanisms and procedures for the establishment of RCCs. It noted that the requirement for such forecasts on the global and regional scales were stated by several WMO constituent bodies and by Thirteenth Congress, and subsequently included in the work plans of CBS, CAS and CCI. These activities had reached a stage where responsibilities could be allocated, and implementation under the relevant WMO Programmes could be initiated.

**5.3.11** The Association noted in particular that the fifty-third session of the Executive Council, when re-establishing the ICTT/RCC, had expanded the group by inviting experts from the regional associations, including RA I, in recognition of the specific regional requirements for tailored long-range forecasts, climate analysis, monitoring information and other climate services, in addition to predictions.

**5.3.12** The Association considered that both options for service provision by RCCs required consideration, namely:

- (a) Concentration of RCC functions in one centre; and
- (b) Distributed RCC functions supported by more than one centre, which might co-exist in Region I in meeting the differing requirements of Members in different parts of the Region.

It agreed to start the preparations for the implementation of RCC services by defining the requirements in more detail and identifying the capabilities of the Region, especially those of

ACMAD, AGRHYMET and the DMCs (Harare and Nairobi) to meet these requirements.

**5.3.13** The Association endorsed the recommendations made by the fifty-fourth session of the Executive Council on the way forward on this issue, and considered that it was time to proceed with the implementation of a systems approach to providing seasonal to inter-annual products for Members on an operational basis, and establish RCC functions as required by Members.

**5.3.14** To ensure the understanding necessary to mitigate the effects of climate change and to enhance the regional capacity to create adaptation strategies, the Association decided to establish a Working Group on Climate Matters as contained in [Resolution 7 \(XIII-RA I\)](#).

#### **5.4 WORLD CLIMATE RESEARCH PROGRAMME (WCRP) (agenda item 5.4)**

**5.4.1** The Association noted that its Members continued to participate actively in several components of the WCRP. A particularly important activity was the GEWEX continental-scale associated regional CATCH project in West Africa, which included in particular collection of a high-quality rainfall data set and installation of a hydrometeorological network in the Ouémé catchment area.

**5.4.2** The Association expressed particular interest in the development of the CLIVAR research study to extend understanding of climate variability on seasonal to decadal timescales, and further strengthen the scientific basis for practical climate prediction. The Association noted the activities undertaken under the auspices of the CLIVAR Variability of African Climate System (VACS) Panel.

**5.4.3** The Association was informed of plans for the AMMA project, which grew out of a French initiative and involved researchers and NMHSs from many countries within and outside the Region. AMMA was designed to build on the CATCH activities and constitute a major focus for CLIVAR VACS. Proposals called for a field campaign in the West African region which included both a long-term multi-year component and a one-year component with more intensive observing periods, as well as modeling and DARE activities. The field campaign was scheduled to begin in 2004 and intensive observing periods were provisionally planned for 2005.

**5.4.4** The Association urged Members to continue to participate actively in the planning and implementation of the CATCH and AMMA projects, and to establish points of contact to affect closer communications between the scientific community and their national activities.

**5.4.5** The Association noted with appreciation that the Region had also been host to an important meeting on Climate Change Detection Indices (Casablanca, Morocco, February 2001), organized jointly by CLIVAR and CCI. The Association noted the importance of these indices and encouraged the Secretary-General to develop similar seminars for other subregions in RA I.

**5.4.6** The Association recognized that WCRP research activities had to be complemented by systematic, sustained and reinforced observations of all key climate variables and by capacity building involving all nations in climate research activities. The Association noted that two additional CLIVAR seminars were planned for RA I, one in November 2002 and one in January 2003.

## **5.5 GLOBAL CLIMATE OBSERVING SYSTEM (GCOS) (agenda item 5.5)**

**5.5.1** The Association noted with appreciation the developments in the implementation of GCOS. It welcomed the full establishment and availability of the performance results from the monitoring centres for the GSN and the GUAN, as indicated in a letter of 15 June 2001 sent by the Secretary-General to all WMO Members. The Association noted with concern that only about 35 per cent of the GSN stations in RA I were reporting more than 50 per cent of the expected messages. More than 50 per cent of the GSN stations were silent, as were 50 per cent of the GUAN stations in the Region. The Association welcomed efforts by the GCOS Secretariat, in cooperation with the WMO Secretariat and technical commissions, and with the support of several WMO Members, to identify and overcome the problems responsible for this underperformance. It welcomed in particular the initiative proposed by the United States to provide support for climate observing networks in developing countries, particularly for the GSN, GUAN and GAW, and looked forward to the improvements that successful implementation of this initiative would bring. The Association noted the need for ongoing refinements to the composition of the networks due to changing circumstances and improved scientific assessments, while recognizing the desirability of long-term stability and sustainability of the basic networks to meet scientific requirements. It requested Members to make every effort possible to improve the performance of their GSN and GUAN stations, as well as those in the GAW network. The Association also welcomed the progress in establishing a Global Terrestrial Network for Hydrology, (GTN-H).

**5.5.2** The Association recognized the importance of the decisions from the fifth session of the Conference of the Parties (COP) to the UNFCCC regarding meteorological and hydrological observing systems, and welcomed the activities of the GCOS Secretariat in response to those decisions. It urged Members to participate in preparing reports on systematic observation in conjunction with their countries' national communications to the UNFCCC. It also urged Members to serve on their national COP delegations or to communicate with them in order to make known the observing needs of their NMHSs. The Association emphasized that the full benefits of COP decisions could be realized only if adequate sources of funding were made available to implement the remedial actions identified, and welcomed conclusions from the seventeenth session of SBSTA, which recognized this need, particu-

larly in its recommendations involving the Subsidiary Body for Implementation and the GEF.

**5.5.3** The Association noted with appreciation the Regional Workshop Programme being organized by GCOS for addressing deficiencies in the global climate observing networks through a regional approach. It welcomed the progress achieved through the Eastern and Southern Africa Regional Workshop (Kisumu, Kenya, October 2001) and related activities, including the development of a Regional Action Plan for improving the observing systems in the Region, and urged Members to support the implementation of the Plan. The Association also welcomed plans for a West and Central Africa Workshop in Niger in 2003 and a Mediterranean Basin Workshop at a later date.

**5.5.4** The Association welcomed the progress being made in developing a Second Report on the Adequacy of the Global Observing Systems for Climate, led by GCOS in response to the request of the GCOS Steering Committee at its ninth session (September 2000), and the endorsement of the fifteenth session of the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA-15) in November 2001. It noted the high priority given to this activity by the tenth session of the Steering Committee (April 2002) and the accelerated schedule for its completion (mid-2003, for consideration by SBSTA-18 and COP-9 in late 2003). The Association expressed its full support for this activity and urged Members to participate as needed in the preparation of the Report. It also welcomed the leadership role being played by WMO and GCOS in providing the COP, on behalf of all the global observing systems for climate, with the information needed to ensure the adequacy of these systems for providing the observations needed to meet UNFCCC objectives.

## **6. ATMOSPHERIC RESEARCH AND ENVIRONMENT PROGRAMME (AREP) – REGIONAL ASPECTS (agenda item 6)**

**6.0.1** The Association noted the activities and initiatives that had taken place in AREP since its previous session, and the fact that RA I Members had taken active roles in many of them. The Association noted with satisfaction that a resident of the Region had won the 2000 WMO Research Award for Young Scientists. It urged all Members to make every effort to nominate eligible scientists from their countries for consideration for this award, particularly those who had conducted their research in the Region.

### **6.1 SUPPORT TO OZONE AND OTHER ENVIRONMENT-ORIENTED CONVENTIONS (agenda item 6.1)**

**6.1.1** The Association recalled that the atmospheric composition information provided by the GAW network in the Region constituted a major contribution to the implementation of the UNFCCC and the Vienna Convention for the Protection of the Ozone Layer. In this regard, the Association noted that its Members were operating a number of GAW stations providing

atmospheric ozone and greenhouse gas information for use by both scientists and government policy makers. The Association also noted with satisfaction that in the continuous effort to maintain high-quality global ozone data sets, the Association had staged an intercomparison for regionally-based Dobson spectrophotometers in March and April 2000. In line with sentiments expressed by the Executive Council, the Association recommended that similar intercomparisons be held in the Region every few years. The Association expressed its appreciation to those countries outside the Region that had consistently assisted the Association's ozone activities by providing training and materials.

**6.1.2** The Association was pleased that some of its Members had made substantial contributions to the 2002 International Scientific Assessment of Ozone Depletion. Members were urged to continue their active support of the next assessment, due in 2006, as these quadrennial assessments underpinned the discussions of the Parties to the Montreal Protocol and its amendments.

## **6.2 GLOBAL ATMOSPHERE WATCH (GAW)** (agenda item 6.2)

**6.2.1** The Association noted with satisfaction the support provided by its Members to the GAW Programme, and was pleased that it remained a priority activity in the Region. It noted the information provided by Mali on the intention to establish a GAW station there. It also noted with concern that some other RA I Members also had the intention to establish GAW stations or make existing ones operational in their countries, but they were unable to do so because of lack of funding. The Association felt that WMO should take appropriate actions to address this issue to the GEF to improve the situation and build capacity for monitoring of urban environment. In view of the increasing pollution problems in some of the quickly-expanding urban centres, the Association congratulated Thirteenth Congress and CAS for the establishment of a GURME project within GAW. The Association felt that an urban pollution forecasting workshop, focusing on operational and applied air quality forecasting capabilities, would be of great interest to many of its Members.

**6.2.2** The Association noted that GAW infrastructure had included a number of WDCs where atmospheric composition information was deposited and made freely available to scientists and decision makers. The Association was pleased that GAW stations in the Region were making important contributions to this vital activity by regularly submitting their measurements to the appropriate Data Centres. The Association urged Members to ensure that this data flow be maintained in the future.

**6.2.3** The Association was aware of the tremendous ongoing training requirements necessary to maintain such a complex system. It expressed its deep appreciation to those institutions and Member countries from both within and outside of the Region that were providing capacity building initiatives to address the issue. The Association strongly urged Members to take advantage of all opportunities for further training, for ex-

ample through twinning arrangements with individual scientists and appropriate institutions, and through seeking attendance at GAWTEC courses in Germany.

**6.2.4** In view of the growing importance of the changing atmospheric composition, manifesting itself at local to global scales in the forms of increasing urban pollution and climate change, the Association called on Members to maintain and enhance, if possible, the number and scope of their GAW measurement programmes. In this regard, the Association agreed on the need to expand the number of sites measuring total ozone and its vertical profile, particularly in tropical zones. It noted with appreciation the information provided by Botswana that a new GAW station with ozone measuring programme would be soon established, with the assistance of Switzerland.

**6.2.5** The complex international and multilayered nature of GAW atmospheric composition monitoring and GURME operations, with their need for frequent and effective communication, dictated that the Internet be employed as the primary tool for coordinating activities, disseminating relevant information and providing two-way communication. The Association therefore strongly urged both its Members and GAW to make full use of such communication technology, using the WMO home page and the AREP link.

## **6.3 WORLD WEATHER RESEARCH PROGRAMME (WWRP)** (agenda item 6.3)

**6.3.1** The Association noted that Members from the Region had maintained an interest in and contributed significantly to the implementation of the WWRP, a new CAS initiative that was endorsed by the fiftieth session of the Executive Council (Geneva, June 1998). It was recalled that this Programme offered the prospect of much-improved weather predictions on all timescales, emphasizing high-impact events and socio-economic applications. Members' contributions included hosting and participating in WMO workshops, as well as providing input to the annual WMO progress reports on NWP and long-range forecasting.

**6.3.2** The Association noted that under the WWRP there was widespread international support for moving ahead with THORPEX. This initiative held the prospect of significantly improving and extending weather forecasts through new observing systems and numerical models. The Association recognized that many of its Members stood to benefit from the successful conduct of THORPEX. It therefore strongly urged NMHSs to become involved in its planning and operational phases.

**6.3.3** The Association noted that other WWRP projects, at various stages of development, were also of much interest to its Members. These included the MEDEX, Warm Season Rainfall and Flooding, and Sand and Dust Storms projects. The Association strongly encouraged interested Members to play active roles in the future development of these projects, especially in view of the fact that each WWRP project included socio-economic aspects as necessary components. It also stressed a necessity to initiate a new WWRP project related to investigation of heat waves.

#### **6.4 TROPICAL METEOROLOGY RESEARCH PROGRAMME (TMRP) (agenda item 6.4)**

**6.4.1** The Association was pleased that its Members continued to support the development and activities of TMRP and that it was represented on the CAS working group charged with providing guidance and oversight of its implementation. It noted with concern that the insufficient number of qualified experts in the Region on Limited Area Modelling in the Tropics created some difficulties in studying and forecasting mesoscale phenomena, and expressed the view that training activities in this area should be increased.

**6.4.2** The Association noted that the IWTC series had provided an excellent forum for interaction between researchers and forecasters, particularly as they had resulted in the publication of two textbooks and a forecast guide. The Association also noted that arrangements were well advanced for holding IWTC-V in Cairns, Australia in December 2002, at which the essential global and forecaster-researcher character of the IWTC series would be maintained.

**6.4.3** The Association was informed that Météo France had created a research team on tropical cyclones at the RSMC for Forecasting for the Indian Ocean (La Réunion). In addition, the community of atmospheric scientists in France was developing an ambitious programme of research into the West African monsoon, which had generated interest in both Europe and North America. The Association expressed its appreciation to France for this programme, which was also closely related to WCRP activities and had a strong capacity building component. It strongly urged all interested NMHSs and the African academic community to fully participate in this exciting initiative.

**6.4.4** The Association was pleased with the excellent role played by the Monsoon Activity Centres in New Delhi, Nairobi and Kuala Lumpur in support of long-term Asian and African monsoon studies. It agreed with the Executive Council that those Centres should also serve as dissemination and coordination centres for NWP products relevant to monsoon forecasting as well as data centres for ENSO and inter-annual variability studies in the Region. The Association felt that the CAS Working Group on Tropical Meteorology Research would be the body best able to provide the necessary guidance and technical assistance to those Centres with their increased responsibilities.

#### **6.5 PROGRAMME ON PHYSICS AND CHEMISTRY OF CLOUDS AND WEATHER MODIFICATION RESEARCH (agenda item 6.5)**

**6.5.1** The Association noted that a number of its Members were active in this Programme, particularly those with chronic water resources problems. It cautioned, however, that these Members should refer to the WMO Statement on the Status of Weather Modification as well as the Guidelines for Advice and Assistance Related to the Planning of Weather Modification Activities when responding to questions, or when contemplating weather modification experiments in their countries.

**6.5.2** The Association was informed of developments in a major initiative, supported by the EU and involving a number of NMHSs from the Region, which would study the feasibility of conducting precipitation enhancement operations in the Mediterranean Sea, South-east Europe and areas of the Middle East. The Association welcomed this initiative and urged interested countries to continue their full involvement in it. The Association also welcomed the agreement by Morocco to host the Eighth WMO Scientific Conference on Weather Modification in April 2003, at which hundreds of scientists from around the world were to discuss the latest developments covering the whole range of weather modification activities. It strongly urged Members to participate in this important event. Moreover, the Association expressed the opinion that in view of the importance of this subject to RA I, the capacity building activities on weather modification should be developed in the Region.

#### **7. APPLICATIONS OF METEOROLOGY PROGRAMME (AMP) - REGIONAL ASPECTS**

##### **7.1 PUBLIC WEATHER SERVICES PROGRAMME (PWSP) (agenda item 7.1)**

**7.1.1** The Association noted with appreciation the progress and development of the PWSP since XII-RA I. It further noted that, while the Programme focused on attaining its global objectives, the needs and concerns of the Members in the Region were given particular attention. The Association stressed that the PWSP should be strengthened in view of the importance of the programme for NMHSs' visibility and for the development of natural disaster reduction activities.

**7.1.2** The Association recalled that the OPAG/PWS had replaced the Working Group on PWS following the restructuring of CBS in 1998. In the successor arrangement, the Programme's functions were to be coordinated through three ETs and an ICT, which would benefit from the participation and contributions of experts from the Region. Mr. K. Essendi (Kenya) was the first chairperson (1999-2001) of OPAG/PWS and Mr M. de Villiers (South Africa) was the Regional Rapporteur on OPAG/PWS until 2002.

**7.1.3** The Association was pleased to note the progress of continuing dialogue with international media representatives, with a single official voice through the PWSP, on issues that promoted the recognition of the important roles played by WMO and the NMSs in the forecast and warning process. Members had in the past expressed concern about international broadcasts of unofficial weather information in the Region, and the impact of such broadcasts on the visibility and status of NMSs, as well as on public safety. The Association strongly supported the promotion by the PWSP of the use of official NMS forecasts and warnings, and recognized that the possibility of public confusion would be minimized with the availability of consistent, authoritative information. In this regard, the Association acknowledged the pressing

need for good NMS-media relations, and welcomed the publication of relevant guidelines.

**7.1.4** The Association was informed about two pilot World Wide Web projects directly related to media issues that were being developed under the auspices of WMO and hosted by Hong Kong, China. The SWIC Web site, which was created to facilitate media access to official NMS warnings, was launched on an experimental operational basis in September 2001. Only tropical cyclone warnings from the North-West Pacific region (ESCAP/WMO Typhoon Committee) were being posted in the trial phase, but further evolution was planned to lead to extending the project to other regions. The second project, the WWIS Web site, was to provide the media and public with official global city weather forecasts. The objective was to counteract adverse effects on the image and authority of NMSs, and on public safety, caused by the large amount of unofficial city forecasts issued by the media and widely available on the Internet. More than half of all WMO Members worldwide, including 28 Members from Region I, had indicated their intention to participate in the project. The first phase, involving the posting of city climatological information (and carrying information from 69 cities in Region I), was launched in December 2001. The second phase, which was to be completed in late 2002, was to consist of posting medium-range city forecasts. The Association urged Members to participate actively in the WWIS by providing additional city forecasts.

**7.1.5** The Association welcomed the focus by the PWSP on capacity building, noting the continuing urgent need for training to enable Members to deliver comprehensive PWS in order to promote community safety and national welfare. In this regard, the Association expressed appreciation for the training events for Members of the Region. The Workshop on PWS for the South-West Indian Ocean Region was held from 28 September to 1 October 1999 in Quatre Bornes, Mauritius. The RA I Regional Training Seminar on Interpretation of GDPS Products and Improvement of PWS Workshop was held at Mahé, Seychelles from 31 October to 11 November 2000. The Second RA I Training Course on Tropical Cyclones and PWS was held at St. Denis, La Réunion from 29 October to 13 November 2001. Participants from the Region attended a PWS Workshop for SIDS held at Melbourne, Australia from 9 to 13 October 2000. The Association noted with appreciation the contribution of the United Kingdom to the capacity building activities in the Region, particularly through conducting training events for the Members of RA I in Nairobi, Kenya, one of which took place in December 2001; a second one was planned to take place in January 2003. The Association expressed appreciation to the host countries and urged that training events continue to receive high priority in the following intersessional period.

**7.1.6** The Association welcomed the publication in January 2000 of the second edition of the *Guide to Public Weather Services Practices* (WMO-No. 834). The Association felt that this expanded edition was more comprehensive and emphasized strong user focus

in the provision and delivery of services. It was complemented by a set of CD-ROMs providing examples of various national practices to assist Members in the development of their own PWS programmes.

**7.1.7** The Association noted that the results of a 1997 WMO global survey to assess the status of Members' national PWS programmes were published in May 1999 as *Public Weather Services in Focus* (WMO/TD-No. 974). Nineteen Members of the Region responded. Among the survey's findings relevant to the Region's NMSs were:

- (a) Ninety-five per cent of NMSs served the general public, 63 per cent served national emergency management services, and 37 per cent served local emergency management services;
- (b) Thirty-seven per cent were the sole authority for hydrological events, whereas 63 per cent issued graduated levels of information (outlooks, watches and warnings), and 33 per cent did not issue warnings;
- (c) Forty-seven per cent owned facsimiles and 74 per cent owned telephones;
- (d) Thirty-two per cent exchanged warnings across borders, and 11 per cent internationally;
- (e) Forty-seven per cent performed verification of PWS and shared results with staff, but only 20 per cent shared results with the public; and
- (f) Most assistance was needed in forecasting, dissemination techniques, user understanding, enhancing visibility, training, resources and improvement of media relationships.

**7.1.8** The Association recalled that in 2001, the RA I Rapporteur on Regional Aspects of PWS had circulated a questionnaire specially designed for Members in RA I to assess the status of their national PWS programmes. Although the response rate (16 Members, 30.7 per cent) was quite small, among observations and conclusions of the final survey report were:

- (a) While there were positive signs of progress in some countries, the national PWS of many countries were far from adequate;
- (b) Severe weather forecast and warning services varied from non-existent to sophisticated, with the most organized countries being those regularly affected by tropical cyclones;
- (c) Forecast verification among most respondents was ad hoc and limited;
- (d) User-based evaluation was usually subjective and limited to random, ad hoc questionnaires and opinion surveys;
- (e) There was high awareness of the value of the media to distribute forecasts and warnings, and the use of the Internet as a means of communication was growing; and
- (f) Requirements identified for improved prediction and warning services included NWP, weather satellite and weather radar coverage, improved quality and density of observation network and staff training.

As regards items (c) and (d), the Association expressed the opinion that all these verification mechanisms

should be implemented on a routine basis that would increase the reliability of the forecasts and warnings.

**7.1.9** The Association noted with appreciation that the following technical documents were published through the PWSP in an effort to provide much-needed guidance in specialized areas, especially for the benefit of NMSs in developing countries:

- (a) *Guidelines on Performance Assessment of Public Weather Services* (WMO/TD-No. 1023);
- (b) *A Technical Framework for Data and Products in Support of Public Weather Services* (WMO/TD-No. 1054);
- (c) *Guidelines on Graphical Presentation of Public Weather Services Products* (WMO/TD-No. 1080);
- (d) *Weather on the Internet and Other New Technologies* (WMO/TD-No. 1084);
- (e) *Guidelines on the Improvement of NMSs - Media Relations and Ensuring the Use of Official Consistent Information* (WMO/TD-No. 1088);
- (f) *Guidelines on the Application of New Technology and Research to Public Weather Services* (WMO/TD-No. 1102); and
- (g) *Supplementary Guidelines on Service Assessment* (WMO/TD-No. 1103).

**7.1.10** The Association concurred that effective coordination and efficient communication with emergency management services were essential in the dissemination of timely warnings to mitigate life and property losses caused by natural disasters. As a result, it appreciated that guidelines were being developed on 'best practices' regarding relationships between NMSs and emergency management organizations, and urged Members to pay particular attention to initiating or improving relations with their national emergency management authorities.

**7.1.11** The Association welcomed efforts to promote cross-border warnings exchanges where there were none, and to enhance existing bilateral and/or regional cooperation and exchange agreements. It agreed that Members should acquire, develop and maintain efficient, reliable communication mechanisms, including the Internet, for exchange of warnings and information. The Association reiterated that NMS staff should receive specialized training in severe weather prediction, the issuing of warnings and the appropriate communication skills to manage the relevant tasks. The Association felt that NMS staff should also be familiarized with practices and procedures of neighbouring NMSs to facilitate cooperation.

**7.1.12** The Association appreciated the PWSP's emphasis on the application of new technology and research to PWS. It noted that advances in computer technology facilitated data acquisition, NMS numerical model runs, and public forecast automation and dissemination in digital, graphical and narrative formats. The Association felt that better quality observations from satellites, radar and other remote sensing systems, as well as improved NMS data distribution via television, radio, wireless technologies and the Internet, would enhance Members' PWS efforts. It acknowledged the potential benefits, especially to developing countries, of the new

technology for providing education and training beyond the traditional centralized instruction, with the use of computer-assisted learning and interactive training modules. In this regard, the Association urged Members to use the PWS guidelines on application of new technologies and research to PWS, as appropriate to their NMSs.

**7.1.13** The Association emphasized the importance of effective dissemination and presentation of forecasts and warnings, stressing their impact not only on the safety of life and property, but also on NMS status and visibility. The Association noted that several Members had received VCP support to acquire suitable dissemination systems, mainly television/media presentation systems, and the relevant training in their use and maintenance to support enhanced quality services. Training in media presentation skills was a core component of PWS workshops. The Association expressed appreciation to those Members, especially the United Kingdom, which had provided TV-weather presentation systems, equipment and training through the VCP for the development of PWS in the Region, and urged donors to continue their efforts to provide such valuable assistance. It was pleased to learn that the United Kingdom would continue its assistance in the future.

**7.1.14** The Association concurred that user-based service assessment was a basic requirement that supplied feedback and input into the design and development of new and appropriate public weather products and services. In this regard, it welcomed the focus on assisting Members with quantification of forecast uncertainty, and conducting verification of warnings, forecasts and service evaluations. The Association noted that earlier guidelines on service assessment had been prepared by PWS experts, and welcomed new supplementary guidance material on service assessment that integrated scientific verification with user-based assessments for specific applications. The Association urged Members to use these guidelines to assist them with their own product verification and service assessments.

**7.1.15** The Association accepted that the rapidly changing global and economic environment had increased the problems of NMSs in developing countries and especially in the least developed countries, limiting the ability of Members to provide adequate PWS. On the other hand, there was an increase in the weather sensitivities of communities, public awareness of the real potential for mitigation of adverse effects of severe weather, and user demand for more detailed, accurate and useful meteorological information. The Association urged Members to give high priority to the following issues:

- (a) Capacity building and transfer of technology, including training in media handling and presentation skills, issuing of weather warnings, and coordination and collaboration with the media, emergency management and other government agencies;

- (b) Application of new technology in NMS systems and operations, and the use of research to design, develop and disseminate new and improved PWS products;
- (c) Increasing adoption by NMSs of performance evaluation, including service assessment, and utilizing user feedback to determine user needs and requirements;
- (d) Enhancing public awareness and understanding of, and response to, weather warnings as part of natural disaster mitigation efforts, and promoting public awareness of the economic benefits of meteorological services;
- (e) Promoting and enhancing cross-border exchanges of warnings and information as well as downscaling of NWP products; and
- (f) Improving the use of official, consistent information, facilitating the international exchange of public weather products, and making weather information available on the Internet.

## **7.2 AGRICULTURAL METEOROLOGY PROGRAMME (AGMP), INCLUDING THE REPORT OF THE RAPORTEURS** (agenda item 7.2)

**7.2.1** The Association complimented the Secretary-General and CAgM for progress made in the field of agricultural meteorology, including the publication of a large number of technical notes and CAgM reports.

**7.2.2** The Association noted with appreciation the theme adopted by the twelfth session of CAgM – ‘To promote agrometeorology and agrometeorological applications for efficient, sustainable agriculture, silviculture, and aquaculture for an increasing world population in rapidly changing environments’ – and stressed the need to increase awareness among users of the economic, environmental and health benefits of the application of meteorological, climatological and hydrological information to agriculture to meet the food, fodder and fuel needs of the growing populations in Africa. The Association considered the theme to be of extreme importance to the Region. The Association noted with interest the intersessional activities of CAgM, and agreed that they contributed greatly to the economic development of the countries in Africa.

**7.2.3** The Association further noted the main topics discussed at the twelfth session of CAgM, among which were the applications of seasonal to inter-annual climate forecasts and the products and services that were becoming available based on these forecasts. The Association supported the decision of the Commission to promote, survey and summarize, using case studies, the current applications of climate forecasts in agriculture, forestry and livestock management, and recommend ways and means to optimize the use of climate forecasts in operational agriculture, with emphasis on user needs, especially in developing countries. In this context, the Association was pleased to note the initiative taken by the Commission to collaborate closely with IGBP’s START, WCRP and IHDP in the CLIMAG project. It congratulated the WMO Secretariat on the successful organization of the

International Workshop on CLIMAG in September 1999 in Geneva. The Association was pleased to note that the Institute of Agrometeorology and Environmental Analysis for Agriculture (IATA) in Florence, Italy was able to obtain funding for its project ‘A Network for Harmonization of Climate Prediction for Mitigation of Global Change Impact in Sudano-Sahelian West Africa (CLIMAG-West Africa)’ from the EU, in the framework of the specific research and technological development programme ‘Energy, Environment and Sustainable Development’. The Association encouraged WMO’s continued participation in the activities of the CLIMAG project and its Steering Committee.

**7.2.4** The Association noted with satisfaction the effective participation of Members of the Region at CAgM-XIII and the International Workshop on Reducing the Vulnerability of Agriculture and Forestry to Climate Variability and Climate Change, held in Ljubljana, Slovenia in October 2002. It further noted that the Commission had adopted the theme ‘To promote operational applications of agrometeorology using innovative technologies for services to agriculture, silviculture and aquaculture’, upon which to focus its activities during the intersessional period. The Association welcomed the introduction of a new working structure for CAgM, in particular the establishment of the three OPAGs: Agrometeorological Services for Agricultural Production, Support Systems for Agrometeorological Services, and Impacts of Climate Change/Variability and Natural Disasters on Agriculture. It encouraged all Members to follow up actively on the outcomes of the workshop and the thirteenth session of the Commission, and to participate effectively in the work of the OPAGs.

**7.2.5** The Association noted with satisfaction that three training events had been held in the Region: a Roving Seminar on Instrumentation and Operation of Automatic Weather Stations for Application in Agrometeorology (Casablanca, Morocco, 28 June-9 July 1999); a Roving Seminar on Drought Preparedness and Drought Management (Accra, Ghana, 1-12 November 1999); and a Roving Seminar on Data Management for Application to Agriculture for SADC Countries (Pretoria, South Africa, June 2000). There were also two international workshops in the Region: Agrometeorology in the 21<sup>st</sup> Century: Needs and Perspectives (Accra, Ghana, 15-17 February 1999); and Coping with Drought in Sub-Saharan Africa: Best Use of Climate Information (Kadoma, Zimbabwe, 4-6 October 1999). The Association also noted that WMO had co-sponsored training courses in Kenya and Italy. It strongly supported the continued organization of such events for the benefit of the participants from the Region. In that connection, the Association requested the Secretary-General to continue to provide strong support to the roving seminars in agricultural meteorology, which were helping to build the much-needed capacity to address the emerging issues in agrometeorology in the Region. The Association agreed that training in agricultural meteorology should receive high priority consideration for meaningful application of meteorological information to agricultural activities.



**7.2.6** The Association noted that experts from the Region had participated actively in two international workshops and an interregional workshop organized by WMO in other regions.

**7.2.7** The Association noted the WMO activities on desertification and urged Members to participate actively in the implementation of the UNCCD. The Association requested the Secretary-General to continue to provide appropriate guidelines to Members in this regard. It further urged Members to benefit from the support provided by the Global Mechanism of the Convention for projects in this area. The Association expressed its strong support for the regional centres in RA I and stated the requirements for strengthening the AGRHYMET, DMCs and ACMAD centres, especially in their efforts to combat desertification. The Association recalled that the AGRHYMET centre was originally established as a result of ongoing drought and desertification and that it needed to be invigorated and revitalized to achieve its objectives. The Association requested the Secretary-General, in collaboration with the relevant regional organizations such as CILSS, IGAD, SADC and ECA, to assist in strengthening these centres.

**7.2.8** Given the importance of the effects of weather and climate on the productivity and sustainability of farming systems, and noting in particular the devastation caused by extreme events such as drought to the economies of many African countries, the Association agreed to accord high priority to the application of agricultural meteorology and to ensure that it was an integral part of national plans for sustainable development. In this regard, the Association agreed to promote the application of agricultural meteorology in Africa through regional initiatives such as NEPAD.

**7.2.9** The Association thanked Mr E. Mersha (Ethiopia) and Mr M.R. Muchinda (Zambia) for their reports on agrometeorological methods, practices and data needs. The Association noted that the Rapporteur on Meteorological Factors in Land and Ecosystem Degradation could not submit his report.

**7.2.10** The Association noted that the two reports submitted by the Rapporteurs did not address the current agrometeorological methods and practices in use at the farm level nor the existing methods of observation and networks of agrometeorological field stations in Africa. The Association agreed that the application of meteorology to agriculture continued to be of high importance to sustainable agriculture and consequently to the economic development of many countries in the Region. It recognized the need for the re-establishment of the Working Group on Agricultural Meteorology, taking into account developments in the Region such as the potential benefit of improving and using seasonal to inter-annual climate forecasts to meet specific needs of agriculture and food security systems, improved adaptation strategies to climate variability and climate change, methods to cope with extreme meteorological events (e.g. droughts and floods), the need for evaluation of the impact of ENSO on agriculture and forestry, and the potential for

developing improved agrometeorological applications using tools such as the GIS. The Association therefore adopted [Resolution 8 \(XIII-RA I\)](#) establishing a Working Group on Agricultural Meteorology.

### **7.3 AERONAUTICAL METEOROLOGY PROGRAMME (AEMP) (agenda item 7.3)**

**7.3.1** The Association noted with satisfaction that Thirteenth Congress in 1999 had re-emphasized the importance it attached to an expanded and vigorous AeMP, and requested the Secretary-General to assist in its implementation and, in particular, to give high priority to training requirements in aeronautical meteorology.

**7.3.2** The Association was pleased to note that the highest priorities of the AeMP were training and fostering closer contacts with service users. It noted with appreciation the major contributions of Members and the WMO Secretariat in training aeronautical meteorological personnel. The Association thanked Botswana, Cameroon, Kenya, Niger, Senegal and the United Kingdom for having kindly hosted 10 successful seminars organized by ASECNA, the United Kingdom and WMO, with the active participation of ICAO. It was grateful that four of these events had been aviation seminars convened by the United Kingdom's Met Office for operational forecasters from countries under the SADIS footprint, and had included 39 participants from Africa. The Association pointed out with concern that many countries under the SADIS footprint were unable to remit charges because many of them did not recover charges from aviation. The Association thanked the Met Office and the WMO Secretariat for having provided the necessary assistance that enabled most participants from the Region to attend the aviation seminars. The Association noted with appreciation the information provided by ASECNA that training courses on meteorology basic module had been organized by ASECNA with encouraging results. It further noted that ASECNA had established local training centre with training units in each country, and it would allow ASECNA to carry out new training programme with assistance of WMO and potential donors. The Association stressed that in the context of training activities it would be highly desirable to organize a technical conference on aeronautical meteorology, possibly conjointly with the next session of CAeM, and expressed its support on this matter to CAeM-XII.

**7.3.3** The Association welcomed recommendation 4.1 made by the Conjoint CAeM session/Meteorology Divisional Meeting that called for WMO, in coordination with ICAO, to continue to arrange seminars on cost recovery as a matter of priority, and for ICAO, in coordination with WMO, to update cost recovery guidance material. In this respect, the Association was pleased to note that, in accordance with the request of the fifty-third session of the Executive Council, draft guidance material on cost recovery and alternative service delivery had been prepared by the CAeM Advisory Working Group with participation of the Members of the EC Advisory

Group on the Role and Operation of NMHSs, and endorsed by the twelfth session of CAeM (September 2002). The Association requested the Secretary-General to arrange for distribution of the guidance material among Members as soon as possible.

**7.3.4** The Association noted with appreciation the large volume of training material available on the AeMP Web site and the efforts being made to provide new or updated guidance material to back up the training process. It welcomed the distribution to all RMTCs of copies of the proceedings of the annual United Kingdom/WMO seminars held between 1997 and 2002. Furthermore, the Association noted with interest the work being undertaken to update the *Guide to Practices for Meteorological Offices Serving Aviation* (WMO-No. 732) and the preparation of a booklet on Aviation and the Global Atmospheric Environment, and requested that these documents be finalized and published as soon as possible. The Association was pleased that a preliminary issue of the English version of the *Compendium on Tropical Meteorology for Aviation Purposes* (WMO-No. 930) had been published in May 2002. In view of the importance of this *Compendium* to both user and service provider communities, the Association urged the Secretariat to give high priority to its publication in other language versions.

**7.3.5** The Association welcomed advances made in implementing the WAFS. It recalled that with the WAFS final phase, expected towards the end of 2004, each of the two WAFCs would transmit by satellite broadcasts global wind and temperature forecasts and SIGWX forecasts only in GRIB and BUFR coded format, respectively. Wind and temperature and SIGWX forecast charts would need to be produced locally from the GRIB and BUFR coded products by service providers, since the WAFCs would no longer provide WAFS T4 charts in the WAFS final phase. As a result, it was pointed out that all Members would need to install the necessary equipment and software, and to train operational staff to enable them to access, decode and use the digital WAFS data sets for the preparation of the T4 charts for flight documentation. In this regard, the Association noted with satisfaction that such training would be convened in Johannesburg, South Africa in January 2003 for English-speaking countries in the Region. The Association also noted with satisfaction that WAFS-London had already been generating high-level SIGWX forecasts in BUFR coded format for all ICAO standard areas, and that these forecasts were being transmitted by satellite. The Association was informed that the two WAFCs had improved back-up procedures to ensure continued global availability of aviation data and products to users in case of a WAFS failure, and the harmonization of their WAFS product output. The Association urged Members to assure training of personnel on the use of GRIB, BUFR and CREX codes for interpretation of aeronautical meteorology messages.

**7.3.6** The Association noted with satisfaction that, since its previous session in 1998, various amendment proposals to Technical Regulation [C.3.1], developed

in close cooperation with relevant CBS and CIMO bodies and in coordination with ICAO, had become part of Amendments 71 and 72, implemented respectively in November 1998 and 2001. It noted that new amendment proposals that would form part of Amendment 73 already endorsed by the Conjoint Meeting were expected to be in force in November 2004.

**7.3.7** The Association noted with interest the introduction of quality systems in WMO Technical Regulation [C.3.1] as part of Amendment 72. It welcomed the establishment of a PROMET Task Team on Quality in October 2001, and noted with interest that a report of the Team had been presented at CAeM-XII (September 2002). The Association was informed that the fifty-third session of the Executive Council (June 2001) had pointed out that any mandatory implementation of ISO 9000 series of quality assurance would lead to significant costs to NMSs, and could increase the gap between developed and developing countries. The mandatory implementation of ISO 9000 series would particularly affect Members in Region I. The Association noted with satisfaction that the Conjoint Meeting had maintained the current provisions related to ISO 9000 series of quality assurance contained in Technical Regulation [C.3.1] as recommended practices. The Association was pleased to learn that the fifty-fourth session of the Executive Council had agreed that WMO should work towards its own quality-management framework by making use of the already developed comprehensive system of documented WMO procedures and practices in Technical Regulations, Manuals and Guides. It welcomed the establishment of an inter-commission task group on quality to develop an overall approach for the WMO quality management framework. The Association stressed that a WMO quality management framework had to be developed in such a mode that gave opportunity to NMHSs to meet users' requirements in the most cost-effective way.

**7.3.8** The Association noted with satisfaction that, in line with the decision of CAeM-XI (March 1999), Australia had tested an internationally-agreed TAF verification system for some airports in Australia and New Zealand through a pilot project. It also noted that France had taken the lead in implementing a TAF verification pilot project at airports in a number of European countries and at other airports in Africa, in collaboration with ASECNA, using its own algorithm. The Association welcomed the results achieved by the two pilot projects and thanked all those involved in implementing them.

**7.3.9** The Association was informed about progress made in automating observing systems, and noted that the PROMET session in 2001 had recognized that work was still needed to ensure that these automated systems fully met aeronautical requirements contained in Technical Regulation [C.3.1]. In this regard, the Association noted with satisfaction that the Conjoint Meeting had recommended that ICAO, in close coordination with WMO, develop a Manual on the Use of Automatic Meteorological Observing Systems at

Aerodromes. The Association agreed that automated systems had undeniable advantages in terms of performance, continuity and uniformity of measurements, which made them very useful when continuous human presence at the observing site was not possible.

**7.3.10** The Association noted with satisfaction that the third AMDAR Panel meeting, held in 2000, had designated Mr M. Edwards (South Africa), as vice president of this important Panel. The Association recognized the positive role played by the AMDAR Panel in enhancing the upper-air component of the GOS. The Association noted with satisfaction that more than 140 000 AMDAR observations per day were being exchanged over the GTS, representing more than a three-fold increase in AMDAR observations compared with 1998, when the Panel started its activities. It felt, however, that the number of AMDAR observations over Africa was not sufficient and more active involvement of airline companies operating in the Region should be encouraged.

**7.3.11** The Association was pleased to note that a South African AMDAR pilot project had been successfully implemented and transformed into a national AMDAR programme, and that this national programme was expected to expand into a regional AMDAR programme that could involve most SADC Member countries. The Association noted with satisfaction that the fifty-fourth session of the Executive Council had encouraged closer cooperation between the AMDAR Panel and ASECNA, to bring the benefits of AMDAR observations to parts of the Region covered by this agency. In this regard, the Association was pleased to note that an AMDAR Workshop had been conducted in Dakar, Senegal by ASECNA with assistance from the WMO Secretariat and the Panel in November 2002. The Association agreed that the availability of targeted AMDAR observations, including AMDAR profiles at international aerodromes in the Region, would contribute to the increased availability of radiosonde data over Africa and to improved weather forecasts. In this regard, the Association was pleased to note that regional AMDAR bulletin headers would soon be available, which would improve access to relevant AMDAR bulletins exchanged on the GTS. The Association noted with interest that an AMDAR Reference Manual comprising a comprehensive technical description of AMDAR, ranging from sensor systems to the final output data, had been prepared and approved for publication by the AMDAR Panel in 2001.

**7.3.12** The Association noted with concern the request by the IATA to the ICAO Conference on Economics of Airports and Air Navigation Services (June 2000) to limit cost recovery to services and facilities exclusively serving aviation, thereby excluding core meteorological services. The Association was pleased to note that Members from the Region supported the WMO position endorsed by the Conference that existing ICAO guidance on meteorological cost recovery should not be modified to exclude, among others, syn-

optic and upper-air stations, common telecommunication and data processing systems. The Association encouraged Members to cooperate with IATA and the airlines in addressing both the quality of the services provided to aviation and the transparency of meteorological costs to be recovered from the airline industry. With the reactivation of the ICAO Air Navigation Services Economics Panel (ANSEP) tasked to review the current guidance on cost recovery, the Association invited Panel members from the Region and the WMO Secretariat to collaborate to address future amendments to the current guidance material on cost recovery. The Association noted with interest that the second meeting of the Panel would take place in Montreal, Canada from 6 to 10 January 2003.

**7.3.13** The Association was pleased to note that the joint ICAO/WMO letter sent in 2000 to ICAO Contracting States and WMO Members had asked for enhanced cooperation at the national level to contribute effectively towards the safety, regularity and efficiency of international air navigation. Furthermore, the Association noted with satisfaction that the exchange of letters between WMO and IATA in 2000 had resulted in the nomination of focal points to address issues of concern to either party, in particular the recovery of meteorological costs from the airlines, as well as users' needs.

**7.3.14** In view of the vital importance of the AeMP for the Region, the Association decided to appoint a Rapporteur on Regional Aspects of the Aeronautical Meteorology Programme and adopted [Resolution 9 \(XIII-RA I\)](#).

#### **7.4 MARINE METEOROLOGY AND ASSOCIATED OCEANOGRAPHIC ACTIVITIES PROGRAMME (MMAOAP), INCLUDING THE REPORT OF THE RAPPORTEURS (agenda item 7.4)**

**7.4.1** The Association noted with interest that Thirteenth Congress had approved MMAOAP as part of the 5LTP. This programme provided overall objectives as well as detailed guidelines for Members, regional associations and WMO in this field. The Association further noted with interest that Congress had approved the establishment, primarily through the merger of the former CMM and the Joint IOC/WMO Committee for IGOSS, of the new JCOMM. The new Joint Commission had subsequently also received the formal approval of the 20<sup>th</sup> Assembly of the IOC (Paris, July 1999). The first session of JCOMM took place in Akureyri, Iceland, from 19 to 29 June 2001. As agreed by Congress and the Assembly, and confirmed during the session, JCOMM was currently the coordinating and reporting body for all operational marine activities of WMO and IOC, and the primary implementation mechanism for an ocean observing system for climate in support of GOOS and GCOS. The Association recognized the potential importance of JCOMM to its Members and to WMO, noted that delegates from seven Members of RA I had participated in JCOMM-I, and offered its strong and ongoing support. Further specific action in this regard is recorded in subsequent paragraphs.

**7.4.2** With regard to the implementation of marine meteorological services, specifically in Region I, the Association noted with appreciation the reports of the Rapporteur on Regional Marine Meteorological Services for the West Indian Ocean, Mr S. Ragoonaden (Mauritius), and the Rapporteur on Regional Marine Meteorological Services for the Eastern Atlantic, Mr L.E. Edefienene (Nigeria). Actions taken on various points raised in these reports are recorded in subsequent paragraphs. The Association agreed that the further development of marine meteorological services and marine observing systems in the Region, particularly in the light of the opinions of Thirteenth Congress on the matter, should be an ongoing activity. It also agreed on the need to maintain close liaison with JCOMM. It therefore decided to reappoint a rapporteur and adopted [Resolution 10 \(XIII-RA I\)](#).

#### MARINE METEOROLOGICAL AND OCEANOGRAPHIC SERVICES

**7.4.3** The Association noted that the new WMO marine broadcast system under the GMDSS (forming a part of SOLAS) had been fully implemented as planned on 1 February 1999. In particular, it noted with satisfaction that meteorological services through SafetyNET for the five Metareas covering the Region were operational, and expressed its considerable appreciation to all the NMSs concerned (France, Greece, India, Mauritius, Pakistan and South Africa). At the same time, it recognized the need to continually review these services, including in particular the views of users, and therefore urged Members in the Region operating VOS to participate actively in the various marine meteorological services monitoring exercises being undertaken.

**7.4.4** The Association noted with interest and appreciation a report presented on the successful work undertaken by France, Morocco, Portugal and Spain, coordinated by Météo France, to develop a common set of forecast sub-areas within Metarea II. The Association noted that the new marine forecast areas in Metarea II had been used in operational forecasts since 4 February 2002 at 1200 UTC. The Association expressed its appreciation to all concerned for the success of this difficult but essential work, and adopted [Resolution 11](#) on the subject. The Association also noted that new marine sub-areas within Metarea III(W) had been used in operational forecasts since 1992 for France, 1997 for Algeria and Morocco, and October 1998 for Spain. It recognized that this work should also be formally agreed to and reflected in the relevant WMO publications. The Association therefore adopted [Resolution 12](#). In doing so, it recognized that a similar harmonization might also be required in other Metareas, including in Metarea III(E). It therefore recommended to the Issuing Services concerned to review the situation and to endeavour to coordinate the work necessary to effect such harmonization as appropriate.

**7.4.5** The Association noted with great concern that despite of the fact that 38 RA I Members had coastal lines, the marine meteorological services for navigation at sea were poorly developed in many NMHSs. This

led to serious loss of life and damage to property. The Association requested the president and the Secretary-General to bring this matter to the attention of potential partners so that necessary assistance could be provided to establish marine meteorological services in the countries concerned. In this context, the Association noted with appreciation that the Agency of Portuguese-Speaking Countries for Climate and Related Environmental Issues (CRIA) formulated a project for development of numerical prediction of the state of the sea based on the numerical models for high seas and coastal waters for Gulf of Guinea and coastal areas in Western Africa. The Association also noted with interest the detailed information on project development provided by Cape Verde, including a proposal to host a workshop on project development planned to take place in March 2003. A request for inter-comparison of models for prediction of meteorological and oceanographic parameters at sea was also made.

**7.4.6** The Association noted with appreciation the offer made by France and ACMAD to provide some assistance in the development of marine meteorological service in the Region. This included the preparation of numerical marine meteorological products, the use of RETIM as a tool to provide model output to the Members concerned, and organizing training events on this subject, which could be necessary to train professional staff in countries concerned.

**7.4.7** Several Members of RA I raised the question regarding the necessity to develop a meteorological service for navigation at great lakes such as Victoria, Tanganyika and others. In view of the importance of this issue, the Association requested the Secretary-General to explore what actions should be taken in this regard to meet Members' requirements.

**7.4.8** The Association recalled that the globally-coordinated MPERSS had been adopted by CMM-XI and, with the approval of the forty-fifth session of the Executive Council, implemented on a trial basis as from 1 January 1994. The Association noted that JCOMM-I had emphasized that a capability for operational response and the operational delivery of data and products was an essential criterion in the provision of meteorological and oceanographic support to many types of marine environmental protection in coastal waters and regional seas, as it was in high seas areas, and agreed that the MPERSS trials should continue during the coming JCOMM intersessional period. The Association urged Members with agreed responsibilities under the MPERSS to continue to make every effort to contribute to the trials and to report the results of these trials to JCOMM.

**7.4.9** The Association noted with appreciation that the MCSS, GDSIDB and GTSP were all being continually developed to meet the requirements for various types of marine climate data to support global climate studies, GCOS and the provision of marine services. It therefore urged Members concerned in the Region to participate actively in these projects, which now all formed part of the JCOMM Data Management Programme Area.

## SYSTEMS FOR MARINE OBSERVATIONS AND DATA COLLECTION

**7.4.10** The Association shared the view of Thirteenth Congress that the development and implementation of GOOS were of considerable importance to WMO and to the NMSs, in view of the need for enhanced ocean data to support meteorological and oceanographic services and global climate studies, and also because of their existing experience and facilities in this field. It recognized that a major initial task for JCOMM would be the implementation, international coordination and regulation of an operational ocean observing system for climate, in support of GOOS and GCOS. For this task, JCOMM would require the enhanced, active support of all maritime Members. The Association therefore adopted [Resolution 13 \(XIII-RA I\)](#) on the subject. The Association strongly supported the establishment of two GOOS regional alliances relevant to Region I – GOOS-Africa and Indian Ocean GOOS – and noted with appreciation the support provided by ACMAD to their activities.

**7.4.11** The Association shared the view of JCOMM-I that coordinated physical, biological and chemical measurements of the ocean and atmosphere were needed to obtain a comprehensive view of the behaviour of coastal seas and their responses to natural and anthropogenic forcing, in support of sustainable development. JCOMM-I also recognized that virtually all marine data users were requiring highly integrated data streams, including meteorological and oceanographic, physical and non-physical data. The Association noted with interest that JCOMM would assess the requirements for implementation of non-physical measurements and work to prepare for and contribute to the implementation of the coastal component of GOOS, considering as appropriate the inclusion of required non-physical measurements, products and services in JCOMM activities.

**7.4.12** The Association agreed that the VOS scheme, SOOP, ASAP, GLOSS, ocean data buoys and oceanographic satellites formed key components of both existing and future ocean observing systems. It noted with interest the work already under way to implement the VOSclim Project to provide high-quality marine meteorological data and associated metadata, to serve as a reference data set to support global climate studies. These activities were all coordinated under JCOMM and contributed directly to GOOS and GCOS. The Association therefore agreed on the importance of continued support of its Members for those activities. In particular, it urged Members to:

- (a) Recruit more ships to the VOS scheme, improve data quality and timeliness, strengthen their PMO networks, and participate where possible in the VOSclim Project;
- (b) Participate whenever possible in the implementation and long-term maintenance of the operational SOOP plan;
- (c) Participate in and support the implementation of the ASAP programme, and the work of the ASAP Panel, wherever possible; and

- (d) Develop and operate drifting buoy programmes in data-sparse ocean areas, and participate in the work of the DBCP and its regional action groups, in particular the ISABP and the IBPIO.

**7.4.13** The Association endorsed the establishment of the JCOMMOPS, based initially upon the existing DBCP, SOOP and Argo international coordination mechanisms. It recognized the potential value of this facility to Members of the Association, in particular in providing technical support and information in the implementation and maintenance of marine observing systems and in the application of marine observational data.

**7.4.14** The Association noted that Inmarsat's satellite system, as well as being a key element in the GMDSS and thus in the new WMO marine broadcast system, was also now the primary means for transmitting meteorological and oceanographic reports from the VOS, SOOP and ASAP ships from ship to shore. The Association agreed that continuing efforts were required to ensure that the most efficient and cost-effective use was made of Inmarsat, for the benefit of all Members. It therefore decided to keep in force [Resolution 15 \(XI-RA I\)](#) on the subject.

**7.4.15** The Association noted and endorsed the support of Congress and the Executive Council for the new Argo project to implement a global network of autonomous sub-surface ocean floats to provide temperature and salinity profiles of vital importance to climate monitoring and prediction. In this context, it recognized that Argo constituted a component of the WCRP, GOOS and GCOS, and that it would also become part of an integrated operational ocean observing system coordinated and regulated through JCOMM. The Association noted with approval the efforts being made jointly by WMO and IOC to inform Members and Member States of Argo float deployments, to facilitate access to Argo data (which would be freely available in real time on the GTS) and information, and also to facilitate participation in the project. It agreed that an effective way of implementing these actions, as well as of addressing technical aspects of data distribution and assisting in the integration of Argo with other ocean observation networks, would be through the Argo technical coordinator, who was working in close collaboration with the DBCP/SOOP coordinator. The Association recalled that an Argo Atlantic Implementation Meeting had taken place in Paris in July 2000, and that an Argo Indian Ocean Implementation Meeting had taken place in Hyderabad, India, in January 2001. In addition, two meetings dealing with data management were held in Brest, France – one in October 2000 and the other in October 2001. The second one was also the first session of the newly established Argo Data Management Subcommittee.

## PROGRAMME SUPPORT ACTIVITIES

**7.4.16** The Association agreed that specialized seminars, workshops and similar events were of considerable value to Members involved in the operation of marine observing systems and in the

provision of marine services, and should be continued. It requested its Members to consider the possibilities for hosting such activities in the future.

**7.4.17** The Association noted with appreciation that experts from a number of Members of the Association had participated in an International Workshop for PMOs from RA I (Cape Town, South Africa, November 2000). The Association expressed its appreciation to South Africa for hosting this workshop, and to the United States' NWS and NOAA and Australia's BOM for providing support. The Association recognized the value to Members of JCOMM of the scientific lectures on the theme of operational oceanography, which had taken place at JCOMM-I.

**7.4.18** The Association noted with interest a proposal to commemorate the 150<sup>th</sup> anniversary, in 2003, of the Brussels Conference of 1853. It recognized that this conference, which had addressed the standardization of meteorological and oceanographic observations from ships and the provision of meteorological services to shipping in return, had been a significant step in the development of international meteorological coordination and cooperation. It therefore welcomed the decision of the Executive Council that WMO should be directly involved in this commemorative event. The Association also noted that the Conference would probably be merged with the proposed second CLIMAR workshop.

**7.4.19** The Association noted with interest that a second seminar/workshop on the MPERSS and a specialized workshop on JCOMM Products in Support of Operational Oceanography and Marine Meteorology were planned to be held in 2004. It noted with appreciation the offer of France to host the workshops in Toulouse.

**7.4.20** The Association also noted with interest that the JCOMM CBCG was conducting a regional survey among maritime WMO/IOC Members/Member States in Africa. This survey was to identify their needs in areas of training, technical assistance, infrastructure and related support, specifically with regard to the areas of responsibility of JCOMM. The JCOMM CBCG would compile and prepare an initial list of such marine capacity building priorities in Region I. Action would then be taken by the CBCG to address these priorities.

**7.4.21** The Association noted with appreciation that in August 2002 a full draft of the project document for the WIOMAP had been prepared by Mr Ragoonaden, and circulated for comment to the Members of the Association and IOC Member States concerned. Subsequently, a second Implementation Planning Meeting for WIOMAP had taken place in Mauritius in early November 2002, in conjunction with the Indian Ocean GOOS conference. The final details of the project document were agreed upon at this meeting, and the document would soon thereafter be submitted to a number of national and international agencies for consideration for funding support.

## **8. HYDROLOGY AND WATER RESOURCES PROGRAMME (HWRP) – REGIONAL ASPECTS, INCLUDING THE REPORT OF THE CHAIRPERSON OF THE RA I WORKING GROUP ON HYDROLOGY (WGH) (agenda item 8)**

### **WORKING GROUP ON HYDROLOGY**

**8.1** The Association noted with appreciation the report of the chairperson of the WGH, Mr J. Wellens-Mensah (Ghana). It noted that significant progress had been achieved in meeting the objectives set. It also noted that five subregional coordinators had been designated to coordinate follow-up activities related to the Addis Ababa, Ethiopia action plan in the subregions, and to carry out case studies based on regional experiences on the role of water resources assessment in different fields.

**8.2** The Association was pleased to learn of the organization of the Regional Seminar on Water Resources held in Cairo, Egypt on 22 July 2002 as a follow-up to the recommendation of the Addis Ababa conference. It noted with satisfaction the range of activities undertaken by WMO and ECA to promote the implementation of the action plan.

**8.3** The Association was pleased to note that ministerial councils comprising the ministers responsible for water had been formed in a number of subregions, and had met to discuss key water resources management issues. It also noted with satisfaction WMO's support to the establishment of the African Ministerial Council on Water (AMCOW). The Association requested the Secretary-General to continue to support AMCOW activities in order to give more visibility to WMO in water issues in the Region.

**8.4** The Association was pleased to note that a very successful eighth session of the WGH had been held in Cairo from 23 to 26 July 2002. The session was planned immediately after the Regional Seminar referred to in paragraph 8.2 above. The president and vice-president of CHy attended the session, as did 43 participants from 25 Member countries and four regional and international organizations. The WGH session was followed by a Workshop on Water Resources Assessment – Evaluation of National Capabilities, held at the same location on 27 and 28 July for the English-speaking countries of the East and West Africa subregions (see paragraph 8.20 below).

**8.5** The Association noted the specific areas identified by the working group for the future programme of work in the field of hydrology and water resources. It recognized that this was largely a continuation of the work initiated in the previous intersessional period in implementing the recommendations of the African Conference on Water Resources. In addition, it noted that a number of important case studies had also been proposed. The Association endorsed the recommendations and the proposed activities of the Working Group.

**8.6** The Association welcomed WMO's financial support to national experts to assist them in preparing the case studies. The four case studies were: 'Environmental Impact of the Gezira Irrigation

Scheme' (Sudan); 'Potential Role of Seasonal Climate Outlook in Addressing Hydropower Reservoir Management Challenges' (Ethiopia); 'Integrated Water Conservation and Utilization: Case of the Beheira Pilot Study Area' (Egypt); and 'Importance des données hydrologiques dans la conception et l'exploitation des stations de traitement d'eau: Cas de l'usine de Djiri à Brazzaville' (Congo). The Association recognized that the subjects were of much interest to the countries of the Region and expressed its appreciation for the work carried out by the experts. It recommended that the case studies be compiled in a technical report and distributed to all Members of RA I.

**8.7** On the basis of the discussions, and taking into consideration the decisions of Thirteenth Congress, CHy-XI and the Regional Seminar on Water Resources, the Association adopted [Resolution 14 \(XIII-RA I\)](#) re-establishing the Working Group on Hydrology.

**8.8** The Association requested that at least one meeting of each Subregional Steering Committee and of the core membership as specified in [Resolution 14 \(XIII-RA I\)](#) be arranged during the following intersessional period, and that financial support be provided by WMO for this purpose. It further requested the WMO Secretariat to provide the necessary support to ensure the accomplishment of the work of the Group.

#### WMO LONG-TERM PLAN

**8.9** The Association was pleased to note that, in general, the needs of Members in the Region had been adequately reflected in the priority activities of WMO in hydrology and water resources given in WMO's 5LTP. It examined those topics in the Plan which were new or required more emphasis, and recommended that those aspects considered to be of particular interest to countries in Africa be taken into account as appropriate in the future work of the WGH.

#### INSTITUTIONAL COOPERATION BETWEEN NMHSS

**8.10** The Association was pleased to note the important roles of HAs to the PRs and of the RHA to the president of the Association. It also noted that, as of October 2002, 46 of the 56 RA I Members had designated HAs. The Association urged Members who had not yet done so to designate HAs so as to strengthen the links between Meteorological and Hydrological Services.

**8.11** The Association noted the report of the chairperson of the RA I WGH on the activities undertaken by him in his capacity as RHA. It welcomed in particular his participation in Executive Council sessions. The Association, in accordance with WMO General Regulation 167 and by [Resolution 14 \(XIII-RA I\)](#), designated the chairperson of the RA I WGH as the RHA for RA I.

#### DECISIONS AND RECOMMENDATIONS OF CHY-XI CONCERNING REGIONAL ACTIVITIES

**8.12** The Association was informed of the decision of Thirteenth Congress adopting revised terms of reference for CHy.

**8.13** The Association congratulated Mr D.G. Rutashobya (United Republic of Tanzania) and Mr B.J. Stewart (Australia) on their election as president and vice-president, respectively, of CHy. It was also informed about the outcome of CHy-XI. The Commission emphasized that future activities of HWRP needed to consider more output-oriented objectives. The Commission also expressed concern that Regional and Subregional Offices, as constituted, did not include the hydrological expertise needed to serve the hydrology and water resources communities in the regions. The Association requested the Secretary-General to consider strengthening the offices in this area.

**8.14** The Association noted the proposal of CHy to establish national committees that could serve as platforms for hydrological data-collecting agencies to coordinate their activities, and requested CHy to further develop this proposal.

#### EXCHANGE OF HYDROLOGICAL DATA

**8.15** The Association was informed that Thirteenth Congress had adopted Resolution 25 (Cg-XIII) — Exchange of Hydrological Data and Products. It welcomed the publication of the brochure *Exchanging Hydrological Data and Information – WMO Policy and Practice* (WMO-No. 925) explaining the background and intent of the Resolution, and noted that the Commission had advised that a mechanism be established for the systematic sampling of data transfer at the national, regional and international levels to monitor the response to its implementation.

#### GUIDE TO HYDROLOGICAL PRACTICES (WMO-NO. 168) AND TECHNICAL REGULATIONS (WMO-NO. 49)

**8.16** The Association was informed that the fifth edition of the *Guide to Hydrological Practices* (WMO-No. 168) had been translated into national languages by some Members. It appreciated that a CD-ROM containing the English and French versions had been issued in September 2001 and that the preparation of the Russian and Spanish versions in electronic format was under way.

**8.17** The Association noted that CHy-XI had agreed on the preparation of a sixth edition of the *Guide*, and recommended that it consist of two parts, containing: (a) basic and well-established methodologies, to be updated every five to six years and possibly made available for free downloading on the Internet; and (b) new and state-of-the-art methodologies, to be released more frequently. It was pleased to note that the CHy Working Group was making good progress in carrying out this task.

**8.18** The Association noted Recommendation 3 (CHy-X) had made proposals for amendments to *Technical Regulations* (WMO-No. 49), Volume 3 – Hydrology, which had been approved by Thirteenth Congress. The proposals comprised mainly a few new additions and replacements of definitions.

**8.19** The Association noted the results of a survey carried out by the Secretariat to assess the use and benefits of the *Technical Regulations* to the NHSSs.

## PROGRAMME ON BASIC SYSTEMS IN HYDROLOGY

### WATER RESOURCES ASSESSMENT

**8.20** The Association noted the continued efforts of the WMO Secretariat to promote the use of the methodology contained in the WMO/UNESCO handbook *Water Resources Assessment – Review of National Capabilities*. The Handbook was available in English, French, Spanish and Russian, and also in PDF format, freely downloadable from the WMO and UNESCO Web sites. The Association was informed that, in order to promote the use of the Handbook in Africa, WMO had organized three regional workshops on the subject in English for national experts from the SADC, AMU, IGAD and ECOWAS subregions. The Association also requested WMO to arrange workshops for the French-speaking countries in Africa.

**8.21** The Association noted that the current handbook was valuable for assisting Member countries to evaluate their national capabilities for water resources assessment, and supported the proposal to develop a user-friendly manual to assess the water resources of a country.

### WORLD HYDROLOGICAL CYCLE OBSERVING SYSTEM (WHYCOS)

**8.22** The Association noted with satisfaction the continuing progress in the development and implementation of the WHYCOS programme. It noted in particular progress associated with the implementation and proposed next stages of the SADC-HYCOS and AOC-HYCOS projects and progress in preparing the project document for the IGAD-HYCOS project. The Association requested the Secretary-General to consider developing and implementing other HYCOS projects in other river basins such as the Congo and Nile.

**8.23** The Association recognized that efforts should be increased to secure extrabudgetary sources of funding for these projects. It stressed the need to take account of the sustainability of the programme when external assistance would no longer be available. The Association also recognized the need for close coordination among the individual HYCOS components and requested the Secretary-General to explore the possibility of including data from WHYCOS projects in the GTS.

### TECHNOLOGY IN OPERATIONAL HYDROLOGY

**8.24** The Association noted with interest that the first phase of updating the HRM, which was initiated in 1998, had culminated in July 2000, when Version 2000 became available online.

**8.25** The Association was informed that an International Workshop on HOMS in the 21<sup>st</sup> Century had been held in September 1999 in Geneva, with the participation of 29 representatives of HNRCs. The Workshop developed an Implementation Plan for HOMS in the 21<sup>st</sup> Century, which was then reviewed and adopted by the Steering Committee and distributed to all HNRCs.

**8.26** The Association recognized as a priority the need to replenish the HRM with new contributions in

those technical areas identified in the Implementation Plan for HOMS in the 21<sup>st</sup> Century as being those where the user community had the greatest need for technology transfer.

**8.27** The Association noted with appreciation the successful outcome of the training workshop for three professional trainers from Africa on flood and low-flow frequency analysis and flood plain delineation procedures, utilizing the HOMS components provided by Canada. It recommended that respective countries support and encourage the trainers to organize national and regional workshops to instruct professionals in their own and other countries of the Region. It also requested WMO to arrange for further training of African professionals. Finally, it requested the Secretariat to promote the use of HOMS in Africa.

## PROGRAMME ON FORECASTING AND APPLICATIONS IN HYDROLOGY

### HYDROLOGICAL ASPECTS OF DISASTERS

**8.28** The Association noted that, within the framework of the GWP, a WMO/GWP Associated Programme on Flood Management (APFM) – Global Coordination had been launched in August 2001, funded by Japan and the Netherlands, and a project technical support unit had been established at the WMO Secretariat. It supported APFM and expressed the desire that this programme would soon translate into projects and activities such as hydrological modelling and development of the ability to monitor and address the impacts of floods as well as droughts.

### HYDROLOGY IN THE CONTEXT OF GLOBAL ENVIRONMENTAL ISSUES

**8.29** The Association noted that expert meetings held in June 2001 in Koblentz, Germany and in June 2002 in Geisenheim, Germany had proposed the establishment of a global network of existing data centres and observing programmes such as WHYCOS, GRDC GPCC and FRIEND to respond to the needs of the climate and hydrology communities. This network was termed the Global Terrestrial Network – Hydrology.

**8.30** The Association was advised that WMO and UNESCO had convened the first meeting of the restructured WCP-Water Steering Committee in Geneva in October 2000. It noted the programme objectives and supported the proposed three priority areas.

**8.31** The Association was informed of the proposal from WMO and UNESCO to establish an IGRAC and supported the role of WMO in this project. The Association requested the Secretary-General to cooperate with the Director-General of UNESCO in facilitating the establishment of such a Centre.

### PROGRAMMES ON SUSTAINABLE DEVELOPMENT OF WATER RESOURCES AND CAPACITY BUILDING IN HYDROLOGY AND WATER RESOURCES

**8.32** The Association noted that budget provisions to implement activities under both the Programme on



Sustainable Development of Water Resources and the Programme on Capacity Building were very limited. Accordingly, the Association encouraged the WMO Secretariat to explore ways of augmenting the current budget, including extrabudgetary sources of funds.

**8.33** The Association noted with concern the increasing scarcity of safe clean water on the continent and called for strengthening of NMHSs to monitor water quality to ensure safe clean water for the future.

**8.34** The Association noted that plans had been laid to hold a conference on CAL in the field of hydrology and water resources, based on proposals of the CHy Advisory Working Group, and discussions at the most recent session of the Executive Council Panel of Experts on Education and Training (April 2000).

**8.35** The Association also noted the establishment of an Editorial Task Force on Hydrology to prepare the fourth edition of *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology* (WMO-No. 258), Volume II – Hydrology.

**8.36** The Association noted that WMO had organized an Experts Meeting on Management of National Hydrological Services for preparing guidelines on the role and operation of NHSs. It recommended that WMO should finalize the guidelines for distribution to Members.

## PROGRAMME ON WATER-RELATED ISSUES

### COOPERATION WITH OTHER INTERNATIONAL ORGANIZATIONS

**8.37** The Association noted that the ACC Subcommittee on Water Resources had met in October 2000 and September 2001, with WMO chairing both meetings. Attention was focused on the preparation of the first edition of the WWDR, which was to be the major project of a WWAP.

**8.38** The Association noted that the IGWA had the mandate to monitor within the UN system progress in targets achieved under the Millennium Goals, the African Water Vision 2025 and its Framework for Action (FFA), and NEPAD. It supported WMO's membership in IGWA and urged Members to contribute to the bi-annual Africa Water Development Report.

**8.39** The Association was informed of the WMO contribution to the Water Dome during the WSSD. It was pleased to note that WMO had successfully coordinated the activities of the day under the theme 'Water, Energy and Climate'. The Association requested WMO to continue its efforts to promote the Organization's visibility gained at the Water Dome.

**8.40** The Association noted the cooperation between WMO, ECA and AfDB, and requested these agencies to continue to collaborate on technical cooperation and training opportunities in RA I and to support the water activities in NEPAD. It also noted with satisfaction WMO's involvement in the African Water Task Force activities and recommend its continued cooperation with the other Task Force members.

**8.41** The Association noted that WMO maintained its membership of the World Water Council and its Board of Governors, under whose auspices the Third World Water Forum was to be held in Kyoto, Japan in March 2003.

**8.42** The Association reviewed the cooperation of WMO with UNESCO in matters concerning freshwater, focusing on activities in water resources assessment, the preparation of the International Glossary of Hydrology, WCP-Water, and education and training in hydrology and water resources. The Association was informed on the outcome of the Fifth UNESCO/WMO International Conference on Hydrology held in Geneva in February 1999.

**8.43** The Association was informed that WMO continued to co-sponsor relevant scientific meetings with NGOs, and had co-sponsored the IAHS Sixth Scientific Assembly, held in July 2001 in Maastricht, Netherlands.

**8.44** The Association also noted that the Organization had maintained its long-standing cooperation with the IAHS and ISO, and had recently strengthened its links with the International Association of Hydraulic Engineering and Research.

**8.45** The Association was informed of ACMAD's collaboration with NBA and AGRHYMET in developing a tool for disseminating hydrometeorological information through RANET-AFRICA. It was also informed of the development of a seasonal hydrological forecast routine. The Association requested the WGH to work closely with ACMAD in the activities of the Group.

**8.46** The Association was informed of the GEF (UNDP) – funded project on the Lake Chad Basin to protect its water resources, ecosystem and biodiversity. The Association requested the Secretary-General to cooperate with the Lake Chad Basin Commission and to provide support to the water activities in the basin.

## OTHER WATER-RELATED ISSUES

### WORLD DAY FOR WATER

**8.47** The Association was informed that the theme for the World Day for Water 2003 would be 'Water for the Future', to match plans for the Third World Water Forum. The provisional title of World Day for Water 2004, in which WMO was expected to play a lead role, was 'Water and Disasters'. The Association also noted the proposal for a 'Pan-African Conference on Water' after the WWF in 2003 and recommended the active participation of WMO in organizing the Conference.

### TECHNICAL COOPERATION AND TRAINING

**8.48** The Association noted with satisfaction that WMO provided financial support and scholarships to hydrologists every year to enhance the institutional capacity of African NHSs. It also supported the Institute for Meteorological Training and Research in Kenya in organizing, in collaboration with IHE, Delft and the University of Nairobi, the annual International Postgraduate Course on Applied Hydrology and Information Systems for Water Management.

**8.49** The Association noted with satisfaction that WMO VCP funds had been used for the implementation of hydrological data rescue pilot projects in nine African countries. The project proved to be cost-effective due to the utilization of training capacity in the Region, which also strengthened the capacity of trainers in Africa. The Association requested WMO to assess the impact of the project in the participating countries and provide more software and training on data management. It also recommended the development of an extended project to cover other interested countries.

## **9. EDUCATION AND TRAINING PROGRAMME (ETRP) - REGIONAL ASPECTS (agenda item 9)**

### **GENERAL**

**9.1** The Association examined the information on the implementation of the ETRP in the Region since its previous session. In noting with appreciation the progress achieved and the assistance provided to Members in developing their trained human resources, the Association stressed that education and training activities were fundamental for the success of all WMO Programmes.

**9.2** The Association was pleased to note Chapter 6.6 of the *Fifth WMO Long-term Plan (2000-2009)* (WMO-No. 908) as adopted by Thirteenth Congress, and urged its Members to ensure that all necessary actions were taken to meet the objectives of the *Plan*.

### **EXECUTIVE COUNCIL PANEL OF EXPERTS ON EDUCATION AND TRAINING: RA I TASK FORCE**

**9.3** The Association was informed that the Executive Council Panel of Experts on Education and Training had considered the views and proposals from rapporteurs and working groups on education and training from several regional associations and technical commissions. The Association, in line with the Panel's suggestions, recommended strengthening its current interactions with the Panel and the Secretariat on education and training issues.

**9.4** The Association noted with satisfaction that the Panel, at its previous session, had reviewed the proposal by the RA I Rapporteur on Education and Training, particularly on the assessment of NMHSs' libraries in the Region. The Association also noted the proposal of the Panel that a database for the training facilities and programmes available in Region I be developed, and that the issue should be addressed in the context of the expected evolution of the mandatory publication *Compendium of Training Facilities for Meteorology and Operational Hydrology* (WMO-No. 240) towards a Web-based presentation.

**9.5** The Association consequently expressed support for the Ad Hoc Task Force established by the Panel comprising the two RA I Rapporteurs on Education and Training, supported by the Subregional Office and WMO's Education and Training Department. The Association noted that mandates of the Task Force included the following specific actions:

(a) To design a specific questionnaire on the state of the NMHSs' libraries, to be forwarded to all RA I Members;

- (b) To design and maintain a database for recording Members' replies;
- (c) To evaluate and propose the suitability of Internet access, in case the future *Compendium* would be Web-based only; and
- (d) To consider any suggestions that might result from the replies of Members.

**9.6** The Association noted with satisfaction that the Task Force had come up with the required questionnaires in two parts. Part I dealt with Training Facilities, Part II with Libraries. The Association noted that the synthesis of all responses to the questionnaires would be posted on the relevant WMO Web site on Education and Training for easy access by any user.

**9.7** While expressing support for the *Compendium* to gradually metamorphose into a Web-based publication, the Association noted that the preliminary report would be out in February 2003, and called on all Members to ensure that their responses reached the Secretariat as soon as possible.

### **HUMAN RESOURCES DEVELOPMENT**

**9.8.** The Association reaffirmed the importance of the human resources development programme in assisting the Secretariat and NMHSs, particularly in developing countries, to plan and mobilize the financial and other resources to meet Members' training needs. The Association expressed the hope that the results of the survey on Members' training needs implemented this year could help in a proper identification of the requirements of its Members.

**9.9** The Association recommended that the requirements of Members in new subject areas and technologies be properly identified.

**9.10** The Association felt that there was a need for the cooperation and coordination of education and training activities in the Region to better meet the expressed requirements and to use effectively available capabilities.

### **TRAINING ACTIVITIES**

**9.11** The Association noted that since its previous session, 49 training events, covering a wide range of subject areas of interest to its Members, had been organized and/or co-sponsored by WMO and held in the Region. It also noted that its Members had benefited from other training events organized and hosted by national or international institutions, with WMO acting as co-sponsor or providing partial financial support.

**9.12** The Association noted with satisfaction that the quadrennial WMO Symposium on Continuing Education and Training in Meteorology and Operational Hydrology had been successfully held in Tehran, Islamic Republic of Iran in November 1999. The Association agreed that the recommendations of the Symposium were of considerable value as a guide to Members in their efforts to strengthen their human resources by improving their staffs' skills and knowledge through continuing education and training.

**9.13** The Association noted that a WMO Training Seminar for National Instructors for RA I and RA VI had been successfully held in Amman, Jordan from 19

to 30 May 2002. It further noted the list of training events planned to be organized by WMO during 2003. The Association agreed that group training events for its next intersessional period should be organized on the following priority subjects, with special consideration given to the participation of female meteorological personnel: Droughts and climate change; use of software and statistics in climatology, hydrology and applied meteorology; regionalization of hydrological parameters; alert systems for disaster prevention; GIS; Management of NMHSs; Information Technology; NWP products; marine meteorology; tropical cyclones; instrumentation and maintenance of electronic equipment; agrometeorology; climatology; aeronautical meteorology; new techniques in hydrological observations; data processing; satellite meteorology; and commercialization of meteorological products.

**9.14** The Association expressed its gratitude to those of its Members, as well as to Members from other Regions, who had made their national training facilities available for the training of meteorological and operational hydrological personnel from Region I. The Association noted with appreciation the offer of the Egyptian Meteorological Authority (EMA) to organize in the WMO RMTc in Cairo during April 2003 a regional training seminar on capacity building, marketing of meteorological and hydrological products and strategy for technological changes, especially in satellite systems and telecommunication services, and requested the WMO Secretariat to sponsor it and assist in its organization within the available budgetary provisions. The Association invited its Members to participate actively in the provision of training services to Members from other Regions and to WMO RMTcs.

**9.15** The Association noted with appreciation the activities of the SCHOTI, in particular CALMet-01, held in Brazil from 1 to 18 July 2001, organized by the SCHOTI Working Group on CAL. The Association noted with appreciation that the fifth meeting of SCHOTI had endorsed the creation of a new working group to assist and promote the initiation of a Web-based network that would link the WMO RMTcs and other training institutions.

**9.16** The Association noted with satisfaction the information on the activities of the Training Library and the use made of its services by Members. It also appreciated the continuous updating of the VTL in an effort to provide the latest and most suitable available training material through the Internet, and recommended that those actions be encouraged and continued.

**9.17** The Association noted with satisfaction that the Agency of the Portuguese-speaking Countries for Climate and Related Environmental Issues (CRIA) had organized, with the co-sponsorship of the Institute of Meteorology of Portugal and WMO, several training courses in NWP and climate modelling, which were attended by meteorological personnel from African countries that were members of the Community of the Portuguese-speaking Countries (CPLP), namely Angola, Cape Verde, Guinea-Bissau, Mozambique and Sao Tome and Principe.

## REGIONAL METEOROLOGICAL TRAINING CENTRES (RMTCS)

**9.18** The Association noted with appreciation that most WMO RMTcs in RA I were functioning satisfactorily and contributing significantly to the training of personnel from RA I and other regions. In urging its Members to make the maximum use of the training programmes offered by the RMTcs, the Association agreed with the need, stressed by Thirteenth Congress, for more emphasis to be placed by RMTcs on regional training requirements for specialized courses in various subject areas. In this connection, Members were requested to assist RMTcs in organizing courses, using such ways and means as the provision of instructors for short-term assignments, the provision of relevant training materials, and other sorts of assistance under bilateral or multilateral arrangements.

**9.19** The Association was pleased to note that a meeting of Directors of WMO RMTcs had been held on 11 November 1999 in Tehran, Islamic Republic of Iran. It also noted that the meeting had nominated a representative and an alternate to serve on the Coordinating Committee of the SCHOTI.

**9.20** The Association encouraged its Members to strengthen the interaction among RMTcs and with other training and educational centres, particularly from advanced countries, to bridge the current scientific and technological gap. It endorsed the establishment and maintenance of the RMTcs' Web pages and requested Members to explore eventual external support for the provision of hardware and software to establish and/or upgrade their Internet connections.

**9.21** Noting the need for capacity building and training of meteorological personnel at the national level, the Association requested the WMO Secretariat to continue to strengthen and enhance the training capabilities of NMTCs through the provision of instructors for short-term assignments, WMO training publications and the provision of relevant scientific journals and periodicals.

**9.22** The Association noted with appreciation the Concept Paper on the Future Role and Operation of RMTcs, which was prepared by the Panel and subsequently endorsed by the fifty-fourth session of the Executive Council. As one of the main RMTc stakeholders, the Association agreed to intensify its involvement in monitoring RMTcs, including through a more systematic identification of regional training needs (to be addressed by RMTcs). The Association was also informed of the 'Guidelines on the Practical Application of the EC Criteria for the Recognition of WMO RMTcs', which was prepared by the Panel and endorsed by the Council.

**9.23** The Association took note of the views of the Panel and of the fifty-fourth session of the Executive Council on recent initiatives regarding the present network of RMTcs in the Region. It recommended that the RA I Rapporteurs on Education and Training evaluate the present training offer vis-à-vis these initiatives and produce a report with recommendations to the president of RA I before Fourteenth Congress.

**9.24** The Association noted with appreciation that, in addition to their regular training programmes, several RMTCs, in particular those located in Algeria, Kenya and Niger, were actively involved in scientific research in the field of meteorology and organized, on a regular basis, scientific training seminars and conferences, both at the national and regional levels, on specialized subjects in meteorology such as climate change, NWP and data processing.

#### **NEW WMO CLASSIFICATION OF METEOROLOGICAL AND HYDROLOGICAL PERSONNEL**

**9.25** The Association noted that Thirteenth Congress had endorsed the new classification of meteorological and hydrological personnel, effective from 1 January 2001, and agreed that its actual implementation should be gradual, recognizing that some Members might require a longer transition period, but that it should not exceed four years. The Association noted with satisfaction that some RMTCs were initiating new training programmes and courses in meteorology to comply with the new classification of meteorological personnel.

**9.26** The Association noted that the new edition of *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology* (WMO-No. 258), Volume I – Meteorology, was issued in June 2002 and distributed to all WMO Members. It also noted that the preparation of Volume II – Hydrology, was under way and expected to be ready for distribution by mid-2003. It further noted that the RMTC in Algeria was arranging for the translation into French of Volume I of the new edition of the *Guidelines*.

#### **TRAINING PUBLICATIONS**

**9.27** The Association noted with satisfaction the progress made in the preparation of training publications and expressed its appreciation to individuals and Members for the production of these texts.

#### **EDUCATION AND TRAINING FELLOWSHIPS**

**9.28** The Association noted with appreciation the generous contributions of several VCP donors, mainly, Australia, France, the Russian Federation, Portugal, Spain, the United Kingdom and the United States, who continued to provide VCP fellowships to the satisfaction of all concerned. The Association appealed to the traditional VCP Members in the Region to increase their VCP contributions to the fellowship programme and solicited other Member countries in the Region who had not contributed to the programme to do so.

**9.29** The Association noted that the Government of Spain continued to organize long-term (21 months) courses for meteorological technicians. To complement these courses, short-term (two months) on-the-job training courses had also been organized since 1993 on specialized subjects and new technologies. These short-term courses were given in English, French and Spanish. The Association also noted with appreciation that the Government of Spain continued to provide each year about 20 fellowships to participants from developing countries for participation in these courses.

**9.30** The Association noted the emerging new needs for education and training, in particular in the fields of satellite meteorology, radar meteorology, information technology, new communication systems, computer technology and modern data-processing systems. It urged VCP donors to arrange for relevant training at all levels to enable such personnel to utilize more effectively the new technologies in those specialized fields.

**9.31** The Association noted with appreciation the cost-sharing tripartite arrangements for optimizing the use of limited VCP and regular budget fellowship resources, where the host country would waive or meet tuition fees, the beneficiary country would meet the cost of international travel of its candidates, and WMO and VCP donors would meet the stipend or living expenses of the fellows concerned. The Association considered these arrangements cost-effective and requested the Secretary-General to continue to promote the implementation of these arrangements for the benefit of all concerned.

**9.32** The Association noted with satisfaction that the Secretary-General had approached several potential new donors and international development funding agencies, soliciting voluntary contributions for the fellowship programme, and requested the Secretary-General to continue his efforts to increase the traditional fellowships' financial resources by tapping extrabudgetary resources and new potential sources of funding for the fellowships programme. In this respect, the Association noted with appreciation and thanks that the Khartoum-based Arab Bank for Economic Development in Africa (BADEA) had made in March 2002 a cash grant of US\$ 255 000 to WMO, to organize a six-month Class III training course in climatology in the WMO RMTC in Cairo from 7 October 2002 to 7 April 2003. Thirty-five fellowships were awarded from this grant to 35 candidates, designated by their respective Governments, from 22 African countries. The Association requested BADEA to continue its valuable and fruitful assistance in the promotion of meteorology in the Region and to the satisfaction of all concerned.

### **10. TECHNICAL COOPERATION PROGRAMME (TCOP) – REGIONAL ASPECTS (agenda item 10)**

**10.1** The Association reviewed the technical cooperation activities carried out during the intersessional period in Africa and noted that several countries in the Region had received technical assistance under projects funded by various sources such as the UNDP, trust funds, the World Bank, the GEF and WMO's VCP. These projects were mainly aimed at strengthening the capabilities of NMHSs and Regional Centres (DMCs and ACMAD) to enable them to provide reliable and accurate weather and climate information and products in support of improved agricultural production, environmental protection, natural disaster preparedness and management, water and energy resources management, etc. The

Association expressed its appreciation to the cooperating partners and Members for the support provided.

#### **UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)**

**10.2** The Association noted that during the period under review, four UNDP-funded projects had been implemented in the Democratic Republic of the Congo, Kenya, Libyan Arab Jamahiriya and Mali. One regional project was also implemented in support of the DMC in Nairobi, Kenya. The Association was pleased to note that the Region had also participated in two GEF-financed projects, 'Global Monitoring of Greenhouse Gases Including Ozone' and 'Capacity Building for Observing Systems for Climate Change'. In this regard, the Association stressed the importance of PRs maintaining close liaison with the UNDP Resident Representatives of their respective countries to ensure that they accessed funds from the various UNDP Country and Regional Programmes.

#### **WMO VOLUNTARY COOPERATION PROGRAMME (VCP)**

**10.3** The Association was pleased to note that several Members in the Region continued to receive support from the VCP. In this regard, during the period from 1999 to 2002, 136 VCP projects were submitted by 44 Members of the Association. Forty-one Members received support for a total of 116 VCP projects for equipment and services. Two hundred and eighty-two fellowships were awarded under the VCP. As of 30 September 2002, 32 VCP projects were ongoing, and 84 others had been completed from 1999 to 2002. No support had been received for 120 other valid projects.

**10.4** The Association noted with appreciation the successful implementation of some VCP-coordinated projects. These included a project for the replacement or upgrading of WWW facilities to be Year 2000 compliant, and a coordinated project supported by France and the United Kingdom for improving the capacity for national climate data management and developing drought preparedness and management strategies in African countries affected by desertification. Under this programme, a new generation of CLICOM systems was installed in 11 NMHSs in Africa, and seminars were held on climate data management, focusing on applications for drought preparedness. Under a project supported by the United Kingdom, simplified PC-based media weather presentation systems were provided to 10 NMHSs in Africa and a training seminar was held in Nairobi, Kenya. Several projects related to rescuing hydrological data were successfully completed with the support of donor Members and the VCP(F).

**10.5** The Association was pleased to note that several Members in the Region continued to receive support from the VCP(F). This support was mainly in the form of expert services, short-term fellowships and high-priority programmes such as Internet connectivity, upper-air stations, enhancement of GTS

operations, TCDC activities, etc. The Association noted with satisfaction that within the framework of the RA I Strategic Plan, developed to support the implementation of GOS, GDPS and GTS in Africa, VCP funds had been made available to support the development of project proposals for strengthening and rehabilitating WWW-related infrastructure in the Region. The Association expressed its appreciation to donor Members for their valuable contributions to the WMO VCP and encouraged others to participate actively in this important programme.

**10.6** During the period from 1999 to 2002, one country in the Region utilized the VCP's WWW Implementation Support Revolving Fund for the purchase of spare parts and consumables. As of 30 September 2002, three countries in the Region had not fully reimbursed their loans. The Secretariat sent a reminder to the countries concerned and Subregional Offices assisted in the arrangements for the reimbursement of the due balance. The Association urged concerned Members to reimburse the loans as soon as possible. The Association reaffirmed the usefulness of this fund for NMHSs of developing countries.

**10.7** The Association noted that several countries of the Region had experienced severe damage caused by torrential rains associated with tropical cyclones and other natural disasters. Emergency assistance was provided to meet the urgent requirements of the affected NMHSs within the framework of the WMO Emergency Disaster Assistance Fund and the VCP. The Association recognized the valuable support provided by WMO to NMHSs of countries affected by disasters and emphasized the need for appropriate resources to be allocated within the framework of the Regular Budget to contribute towards these efforts during the next financial period.

#### **TRUST FUND ARRANGEMENTS**

**10.8** The Association reiterated the increasing importance of trust funds for supporting WMO technical cooperation activities for ensuring and enhancing the smooth operation and functioning of NMHSs in the Region. It noted with satisfaction the increased efforts by the WMO Secretariat in mobilizing resources under trust fund arrangements. It noted in this regard that under a project funded by USAID, the DMC in Nairobi, Kenya continued to carry out the regular functions of providing weather and climate-related advisories to the countries in the eastern African subregion. In southern Africa, support was provided to the DMC in Harare, Zimbabwe under a Belgian-funded project to carry out activities similar to those of the Nairobi DMC. The Association requested the Secretary-General to continue providing support to these Centres in collaboration with the SATCC and IGAD.

**10.9** The project 'Early Warning and Agricultural Yield Forecasting, Phase 2' for the CILSS countries, with a contribution from the Italian Government, continued to be implemented satisfactorily. In Chad and Mali, the Swiss Development Cooperation

Department contributed towards strengthening the application of agrometeorological information and the provision of regular advice to farmers.

**10.10** The Association noted with satisfaction that WMO had concluded an MOU with the World Bank whose main objective was to strengthen cooperation in areas of common interest between the two institutions, particularly in natural disaster prevention and mitigation, climate change and water resources management. The Association also noted that WMO was negotiating a similar arrangement with the African Development Bank (ADB). The Association encouraged Members to participate actively in bank-funded initiatives at both the national and regional levels.

#### **PROGRAMME DEVELOPMENT AND RESOURCE MOBILIZATION ACTIVITIES**

**10.11** The Association noted with appreciation the various initiatives taken by the Secretariat in support of the Members in the Region. Among these were two pipeline projects recently approved by USAID to support the continued operations of the Nairobi DMC. Another USAID-funded project was also approved to mitigate the effects of hydrometeorological extremes in southern Africa. For the CILSS countries, the project 'Vulnerability Assessment in the Sahel' for the AGRHYMET Regional Centre was approved for a three-year implementation period by the Italian Government. The objective of the project was to provide to the Sahel countries the appropriate tools of vulnerability assessment for food security and the management of natural resources. As emphasized by Thirteenth Congress, the Association reiterated the important role PRs of Member countries should play in mobilizing resources from cooperating partners and bilateral and multilateral organizations. The Association requested the Secretary-General to continue collaborating with the UNDP and other partners to enhance resource mobilization in support of meteorological and hydrological projects.

**10.12** The Association was pleased to note that WMO had continued to collaborate with various economic subgroups in the Region in order to enhance the development and implementation of regional meteorology programmes and projects. These included ASECNA, COMESA, ECOWAS, IOC, EAC, IGAD, NBA and SADC. The Association further noted that efforts were also being made to initiate collaboration with the AMU and CEN-SAD, with a view to developing regional meteorology programmes. The Association emphasized the importance of reinforcing tripartite arrangements between Members, subregional economic groups and funding partners in enhancing resource mobilization efforts in support of meteorological and hydrological projects and programmes in the Region.

**10.13** The Association encouraged the PRs of WMO Member countries and other senior officials of NMHSs to play a more proactive role in resource mobilization to meet their countries' future requirements through strengthening partnerships with possible sources of funding, including government institutions, bilat-

eral/multilateral agencies, the private sector and United Nations programmes such as the UNDP. The Association also requested the Secretary-General to continue assisting Members in the mobilization of resources.

**10.14** The Association noted with appreciation that ACMAD, in collaboration with WMO, was organizing a series of workshops on resource mobilization for senior managers of NMSs, with the support of several partners. The first workshop was to be held in Niamey, Niger in January 2003 for the French-speaking countries; a similar workshop was to be organized for English, Arabic and Portuguese-speaking countries. The Association expressed its appreciation to France and WMO for their support to resource mobilization efforts at ACMAD through the provision of expertise.

**10.15** The Association was pleased to note that WMO had continued to support the activities of the PUMA Task Team, whose objective was to assist African countries to acquire satellite ground receiving equipment for the reception of data and products from MSG satellites. The European Commission was supporting the procurement of this equipment and the related training for those African countries that were signatories to the Lome Convention. WMO established a trust fund, which was to be dedicated to helping other interested countries participate in the project. Furthermore, the Association expressed its appreciation to EUMETSAT for providing regular support to the ASMET project, through which specialized training on satellites was being carried out at the Institute of Meteorological Training and Research (IMTR), Nairobi, Kenya and the Ecole Africaine de la météorologie et de l'Aviation civile (EAMAC), Niamey, Niger).

**10.16** The Association noted that following the Third United Nations Conference on the Least Developed Countries held in Brussels in May 2001, the Executive Council had endorsed the preparation of a WMO Programme for the Least Developed Countries to support the implementation of the Programme of Action for the LDCs for the decade of 2001 to 2010. The Association noted that the programme would contribute to capacity building, poverty alleviation and sustainable development of the LDCs. In this regard, the Association expressed its appreciation to the Secretary-General for his efforts in preparing a comprehensive proposal for submission to Fourteenth Congress. Noting that NMHSs of several non-LDCs countries in Africa still needed to be strengthened, the Association requested the Secretary-General to continue efforts in assisting these NMHSs and in mobilizing resources for their benefit.

**10.17** Concerning the promotion of technical cooperation activities and resource mobilization, the Association agreed that it was necessary to:

- (a) Encourage the establishment of stronger partnerships between the WMO Secretariat and the NMHSs of Members in the development and implementation of joint projects and programmes and in the mobilization of resources from bilateral and multilateral agencies;
- (b) Enhance the promotion of trust fund projects;

- (c) Collaborate with the private sector, especially foundations and NGOs, taking into account the intergovernmental nature of WMO, based on a mutual recognition of roles and expectations; and
- (d) Encourage Members to contribute to the established Trust Fund for Technical Cooperation Programme Development Activities created in 1999 by Thirteenth Congress.

**10.18** The Association recommended that efforts be made in the future to enhance capacities of NMHSs through specialized training in areas such as external communication, commercialization and marketing techniques, and management. It also recommended that cooperation between countries of the Region be enhanced to maximize the use of available expertise and technologies at affordable costs.

**10.19** The Association noted that the Regional and Subregional Offices continued to play an important role in technical cooperation activities. It requested the Secretary-General to continue his efforts to harmonize further activities of the WMO Regional, Technical Cooperation and Education and Training Programmes to ensure that adequate support was given to the Members in the area of capacity building. In this regard, the Association stressed the need for Congress to allocate adequate resources for those Programmes and to provide adequate human and financial resources for the regional and subregional offices so that they could play their roles in an efficient manner.

## **11. INFORMATION AND PUBLIC AFFAIRS (IPA) PROGRAMME - REGIONAL ASPECTS (agenda item 11)**

**11.1** The Association recalled that Resolution 22 (Cg-XIII) had underlined the need for greater visibility of the Organization and the NMHSs. The resolution stressed the importance of communication aspects in mitigating the devastating impacts of extreme weather and climate events. It also considered that the WMO Global Communication Strategy should guide and enhance the process of making NMHSs and WMO more visible and better appreciated.

**11.2** The Association noted with satisfaction the number and quality of public information products developed and distributed to all Members in support of national plans for the celebration of the 50<sup>th</sup> anniversary of WMO. These products included a message from the Secretary-General, a calendar, a series of posters, a brochure on World Meteorological Day 2000, an information kit containing media briefs on WMO Programmes, a WMO50 video, a WMO radio programme, public service announcement spots and a comprehensive brochure for youngsters. The Association noted with appreciation the contributions of Members of the Region to the celebration of the 50<sup>th</sup> anniversary, and follow-up celebrations of World Meteorological Day 2001 and World Water Day 2001, through the organization of commemorative events and the production of commemorative items.

**11.3** The Association took note of the 2001 World Meteorological Day theme, 'Volunteers for Weather, Water and Climate'; and the World Water Day 2001 theme, 'Water and Health'. It also noted their celebration among a large number of NMHSs and at the WMO Secretariat in collaboration with the UNV. The Association noted with appreciation WMO's participation in the ISDR and in the global launch of its campaign on the International Day for Disaster Reduction, 17 October 2001. This also contributed to the preparation for the celebration of World Meteorological Day 2002 with its theme, 'Reducing Vulnerability to Weather and Climate Extremes'; and to the 2002 World Day for Water theme, 'Water and Development'. The Association welcomed the inclusion of WMO media products in the global campaign of ISDR. It noted that the United Nations General Assembly had proclaimed 2002 the International Year of Mountains, and 2003 the International Year for Freshwater. The Association took note of the theme for World Meteorological Day 2003, 'Our Future Climate'; and for World Meteorological Day 2004, 'Weather, Water and Climate in the Information Age'. The Association invited its Members to celebrate these events in a way that would promote the NMHSs and enhance their visibility towards the public, decision makers and the media. It requested the Secretary-General to continue to provide timely background documents and information in this regard. The Association was informed of some Members' celebration experiences, including joint programmes with other institutions.

**11.4** The Association welcomed the emphasis on media training to reflect current trends in climate change, climate variability and other phenomena such as El Niño/La Niña, ozone layer depletion and increasing water scarcity. It expressed satisfaction with the IPA Programme's media training efforts, such as the organization of Media Training Workshops, and requested the Secretary-General, in collaboration with Members and relevant bodies, to continue to organize similar events in the future.

**11.5** The Association noted with appreciation the development of a special WMO50 Web site ([www.wmo.ch/wmo50/](http://www.wmo.ch/wmo50/)) with links to home pages of Members' NMHSs. It further called for the establishment of specific pages on public information activities of the regions as part of the IPA home page, and the establishment of direct links on home pages of Members' NMHSs to the WMO Web site.

**11.6** The Association noted with appreciation the public outreach activities undertaken by the IPA Programme during the WSSD (Johannesburg, South Africa, 26 August to 4 September 2002). New products developed for that occasion resulted in significant visibility of the Organization and the NMHSs with the participants in the Summit, including delegates, media representatives and NGOs. Several press conferences, including one held jointly with ISDR, had been organized for the media attending the Summit. Press releases and information materials had been widely disseminated, including new brochures, postcards,

posters and videos. WMO and NMHSs were featured prominently in the United Nations System exhibit and in other exhibits set up for the Summit. The Association welcomed the fact that the new brochures on sustainable development and the new video were made available to the NMHSs as valuable tools for their own public information needs.

**11.7** The Association welcomed the initiative taken by the Secretary-General to develop the WMO SECS. The communication Strategy included a comprehensive model plan for action and an outline of guidelines for NMHSs to reach maximum synergy between the Secretariat and the Members.

**11.7** The Association welcomed the significant number of replies received from the Region's NMHSs to the questionnaire on the SECS. The information submitted on communications policies at the regional and national levels was important for the appropriate formulation of the Strategy, its model plan of action and its outline of guidelines to ensure a unified communications policy. The Association took note of the Draft Guidelines for WMO Members, included in [Annex III](#) of this report, for the development of their own communications strategies.

**11.8** The Association invited its Members to ensure mutual assistance and support in matters related to public information and communications, including partnerships and constituency-building, resource mobilization and closer cooperation with the media, NGOs, meteorological and hydrological societies, advocacy groups, academic institutions, parliamentarians, the private sector and corporate foundations, and other civil society institutions and public entities. In this respect, the Association was informed of the ongoing collaboration between WMO, the International Weather Festival and the IABM.

**11.9** In order to enhance WMO's IPA Programme in the Region, the Association requested its Members to further strengthen their cooperation among themselves and with the Secretariat in this area. The Association invited its Members to update their lists of IPA focal points, which it said served as a useful link with the WMO Secretariat, and to provide it with relevant audio-visual and other public information materials prepared by them for their own public information activities.

## **12. LONG-TERM PLANNING (LTP) - REGIONAL ASPECTS** (agenda item 12)

**12.1** The Association noted the adoption by Thirteenth Congress of the 5LTP covering the period 2000-09. It further noted that regional associations, among others, were requested to adhere to the policies and strategies set forth in the Plan and to organize their activities to achieve the main long-term objectives as defined in the Plan.

**12.2** The Association expressed its appreciation for the publication of the 5LTP and a separate summary for decision makers, which focused on the benefits that would accrue to countries from the successful implementation of the Plan.

**12.3** The Association recalled that Thirteenth Congress had decided that the 6LTP should be prepared.

In so doing, Congress requested the regional associations:

- (a) To provide a forum for consideration of the Plan and, in particular, to provide an integrated view of their respective activities and priorities within the context of the 6LTP; and
- (b) To coordinate, as necessary, national contributions to regional aspects of the Plan.

**12.4** The Association also recalled that the Executive Council had established its Working Group on Long-term Planning to assist it in connection with long-term planning, and the Task Team on WMO Structure, and that both had reported to the Council.

### **PREPARATION OF THE 6LTP**

#### **VISION, DESIRED OUTCOMES, STRATEGIES AND ASSOCIATED STRATEGIC GOALS**

**12.5** The Association endorsed the view of the Executive Council that the vision, desired outcomes, strategies and associated strategic goals, as well as the programme structure of the 6LTP, provided a suitable framework for the elaboration of the 6LTP. Also, this framework would serve as a clear basis for the programme and budget. The achievement of expected results defined in the programme and budget would contribute to the realization of 6LTP strategies and associated goals. Those established the meaningful link between the 6LTP and the programme and budget. In this connection, the Association wished to highlight the tasks and activities under the responsibility of the Association which were expected to contribute to the realization of the WMO vision, desired outcomes, strategies and associated goals, and emphasized the need to allocate appropriate resources to WMO Programmes in order to implement the LTP and to assist RA I Members to familiarize themselves with Result Based Budgeting (RBB). In this connection the Association felt that it would not be possible to achieve the desired outcomes through a zero nominal growth budget.

#### **REGIONAL AREAS OF CONCERNS**

**12.6** On the basis of the draft 6LTP framework, the Association identified the areas of concern of particular interest to the Region. It attached highest priority to the following actions, taking into consideration the WMO commitment to the United Nations Millennium Declaration Goals for enhanced and innovative support to Africa's development efforts and the requirements by the NEPAD objectives and action plan for achieving sustainable development in Africa:

- (a) Implementation and improvement of the WWW Basic Systems in Africa through a Strategy for:
  - (i) Enhancing the availability of weather, climate and environmental data and information for sustainable socio-economic development in Africa, through the implementation of automatic weather stations with appropriate communications to NMCs and the promotion of marine observations, among others;



- (ii) Preparation, distribution and application of meteorological products required for sustainable socio-economic development of Africa, through the use of modern communication technologies and satellite-based dissemination systems, and strengthening the capacities of NMHSs and regional institutions to improve weather forecasts and seasonal and long-term climate predictions;
  - (iii) Use of the Internet in Africa for improving the exchange of meteorological and environmental information through, among other things, the implementation of Web sites at NMHSs; and
  - (iv) Development of procurement, manufacturing, maintenance, repair and calibration facilities within Africa for meteorological observing systems;
- (b) Improvement of the visibility and status of NMHSs through effective public information activities and assessment of the socio-economic benefits resulting from the understanding and application of weather, climate, water and related environmental issues;
  - (c) Enhancing natural disaster prevention and mitigation programmes in support of national, subregional and regional activities and programmes relating to poverty reduction, agriculture and food security, water and sanitation and environmental protection;
  - (d) Enhancing human resources development plans (education and training) to attain the appropriate technical and professional levels required to meet present and future needs, including improvement of regional climate modeling capacity, climate change impacts assessment studies and training on the use of information-communication technology;
  - (e) Strengthening active collaboration and joint interdisciplinary programmes with economic groupings and organizations such as CEMAC, ECOWAS, IGAD, SADC, ASECNA, NBA, COMESA, IOC and AMU, and supporting regional institutions such as ACMAD, AGRHYMET and the DMCs;
  - (f) Preparation for the use of MSG satellites and implementation of the AMESD initiative;
  - (g) Promotion of the provision of timely and skillful tailored weather, water-related and climate information and prediction services to users; and
  - (h) Mobilization of more resources, including through cost-recovery measures.
  - (i) Emergency assistance to Members affected by natural disasters and disasters related to other causes, including wars.

#### **MONITORING AND EVALUATION OF THE SIXTH WMO LONG-TERM PLAN (6LTP)**

**12.7** The Association noted that the Executive Council had recalled that in the preparation of the 6LTP, the monitoring and evaluation approach, including performance indicators and milestones,

should be clearly outlined to facilitate its subsequent monitoring and evaluation. It further noted that the Council had recognized the need to identify how and at what level(s) the monitoring and/or evaluation had to be carried out, and who would have responsibility for the related tasks (e.g. roles of Members, Congress, Executive Council, regional associations, technical commissions and the Secretary-General). The goal was to have the guidelines for the monitoring and evaluation of the 6LTP be considered at the same time as the 6LTP itself.

**12.8** The Association noted the importance given by the Group to the monitoring and evaluation of the resources, including extrabudgetary resources, associated with the planned activities, and that the Council had requested that options and mechanism for such monitoring and evaluation be explored.

**12.9** The Association recognized that it had a role to play in the implementation of the 6LTP, as well as in its monitoring and evaluation.

#### **MONITORING AND EVALUATION OF THE 5LTP**

**12.10** The Association took note that the monitoring and evaluation of the first two years (2000 and 2001) of the 5LTP was considered by the fifty-fourth session of the Executive Council and would be subsequently considered by Fourteenth Congress. It requested its president to continue to ensure the provision of the appropriate contribution in that connection.

**12.11** With respect to the implementation of the 5LTP, the Association emphasized the importance of ensuring the implementation of the Region's priorities, in particular those relating to the improvement of the basic systems, provision of services, regional cooperation, and the use of new technology to increase application capabilities of NMSs.

#### **PREPARATION OF THE 7LTP**

**12.12** The Association noted that the Executive Council had agreed to recommend to Fourteenth Congress the preparation of the 7LTP. It supported this recommendation and expressed the view that in the preparation of the 7LTP, consideration should be given to resources required to implement the LTP and to measurable outcomes in the era of globalization.

#### **STRUCTURE OF WMO**

**12.13** The Association noted the deliberation of the Executive Council on the structure of WMO, which had provided guidance relating to the functioning of the Executive Council, technical commissions and regional associations. In this connection, the Association felt that in any future consideration of the WMO structure, the role of regional associations should be strengthened and the collaboration between technical commissions and regional associations should be improved, as recognized by the Council. It was felt that particular attention should be given to ensuring that the intersessional activities of the regional associations were effectively carried out. In this connection, the Association emphasized that its participation and contribution in the long-term

planning process during the intersessional period was a matter of utmost importance.

### 13. ROLE AND OPERATION OF NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES (NMHSs)

(agenda item 13)

**13.1** The Association recalled that Thirteenth Congress had held extensive discussions on the role and operation of NMHSs and requested the Executive Council to keep this matter under review, and that the Council, in turn, had established its Advisory Group on the Role and Operation of NMHSs to assist it in this area. The Association, among other issues, considered with Congress that the relevant issues on the subject of the role and operation of NMHSs during the intersessional period focused on :

- (a) The NMSs and alternative service delivery;
- (b) Legal instruments;
- (c) The status and visibility of NMHSs;
- (d) Capacity building;
- (e) Provision of aeronautical and marine meteorological services; and
- (f) Partnership and cooperation (with the media, private sector and academia).

**13.2** The Association noted that the Executive Council had provided guidelines on the role and operation of NMSs and that, on the basis of this guidance, Congress had adopted Resolution 26 (Cg-XIII), which invited Members to take relevant actions to enhance the role and operation of NMSs

**13.3** The Association also recalled that Thirteenth Congress had felt the need to draw the attention of States and Governments to various areas of concern relating to the functioning of NMSs, and adopted the Geneva Declaration of the Thirteenth World Meteorological Congress. All the Members of RA I were provided with copies of the Geneva Declaration.

**13.4** The Association also noted the discussions and decisions made by the Executive Council, particularly during its fifty-fourth session, on the role and operation of NMHSs. The Council's discussions had covered the following areas:

- (a) Findings from the questionnaire;
- (b) Studies of major issues;
- (c) The economic framework for the provision of meteorological services with a particular focus on issues relating to the funding of NMSs;
- (d) Legal instruments governing the operation of NMSs;
- (e) The changing environment for the provision of aeronautical meteorological services;
- (f) The scope of regional cooperation in assisting NMSs in the discharge of their national responsibilities;
- (g) The concept of WMO standards for weather forecasting;
- (h) Quality management certification for NMS services;
- (i) The scientific basis for, and limitations of, weather and climate forecasting;
- (j) Mechanisms for strengthening NMSs;

- (k) Preparation of a WMO Statement on the Role and Operation of NMSs;
- (l) Preparation of a consolidated set of guidelines on the role and operation of NMSs;
- (m) Convening of a high-level conference on the role and socio-economic benefits of NMHSs;
- (n) Amendment of the WMO Convention to highlight the role of NMSs in line with the Geneva Declaration of Thirteenth Congress;
- (o) Cooperation with related data and service providers;
- (p) Involvement of the media, the private sector and academia;
- (q) Cooperation with other international organizations;
- (r) Definition of commonly used terms; and
- (s) The role and operation of NMSs.

**13.5** The Association was informed that the following were expected to be produced in due course:

- (a) A WMO Policy Statement on the Role and Operation of NMSs, which would either confirm, update and/or refine the Executive Council Statement of April 1999 on the NMS and Alternative Service Delivery, and elaborate the Geneva Declaration adopted by Thirteenth Congress;
- (b) A consolidated set of 'Guidelines on the Role and Operation of NMSs', making use when possible of relevant WMO materials already available;
- (c) A comprehensive Executive Council report to Fourteenth Congress on action taken in response to Resolution 26 (Cg-XIII), possibly including proposals for modification of the WMO Convention and Regulations to represent more clearly the essential role and primary responsibilities of NMSs in carrying out the purposes of WMO; and
- (d) Similar tasks carried out in respect to the role and operation of NMSs.

**13.6** The Association recalled that in order to provide an adequate factual database for its analysis for the many issues affecting the role and operation of NMSs, a questionnaire had been sent to all Members.

**13.7** Members of the Association expressed their views and shared their relevant experiences on the role and operation of NMSs. Among other things, the Association recognized that NMSs should continue their efforts toward responding to major challenges such as the use of new technology to increase application capabilities of NMSs, alternative services delivery, the process of globalization, resource mobilization, commercialization, regional cooperation and capacity building. The Association re-emphasized that NMSs should remain the single authoritative national source of meteorological warnings to the public, especially in potentially dangerous weather situations involving safety of life and property, as well as being an authoritative scientific voice in relevant issues such as aeronautical and marine meteorology, climate change and natural disaster mitigation.

**13.8** The Association underscored the importance of the study undertaken by the Secretary-General on the Role and Operation of NMSs and expressed its satisfaction on the results of the questionnaire and considered that the information would be useful for the meteorological services. It also supported the idea that an abridged version of the questionnaire should be prepared to study the evolution of some of the most important items that had been studied.

**13.9** The Association noted that the funding of NMSs was the first main issue currently facing NMSs in RA I. In this regard, it expressed the view that cost recovery and alternative ways of provision of services by NMHSs should be implemented in the most efficient and cost-effective manner, without destabilizing the overall national and international system.

**13.10** Regarding legal instruments, the Association agreed on the need to codify the core mission of NMSs in national legislation or some other formal instruments, recognizing that their primary role was in the domain of public good and that they should remain the single authoritative national source of meteorological warnings to the public, especially in potentially dangerous weather situations involving safety of life and property. The Association further noted with concern that many Member countries had not yet adopted national legislation related to the establishment and functioning of their NMSs. It emphasized the urgent need for adoption of appropriate national legal instruments specifically related to the obligations, duties and rights of NMSs.

**13.11** The Association considered the topic of the provision of aeronautical meteorological services as a main issue currently facing the NMSs in RA I, as well as the most important national economic applications sector served by the NMSs in RA I. The Association requested its president and the Secretary-General to keep Members of the Region informed of relevant developments, especially on the cost recovery of meteorological services provided for aeronautical activities.

**13.12** Another major issue facing NMSs of the Region was governmental financing and support. The Association agreed that NMSs should establish close working arrangements and promote strategic alliances and cooperation with relevant institutions within their respective countries and between NMSs in the Region. It recommended that priority attention be given to resource mobilization and to assigning resources to those areas that generated greater benefits.

**13.13** The Association considered that the topic of WMO standards for weather forecasts was very important albeit complex, given the differences among NMHSs and the possible difficulty in reaching satisfactory agreements. It agreed on the need for strengthening collaboration and cooperation among Members, including the promotion of cross-border exchanges of warnings and information.

**13.14** The Association expressed interest in the topic of quality management certification, as the process of 'certification' might be an approach to the improvement in the management of NMSs. The

Association recognized that, in general, it was a process involving significant investment and it was necessary to study other possible alternatives, including the use of the WMO guidelines.

**13.15** The Association took note of the preparation of a draft WMO statement on the scientific basis for and limitation of weather and climate forecasting.

**13.16** The Association considered the importance of holding a high-level conference during the following financial period that would highlight the role and contribution to society of the NMHSs. This could help to enhance their visibility and to demonstrate to decision makers their irreplaceable contribution to the achievement of national sustainable development goals.

**13.17** The Association recognized that the involvement of the media, the private sector and academia in the work of WMO and the NMHSs was of great importance to the Organization and the Association; it felt that clear directives should be developed, including the 'certification' of media presentation skills for PWS delivery.

**13.18** The Association also agreed that it was important to intensify the cooperation with the international representatives of the different relevant sectors and that the sectors in which cooperation should be intensified should be defined. It further agreed on the need for strengthening the capacities and resources of WMO Subregional Offices and enhancing collaboration with subregional economic groupings.

**13.19** The Association considered with great interest the topic of possible changes in the WMO Convention, and noted that the fifty-fourth session of the Executive Council had discussed the proposal of its Task Team; namely, the draft amendment to the Preamble of the WMO Convention, based on the text of the Geneva Declaration adopted by Thirteenth Congress and an amendment to the Convention containing a provision for an adoption of protocols. The Association supported the view of the Council about the need for further consideration.

**13.20** The Association agreed that, for the Region, the relevant priority areas of concern that provided challenges and opportunities to its Members were stated in paragraph 12.6 of this general summary. It requested Members to provide any additional proposal for priority areas of concern to the President of RA I before the Fourteenth Congress.

#### **14. NATURAL DISASTER REDUCTION – REGIONAL ASPECTS (agenda item 14)**

**14.1** The Association noted with appreciation the report on activities and efforts to meet the goals of the IDNDR during the previous four years. The IDNDR came to an end in December 1999 with success in achieving substantial progress in natural disaster reduction at all levels. The Association was informed of the closing events of the IDNDR and of the new structure for continuing natural disaster reduction activities beyond the Decade.

**14.2** The Association particularly expressed its appreciation to the Secretary-General for the leading role played by WMO through its major scientific and

technical programmes in support of IDNDR efforts regarding mitigation of natural disasters and preparedness for the effects of natural hazards of meteorological and hydrological origin. The Association was informed that an IDNDR Programme Forum had been successfully held in July 1999 as the consolidation and closing event of the Decade under the title 'A Safer World in the 21st Century: Disaster and Risk Reduction'. The Association noted with satisfaction that WMO and UNESCO, as the two principal United Nations agencies concerned with the scientific and technological aspects of disaster reduction, had convened a 'Sub-forum on Science and Technology in Support of Natural Disaster Reduction' as a special contribution to the Forum. The participants at the Sub-forum, which included several experts from Region I, came from both the natural and social sciences, and with both research and operational backgrounds. In addition, they came from both developing and developed countries. The Sub-forum reviewed the various ways in which science and technology contributed to the disaster reduction process, in particular through:

- (a) Assessment of vulnerability and enhancement of community awareness of the nature of the risk;
- (b) Operation of integrated warning systems; and
- (c) Preparedness and education programmes.

The Sub-forum reviewed recent progress and discussed future prospects in each of these three aspects of the application of science and technology to the reduction of the impacts of tropical cyclones, extra-tropical storms, storm surges, severe local storms and tornadoes, sand and dust storms, drought, extreme and persistent temperatures, fire weather, floods, landslides, avalanches, volcanoes, earthquakes and tsunamis.

**14.3** The Association was informed that the IDNDR had been succeeded by a new substantive programme, the ISDR, which included an IATF and an Inter-Agency Secretariat. On 23 December 1999, the United Nations General Assembly adopted Resolution A/RES/54/219, which provided specific guidance for the future work of the ISDR. The main objectives of the ISDR were to enable communities to become resilient to natural hazards and to proceed with an approach including protection against hazards through the management of risk. It was structured around four main themes for action: public awareness, commitment of community and public authorities, disaster-resilient communities and the reduction of socio-economic loss. The primary functions of the Task Force were to devise strategies and policies for the reduction of natural hazards, identify gaps in existing policies and programmes, ensure complementary action by agencies, provide policy guidance, and convene ad hoc meetings of experts on issues relating to disaster reduction.

**14.4** The Association also noted that the United Nations General Assembly had passed, in the context of natural disaster reduction, a further resolution relating to International Cooperation to Reduce the Impact of the El Niño Phenomenon (A/RES/56/194). The Association recalled the important role that WMO

had played in the work of the United Nations Task Force on El Niño in reviewing the effects of the 1997-98 El Niño event, and in the implementation of earlier United Nations General Assembly resolutions (A/RES/52/200, A/RES/53/185 and A/RES/54/220).

**14.5** The Association noted that WMO had been designated a member of the IATF for the ISDR and endorsed a lead role for WMO in the Task Force. It also noted that the Secretary-General had taken various initiatives on the structure of the ISDR, to ensure a prominent role for science and technology and the operational activities of NMHSs in the implementation of the Strategy.

**14.6** The Association was informed that the ISDR IATF, as part of its Framework for Action, had established four ad hoc working groups to initiate its work programme, and that WMO was a member of all four groups. The first working group on Climate and Disasters had taken over the responsibilities of the United Nations Task Force on El Niño with an expanded mandate to consider all climate-related aspects of disasters. The group was led by WMO. The second working group considered early warning systems for disasters, with UNEP as the lead agency. UNDP led the third working group dealing with risk, vulnerability and impact assessment. The fourth working group was convened by the Global Fire Monitoring Centre in Freiburg, Germany, and dealt with the problem of wildland fires. The Association encouraged its Members to contribute to the work of ISDR in general and to regional activities in particular. In this respect, the Association noted that there was ongoing activity in the Region related to disaster preparedness and mitigation within the framework of the ISDR. It agreed that there would be considerable advantages for NMHSs in developing close relationships with relevant regional groups, including the collaboration on joint projects to mitigate the effects of natural disasters.

**14.7** The Association noted the decisions of the Executive Council with respect to the incorporation of natural disaster issues into the WMO LTP as a Major Programme on Disaster Prevention and Mitigation, and urged its Members to contribute to these forward-planning processes. The Association requested the Secretary-General to continue to promote the role of NMHSs in disaster preparedness and mitigation through a variety of means. Such means included creation of awareness among senior government officials, the preparation of promotional material and the organization of forums in which experiences of different countries in the preparation and dissemination of early warnings could be exchanged. The Association noted that disasters of long duration and extensive impacts, especially those that severely affected less developed regions of the world, frequently became issues of worldwide attention. It was common in such cases for several agencies of the United Nations System and non-governmental aid agencies to become involved. The Association noted that this globalization of disaster response activities was making increasing demands on WMO, and agreed that it was appropriate

for the Organization to develop modalities to respond to the challenges.

**14.8** The Association also commended the initiative of the Secretary-General in establishing the EDRG within the WMO Secretariat, to assist in particular in the rehabilitation of meteorological and hydrological infrastructure in Member countries following a disaster.

**14.9** The Association noted the significant number of serious natural disasters that had affected the Region, including droughts in several parts of Africa and the Mozambique floods following Tropical Cyclone Eline in February 2000. These floods had a strong social and economic impact in the country and also seriously damaged its meteorological and hydrological infrastructure. The Association noted the quick response obtained from the international community through the WMO Emergency Assistance Fund and VCP, and urged its Members affected by serious natural disasters to report damages in their infrastructure as quickly as possible to the WMO Secretariat, in order to obtain a prompt response.

**14.10** The Association was informed on the international activities and efforts in the fields of landslide research, landslide risk mitigation and protection, and on the establishment of the ICL. In that regard, the Association requested the Secretary-General to maintain WMO's high profile and leading role in major aspects of disaster reduction, including landslides, and welcomed the signing of an MOU between WMO and the ICL.

**14.11** The Association was informed on new initiatives related to a possible coordination role for WMO in the field of operational seismology to address the issues of global and regional observations, data collection and exchange, analysis predictions and warnings, and capacity building. It was noted that this initiative was being given support not only from many NMHSs, but also from regional groups such as the ASEAN Sub-Committee on Meteorology and Geophysics. The Association expressed its strong support to this initiative, noting that assistance would be needed for Members who had no specific infrastructure for seismic observations. It also noted that capacity building activities would be necessary. Several Members expressed the opinion that it would be useful if consideration could also be given to disasters of volcanic origin as a part of the WMO natural disaster reduction activities.

**14.12** The Association also noted that disasters could occur on a wide range of timescales, and could be initiated by many forms of severe or unusual weather and climate-related events. Early warning systems, therefore, needed to be tailored to meet particular circumstances. However, it was felt to be essential that different systems worked together effectively when necessary, for example flood warning systems and tropical cyclone warning systems. The Association took note of the increasing value in the field of disaster preparedness that could accrue from early warnings on longer timescales derived from

seasonal to inter-annual climate predictions. It agreed that the subregional forums that were being regularly convened to develop seasonal outlooks provided an excellent opportunity for cooperation between NMHSs and user communities. The Association requested the Secretary-General to continue his support for improving the scope and effectiveness of these forums, which were being implemented within the framework of CLIPS.

**14.13** The Association noted that in July 2001, the Heads of State and Government had adopted the NEPAD. This initiative was at the core of the commitment to fight poverty. As combating desertification and mitigating the effects of drought and floods were considered prime tools in fighting poverty, the Association also stressed the major role that WMO and the NMHSs could and should play in natural disaster prevention and mitigation, thus contributing to NEPAD's success.

**14.14** The Association noted that in the main outcomes of the WSSD, the issue of disaster management had been a key topic. Natural disaster prevention and mitigation were included in WSSD's Plan of Implementation as essential elements for a safer world in the 21st century. The Summit agreed that actions were required at all levels to improve surface-based monitoring and increase the use of satellite data to improve early warning systems and prediction of extreme weather events. The Association urged its Members to actively participate in the implementation of these actions coordinated through the proposed WMO Disaster Prevention and Mitigation Programme.

## **15. INTERNATIONAL EXCHANGE OF DATA AND PRODUCTS** (agenda item 15)

**15.1** The Association recalled the discussions that took place at Thirteenth Congress in connection with the topic of international exchange of data and products. It was aware that the EC/AGE was addressing these developments and other related issues.

**15.2** The Association noted that Congress had recognized that the experience with Resolution 40 (Cg-XII) had been largely positive and that there was generally a strong commitment to make it work. It further noted that the fifty-fourth session of the Executive Council had concurred that the policy and practice on the free and unrestricted exchange of meteorological and related data and products as contained in Resolution 40 (Cg-XII) had continued to be applied in a generally satisfactory manner, despite some difficulties encountered.

**15.3** The Association asked its Members to continue to observe the letter and spirit of Resolution 40 (Cg-XII) and to help increase the volume of data and products being exchanged, consistent with the WMO principle of free and unrestricted international exchange of meteorological and related data and products.

**15.4** The Association recalled that every April and October, circular letters were disseminated when necessary concerning the implementation of Resolution

40 (Cg-XII), and that information provided by Members and relevant international organizations on their additional data and products was also published in the WWW Newsletter and the WMO Web site. The Association requested its Members to provide the WMO Secretariat with information relating to the implementation of Resolution 40 (Cg-XII).

**15.5** The Association noted that the Executive Council had agreed that it had not been easy to establish the direct link between the quantity of data and products being exchanged (as measured by the monitoring of the bulletin headers in the GTS) and Resolution 40 (Cg-XII), and that there was no perceivable signal at present that Resolution 40 (Cg-XII) had influenced, either in a positive or negative manner, the flow of data and products as measured in the method mentioned above. Nonetheless, there had been some indication of an increased willingness to make more data and products available in the period after the adoption of Resolution 40 (Cg-XII). In the case of RA I, the Association felt that more data and products were being exchanged. Some meteorological services, however, did not have the capacity to effectively utilize these data. It invited countries that were not yet on the GTS to explore and implement such complementary means as the Internet so as to benefit from the international exchange of data and products.

**15.6** The Association was informed of the results of the work of the Task Group on the Implementation of Resolution 40 (Cg-XII) and Related Issues in RA I (established during XII-RA I), which was distributed in the form of a guide and update to RA I Members, on the basis of the decisions of Thirteenth Congress (1999) and the fifty-second session of the Executive Council (May 2000). This was also considered during the Sixth Technical Conference on Management for the Development of Meteorological Services in Africa (Abuja, Nigeria, November 2000). The Association thanked the Task Group for the important work it accomplished, endorsed the Group's recommendations, and encouraged Members to take these recommendations into consideration.

**15.7** The Association was informed that, in relation to the free and unrestricted access to all data and products exchanged for the research and education communities for their non-commercial activities, certain experiences had resulted in difficulties for some NMSs, while others had indicated the development of opportunities, which were also beneficial to NMSs. In this connection, the Association considered that a dialogue involving the broader non-governmental sector could be helpful. In this respect, the role of the PRs of WMO Members, whose responsibilities encompassed the interests of the larger meteorological community in their countries, was emphasized.

**15.8** In connection with the relationship between NMSs and the private sector regarding the data and products exchanged, the Association discussed relevant experiences. In light of these experiences, the Association was of the view that no significant

difficulties were experienced in relation with the private sector.

**15.9** Overall, the Association agreed with the Council that Resolution 40 (Cg-XII) should be maintained in force, and that relevant concerns should be addressed in some other way, e.g. through separate resolutions, declarations or guidelines from Congress.

**15.10** Regarding the possibility of putting the principle of free and unrestricted exchange of meteorological and related data and products on a firmer legal basis, such as by incorporating it in the WMO Convention, the Association noted that the chairperson of the EC Advisory Group on the International Exchange of Data and Products had been requested to keep this topic under review, and that this was also considered in the context of the review of the WMO Convention facilitated by the EC Task Team to Explore and Assess the Possible Changes to the WMO Convention. Further considerations were to be made during Fourteenth Congress.

**15.11** Regarding Resolution 25 (Cg-XIII), Exchange of Hydrological Data and Products, the Association urged Members to make available, on a free and unrestricted basis, data on water quality, together with data on discharge and water levels. It welcomed that a brochure had been published in four languages describing the context in which the resolution had been drafted and in which it would be implemented. The Association noted that CHy had issued a technical report on the exchange of hydrological data in which information was given on the types of data being exchanged.

**15.12** The Association also recalled the discussions and decisions of the fifty-third session of the Executive Council on the international exchange of climate data and products. In this connection, the Association noted that the Council had adopted a statement that would be helpful in clarifying the status of climatological data and products exchanged.

**15.13** The Association noted that the Executive Council had agreed that the distinction between data exchanged before and after the adoption of Resolution 40 (Cg-XII) should not result in a discontinuity in the availability or distribution of climatological data to meet the needs of WMO Programmes and those of the UNFCCC and other environmental conventions.

**15.14** The Association noted that CCI-XIII had reaffirmed the necessity for Members to exchange data for climate purposes in the wider interests of community welfare and safety of lives. The Commission had stressed the importance of cooperative linkages among the scientific research, operational meteorology, and user communities in stating the need for adequate climate data and addressing the necessary steps to ensure its availability.

**15.15** The Association noted that the fifty-fourth session of the Executive Council had endorsed the CCI's statement '...that the accessibility and use of climate data is at least as important as its collection and archiving, and that WMO and NMHS policy and activity should reflect this comparable importance'.

**15.16** The Association noted that work was continuing within the IOC to define an IOC oceanographic data exchange policy, particularly through an Intergovernmental Working Group on IOC Oceanographic Data Exchange Policy. The Group considered a two-tier approach (as used by WMO Resolution 40 (Cg-XII), distinguishing between 'essential' and 'additional' data), and the elements to be included in the revised policy statement. The Association also noted that the Group had presented an interim statement to the IOC Assembly session in 2001, and that the IOC Group had held its second meeting in Paris on 17 and 18 June 2002. Relevant results of this meeting, when available, were to be transmitted to WMO and in particular to the EC Advisory Group on the International Exchange of Data and Products.

**15.17** Following Thirteenth Congress, the Secretary-General conveyed the concerns of WMO to ICAO regarding the potential impact of ICAO data distribution policy on all WMO Members, and invited ICAO to address the international exchange of aeronautical meteorological information in cooperation with WMO. In view of the interest of both ICAO and WMO regarding this issue, aeronautical meteorological data exchange was discussed as an agenda item for the joint CAeM/ICAO Meteorology Divisional Meeting held in September 2002. The outcome of further consultations and developments on this issue were to be reported to Fourteenth Congress.

**15.18** The Association recalled the discussions and decisions of the fifty-third session of the Executive Council concerning the current situation with respect to the availability and distribution of agrometeorological data. It was noted that, although there were a number of practical concerns with respect to the merging of agricultural and meteorological data from different sources, there were no major issues relating to the international exchange of agrometeorological data or products.

## **16 OTHER REGIONAL ACTIVITIES**

### **16.1 INTERNAL MATTERS OF THE ASSOCIATION** (agenda item 16.1)

#### **REPORT OF THE CHAIRPERSON OF THE RA I AWG**

**16.1.1** The Association noted with appreciation the report of Mr M.S. Mhita (United Republic of Tanzania), chairperson of the RAI AWG. The other members of the Group were the Vice-President of RA I and the PRs of Egypt, Lesotho, Rwanda, Senegal and Sudan

**16.1.2** The Association noted that the RA I AWG had held its first meeting in Arusha, United Republic of Tanzania from 24 to 27 April 2000, and had reviewed the activities carried out as well as the activities planned in the Region since the twelfth session of the Association.

**16.1.3** The Association also noted that the second meeting of the AWG had been held in Nairobi, Kenya

at the WMO Subregional Office for Eastern and Southern Africa from 19 to 20 April 2001, to consider and discuss the development status of the Strategic Plan for Implementation and Improvement of WWW Basic Systems in Africa, and approved the timetable for the implementation of the Plan. The working group fully endorsed the Plan and requested the Secretary-General to assist in its implementation.

**16.1.4** The Association further noted with appreciation that during its sessions, the AWG had deliberated on issues relating to RA I internal matters and had made appropriate recommendations that guided the president in his duties. It adopted [Resolution 16 \(XIII-RA I\)](#) on the re-establishment of the Advisory Working Group of RA I.

#### **REVIEW OF SUBSIDIARY BODIES OF THE ASSOCIATION**

**16.1.5** The Association noted the information provided by its president on the activities of RA I subsidiary bodies during the intersessional period. It expressed its satisfaction for the Working Group's activities but noted with concern that many rapporteurs had not been able to perform well for various reasons.

**16.1.6** The Association decided to make the necessary arrangements to keep its subsidiary bodies active throughout the intersessional period considering the importance of relevant issues for the Region and taking into account all the possibilities for carrying out the work, including through electronic means.

#### **TECHNOLOGICAL DEVELOPMENTS HAVING IMPACTS ON NMHSS IN AFRICA**

**16.1.7** The Association was informed on the activities and the work of the PUMA Task Team established during the Second EUMETSAT User Forum (December 1996) for the purpose of mobilizing resources to assist African countries to acquire satellite ground receiving facilities for the reception of data and products from the MSG satellites.

**16.1.8** The Association noted with appreciation that the European Commission had approved funding for the Meteorological Transition in Africa Project for 47 African countries that were signatories to the Lomé Convention, and that WMO had established a Trust Fund to help the remaining countries – Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Tunisia and South Africa – participate in the project. The Association was pleased to note the establishment of a Project Steering Committee and a Project Management Unit, with the host country Kenya serving as the Delegated Regional Authorizing Officer.

**16.1.9** In this connection, the Association expressed its appreciation to all the various subregional Economic Groupings concerned in Africa for their support of the Meteorological Transition Project in Africa and for their commitment to the PUMA Task Team.

**16.1.10** The Association thanked the European Commission for providing assistance in implementing the Meteorological Transition in Africa Project. It also thanked EUMETSAT for organizing user forums to

keep NMHSs and other users abreast of the application of satellite information.

**16.1.11** The Association expressed its deep appreciation to the United Kingdom and France, which contributed to the trust fund established for the implementation of the PUMA project in Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, South Africa and Tunisia.

**16.1.12** The Association commended the chairperson of the PUMA Task Team, Mr E.A. Mukolwe (Kenya), for the devotion with which he carried out his tasks since 1996, and expressed its sincere thanks and heartfelt congratulations for the progress and achievement made by the PUMA Task Team under his leadership. It also expressed its appreciation to the members of the PUMA Task Team.

**16.1.13** The Association further noted with appreciation the new AMESD initiative, which was developed as a follow-up to the PUMA project development approach. It noted with satisfaction the Dakar Declaration of the Secretariats of the African Subregional Economic Groupings, (ECOWAS, CEMAC, IGAD, SADC and IOC) supporting that initiative.

**16.1.14** Considering the technological development affecting NMHSs in Africa, the Association decided that the PUMA Task Team should in the future be considered as a think tank for the development of Africa, especially in the fields of meteorology and Earth observation technologies. The role of the task team would be to develop new projects such as the AMESD initiative and mobilize resources for their funding.

**16.1.15** The Association expressed its appreciation to the Secretary-General for providing timely information and guidance on evolving new technologies through relevant training events in RA I. It requested the Secretary-General to continue to assist Members in the use of new technologies and to support the PUMA Task Team.

**16.1.16** The Association decided to invite Mr A. Ndiaye (Senegal) to serve as chairperson of the PUMA Task Team.

## **16.2 COOPERATION WITH REGIONAL AND INTERNATIONAL ORGANIZATIONS (agenda item 16.2)**

### **AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR DEVELOPMENT (ACMAD)**

**16.2.1** The Association noted that good progress was made in the implementation of ACMAD programmes relevant to the needs of NMHSs, including seasonal forecasts for various socio-economic applications and use of new technology. It noted with appreciation the efforts deployed in this respect by WMO, ECA and other ACMAD cooperating partners.

**16.2.2** The Association reaffirmed its strong support of ACMAD, which should continue to be an important tool used by Members for the capacity building of their human resources. It recalled its Resolution 20 (XI-RA I) of November 1994 and requested the Secretary-

General of WMO and all stakeholders to continue to support the activities of ACMAD.

**16.2.3** The Association was informed of the decision of the ECA Conference of Ministers to redefine its relationship with ECA-sponsored institutions and that ACMAD belonged to the group of institutions for which ECA would maintain programmatic links. The Association also noted that there was a need to revise the present statutes or constituent instruments of ACMAD to take into account the new developments.

**16.2.4** The Association agreed that all efforts should be made to ensure the continued development of ACMAD as a centre of excellence to support the relevant activities of NMSs and related institutions. In this regard, it noted that the establishment of a new constituent body was urgent. The Association therefore decided to establish a Task Force and adopted [Resolution 16.2/1\(XIII-RA I\)](#).

**16.2.5** The Association was informed that the Board of Governors of ACMAD had elected a new chairman and vice-chairman, respectively, Mr S.N. Sok Appadu (Mauritius) and Mr M. Labo (Niger). The Association was further informed that the Board had decided to appoint Mr A. Kignaman-Soro (Côte d'Ivoire) as Director General of ACMAD effective from 1 June 2003. The Association extended its congratulations to the new officers and the future Director General. The Association expressed its appreciation and special thanks to Mr M.S. Boulahya (Algeria) for his valuable contribution to the establishment and development of ACMAD during his term of office as Director General for more than 11 years.

### **NEW PARTNERSHIP FOR AFRICA'S DEVELOPMENT (NEPAD)**

**16.2.6** The Association expressed its appreciation to the NEPAD Secretariat for the comprehensive presentation made on the structure and operation of NEPAD. It also noted the information provided by the President of RA I on this issue.

**16.2.7** The Association noted that NEPAD was a holistic, comprehensive, strategic framework for the socio-economic development of Africa. It noted that the initiative was adopted by the OAU Summit in July 2001 (Lusaka, Zambia) as a pledge based on a common vision and a firm and shared conviction of African leaders to eradicate poverty and to place their countries, both individually and collectively, on a path of sustainable growth and development and, at the same time, to participate actively in the world economy.

**16.2.8** The Association discussed NEPAD's sectoral priorities and noted that the implementation of NEPAD, especially in the sectors of agriculture and food security, energy, water resources, natural disaster reduction, transport, environment, commerce, tourism, insurance, marine activities and land use planning and recreation, required weather and climate information and products.

**16.2.9** The Association underscored the significant contribution of WMO Programmes to the whole NEPAD process. It was informed of the fourth meeting



of the Annual Regional Consultation of United Nations Agencies Working in Africa, which took place in October 2002 and deliberated on the United Nations System contribution to NEPAD. The Association noted that WMO provided information to the meeting on the support it would provide to NEPAD in the areas of poverty eradication, natural disaster preparedness and mitigation, climate variability and change, and water resources. In particular, the important contribution WMO would make to NEPAD through the RA I Strategy for Enhancement of the WWW-Basic Systems was emphasized. The Association noted with satisfaction that WMO would be playing a role as one of the lead United Nations Agencies in the activities of the clusters established by the Regional Consultation meeting, in particular in the fields of natural disasters, climate change and water resources.

**16.2.10** The Association requested the Secretary-General to take all necessary measures to support NEPAD and to ensure that the RA I Strategy for Enhancement of the WWW-Basic Systems, the AMESD initiative and other relevant WMO Programmes were appropriately structured into NEPAD projects.

### **16.3 OUTCOME AND FOLLOW-UP OF THE WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD) (agenda item 16.3)**

**16.3.1** The Association noted with satisfaction that WMO had been actively involved in the preparatory process for the WSSD. This included participation in several regional and subregional preparatory meetings, as well as in sessions of the UNCSD, acting as the preparatory committee (PrepCom) for the WSSD. The PRs of WMO Members had been kept informed on activities of the United Nations System associated with the Summit, and on developments that had implications for their Services.

**16.3.2** The Association further noted with satisfaction that the Secretary-General had used his attendance at the preparatory events related to the WSSD, particularly the sessions of PrepCom, to exchange views with a number of national delegations to highlight issues of importance for both WMO, including NMHSs, and sustainable development as a whole. Particularly appreciated was the Secretary-General's emphasis on the need to adopt a 'culture of prevention' of natural disasters of meteorological and hydrological origin; the need to strengthen the unique global observational networks, coordinated by WMO; the need for monitoring the atmosphere, oceans, rivers and lakes; the need for recognition of the importance of weather, climate and water applications and services; and the need to enhance the capacity of NMHSs.

**16.3.3** The Association recognized that, in the course of the preparatory process for the WSSD, protecting and managing the natural resource base of economic and social development had been thoroughly discussed as one of the pillars for sustainable development. The proposed actions included several that had been constantly promoted by WMO, such as those outlined in the paragraph above.

**16.3.4** The Association noted that representatives from 193 countries, 69 intergovernmental organizations and 17 specialized agencies had attended the WSSD, and that more than 120 heads of state or government had made statements. The Association noted with satisfaction that WMO had participated fully in all the proceedings at the Summit. The Secretary-General delivered six statements at various events and gave several press conferences and radio interviews. WMO publications and brochures in WMO's official languages were distributed widely. Exhibition stands on WMO activities were set up throughout the period at the Summit venue at the Ubuntu Village, the main exhibition site of WSSD, and also at the Water Dome, the main exhibition venue for water issues.

**16.3.5** The Association noted further that the Summit had reaffirmed sustainable development as a central element of the international agenda, and had given new impetus to global action to fight poverty and protect the environment. The understanding of sustainable development had been broadened and strengthened as a result of the Summit, particularly the important linkages between poverty, the environment and the use of natural resources. Governments had agreed to and reaffirmed a wide range of concrete commitments and targets for action to achieve more effective implementation of sustainable development objectives.

**16.3.6** The Association noted that the main outcomes of the Summit were the adoption of the Johannesburg Declaration and the Plan of Implementation, which it felt would be helpful in increasing the contributions of WMO and NMHSs in protecting the global commons, including the Earth's atmosphere, oceans, freshwater and ecosystems. This was particularly true in addressing the issues related to global warming and climate change, disaster prevention and mitigation, as well as promoting advances in science and technology and their applications to sustainable development activities.

**16.3.7** The Association noted with appreciation that in view of the importance of the outcome of the Summit to all WMO Members, the Secretary-General had prepared and circulated to PRs the extracts related to the core activities of WMO and the NMHSs from the text of the Johannesburg Declaration on Sustainable Development and the corresponding Plan of Implementation.

**16.3.8** The Association noted that several events had been organized before and simultaneously with the Summit, among them a WMO experts meeting on the management of NMSs. Eighteen managers of NMSs from various regions actively participated and nine directors of NMSs greatly contributed to the successful outcome of the meeting. The African Meteorological Society (SMA) and the South African Society for Atmospheric Sciences (SASAS) also held a joint conference during the Summit. A review meeting on the RA I Strategy for Enhancement of the WWW-Basic Systems and its contribution to NEPAD was also held. Twenty-one WMO PRs participated in these events and several participated in the Summit sessions

as members of their national delegations. The Association expressed special thanks to the Secretary-General of WMO and to the PR of South Africa with WMO for the excellent arrangements made for the meteorological and hydrological communities during the Summit. The Association requested its president to bring to the attention of Fourteenth Congress the need to fully support WMO's contribution to NEPAD. It also requested the Secretary-General to support the implementation of the RA I Strategy for Enhancement of the WWW-Basic Systems in support of NEPAD.

**16.3.9** The Association recognized that water had been a key topic of interest to participants of the Summit and that the Water Dome had been set aside as the central venue for water-related events held in parallel with the Summit. It was a tangible product of international cooperation in the water sector with special emphasis on Africa. WMO provided support to the Dome initiative. The Dome was open to visitors for six days, from 29 August to 3 September 2002, with a focus on a particular theme each day. WMO was selected to coordinate activities on the theme 'Water, Energy and Climate' on 1 September 2002. That day brought together several ministers for water, senior governmental officials, and representatives from international governmental organizations, NGOs, institutions, the private sector and academic circles. The Secretary-General opened and chaired the plenary session, and in the afternoon WMO organized four parallel sessions to discuss specific issues. Two special exhibitions were organized by WMO on water-related activities, one in the centre of the Dome focusing on Africa, the other within the general exhibition area of the Dome. Several WMO publications were also distributed. The Association emphasized that WMO's participation in the Water Dome had given a very good opportunity to publicize NMHSs' and WMO's role in water issues, and had demonstrated the importance of water, energy and climate to global sustainable development.

**16.3.10** The Association urged its Members to develop a strategy to implement the outcomes of WSSD in support of sustainable development at the national, subregional and regional levels. It requested the Secretary-General to give his support to Members' efforts to implement the outcomes of WSSD.

#### **16.4 PREPARATIONS FOR THE FOURTEENTH WORLD METEOROLOGICAL CONGRESS** (agenda item 16.4)

**16.4.1** Association noted with appreciation the leadership and the devotion of Professor G.O.P. Obasi as the Secretary-General of WMO during his term of tenure and adopted [Resolution 18 \(XIII-RA I\)](#).

**16.4.2** The Association noted with satisfaction the Decision CM/Dec. 37 (LXXVII) of the Seventy-seventh Ordinary Session of the Council of Ministers and Thirty-eighth Summit of the Heads of State and Government of the Organization of African Unity (OAU)/African Union (A.U) lending the support of OAU/AU to the candidature of Mr E.A. Mukolwe for

appointment as WMO Secretary-General. The Association placed its confidence in Mr Mukolwe, who it felt had the qualifications, experience and integrity required for the post and adopted [Resolution 19 \(XIII-RA I\)](#). (France, Portugal, Spain and the United Kingdom abstained.)

**16.4.3** The Association noted with appreciation the efforts made by the Secretary-General to provide Portuguese interpretation at its thirteenth session. It recalled its recommendations to Congress at its eleventh and twelfth sessions requesting to include Portuguese as a working language of WMO. It noted the view of Congress that Portuguese was a historical language of science and culture spoken by 200 million people in Angola, Brazil, Cape Verde, Guinea Bissau, Mozambique, Portugal and Sao Tome and Principe, who were Members of WMO and of three of its regional associations. It noted that Portuguese was a working language of 12 international organizations, one of them being in the United Nations System. It also noted that, with the recent independence of East Timor, the number of Portuguese-Speaking countries had increased to eight.

**16.4.4** Further to the efforts and arrangements made for the two previous sessions, the Association asked Congress to consider its request to include Portuguese as an official and working language of WMO.

#### **16.5 SIXTH TECHNICAL CONFERENCE ON MANAGEMENT FOR DEVELOPMENT OF METEOROLOGICAL SERVICES IN AFRICA** (agenda item 16.5)

**16.5.1** The Association noted with appreciation that, in accordance with its recommendation at its twelfth session, a Sixth Technical Conference on Management for Development of Meteorological Services in Africa had been organized in Abuja, Nigeria from 6 to 10 November 2000, at the kind invitation of the Government of Nigeria. The Association welcomed the opportunity for the Directors to discuss management questions and exchange views and experiences on a wide range of topics, including: Climate Change – Reality; Expectations and Role of WMO and NMHSs; the Use of New Technologies to Increase Application Capabilities of NMSs; Strengthening of NMHSs to Provide Timely and Accurate Information to End-Users – The Issue of Interactions Between the End-Users and Information Providers; Alternative Service Delivery as Related to Services to be Provided; and Supporting Measures for the Development of NMSs in Africa. It expressed satisfaction that 39 of its Member countries had participated in the Conference and that many Directors of NMHSs had delivered lectures or presented case studies on various topics. It also welcomed the participation of several subregional, regional and international organizations in the Conference.

**16.5.2** The Association noted with satisfaction the importance attached by Thirteenth Congress to technical conferences on management for having demonstrated their usefulness in improving the capacities of NMHSs.

**16.5.3** The Association considered and adopted the conclusions and recommendations of the Conference given in *Annex IV* to this report. It recommended that a Seventh Technical Conference on Management for Development of Meteorological Services be organized by WMO during the fourteenth financial period, and that Members wishing to host this Seventh Conference submit their offers to the Secretariat. It agreed that the Conference should examine the matters of extreme weather events and natural disaster prevention.

## **17. WMO REGIONAL AND SUBREGIONAL OFFICES FOR AFRICA** (agenda item 17)

**17.1** The Association reviewed the activities, since its twelfth session in Arusha, United Republic of Tanzania in 1998, of the Regional Office for Africa; the Subregional Office for Western, Central and Northern Africa; and the Subregional Office for Eastern and Southern Africa. It noted that the Regional and Subregional Offices were effectively continuing their functions and responsibilities as integral parts of the WMO Secretariat. It also noted the assistance provided by the Offices to the president, vice-president, various working groups and rapporteurs of the Association in discharging their responsibilities. It expressed its appreciation to the Secretary-General and to the staffs of the Regional Office and Subregional Offices for their continued support to the activities of the Association during the period.

**17.2** The Association noted that the Regional and Subregional Offices had followed up the implementation of decisions and resolutions of the twelfth session of the Association, and had continued to give support to the various WMO programmes in the Region, especially for the implementation of the WWW, for support to natural disaster reduction activities, for the development of applications in WMO areas of expertise, for the strengthening of hydrological networks, for the development in the use of satellite data and for capacity building of NMSs in the Region.

**17.3** The Association noted with satisfaction that the Regional and Subregional Offices continued to provide assistance to Members for implementation of regional components of WMO Programmes and contribute to the improvement of the status and visibility of the NMHSs and their capacity to contribute to the sustainable development of their countries.

**17.4** The Association further noted with appreciation that the staff of the Regional and Subregional Offices continued to assist Members in identifying and reviewing their requirements and in formulating project proposals as well as in liaising with potential partners.

**17.5** The Association expressed its satisfaction and noted that of Thirteenth Congress regarding the commitment shown by the Subregional Offices in supporting the NMHSs, which had suffered numerous natural disasters of hydrometeorological origin. It also noted with satisfaction that the Secretary-General had established an EDRG to enable the Secretariat to meet without delay and with efficiency the needs of Members when such disasters occurred.

**17.6** The Association noted with appreciation that the Regional and Subregional Offices continued to develop and maintain close liaison with relevant subregional, regional and international organizations and institutions, for the promotion of meteorological and hydrological activities and for improving the visibility of WMO in the Region, including in Central Africa. In this regard, the Association requested the Secretary-General to continue to develop and strengthen collaboration and cooperation with these organizations and institutions in order to better assist NMHSs in their respective subregions.

**17.7** The Association noted with satisfaction that the Subregional Offices continued to improve the visibility of WMO within the United Nations System in their respective subregions, through a more active representation of the Organization in the activities of various bodies in the relevant subregions.

**17.8** The Association noted with appreciation the activities undertaken by the Subregional Offices in resource mobilization for the meteorology and hydrology programmes of the various economic groupings.

**17.9** The Association noted that the Subregional Offices continued to give special attention to the capacity building activities of NMHSs in seasonal to inter-annual climate prediction.

**17.10** The Association noted that the biannual Newsletter provided a vehicle for the exchange and dissemination of regional news as well as a means of maintaining close liaison between the Regional Office and Members of RA I. The Association requested the Secretary-General to continue to issue the Newsletter and urged Members to actively contribute news, items and articles to the Newsletter on a regular basis.

**17.11** Considering the achievements obtained since the Subregional Offices were established on an experimental basis, the Association recommended to Congress the continuation on a permanent basis and extension of the system of Subregional Offices as well as the strengthening of their human and financial resources so that they could more efficiently serve Members in the Region, including in the areas of hydrology and water resources.

**17.12** The Association acknowledged the measures taken by the Secretary-General for the smooth running of the Regional and Subregional Offices. It requested the Secretary-General to continue his efforts to strengthen the Regional Office for Africa; the Subregional Office responsible for Western, Central and North Africa; and the Subregional Office for Eastern and Southern Africa, in order to meet the growing requirements of Members in the Region.

## **18. SCIENTIFIC LECTURES AND DISCUSSIONS** (agenda item 18)

**18.1** The following scientific lectures were presented during the session:

- (a) Transforming the Status of Meteorological Services to Address Relevant Global Changes;
- (b) Cost Recovery of Meteorological Services to Aviation;

- (c) Cost Recovery of Meteorological Services to Non-aeronautical Customers; New Approach for Technical Cooperation;
- (d) Financial Resources and Their Mobilization in Africa;
- (e) Structure and Operation of the New Partnership for Africa's Development (NEPAD), the Way Forward;
- (f) WMO Activities in Support of NEPAD objectives.

The lectures, which were presented on 18 and 19 November 2002 at the RA I Seminar on Specialized Services, were followed by lively discussions. The Association expressed its appreciation to the lecturers for their interesting presentations. The Association further agreed that a programme of scientific lectures should be arranged for its fourteenth session and requested the Secretary-General, in consultation with the president of RA I, to make the necessary arrangements.

**19. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION AND OF RELEVANT RESOLUTIONS OF THE EXECUTIVE COUNCIL (agenda item 19)**

**19.1** The Association reviewed those of its past resolutions which were still in force at the time of its

thirteenth session and adopted [Resolution 20 \(XIII-RA I\)](#) accordingly.

**19.2** The Association considered that Resolution 6 (EC-LI) on the report of its twelfth session did not need to be kept in force.

**20. ELECTION OF OFFICERS (agenda item 20)**

The Association elected Mr M.S. Mhita (United Republic of Tanzania) and Mr F. Ounnar (Algeria) as president and vice-president, respectively, of RA I (Africa).

**21. DATE AND PLACE OF THE FOURTEENTH SESSION (agenda item 21)**

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

**21.2** In this respect, the Association noted with appreciation the offer of Nigeria and Senegal to host the next session of the Association.

**22. CLOSURE OF THE SESSION (agenda item 22)**

**22.1** The thirteenth session of Regional Association I (Africa) closed at 15.50 pm on 28 November 2002.

# RESOLUTIONS ADOPTED BY THE SESSION

## RESOLUTION 1 (XIII-RA I)

### WORKING GROUP ON PLANNING AND IMPLEMENTATION OF THE WORLD WEATHER WATCH IN REGION I

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) That continuous developments in science and technology call for continuous adjustments in World Weather Watch (WWW) facilities,
- (2) That the interest in WWW implementation and operation is wide and not limited to individual countries,
- (3) That WWW data and products are of vital importance to Members in Regional Association (RA) I for meeting the increasing requirements of users for meteorological services,

**CONSIDERING:**

- (1) That the implementation of the WWW in the Region should be kept under constant review,
- (2) That the implementation of new satellite-based technologies as part and parcel of the WWW systems component in RA I will benefit all Members in the Region,
- (3) That there is a need for wide-scale coordination of the implementation of the WWW in the Region,

**DECIDES:**

- (1) To establish a Working Group on Planning and Implementation of the WWW (WG/PIW) in Region I with the following terms of reference:
  - (a) To monitor the progress made in the implementation and operation of the WWW facilities in the Region and advise on possible improvements and priorities for appropriate actions to be carried out under the WWW Programme and the need for external support, where required;
  - (b) To keep under review the design of the Regional Basic Synoptic Network (RBSN) on the basis of criteria on minimum network density required in the WMO Long-term Plan (LTP) and the abilities of Members to implement the Network;
  - (c) To continue to monitor and coordinate the implementation and operation of the telecommunication loop Algiers-Cairo-Nairobi-Niamey-Dakar-Algiers and implementation and/or upgrading of all the main branches of the loop;
  - (d) To monitor and coordinate the implementation and operation of modern tech-

nologies, including the use of automated message switch systems, high-speed data links, Data Collection Systems (DCSs)/Data Collection Plat-form (DCP) Retransmission System (DRS), Meteorological Data Distribution (MDD) and other satellite-based telecommunication services that are relevant to the Region, and to develop proposals for reorganizing the Regional Meteorological Telecommunication Network (RMTN) in a more efficient way;

- (e) To review and coordinate the implementation of Regional Specialized Meteorological Centres (RSMCs) and other centre functions and services, including updating product requirements to meet the stated needs of National Meteorological Centres (NMCs) in RA I;
  - (f) To review and coordinate the automation of real-time functions of NMCs in RA I;
  - (g) To monitor the Regional WWW System and develop proposals for specific regional data management functions for implementation in the Region;
  - (h) To update old regional codes and develop new ones in line with requirements of existing RSMCs, upcoming RSMCs and NMCs in the Region;
  - (i) To keep under review the implementation of the Public Weather Services Programme (PWSP) in the Region, and develop guidance and advice with a view to assisting Members with their delivery of the most effective services to the public;
  - (j) To review training requirements in aspects related to new concepts of the WWW components and proposed relevant training programmes to be offered by RSMCs and other centres in RA I;
- (2) That the working group should be composed of:
    - (a) A coordinator of a Subgroup on Regional Aspects of the Global Telecommunication System (GTS);
    - (b) A Rapporteur on Regional Aspects of the Global Observing System (GOS);
    - (c) A Rapporteur on Regional Aspects of the Global Data-processing System (GDPS);

- (d) A Rapporteur on Regional Aspects of Data Management (DM);
- (e) A Rapporteur on Codes;
- (f) A Rapporteur on Regional Aspects of Public Weather Services (PWS);
- (g) Other experts as nominated by Members;

The terms of reference of the subgroup and rapporteurs are indicated in the annex to this resolution;

- (3) To designate in accordance with Regulation 32 of the WMO General Regulations Mr W. Nyakwada (Kenya) as chairperson of the Working Group;
- (4) To designate Mr M. Sonko (Senegal) as coordinator of the subgroup;
- (5) (a) To invite Mr M. SaLoum (Niger) to serve as Rapporteur on Regional Aspects of the GOS;
- (b) To invite Mr M. Hamadache Bachir (Algeria) to serve as Rapporteur on Regional Aspects of the GDPS;
- (c) To invite Mr G. Obua (Uganda) to serve as Rapporteur on Regional Aspects of DM;

- (d) To invite Mr W. Chilambo (United Republic of Tanzania) to serve as Rapporteur on Codes;
- (e) To invite Mr M. Ndabambi (South Africa) to serve as Rapporteur on Regional Aspects of PWS;
- (6) To invite Members to nominate experts to serve in:
  - (a) The working group;
  - (b) The Subgroup on Regional Aspects of the GTS;
- (7) To request the chairperson of the Working Group to submit progress reports at yearly intervals to the president of the Association and a final report not later than six months before the fourteenth session of the Association.

NOTE: This Resolution supersedes Resolution 1 (XII-RA I) which is no longer in force

#### ANNEX TO RESOLUTION 1 (XIII-RA I)

##### WORKING GROUP ON THE PLANNING AND IMPLEMENTATION OF THE WWW IN REGION I

The terms of reference of the subgroup and rapporteurs nominated under Resolution 1 (XIII-RA I) are as follows:

- (a) **The Subgroup on Regional Aspects of the GTS**
  - (i) To formulate recommendations for coordination of the implementation and operation of new telecommunication facilities and techniques in Region I;
  - (ii) To formulate recommendations on regional activities relating to the WWW telecommunication system in Region I;
  - (iii) To monitor developments in new telecommunication technology and equipment and study their possible integration into the meteorological telecommunication system in Region I for its efficient management;
  - (iv) To study existing problems and advise on improvements on the exchange of observational data and processed products and information within Region I and outside it;
  - (v) To develop proposals for the more efficient reorganization of RMTNs in line with new technological developments;
  - (vi) To monitor and report on the operation of meteorological telecommunications in Region I, particularly the loop

- Algiers-Cairo-Nairobi-Niamey-Dakar-Algiers and its branches, and formulate appropriate recommendations;
- (vii) To identify the training needs of Members for effective implementation, operation and maintenance of the GTS in Region I;
- (viii) To represent the Association at sessions of the CBS Working Group on the GTS;
- (b) **Rapporteur on Regional Aspects of the GOS**
  - (i) To follow up the operational experience of Members in Region I on the use of new observing systems and formulate recommendations;
  - (ii) To review and make proposals regarding the design of the RBSN in the light of spatial requirements stipulated in the WMO LTP;
  - (iii) To monitor developments in observing systems and advise Members of RA I on how best they could be used to improve the observational network;
  - (iv) To identify problem areas in the regional observing systems and network and advise on possible suitable solutions in light of new developments in observing techniques;

<p>(v) To identify and/or advise on the training requirements of Members in Region I for the successful implementation, operation and maintenance of new observation technologies;</p> <p>(vi) To represent the Association at sessions of the CBS Working Group on the GOS;</p> <p><b>(c) Rapporteur on Regional Aspects of the GDPS</b></p> <p>(i) To monitor developments in data-processing equipment and techniques and advise on those which could be beneficially introduced at national and regional centres to improve their operational capability both within the WWW system and in related areas;</p> <p>(ii) To formulate recommendations for coordinated implementation of data-processing facilities and standardization of data-processing techniques at NMCs, RSMCs and other centres for multi-purpose use;</p> <p>(iii) To identify and/or advise on the training requirements of Members in the Region for the successful implementation, operation and maintenance of data-processing systems in Region I;</p> <p>(iv) To review and recommend products to be made available by RSMCs to NMCs, considering Members' requirements;</p> <p>(v) To represent the Association at sessions of the CBS Working Group on the GDPS;</p> <p><b>(d) Rapporteur on Regional Aspects of DM</b></p> <p>(i) To review data, product and information presentation, selection and dissemination to recipients (NMCs);</p> <p>(ii) To collect information on the level of quality control of data and products;</p> <p>(iii) To review the WWW data and products recovery procedures in case of major outages of key facilities;</p> <p>(iv) To coordinate and provide information on real-time and non-real-time monitoring of the integrated WWW system in Region I;</p> <p>(v) To identify and/or advise on training requirements of Members for the successful implementation of the WWW DM functions in Region I;</p> <p>(vi) To advise and report on DM activities in the Region to the chairperson of the Working Group;</p>	<p>(vii) To represent the Association at sessions of the CBS Working Group on DM;</p> <p><b>(e) Rapporteur on Codes</b></p> <p>(i) To review data and related information presentation, including exchange formats and codes, and conversion between formats and codes;</p> <p>(ii) To update regional codes and respond to newly emerging code requirements in the Region;</p> <p>(iii) To take action towards solving coding problems assigned by the chairperson of the Working Group;</p> <p>(iv) To identify and/or advise on training requirements of Members for the successful implementation of approved exchange formats and codes in Region I;</p> <p>(v) To advise and report to the chairperson of the Working Group on all matters concerning meteorological codes and new developments in codes;</p> <p>(vi) To represent the Association at sessions of the Subgroup on Data Representation and Codes of the CBS Working Group on DM;</p> <p><b>(f) Rapporteur on Regional Aspects of PWS</b></p> <p>(i) To keep abreast of and evaluate technical and scientific developments relating to formulation, presentation and dissemination techniques, and make recommendations as appropriate on the best possible use of the NMHSs' resources, to achieve the most effective delivery of services to the public, particularly during severe weather situations;</p> <p>(ii) To provide information and advice to Members in the Region on development of guidelines for meeting user requirements and for verification of the quality, content, and usefulness of warnings and public weather forecasts;</p> <p>(iii) To keep under review education and training requirements related to the PWSP;</p> <p>(iv) To keep under review, in coordination with the Rapporteur on Regional Aspects of the GDPS, aspects relating to exchange and coordination of hazardous weather information among neighbouring countries;</p> <p>(v) To represent the Region on the CBS Working Group on PWS.</p>
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## RESOLUTION 2 (XIII-RA I)

### REGIONAL BASIC SYNOPTIC NETWORK IN REGION I

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) Resolution 2 (XII-RA I) – Regional Basic Synoptic Network (RBSN),
- (2) *The Manual on the Global Observing System* (WMO-No. 544), Volume I, Part III, paragraphs 2.1.4, 2.1.5 and 2.1.6 and the definition of the Regional Basic Synoptic Networks,
- (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 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 RBSN in Region I;

**URGES** Members:

- (1) To spare no effort in their endeavours to

secure, at the earliest date possible, full implementation of the network of 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), the *Manual on the Global Observing System* (WMO-No. 544), the *Manual on Codes* (WMO-No. 306) and the *Manual on the Global Telecommunication System* (WMO-No. 386);

**AUTHORIZES** the president of the Association to approve, at the request of the Members concerned and in consultation with the Secretary-General, minor amendments to the list of stations in accordance with the procedures laid down in the *Manual on the Global Observing System* (WMO-No. 544), Volume II – Regional Aspects, Region I (Africa).

Note: This resolution replaces Resolution 2 (XII-RA I) which is no longer in force.

#### ANNEX TO RESOLUTION 2 (XIII-RA I) LIST OF STATIONS COMPRISING THE RBSN IN REGION I

<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
<b>ALGERIA</b>			60607	TIMIMOUN	S
60355	SKIKDA	S	60611	IN-AMENAS	W
60360	ANNABA	S	60620	ADRAR	S
60360	ANNABA	W	60620	ADRAR	W
60390	DAR-EL-BEIDA	S	60630	IN-SALAH	S
60390	DAR-EL-BEIDA	W R	60630	IN-SALAH	W R
60402	BEJAIA-AEROPORT	S	60640	ILLIZI	S
60419	CONSTANTINE	S	60656	TINDOUF	S
60419	CONSTANTINE	W	60670	DJANET	S
60445	SETIF	S	60680	TAMANRASSET	S
60475	TEBESSA	S	60680	TAMANRASSET	W R
60490	ORAN-SENIA	S	60690	IN-GUEZZAM	S
60490	ORAN-SENIA	W	<b>ANGOLA</b>		
60506	MASCARA-MATEMORE	S	66130	N'ZETO (AMBRIZETE)	S
60511	TIARET	S	66152	DUNDO	S
60525	BISKRA	S	66160	LUANDA	S
60549	MECHERIA	S	66160	LUANDA	W R
60550	EL-BAYADH	S	66240	PORTO AMBOIM	S
60555	TOUGGOURT	S	66270	WAKU KUNGU (CELA)	S
60559	EL-OUED	S	66318	HUAMBO (NOVA LISBOA)	S
60566	GHARDAIA	S	66390	LUBANGO (SA DA BANDEIRA)	S
60571	BECHAR	S	66390	LUBANGO (SA DA BANDEIRA)	W R
60571	BECHAR	W R			
60581	HASSI-MESSAOUD	S			
60590	EL-GOLEA	S			



<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
66410	MENONGUE (SERPA PINTO)	S	64901	BETARE-OYA	S
66422	MOCAMEDES	S	64910	DOUALA OBS.	S
66447	MAVINGA	S	64910	DOUALA R.S.	W R
66460	PEREIRA DE ECA	S	64930	BERTOUA	S
<b>ASCENSION ISLAND</b>			64920	BAFIA	S
61902	WIDE AWAKE FIELD (ASCENSION IS.)	S	64950	YAOUNDE	S
61902	WIDE AWAKE FIELD (ASCENSION IS.)	W R	64960	ABONG-MBANG	S
<b>BENIN</b>			64971	KRIBI	S
65306	KANDI	S	<b>CAPE VERDE</b>		
65319	NATITINGOU	S	8583	MINDELO	S
65330	PARAKOU	S	8589	PRAIA	S
65335	SAVE	S	8594	SAL	S
65338	BOHICON	S	8594	SAL	W R
65344	COTONOU	S	<b>CENTRAL AFRICAN REPUBLIC</b>		
<b>BOTSWANA</b>			64600	BERBERATI	S
68024	GHANZI	S	64601	BOUAR	S
68026	SHAKAWE	S	64605	BOSSEMBELE	S
68029	KASANE	S	64610	BOSSANGOA	S
68032	MAUN	S	64650	BANGUI	S
68032	MAUN	W R	64650	BANGUI	W R
68038	SUA-PAN	S	64654	N'DELE	S
68040	LETLHAKANE	S	64655	BRIA	S
68040	LETLHAKANE	W R	64656	BANGASSOU	S
68054	FRANCISTOWN	S	64658	BIRAO	S
68148	MAHALAPYE	S	64659	OBO	S
68226	TSHANE	S	64660	BAMBARI	S
68234	JWANENG	S	64661	YALINGA	S
68240	SERETSE KHAMA INTERNATIONAL AIRPORT	S	64665	MOBAYE	S
68240	SERETSE KHAMA INTERNATIONAL AIRPORT	W R	<b>CHAD</b>		
68328	TSABONG	S	64700	NDJAMENA	S
68328	TSABONG	W R	64700	NDJAMENA	W R
<b>BOUVET ISLAND</b>			64701	MAO	S
68992	BOUVET ISLAND	S	64705	BOUSSO	S
<b>BURKINA FASO</b>			64706	MOUNDOU	S
65501	DORI	S	64709	PALA	S
65502	OUAHIGOUYA	S	64750	SARH	S
65503	OUAGADOUGOU	S	64750	SARH	W
65503	OUAGADOUGOU	W R	64751	ATI	S
65505	DEDOUGOU	S	64753	FAYA	S
65507	FADA N'GOURMA	S	64753	FAYA	W R
65510	BOBO-DIOULASSO	S	64754	AM-TIMAN	S
65516	BOROMO	S	64756	ABECHE	S
65518	PO	S	64758	MONGO	S
65522	GAOUA	S	<b>COMOROS</b>		
<b>BURUNDI</b>			67002	HAHAYA INT. AIRPORT	S
64390	BUJUMBURA	S	67005	DZAOUDZI/PAMANZI (MAYOTTE)	S
<b>CAMEROON</b>			<b>CONGO</b>		
64851	MAROUA-SALAK	S	64400	POINTE-NOIRE	S
64860	GAROUA	S	64400	POINTE-NOIRE	W
64870	NGAOUNDERE	S	64401	DOLISIE	S
64880	BANYO	S	64450	BRAZZAVILLE /MAYA-MAYA	S
64890	MAMFE	S	64453	DJAMBALA	S
64893	KOUNDJA	S	64456	MAKOVA	S
64900	YOKO	S	64458	OUESSO	S
			64458	OUESSO	W
			64459	IMPFONDO	S
			64460	SOUANKE	S

<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
<b>COTE D'IVOIRE</b>			62337	EL ARISH	W R
65528	ODIENNE	S	62357	WADI EL NATROON	S
65536	KORHOGO	S	62366	CAIRO AIRPORT	S
65545	BONDOUKOU	S	62378	HELWAN	S
65548	MAN	S	62378	HELWAN	W R
65548	MAN	W	62387	MINYA	S
65555	BOUAKE	S	62403	SOUTH OF VALLEY	S
65557	GAGNOA	S	62403	UNIVERSITY	W R
65562	DIMBOKRO	S	62403	SOUTH OF VALLEY	W R
65578	ABIDJAN	S	62403	UNIVERSITY	S
65578	ABIDJAN	W R	62405	LUXOR	S
65585	ADIAKE	S	62414	ASSWAN	S
65592	TABOU	S	62414	ASSWAN	W R
65599	SASSANDRA	S	62417	SIWA	S
<b>DEMOCRATIC REPUBLIC OF THE CONGO</b>			62420	BAHARIA	S
64005	MBANDAKA	S	62420	BAHARIA	S
64006	GEMENA	S	62423	FARAFRA	S
64008	BASANKUSU	S	62423	FARAFRA	W R
64018	BASOKO	S	62432	DAKHLA	S
64040	KISANGANI	S	62432	DAKHLA	S
64040	KISANGANI	W R	62435	KHARGA	S
64062	ISRO	S	62435	KHARGA	S
64076	BUNIA	S	62440	ISMAILIA	S
64108	BANDUNDU	S	62440	ISMAILIA	S
64115	INONGO	S	62452	NEKHEL	S
64126	BOENDE	S	62452	NEKHEL	S
64146	LODJA	S	62455	RAS SEDR	S
64155	KINDU	S	62455	RAS SEDR	S
64180	BUKAVU	S	62459	EL TOR	S
64184	GOMA	S	62463	HURGUADA	S
64207	MATADI	S	62463	HURGUADA	S
64210	KINSHASA/N'DJILI	S	62465	KOSSEIR	S
64210	KINSHASA/N'DJILI	W R	<b>EQUATORIAL GUINEA</b>		
64220	KINSHASA-BINZA	S	64810	MALABO	S
64222	KIKWIT	S	64820	BATA (RIO MUNI)	S
64228	TSHIKAPA	S	<b>ERITREA</b>		
64235	KANANGA	S	63021	ASMARA	S
64235	KANANGA	W R	63021	ASMARA	W R
64247	MBUJI-MAYI	S	63043	ASSAB	S
64276	KONGOLO	S	<b>ETHIOPIA</b>		
64282	MANONO	S	63330	MAKALE	S
64285	KALEMIE	S	63331	GONDAR	S
64315	KAMINA/BASE	S	63333	COMBOLCHA	S
64328	KOLWEZI	S	63333	COMBOLCHA	S
64360	LUBUMBASHI-LUANO	S	63334	DEBREMARCOS	S
<b>DIEGO GARCIA</b>			63340	LEKEMTE	S
61967	DIEGO GARCIA	S	63402	JIMMA	S
61967	DIEGO GARCIA	W R	63403	GORE	S
<b>DJIBOUTI</b>			63450	ADDIS ABABA-BOLE	S
63125	DJIBOUTI	S	63450	ADDIS ABABA-BOLE	W R
<b>EGYPT</b>			63453	METEHARA	S
62305	SALLUM PLATEAU	S	63460	AWASSA	S
62306	MERSA MATRUH	S	63471	DIREDAWA	S
62306	MERSA MATRUH	W R	63474	ROBE/BALE	S
62309	DABAA	S	63478	GODE	S
62318	ALEXANDRIA/ NOUZHA	S	63500	ARBA MINCH	S
62325	BALTIM	S	63533	NEGHELLE	S
62332	PORT SAID/EL GAMIL	S	63533	NEGHELLE	W R
62337	EL ARISH	S	<b>GABON</b>		
			64500	LIBREVILLE	S
			64500	LIBREVILLE	W R
			64503	MAYUMBA	S
			64507	TCHIBANGA	S
			64550	MOUILA	S
			64551	LAMBARENE	S
			64552	MITZIC	S
			64556	MAKOKOU	S
			64565	MOANDA	S

<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
<b>GAMBIA</b>			62010	TRIPOLI	S
61701	BANJUL/YUNDUM	S		INTERNATIONAL	
<b>GHANA</b>				AIRPORT	
65401	NAVRONGO	S	62010	TRIPOLI	W R
65404	MOUILA	S		INTERNATIONAL	
65416	BOLE	S		AIRPORT	
65418	TAMALE	S	62016	MISURATA	S
65418	TAMALE	W R	62019	SIRTE	S
65432	WENCHI	S	62019	SIRTE	W R
65437	KETE-KRACHI	S	62053	BENINA	S
65442	KUMASI	S	62053	BENINA	W R
65445	SEFWI BEKWAI	S	62055	AGEDABIA	S
65453	HO	S	62056	SHAHAT	S
65457	AKIM ODA	S	62059	DERNA	S
65467	TAKORADI	S	62062	TOBRUK	S
65472	ACCRA	S	62103	GHADAMES	S
65472	ACCRA	W R	62103	GHADAMES	W R
65475	ADA	S	62120	GARIAT EL-SHARGHIA	S
<b>GUINEA</b>			62124	SEBHA	S
61802	KOUNDARA	S	62124	SEBHA	W R
61809	LABE	S	62131	HON	S
61811	SIGUIRI	S	62161	JALO	S
61816	BOKE	S	62176	GIARABUB	S
61818	KINDIA	S	62200	OBARI	S
61820	MAMOU	S	62212	GHAT	S
61829	KANKAN	S	62259	TAZERBO	S
61831	CONAKRY/GBESSIA	W R	62271	KUFRA	S
61832	CONAKRY/GBESSIA	S	62271	KUFRA	W R
61833	FARANAH/BADALA	S	<b>MADAGASCAR</b>		
61834	KISSIDOUGOU	S	67009	ANTSIRANANA	S
61847	MACENTA	S	67012	FASCENE (NOSSI-BE)	S
61849	N'ZEREKORE	S	67017	VOHEMAR	S
<b>GUINEA-BISSAU</b>			67019	ANALALAVA	S
61766	BISSAU (AEROPORTO INT. OSVALDO VIEIRA)	S	67020	ANTSOHIHY	S
<b>KENYA</b>			67023	SAMBAVA	S
63612	LODWAR	S	67025	ANTALAHA	S
63619	MOYALE	S	67027	MAHAJANGA	S
63624	MANDERA	S	67037	BESALAMPY	S
63641	MARSABIT	S	67045	MAEVATANANA	S
63661	KITALE	S	67067	AMBOHITSILAOZANA	S
63671	WAJIR	S	67072	SAINTE-MARIE	S
63695	MERU	S	67073	MAINTIRANO	S
63708	KISUMU	S	67083	IVATO	S
63714	NAKURU	S	67083	IVATO	W R
63723	GARISSA	S	67085	ANTANANARIVO	S
63723	GARISSA	W R	67095	TOAMASINHA	S
63740	NAIROBI/KENYATTA AIRPORT	S	67107	ANTSIRABE	S
63741	NAIROBI/DAGORETTI	W R	67113	MAHANORO	S
63766	MAKINDU	S	67117	MORONDAVA	S
63772	LAMU	S	67131	MOROMBE	S
63793	VOI	S	67137	FIANARANTSOA	S
63799	MALINDI	S	67143	MANANJARY	S
63820	MOMBASA	S	67152	RANOHIRA	S
<b>LESOTHO</b>			67157	FARAFANGANA	S
68454	MASERU-MIA	S	67161	TOLIARA	S
<b>LIBYAN ARAB JAMAHIRIYA</b>			67197	TAOLAGNARO	S
62002	NALUT	S	67197	TAOLAGNARO	W R
62007	ZUARA	S	<b>MADEIRA ISLANDS (PORTUGAL)</b>		
62008	YEFREN	S	8521	FUNCHAL/S.CATARINA	S
			8522	FUNCHAL	S

<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
8522	FUNCHAL	W R	60135	RABAT-SALE	S
8524	PORTO SANTO	S	60141	FES-SAIS	S
<b>MALAWI</b>			60150	MEKNES	S
67586	LILONGWE INT'L AIRPORT	S	60155	CASABLANCA	S
67586	LILONGWE INT'L AIRPORT	W R	60155	CASABLANCA	W R
67693	CHILEKA	S	60156	NOUASSEUR	S
<b>MALI</b>			60185	SAFI	S
61202	TESSALIT	S	60190	KASBA-TADLA	S
61202	TESSALIT	W R	60195	MIDELT	S
61214	KIDAL	S	60210	ERRACHIDIA	S
61223	TOMBOUCTOU	S	60210	ERRACHIDIA	W
61223	TOMBOUCTOU	W R	60220	ESSAOUIRA	S
61226	GAO	S	60230	MARRAKECH	S
61230	NIORO DU SAHEL	S	60252	AGADIR AL MASSIRA	W R
61233	NARA	S	60265	OUARZAZATE	S
61240	HOMBORI	S	<b>MOZAMBIQUE</b>		
61250	MENAKA	S	67215	PEMBA	S
61257	KAYES	S	67217	LICHINGA	S
61265	MOPTI	S	67231	CUAMBA	S
61270	KITA	S	67237	NAMPULA	S
61272	SEGOU	S	67237	NAMPULA	W R
61277	SAN	S	67243	ZUMBO	S
61291	BAMAKO/SENOU	S	67261	TETE	S
61291	BAMAKO/SENOU	W R	67283	QUELIMANE	S
61293	KOUTIALA	S	67297	BEIRA	S
61296	BOUGOUNI	S	67297	BEIRA	W R
61297	KIASSO	S	67315	VILANCULOS	S
<b>MAURITANIA</b>			67323	INHAMBANE	S
61401	BIR MOGHREIN	S	67335	XAI XAI	S
61404	ZOUERATE	S	67341	MAPUTO/MAVALANE	S
61415	NOUADHIBOU	S	67341	MAPUTO/MAVALANE	W R
61415	NOUADHIBOU	W R	<b>NAMIBIA</b>		
61421	ATAR	S	68010	OKAUKUEJO	S
61437	AKJOUJT	S	68014	GROOTFONTEIN	S
61450	TIDJIKJA	S	68016	MOWE	S
61461	BOUTILIMIT	S	68018	RUNDU	S
61497	NEMA	S	68098	WALVIS BAY INT	S
61498	KIFFA	S	68102	SITRUSDAL	S
61499	AIOUN EL ATROUSS	S	68104	WALVIS BAY (PELICAN POINT)	S
<b>MAURITIUS</b>			68106	GOBABEB	S
61974	AGALEGA	S	68110	WINDHOEK	S
61986	ST. BRANDON (ST. RAPHAEL)	S	68110	WINDHOEK	W R
61986	ST. BRANDON (ST. RAPHAEL)	W	68112	J.G.STRIJDOM	S
61988	RODRIGUES	S	68114	OMARURU	S
61988	RODRIGUES	W	68116	GOBABIS	S
61990	PLAISANCE (MAURITIUS)	S	68212	HARDAP	S
61995	VACOAS (MAURITIUS)	S	68300	LUDERITZ (DIAZ POINT)	S
61995	VACOAS (MAURITIUS)	W R	68312	KEETMANSHOOP	S
<b>MOROCCO</b>			<b>NIGER</b>		
60060	SIDI IFNI	S	61017	BILMA	S
60101	TANGER (AERODROME)	S	61024	AGADEZ	S
60105	LARACHE	S	61024	AGADEZ	W R
60115	OIJDA	S	61036	TILLABERY	S
60127	TAZA	S	61043	TAHOUA	S
			61045	GOURE	S
			61049	N'GUIGMI	S
			61052	NIAMEY-AERO	S
			61052	NIAMEY-AERO	W R
			61075	BIRNI-N'KONNI	S

<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
61080	MARADI	S			
61090	ZINDER	S			
61091	MAGARIA	S			
61096	MAINE-SOROA	S			
61099	GAYA	S			
<b>NIGERIA</b>					
65001	YELWA	S			
65010	SOKOTO	S			
65015	GUSAU	S			
65019	KADUNA	S			
65028	KATSINA	S			
65030	ZARIA	S			
65046	KANO	S			
65046	KANO	W R			
65064	NGURU	S			
65073	POTISKUM	S			
65082	MAIDUGURI	S			
65123	MINNA	S			
65123	MINNA	W R			
65125	ABUJA	S			
65134	JOS	S			
65145	IBI	S			
65167	YOLA	S			
65201	LAGOS/IKEJA	S			
65202	LAGOS/OSHODI	W R			
65208	IBADAN	S			
65215	OSHOGBO	S			
65229	BENIN CITY	S			
65243	OKOJA	S			
65250	PORT HARCOURT	S			
65257	ENUGU	S			
65264	CALABAR	S			
65271	MAKURDI	S			
<b>OCEAN ISLANDS (FRENCH) BETWEEN 0° and 30°S</b>					
61968	ILES GLORIEUSES	S			
61970	ILE JUAN DE NOVA	S			
61972	ILE EUROPA	S			
61976	SERGE-FROLOW (ILE TROMELIN)	S			
61976	SERGE-FROLOW (ILE TROMELIN)	W R			
61980	SAINT-DENIS/GILLOT (REUNION)	S			
<b>OCEAN ISLANDS (FRENCH) BETWEEN 30° and 60°S</b>					
61996	MARTIN DE VIVIES (ILE AMSTERDAM)	S			
61996	MARTIN DE VIVIES (ILE AMSTERDAM)	W R			
61997	ALFRED FAURE (ILES CROZET)	S			
61998	PORT-AUX-FRANCAIS (ILES KERGUELEN)	S			
61998	PORT-AUX-FRANCAIS (ILES KERGUELEN)	W R			
<b>RWANDA</b>					
64387	KIGALI	S			
<b>SAO TOME AND PRINCIPE</b>					
61931	S. TOME	S			
61931	S. TOME	W			
61934	PRINCIPE	S			
			<b>SENEGAL</b>		
61600	SAINT-LOUIS	S			
61612	PODOR	S			
61627	LINGUERE	S			
61630	MATAM	S			
61641	DAKAR/YOFF	S			
61641	DAKAR/YOFF	W R			
61679	KAOLACK	S			
61687	TAMBACOUNDA	S			
61687	TAMBACOUNDA	W R			
61695	ZIGUINCHOR	S			
61698	KOLDA	S			
61699	KEDOUGOU	S			
<b>SEYCHELLES</b>					
63980	SEYCHELLES INTERNATIONAL AIRPORT	S			
63981	PRASLIN	S			
63995	ALDABRA	S			
<b>SIERRA LEONE</b>					
61856	LUNGI	S			
<b>SOMALIA</b>					
63150	BORAMA	S			
63160	BERBERA	S			
63170	HARGEISA	S			
63175	BURAO	S			
63180	ERIGAVO	S			
63200	ALULA	S			
63210	BOSASO	S			
63225	GARDO	S			
63230	GALCAYO	S			
63240	BELET UEN	S			
63247	ISCIA BAIDOA	S			
63250	BARDERA	S			
63260	MOGADISCIO	S			
63260	MOGADISCIO	W R			
63270	CHISIMAIO	S			
<b>SOUTH AFRICA</b>					
68174	PIETERSBURG	S			
68174	PIETERSBURG	W R			
68242	MMABATHO	S			
68255	RUSTENBURG	S			
68262	PRETORIA	S			
68263	PRETORIA (IRENE)	W R			
68273	WITBANK	S			
68289	NELSPRUIT	S			
68296	SKUKUZA	S			
68322	TWEE RIVIEREN	S			
68331	KATHU	S			
68342	OTTOSDAL	S			
68350	POTCHEFSTROOM	S			
68368	JOHANNESBURG	S			
	INTNL. AIRPORT				
68370	BETHAL	S			
68385	PIET RETIEF	S			
68438	KIMBERLEY	S			
68449	FICKSBURG	S			
68461	BETHLEHEM	S			
68461	BETHLEHEM	W R			
68491	CHARTERS CREEK	S			

<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
68496	CAPE ST. LUCIA	S	62752	GEDAREF	S
68512	SPRINGBOK	S	62760	EL FASHER	S
68512	SPRINGBOK	W R	62760	EL FASHER	W R
68523	BRANDVLEI	S	62762	SENNAR	S
68524	VANWYKSVLEI	S	62770	GENINA	S
68527	PRIESKA	S	62771	EL OBEID	S
68538	DE AAR	R	62781	EN NAHUD	S
68545	VENTERSTAD	S	62790	NYALA	S
68546	ALIWAL NORTH	S	62795	ABU NA'AMA	S
68580	CEDARA	S	62801	RENK	S
68588	DURBAN INTNL. AIRPORT	S	62805	DAMAZINE	S
68588	DURBAN INTNL. AIRPORT	W R	62809	BABANUSA	S
68618	CALVINIA	S	62810	KADOGLLI	S
68624	FRASERBURG	S	62840	MALKAL	S
68674	PORT ST JOHNS	S	62840	MALKAL	W R
68712	CAPE COLUMBINE	S	62880	WAU	S
68723	LAINGSBURG	S	62941	JUBA	S
68727	BEAUFORT WEST	S			
68737	GRAAFF-REINET	S	<b>SWAZILAND</b>		
68814	DASSEN ISLAND	S	6396	MANZINI/MATSAPA AIRPORT	S
68815	LANGEBAAN	S			
68816	CAPE TOWN INTNL. AIRPORT	S	<b>TOGO</b>		
68816	CAPE TOWN INTNL. AIRPORT	W R	65352	MANGO	S
68842	PORT ELIZABETH	S	65361	SOKODE	S
68842	PORT ELIZABETH	W R	65376	ATAKPAME	S
68858	EAST LONDON	S	65387	LOME	S
68906	GOUGH ISLAND	S			
68906	GOUGH ISLAND	W R	<b>TUNISIA</b>		
68994	MARION ISLAND	S	60715	TUNIS-CARTHAGE	S
68994	MARION ISLAND	W R	60715	TUNIS-CARTHAGE	W R
	<b>SPAIN (CANARY ISLANDS)</b>		60723	BEJA	S
60018	TENERIFE/GUIMER	W R	60725	JENDOUBA	S
60020	SANTA CRUZ DE TENERIFE, CMZ	S	60735	KAIROUAN	S
60030	LAS PALMAS DE GRAN CANARIA/GANDO	S	60745	GAFSA	S
60040	LANZAROTE/AEROPUE RTO	S	60748	SIDI BOUZID	S
	<b>SPAIN (CEUTA AND MELILLA)</b>		60750	SFAX EL-MAOU	S
60338	MELILLA	S	60760	TOZEUR	S
	<b>ST. HELENA ISLAND</b>		60760	TOZEUR	W R
61901	ST. HELENA IS.	S	60765	GABES	S
61901	ST. HELENA IS.	W R	60769	DJERBA MELLITA	S
	<b>SUDAN</b>				
62600	WADI HALFA	S	<b>UGANDA</b>		
62640	ABU HAMED	S	63602	ARUA	S
62641	PORT SUDAN	S	63630	GULU	S
62641	PORT SUDAN	W R	63654	MASINDI	S
62650	DONGOLA	S	63658	SOROTI	S
62660	KARIMA	S	63674	KASESE	S
62680	ATBARA	S	63684	TORORO	S
62721	KHARTOUM	S	63702	MBARARA	S
62721	KHARTOUM	W R	63705	ENTEBBE AIRPORT	W R
62730	KASSALA	S			
62750	ED DUEIM	S	<b>UNITED REPUBLIC OF TANZANIA</b>		
62751	WAD MEDANI	S	63729	BUKOBA	S
			63733	MUSOMA	S
			63756	MWANZA	S
			63791	KILIMANJARO AIRPORT	S
			63801	KIGOMA	S
			63801	KIGOMA	W R
			63810	SINGIDA	S
			63832	TABORA AIRPORT	S
			63844	TANGA	S
			63862	DODOMA	S
			63866	MOROGORO	S
			63887	IRINGA	S

<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>	<i>Index No.</i>	<i>Station name</i>	<i>Observations</i>
63894	DAR ES SALAAM AIRPORT	S	67665	LUSAKA INTERNATIONAL AIRPORT	S
63894	DAR ES SALAAM AIRPORT	W R	67666	LUSAKA CITY AIRPORT	W R
63932	MBEYA	S	67673	PETAUKE	S
63940	KILWA	S	67743	LIVINGSTONE	S
63962	SONGEA	S	67753	CHOMA	S
63971	MTWARA	S	<b>ZIMBABWE</b>		
63971	MTWARA	W R	67761	KARIBA	S
<b>WESTERN SAHARA</b>			67765	KAROI	S
60033	EL AAYOUNE	S	67774	HARARE (BELVEDERE)	W R
60096	DAKHLA	S	67775	HARARE (KUTSAGA)	S
<b>ZAMBIA</b>			67779	MOUNT DARWIN	S
67403	KAWAMBWA	S	67843	VICTORIA FALLS	S
67413	MBALA	S	67853	HWANGE NATIONAL PARK	S
67441	MWINILUNGA	S	67861	GOKWE	S
67461	MANSA	S	67867	GWERU	S
67475	KASAMA	S	67867	GWERU	W
67477	MPIKA	S	67869	KADOMA	S
67541	KASEMPA	S	67881	RUSAPE	S
67551	SOLWEZI	S	67964	BULAWAYO (GOETZ OBSY.)	W R
67561	NDOLA	S	67965	BULAWAYO AIRPORT	S
67581	CHIPATA	S	67969	WEST NICHOLSON	S
67583	LUNDAZI	S	67975	MASVINGO	S
67599	MFUWE	S	67977	BUFFALO RANGE	S
67633	MONGU	S	67983	CHIPINGE	S
67641	KAOMA	S	67991	BEITBRIDGE	S
67663	KABWE	S			

### RESOLUTION 3 (XIII-RA I)

#### REGIONAL BASIC CLIMATOLOGICAL NETWORK IN REGION I

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) The WMO Technical Regulations, Regulation [B.1] 3.1.1.2,
- (2) Resolution 4 (XII-RA II) – Regional Basic Climatological Network in Region II,
- (3) Resolution 3 (XIII-RA IV) – Regional Basic Climatological Network in Region IV,
- (4) Resolution 3 (XIII-RA III) – Regional Basic Climatological Network in Region III,
- (5) Resolution 3 (XIII-RA VI) – Regional Basic Climatological Network in Region VI,
- (6) Resolution 3 (XIII-RA V) – Regional Basic Climatological Network in Region V,
- (7) The approval of lists of Global Climate Observing System (GCOS) Surface Network (GSN) and GCOS Upper-Air Network (GUAN) stations by the president of the Association,

**CONSIDERING** that the Thirteenth World Meteorological Congress stressed the important role of regional associations in the evolution of networks

of stations necessary to provide a good representation of climate on the regional scale, in addition to the global scale,

**CONSIDERING FURTHER** that the Global Observing System (GOS) of the World Weather Watch (WWW) provides the foundation on which the capacity for climate monitoring in the Region continues to be built and that most WWW observing stations will function as part of both the Regional Basic Synoptic Network (RBSN) and the Regional Basic Climatological Network (RBCN),

**DECIDES** that the stations listed in the annex to this resolution constitute the RBCN in Region I;

**URGES MEMBERS:**

- (1) To spare no effort in their endeavours to ensure, at the earliest date possible, full implementation of the network of RBCN stations set forth in the annex to this Resolution with those stations designated as GCOS receiving the highest priority.
- (2) To comply fully with the global and regional coding procedures and data collection





INDEX NO.	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN	INDEX NO.	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
<b>Cameroon</b>						64453	DJAMBALA	X			
64851	MAROUA-SALAK	X				64456	MAKOUA	X			
64860	GAROUA	X				64458	OUESSO	X			
64870	NGAOUNDERE	X		X		64459	IMPFONDO	X		X	
64880	BANYO	X				64460	SOUANKE	X			
64890	MAMFE	X				<b>Cote d'Ivoire</b>					
64893	KOUNDJA	X				65528	ODIENNE	X		X	
64900	YOKO	X				65536	KORHOGO	X			
64910	DOUALA OBS.	X	X		X	65545	BONDOUKOU	X			
64920	BAFIA	X				65548	MAN	X			
64930	BERTOUA	X				65555	BOUAKE	X			
64950	YAOUNDE	X				65557	GAGNOA	X			
64960	ABONG-MBANG	X				65560	DALOA	X			
64971	KRIBI	X				65562	DIMBOKRO	X			
<b>Cape Verde</b>						65563	YAMOOUSSOUKRO	X			
08583	MINDELO	X		X		65578	ABIDJAN	X	X		X
08589	PRAIA	X				65585	ADIAKE	X		X	
08594	SAL	X				65592	TABOU	X			
<b>Central African Republic</b>						65594	SAN PEDRO	X			
64600	BERBERATI	X				65599	SASSANDRA	X		X	
64601	BOUAR	X				<b>Democratic Republic of the Congo</b>					
64605	BOSSEMBELE	X				64005	MBANDAKA	X			
64610	BOSSANGO	X				64006	GEMENA	X			
64650	BANGUI	X				64008	BASANKUSU	X			
64654	N'DELE	X				64018	BASOKO	X			
64655	BRIA	X				64040	KISANGANI	X		X	
64656	BANGASSOU	X				64062	ISRO	X			
64658	BIRAO	X				64076	BUNIA	X			
64659	OBO	X				64108	BANDUNDU	X			
64660	BAMBARI	X				64115	INONGO	X			
64661	YALINGA	X				64126	BOENDE	X			
64665	MOBAYE	X				64146	LODJA	X		X	
<b>Chad</b>						64155	KINDU	X			
64700	NDJAMENA	X		X		64180	BUKAYU	X			
64701	MAO	X				64184	GOMA	X			
64702	BOL-BERIM	X				64207	MATADI	X			
64705	BOUSSO	X				64210	KINSHASA/N'DJILI	X			
64706	MOUNDOU	X		X		64220	KINSHASA-BINZA	X			
64709	PALA	X				64222	KIKWIT	X			
64750	SARH	X				64228	TSHIKAPA	X			
64751	ATI	X		X		64236	KANANGA	X			
64753	FAYA	X		X		64247	MBUJI-MAYI	X			
64754	AM-TIMAN	X		X		64276	KONGOLO	X			
64756	ABECHE	X				64282	MANONO	X		X	
64758	MONGO	X				64285	KALEMIE	X			
<b>Comoros</b>						64315	KAMINA/BASE	X			
67002	HAHAYA INT. AIRPORT	X				64328	KOLWEZI	X			
67005	DZAOUDZI/PAMANZI (MAYOTTE)	X				64360	LUBUMBASHI-LUANO	X			
<b>Congo</b>						<b>Diego Garcia</b>					
64400	POINTE-NOIRE	X				61967	DIEGO GARCIA	X			
64401	DOLISIE	X				<b>Djibouti</b>					
64450	BRAZZAVILLE /MAYA-MAYA	X				63125	DJIBOUTI	X			
<b>Egypt</b>						62305	SALLUM PLATEAU	X			



<i>INDEX NO.</i>	<i>STATION NAME</i>	<i>CLIMAT</i>	<i>CLIMAT TEMP</i>	<i>GSN</i>	<i>GUAN</i>	<i>INDEX NO.</i>	<i>STATION NAME</i>	<i>CLIMAT</i>	<i>CLIMAT TEMP</i>	<i>GSN</i>	<i>GUAN</i>
63793	VOI	X				67143	MANANJARY	X		X	
63799	MALINDI	X				67152	RANOHIRA	X			
63820	MOMBASA	X		X		67157	FARAFANGANA	X			
<b>Lesotho</b>						67161	TOLIARA	X		X	
68454	MASERU-MIA	X				67197	TAOLAGNARO	X			
<b>Liberia</b>						<b>Madeira Islands (Portugal)</b>					
65660	ROBERTS FIELD	X				8522	FUNCHAL	X	X		
<b>Libyan Arab Jamahiriya</b>						08524	PORTO SANTO	X			
62002	NALUT	X				<b>Malawi</b>					
62007	ZUARA	X				67586	LILONGWE INT'L AIRPORT	X			
62008	YEFREN	X				67693	CHILEKA	X		X	
62010	TRIPOLI INTERNATIONAL AIRPORT	X		X		<b>Mali</b>					
62012	EL KHOMS	X				61202	TESSALIT	X		X	
62016	MISURATA	X				61214	KIDAL	X			
62019	SIRTE	X				61223	TOMBOUCTOU	X		X	
62053	BENINA	X		X		61226	GAO	X			
62055	AGEDABIA	X				61230	NIORO DU SAHEL	X			
62056	SHAHAT	X				61233	NARA	X			
62059	DERNA	X				61235	YELIMANE	X			
62062	TOBRUK	X				61240	HOMBORI	X			
62103	GHADAMES	X				61250	MENAKA	X		X	
62120	GARIAT EL-SHARGHIA	X				61257	KAYES	X			
62124	SEBHA	X		X		61265	MOPTI	X			
62131	HON	X		X		61270	KITA	X		X	
62161	JALO	X				61272	SEGOU	X			
62176	GIARABUB	X				61277	SAN	X			
62200	OBARI	X				61291	BAMAKO/SENOU	X			
62212	GHAT	X				61293	KOUTIALA	X			
62259	TAZERBO	X				61296	BOUGOUNI	X			
62271	KUFRA	X		X		61297	SIKASSO	X		X	
<b>Madagascar</b>						<b>Mauritania</b>					
67009	ANTSIRANANA	X		X		61401	BIR MOGHREIN	X		X	
67012	FASCENE (NOSSI-BE)	X				61404	ZOUERATE	X			
67017	VOHEMAR	X				61415	NOUADHIBOU	X		X	
67019	ANALALAVA	X		X		61421	ATAR	X		X	
67020	ANTSOHIHY	X				61437	AKJOUJT	X			
67023	SAMBAVA	X				61442	NOUAKCHOTT	X			
67025	ANTALAHA	X		X		61450	TIDJIKJA	X		X	
67027	MAHAJANGA	X				61461	BOUTILIMIT	X			
67037	BESALAMPY	X				61489	ROSSO	X			
67045	MAEVATANANA	X				61492	KAEDI	X			
67067	AMBOHITSILAOZANA	X				61497	NEMA	X		X	
67072	SAINTE-MARIE AERODROME	X				61498	KIFFA	X			
67073	MAINTIRANO	X		X		61499	AIOUN EL ATROUSS	X			
67083	IVATO	X		X		<b>Mauritius</b>					
67085	ANTANANARIVO	X				61974	AGALEGA	X			
67095	TOAMASINA	X	X	X		61986	ST. BRANDON (ST. RAPHAEL)	X			
67107	ANTSIRABE	X				61988	RODRIGUES	X		X	
67113	MAHANORO	X				61990	PLAISANCE (MAURITIUS)	X		X	
67117	MORONDAVA	X				61995	VACOAS (MAURITIUS)	X	X		X
67131	MOROMBE	X				<b>Morocco</b>					
67137	FIANARANTSOA	X				60060	SIDI IFNI	X			
						60101	TANGER (AERODROME)	X			

INDEX NO.	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN	INDEX NO.	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
60105	LARACHE	X				61036	TILLABERY	X			
60106	CHEFCHAOUEN	X				61043	TAHOUA	X		X	
60107	AL HOCEIMA	X				61045	GOURE	X			
60115	OUJDA	X				61049	N'GUIGMI	X			
60127	TAZA	X				61052	NIAMEY-AERO	X	X		X
60135	RABAT-SALE	X				61075	BIRNI-N'KONNI	X			
60141	FES-SAIS	X				61080	MARADI	X			
60150	MEKNES	X				61090	ZINDER	X			
60155	CASABLANCA	X				61091	MAGARIA	X			
60156	NOUASSEUR	X		X		61096	MAINE-SOROA	X		X	
60185	SAFI	X				61099	GAYA	X			
60190	KASBA-TADLA	X				<b>Nigeria</b>					
60191	BENI-MELLAL	X				65001	YELWA	X			
60195	MIDELT	X		X		65010	SOKOTO	X			
60210	ERRACHIDIA	X				65015	GUSAU	X			
60220	ESSAOUIRA	X				65019	KADUNA	X			
60230	MARRAKECH	X				65028	KATSINA	X			
60252	AGADIR AL MASSIRA	X				65030	ZARIA	X			
60265	OUARZAZATE	X		X		65046	KANO	X			
60318	TETUAN/SANIA RAMEL	X				65064	NGURU	X			
60340	NADOR	X				65073	POTISKUM	X			
<b>Mozambique</b>						65082	MAIDUGURI	X			
67215	PEMBA	X		X		65123	MINNA	X		X	
67217	LICHINGA	X				65125	ABUJA	X			
67231	CUAMBA	X				65134	JOS	X			
67237	NAMPULA	X				65145	IBI	X			
67261	TETE	X				65167	YOLA	X		X	
67283	QUELIMANE	X		X		65201	LAGOS/IKEJA	X			
67297	BEIRA	X		X		65208	IBADAN	X			
67315	VILANCULOS	X				65215	OSHOGBO	X			
67323	INHAMBANE	X		X		65229	BENIN CITY	X			
67335	XAI XAI	X				65243	LOKOJA	X			
67341	MAPUTO/MAVALANE	X				65250	PORT HARCOURT	X			
<b>Namibia</b>						65257	ENUGU	X			
68010	OKAUKUEJO	X				65264	CALABAR	X			
68014	GROOTFONTEIN	X		X		65271	MAKURDI	X			
68016	MOWE	X				<b>Ocean Islands (French) between 0° and 30°S</b>					
68018	RUNDU	X				61968	ILES GLORIEUSES	X			
68098	WALVIS BAY INT. AIRPORT	X				61970	ILE JUAN DE NOVA	X			
68102	SITRUSDAL	X				61972	ILE EUROPA	X		X	
68104	WALVIS BAY (PELICAN POINT)	X				61976	SERGE-FROLOW (ILE TROMELIN)	X	X		X
68106	GOBABEB	X		X		61980	SAINT-DENIS/GILLOT (REUNION)	X			
68110	WINDHOEK	X	X		X	<b>Ocean Islands (French) between 30° and 60°S</b>					
68112	J.G.STRIJDOM	X				61996	MARTIN DE VIVIES (ILE AMSTERDAM)	X	X	X	X
68114	OMARURU	X				61997	ALFRED FAURE (ILES CROZET)	X		X	
68116	GOBABIS	X				61998	PORT-AUX-FRANCAIS (ILES KERGUELEN)	X	X	X	X
68212	HARDAP	X				<b>Rwanda</b>					
68300	LUDERITZ (DIAZ POINT)	X				64387	KIGALI	X			
68312	KEETMANSHOOP	X		X							
<b>Niger</b>											
61017	BILMA	X		X							
61024	AGADEF	X		X							



INDEX NO.	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN	INDEX NO.	STATION NAME	CLIMAT	CLIMAT TEMP	GSN	GUAN
62730	KASSALA	X		X		63733	MUSOMA	X			
62750	ED DUEIM	X				63756	MWANZA	X			
62751	WAD MEDANI	X				63791	KILIMANJARO AIRPORT	X			
62752	GEDAREF	X				63801	KIGOMA	X			
62760	EL FASHER	X		X		63832	TABORA AIRPORT	X		X	
62762	SENNAR	X		X		63844	TANGA	X			
62770	GENINA	X		X		63862	DODOMA	X		X	
62771	EL OBEID	X				63866	MOROGORO	X			
62781	EN NAHUD	X		X		63887	IRINGA	X			
62790	NYALA	X				63894	DAR ES SALAAM AIRPORT	X		X	
62795	ABU NA'AMA	X				63932	MBEYA	X			
62801	RENK	X				63962	SONGEA	X		X	
62805	DAMAZINE	X				63971	MTWARA	X			
62809	BABANUSA	X				<b>Western Sahara</b>					
62810	KADOGILLI	X				60033	EL AAYOUNE	X			
62840	MALKAL	X		X		60096	DAKHLA	X			
62880	WAU	X		X		<b>Zambia</b>					
62941	JUBA	X		X		67403	KAWAMBWA	X			
<b>Swaziland</b>						67461	MANSA	X			
68396	MANZINI/MATSAPA AIRPORT	X				67413	MBALA	X			
<b>Togo</b>						67441	MWINILUNGA	X		X	
65352	MANGO	X		X		67475	KASAMA	X			
65361	SOKODE	X				67477	MPIKA	X			
65376	ATAKPAME	X				67541	KASEMPA	X			
65387	LOME	X				67551	SOLWEZI	X			
<b>Tunisia</b>						67561	NDOLA	X			
60710	TABARKA	X				67581	CHIPATA	X		X	
60714	BIZERTE	X				67583	LUNDAZI	X			
60715	TUNIS-CARTHAGE	X				67599	MFUWE	X			
60720	KELIBIA	X				67633	MONGU	X		X	
60723	BEJA	X				67641	KAOMA	X			
60725	JENDOUBA	X		X		67663	KABWE	X			
60735	KAIROUAN	X				67665	LUSAKA INTERNATIONAL AIRPORT	X		X	
60740	MONASTIR-SKANES	X				67673	PETAUKE	X			
60745	GAFSA	X				67743	LIVINGSTONE	X		X	
60748	SIDI BOUZID	X				67753	CHOMA	X			
60750	SFAX EL-MAOU	X				<b>Zimbabwe</b>					
60760	TOZEUR	X				67761	KARIBA	X			
60765	GABES	X		X		67765	KAROI	X			
60769	DJERBA MELLITA	X				67775	HARARE (KUTSAGA)	X		X	
<b>Uganda</b>						67779	MOUNT DARWIN	X			
63602	ARUA	X				67843	VICTORIA FALLS	X			
63630	GULU	X				67853	HWANGE NATIONAL PARK	X			
63654	MASINDI	X				67861	GOKWE	X			
63658	SOROTI	X				67867	GWERU	X			
63674	KASESE	X				67869	KADOMA	X			
63684	TORORO	X				67881	RUSAPE	X			
63702	MBARARA	X				67965	BULAWAYO AIRPORT	X		X	
63705	ENTEBBE AIRPORT	X				67969	WEST NICHOLSON	X			
63726	KABALE	X				67975	MASVINGO	X			
<b>United Republic of Tanzania</b>						67977	BUFFALO RANGE	X			
63729	BUKOBA	X				67983	CHIPINGE	X			
						67991	BEITBRIDGE	X			

## RESOLUTION 4 (XIII-RA I)

### CO-RAPPORTEURS ON REGIONAL ASPECTS OF INSTRUMENT DEVELOPMENT, RELATED TRAINING AND CAPACITY BUILDING

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) *Regional Association I (Africa) – Abridged Final Report with Resolutions of the Twelfth Session* (WMO-No. 891),
- (2) Resolution 4 (EC-L) — Report of the Twelfth Session of the Commission for Instruments and Methods of Observation (CIMO),

**CONSIDERING:**

- (1) The importance of information on instrument development as guidance for improving the equipment of surface-based observing stations with sensors and automatic weather stations,
- (2) The need for updating information on the status of instrumentation used at meteorological stations and on maintenance and calibration of instruments,
- (3) The need for coordinating education and training activities for observers, station inspectors and technicians in the field of operation, maintenance and calibration of meteorological instruments,

**DECIDES:**

- (1) To appoint two Co-Rapporteurs on Regional Aspects of Instrument Development, Related

Training and Capacity Building, with the following terms of reference:

- (a) To update information on instrumentation operated at meteorological stations and on its maintenance and calibration;
  - (b) To prepare guidance for the best effective use of meteorological instrumentation;
  - (c) To keep abreast of all matters related to instrument development;
  - (d) To provide guidelines for coordination of education and training activities for instrument technicians in collaboration with the Regional Instrument Centres and the WMO Secretariat;
  - (e) To facilitate liaison between CIMO and the Regional Association on matters pertaining to capacity building in the field of instruments and methods of observation;
- (2) To invite K. Gobagoba and Dean Terreblancho to serve as Co-Rapporteurs on Regional Aspects of Instrument Development, Related Training and Capacity Building;
  - (3) To request the co-rapporteurs to submit annual progress reports and a final report to the president of RA I at least six months before the next session of the Association.

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## RESOLUTION 5 (XIII-RA I)

### RAPPORTEUR ON SOLAR RADIATION

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) *Regional Association I (Africa), Twelfth Session (1998) – Abridged Final Report with Resolutions* (WMO-No. 891),
- (2) Resolution 13 (EC-XXXIV) – Development and Comparison of Radiometers,

**CONSIDERING:**

- (1) The requirements for high-quality radiation measurements for meteorological and related environmental applications, and especially for climate change research,
- (2) The need for regular maintenance and calibration of radiation instruments and the need to apply consistent quality control procedures to the measured data,
- (3) The need for technology transfer among Members, related to radiation measurements,
- (4) The need for updating the information on the status of instrumentation used in national

networks and on maintenance and calibration of instruments,

- (5) The need to coordinate education and training measures for observers and technicians in the field of operation, maintenance and calibration of radiation instruments,

**DECIDES:**

- (1) To appoint a Rapporteur on Solar Radiation with the following terms of reference:
  - (a) To update the information on radiation instrumentation and national radiation networks, as well as on maintenance and calibration;
  - (b) To provide guidance to Members on radiation instrumentation and techniques and their effective application, and on archiving and presentation of data in better fulfilling the needs for various applications;
  - (c) To advise the president of the Association on the issues related to National and

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|--|---|
| <p>Regional Radiation Centres and the radiation station network in the Region;</p> <p>(d) To assist in the preparation of the Fifth Regional Pyrheliometer Comparison of RA I and in the evaluation and presentation of the results;</p> <p>(e) To support the coordination of measures in the field of radiation measurement,</p> | <p>calibration of radiation instrumentation, as well as in education and training;</p> <p>(2) To invite S.N. Marigi (Kenya) to serve as Rapporteur on Solar Radiation;</p> <p>(3) To request the Rapporteur to submit annual progress reports and a final report to the president of RA I at least six months before the next session of the Association.</p> |
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## RESOLUTION 6 (XIII-RA I)

### TROPICAL CYCLONE COMMITTEE FOR THE SOUTH-WEST INDIAN OCEAN

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) Resolution 5 (Cg-XIII) - Tropical Cyclone Programme (TCP),
- (2) Resolutions of the General Assembly of the United Nations – International Strategy for Disaster Reduction (ISDR) or post-International Decade for Natural Disaster Reduction (IDNDR),
- (3) Decisions of the United Nations Commission on the Sustainable Development of Small Island Developing States (SDSIDS),
- (4) The final reports of the fourteenth and fifteenth sessions of the RA I Tropical Cyclone Committee (TCC) for the South-West Indian Ocean,
- (5) Regulations 32 and 35 of the WMO General Regulations,
- (6) Sections concerning the TCP under Chapter 6 (WMO Programmes) of the *Fifth WMO Long-term Plan (2000-2009)* (WMO-No. 908),

**CONSIDERING:**

- (1) The need for the countries in the South-West Indian Ocean region 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,
- (2) The need for coordination in the implementation of the regional cooperation programme elaborated by the RA I TCC,
- (3) The view expressed by the Executive Council that such regional cooperation programmes are the basis for the success of the WMO TCP,
- (4) The need to implement projects in the Region aimed at achieving the goals of the ISDR and the SDSIDS,

**DECIDES:**

- (1) To re-establish a Working Group to be known as the RA I Tropical Cyclone Committee for the South-West Indian Ocean with the following terms of reference:
  - (a) To promote and coordinate the planning and implementation of measures required to minimize loss of life and damage

caused by tropical cyclones in the South-West Indian Ocean;

- (b) In carrying out its functions under (a) above and in relation to those functions, the Committee should:

- (i) Promote the implementation within the Region of activities of tropical cyclone disaster reduction, taking into account the long-term effects of global warming and associated climate change on the air-sea interaction related to tropical cyclones;
  - (ii) Assess the degree of success of established disaster reduction methods and the status of related plans and effect improvements;
  - (iii) Review regularly the progress made in the various fields of tropical cyclone disaster mitigation;
  - (iv) Suggest those measures which should be taken to improve the tropical cyclone warning system in the South-West Indian Ocean;
  - (v) Advise on the possible sources of financial and technical support for such measures and, where appropriate, coordinate regional projects with such support;
  - (vi) Consider and recommend working arrangements and coordination mechanisms with international and regional centres, as well as other regional tropical cyclone bodies;
  - (vii) Act as an advisory body on regional matters related to implementation and operation of the RSMC La Réunion Tropical Cyclone Centre and the subregional tropical cyclone advisory centres;
  - (viii) Coordinate as appropriate with other subsidiary bodies of Regional Association I (Africa) on matters related to tropical cyclones;
- (2) To invite the following Members to be represented on the Committee:



Botswana            Madagascar        Seychelles  
 Comoros            Malawi             South Africa  
 France              Mauritius           Swaziland  
 Lesotho             Mozambique  
 United Republic of Tanzania        Zimbabwe

- (3) To designate, in accordance with Regulation 32 of the WMO General Regulations, Mr S.N. Sok Appadu (Mauritius) as chairperson of the Committee;
- (4) To invite Australia to designate an expert to serve as an *ex-officio* member;
- (5) To invite the chairperson of the RA I Working Group on Hydrology (see Resolution 14 (XIII-RA I)) to designate a Member of the Committee to serve as Rapporteur on Hydrology;

- (6) To request the chairperson of the Committee to submit a report to the president of the Association not later than six months before the fourteenth session of the Association;

**REQUESTS the Secretary-General:**

- (1) To convene biennial sessions of the Committee;
- (2) To take the necessary steps to assist the Committee and to provide appropriate Secretariat support for its activities.

NOTE:: This resolution replaces Resolution 6 (XII-RA I), which is no longer in force

## RESOLUTION 7 (XIII-RA I)

### WORKING GROUP ON CLIMATE MATTERS

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) The reports of its rapporteurs on climate matters,
- (2) The Fifth WMO Long-term Plan,
- (3) *Commission for Climatology, Thirteenth Session (2001) – Abridged Final Report with Resolutions and Recommendations* (WMO-No. 938),
- (4) The discussions on climate-related issues in *Thirteenth World Meteorological Congress (1999) – Abridged Final Report with Resolutions* (WMO-No. 902); *Executive Council, Fifty-Third Session (2001) – Abridged Final Report with Resolutions* (WMO-No. 929); and by the fifty-fourth session of the Executive Council (2002),

**CONSIDERING** the need for the Association to strengthen its activities in climate activities of particular importance to the Region,

**DECIDES:**

- (1) To establish a Working Group on Climate Matters with the following terms of reference:
- (a) To provide advice on methods to strengthen and improve climate observations, data management (including Climate Computing (CLICOM) and Climate Database Management System (CDMS), data rescue, monitoring and provision of data sets; and to coordinate observational concerns and requirements with the Global Climate Observing System (GCOS) office;
- (b) To provide advice on and assist in regional activities concerning climate monitoring, indices and indicators for climate change detection in RA I, especially as related to disaster reduction and

extreme events and keep abreast of the Intergovernmental Panel on Climate Change (IPCC) activities and the regional involvement in the IPCC process;

- (c) To provide advice on and assist in the implementation of various seasonal and inter-annual climate prediction and climate application projects in RA I, including Climate Information and Prediction Services (CLIPS), CLIVAR and especially in agricultural meteorology, renewable energy, bioclimatic indices, urban and building climatology, air quality and health;
- (d) To provide advice on and assist in identifying climate-related education and training needs in the Region, including Information Technology (IT) management training;
- (e) To evaluate the role of, and provide suggestions to the Association on the implementation of, Regional Climate Centre (RCC) functions within the Region;
- (2) To select the following experts to serve on the Working Group in the capacities indicated:
- A. Epiphane (Benin) to serve as Rapporteur on Observations, Data Management and GCOS Activities;
- R. Mugara (Zambia) to serve as Rapporteur on Climate System Monitoring, CLIVAR Analyses, Indices and the IPCC Process Within the Region;
- M. Nacef Lamri (Algeria), E.J. Mpetu (United Republic of Tanzania) and A. Nascimento (Sao Tome and Principe) to serve as Focal Points for CLIPS Activities for RA I;
- S. Veerasamy (Mauritius) to serve as Rapporteur on Climate Support to Disaster

Reduction, with Special Emphasis on Extreme Meteorological Events;

B. Chipindu (Zimbabwe) to serve as Rapporteur on Climate-Related Education and Training Needs in the Region;

M. Kadi Mohamed (Algeria) and Carlos Moniz (Cape Verde) to serve as Co-Rapporteurs on RCC Implementation;

- (3) To select O. Baddour (Morocco) to act as chairperson the Working Group;
- (4) That Members may nominate other experts to serve on the Working Group as required;

#### REQUESTS:

- (1) The Working Group chairperson and Members to liaise with the chairpersons of related Open Programme Area Groups (OPAGs) of the Commission for Climatology (CCI), Commission for Basic Systems (CBS) and other WMO technical commissions, GCOS and relevant regional groups; and,
- (2) The Working Group chairperson to submit annual progress reports to the president of the Association and a final report not later than six months before the fourteenth session of the Association.

## RESOLUTION 8 (XIII-RA I)

### WORKING GROUP ON AGRICULTURAL METEOROLOGY

REGIONAL ASSOCIATION I (AFRICA),

#### NOTING:

- (1) Resolution 12 (Cg-XIII) – Agricultural Meteorology Programme,
- (2) *The Abridged Final Report with Resolutions and Recommendations of the Twelfth Session of the Commission for Agricultural Meteorology* (WMO-No. 900),
- (3) *Executive Council, Fifty-Third Session (2001) – Abridged Final Report With Resolutions* (WMO-No. 929), paragraph 6.2.2,
- (4) Resolution 8 (XII-RA I) — Rapporteurs on Agricultural Meteorology,
- (5) The United Nations Convention to Combat Desertification (UNCCD) and its Regional Implementation Annex for Africa,

#### CONSIDERING:

- (1) The importance of agriculture to the economic development of many countries in Region I (Africa),
- (2) The need for development of appropriate adaptation strategies to cope with climate variability and climate change,
- (3) That studies on drought and desertification should be continued as an integral part of the development of agrometeorology in the Region,
- (4) That extreme meteorological events continue to increase in frequency and affect the productivity of agriculture, forestry, livestock and fisheries in the Region,
- (5) The impact of climate variability, climate change and El Niño/Southern Oscillation (ENSO) on Agriculture and Forestry in the Region,
- (6) The potential for improved applications of Geographical Information Systems (GIS) and Environmental Information Systems (EIS) in the development and dissemination of products to meet the user requirements for agrometeorological services,

#### URGES MEMBERS:

- (1) To undertake studies on applications of intra-seasonal (monthly), seasonal and inter-annual weather and climate predictions in developing sustainable agricultural strategies;
- (2) To assess the impacts of extreme meteorological events on sustainable agriculture in the Region and develop appropriate strategies to mitigate such impacts;
- (3) To strengthen relations between National Meteorological and Hydrological Services (NMHSs) and national and international agencies working in the fields of agriculture and the environment (such as UNCCD), in order to improve products in terms of users;

#### DECIDES:

- (1) To establish a Working Group on Agricultural Meteorology with the following terms of reference:
  - (a) To review and summarize the effects of climate change and climate variability on agriculture and food security, animal husbandry, forestry and fisheries (food aspects);
  - (b) To review and evaluate proven agrometeorological methods and practices and their successful adaptation and adoption at the farm level in Africa, including the more active use of seasonal to inter-annual climate forecasts for sustainable agriculture in Africa;
  - (c) To review and evaluate the impacts of ENSO on agriculture, forestry and fisheries in Africa;
  - (d) To review and summarize the current understanding of the physical mechanisms of drought and desertification, as well as the existing systems of drought monitoring and prediction in Africa, and suggest appropriate drought coping strategies;

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| <p>(e) To review and evaluate the socio-economic impacts of extreme climatic events on agriculture, forestry, livestock and fisheries, and the long-term and short-term remedial measures to deal with them;</p> <p>(f) To review and summarize the status of applications of new methods such as GIS, EIS and remote sensing in agrometeorology in Africa;</p> <p>(g) To evaluate the current procedures for the provision of agrometeorological advisories and services for farmers and end-users, and suggest the ways and means to improve them;</p> <p>(2) (a) To invite the following experts to serve as members of the Working Group:</p> <p style="padding-left: 40px;">M. Minia (Ghana) with TOR (a)</p> | <p>M.J. Musslinda (Gabon) with TOR (b)</p> <p>S. Gyuyiro (Nigeria) with TOR (c)</p> <p>M.A. Diallo (Mali) with TOR (d)</p> <p>Y. Bangoura (Guinea) with TOR (e)</p> <p>I. Kusane (Botswana) with TOR (f)</p> <p>G.K. Munthali (Malawi) with TOR (g)</p> <p>(b) To invite I. Tarakidzewa (Zimbabwe) to act as chairperson of the Working Group on Agricultural Meteorology;</p> <p>(3) (a) To request the chairperson to allocate responsibilities in consultation with the members of the group for the various tasks contained in the terms of reference;</p> <p>(b) To request the chairperson to submit a final report comprising individual reports of the members to the president of the Regional Association not later than six months before the next session of the Association.</p> |
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## RESOLUTION 9 (XIII-RA I)

### RAPPORTEUR ON REGIONAL ASPECTS OF THE AERONAUTICAL METEOROLOGY PROGRAMME IN REGION I

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) The need for monitoring and keeping under review developments in aeronautical meteorology in the Region,
- (2) The need for coordination among RA I Members of activities related to aeronautical meteorology and for reporting these activities to the Region and to the Commission for Aeronautical Meteorology (CAeM),

**CONSIDERING** that the monitoring, review and coordination of aeronautical meteorological issues would be of great benefit to Members in the Region,

**DECIDES:**

- (1) To appoint a Rapporteur on Regional Aspects of the Aeronautical Meteorological Programme (AeMP) with the following terms of reference:
  - (a) To review and advise on observational data and product requirements of countries in the Region in the context of the AeMP;
  - (b) To review the status of the implementation of the AeMP in the Region, including observing systems at aerodromes, aircraft data collection, and services provided under the World Area Forecast System (WAFS), and to formulate proposals through the WMO Secretariat to the appropriate International Civil Avia-

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| <p>tion Organization (ICAO) bodies for its future developments and implementation;</p> <p>(c) To monitor and promote capacity building activities related to the AeMP within the Region and to identify training requirements;</p> <p>(d) To keep abreast of matters related to the implementation of AMDAR programmes and projects in the Region;</p> <p>(e) To liaise by correspondence with CAeM Working Groups and the ICAO meteorological groups in the ICAO AFI Region through their respective Secretariats on specific regional matters, in particular those related to cost recovery of aeronautical meteorological services;</p> <p>(f) To provide advice to the president of RA I on aeronautical meteorology matters and to take actions in this regard;</p> <p>(2) To invite S. Sillayo (United Republic of Tanzania) to serve as Rapporteur on Regional Aspects of the Aeronautical Meteorology Programme; and</p> <p>(3) To request the Rapporteur to submit an annual report on his (her) activities to the president of the Association as well as a final report six months before the next session of the Association, both copied to the Director of the World Weather Watch (WWW) Applications Department in the WMO Secretariat.</p> | <p>tion Organization (ICAO) bodies for its future developments and implementation;</p> <p>(c) To monitor and promote capacity building activities related to the AeMP within the Region and to identify training requirements;</p> <p>(d) To keep abreast of matters related to the implementation of AMDAR programmes and projects in the Region;</p> <p>(e) To liaise by correspondence with CAeM Working Groups and the ICAO meteorological groups in the ICAO AFI Region through their respective Secretariats on specific regional matters, in particular those related to cost recovery of aeronautical meteorological services;</p> <p>(f) To provide advice to the president of RA I on aeronautical meteorology matters and to take actions in this regard;</p> <p>(2) To invite S. Sillayo (United Republic of Tanzania) to serve as Rapporteur on Regional Aspects of the Aeronautical Meteorology Programme; and</p> <p>(3) To request the Rapporteur to submit an annual report on his (her) activities to the president of the Association as well as a final report six months before the next session of the Association, both copied to the Director of the World Weather Watch (WWW) Applications Department in the WMO Secretariat.</p> |
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## RESOLUTION 10 (XIII-RA I)

### RAPPORTEUR ON REGIONAL MARINE METEOROLOGICAL AND OCEANOGRAPHIC SERVICES

REGIONAL ASSOCIATION I (AFRICA),  
**NOTING** the reports of the Rapporteurs on Regional Marine Meteorological Services,

**CONSIDERING:**

- (1) The need for continued development of marine meteorological and oceanographic services in Region I,
- (2) The need to continue close liaison with the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), in particular through its programme area on capacity building, with regard to matters affecting the Region,

**DECIDES:**

- (1) To appoint a Rapporteur on Regional Marine Meteorological and Oceanographic Services with the following terms of reference:
  - (a) To continuously review the status of the implementation of marine meteorological and oceanographic services and marine observing systems in Region I and to formulate suggestions for their further development;

- (b) To suggest actions on marine meteorological and oceanographic matters assigned by the president of RA I;
  - (c) To liaise with the appropriate JCOMM subsidiary bodies, in particular within the Capacity Building Programme Area, on specific matters concerning Region I;
- (2) To invite A.J. Mafimbo (Kenya) and S. Konate (Guinea) to serve as Co-Rapporteurs on Regional Marine Meteorological and Oceanographic Services;
- (3) To request the co-rapporteurs to submit annual reports, as appropriate, to the president of the Association with a final report to be presented six months prior to the fourteenth session of the Association;

**REQUESTS** the Secretary-General to assist the co-rapporteurs in their work as appropriate.

**NOTE:** This resolution replaces Resolution 9 (XII-RA I), which is no longer in force.

## RESOLUTION 11 (XIII-RA I)

### COORDINATED COMMON SYSTEM FOR THE DESIGNATION OF MARINE FORECAST AREAS IN METAREA II

REGIONAL ASSOCIATION I (AFRICA),  
**NOTING** the report by France on Coordinated Common Systems for the Designation of Marine Forecast Areas for Metarea II and Metarea III (W),  
**CONSIDERING** that the designation of common forecast areas in METAREA II will enhance the coordination of marine meteorological support to marine activities, particularly shipping, fisheries, marine pollution emergency response and maritime search and rescue operations, in Metarea II,

**DECIDES** to formally adopt the Coordinated Common System for the Designation of Marine Forecast Areas in Metarea II as given in the annex to this resolution;

**REQUESTS** the Secretary-General of WMO to include the substance of the annex to this resolution in *Weather Reporting* (WMO-No. 9), Volume D and in the *Manual on Marine Meteorological Services* (WMO-No. 558).

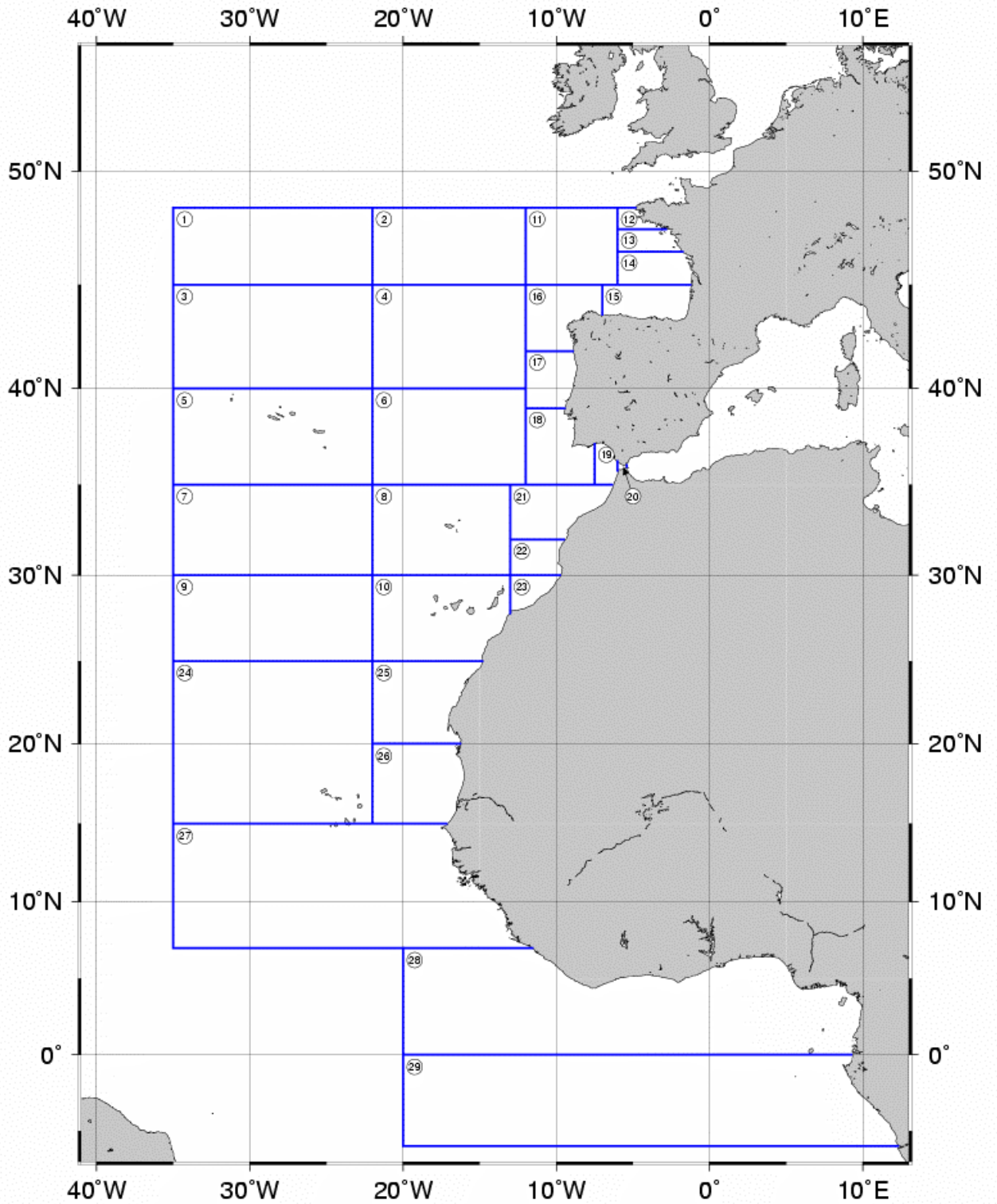
#### ANNEX TO RESOLUTION 11 (XIII-RA I)

##### Coordinated Common System for the Designation of Marine Forecast Areas in Metarea II.

**CONSIDERING** that the designation of common forecast areas in Metarea II will enhance the coordination of marine meteorological support to various marine activities Regional Association I has adopted the Coordinated Common System for the Designation of Marine Forecast Areas as described

below. The basis for the uniform system is a two-level division of the forecast areas, main areas and sub-areas. Sub-areas within the main area are described, in general, according to the point of compass, e.g. eastern part, southern part, etc.

### Common GMDSS subareas for METAREA II



**Name list of METAREA II marine areas**

- 1 - **FARADAY** : BETWEEN 45°N AND 48°27'N, BETWEEN 22°W AND 35°W
- 2 - **ROMEO** : between 45°N and 48°27'N, between 12°W and 22°W
- 3 - **ALTAIR** : between 40°N and 45°N, between 22°W and 35°W
- 4 - **CHARCOT** : between 40°N and 45°N, between 12°W and 22°W
- 5 - **ACORES** : between 35°N and 40°N, between 22°W and 35°W
- 6 - **JOSEPHINE** : between 35°N and 40°N, between 12°W and 22°W
- 7 - **IRVING** : between 30°N and 35°N, between 22°W and 35°W
- 8 - **MADEIRA** : between 30°N and 35°N, between 13°W and 22°W
- 9 - **METEOR** : between 25°N and 30°N, between 22°W and 35°W
- 10 - **CANARIAS** : between 25°N and 35°N, between 13°W and 22°W
- 11 - **PAZENN** : BETWEEN 45°N AND 48°27'N, BETWEEN 6°W AND 12°W
- 12 - **IROISE** : between 47°30'N and 48°27'N, from the coast of France to 6°W
- 13 - **YEU** : between 46°30'N and 47°30'N, from the coast of France to 6°W
- 14 - **ROCHEBONNE** : between 45°N and 46°30'N, from the coast of France to 6°W
- 15 - **CANTABRICO** : from the coast of Spain to 45°N, from the coast to of France to 7°W
- 16 - **FINISTERRE** : between 41°50'N and 45°N, between 7°W and 12°W
- 17 - **PORTO** : BETWEEN 39°N AND 41°50'N, FROM THE COAST OF PORTUGAL TO 12°W
- 18 - **S. VICENTE** : between 35°N and 39°N, between 7°30'W to 12°W
- 19 - **CADIZ** : from 35°N to the coast of Spain, between 6°W and 7°30'W
- 20 - **GIBRALTAR STRAIT / ESTRECHO** : between line Gibraltar/Ceuta and 6°W, from the coast of Morocco to the coast of Spain.
- 21 - **CASABLANCA** : BETWEEN 32°N AND 35°N, FROM THE COAST OF MOROCCO TO 13°W
- 22 - **AGADIR** : between 30°N and 32°N, from the coast of Morocco to 13°W
- 23 - **TARFAYA** : from the coast of Morocco to 30°N, from the coast of Morocco to 13°W
- 24 - **CAPE VERDE** : between 15°N and 25°N, between 22°W and 35°W
- 25 - **CAP BLANC** : between 20°N and 25°N, from the coast of Africa to 22°W
- 26 - **CAP TIMIRIS** : BETWEEN 15°N AND 20°N, FROM THE COAST OF AFRICA TO 22°W
- 27 - **SIERRA LEONE** : between 7°N and 15°N, from the coast of Africa to 35°W
- 28 - **GULF OF GUINEA** : between the equator and 7°N, from the coast of Africa to 20°W
- 29 - **POINTE NOIRE** : between 6°S and the equator, from the coast of Africa to 20°W

**RESOLUTION 12 (XIII-RA I)**

**COORDINATED COMMON SYSTEM FOR THE DESIGNATION OF  
MARINE FORECAST AREAS IN METAREA III(W)**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING** the report by France on Coordinated Common Systems for the Designation of Marine Forecast Areas for Metarea II and Metarea III (W),

**CONSIDERING** that the designation of common forecast areas in Metarea III(W) will enhance the coordination of marine meteorological support to marine activities, particularly shipping, fisheries, marine pollution emergency response and maritime search and rescue operations, in Metarea III(W),

**DECIDES** to formally adopt the Coordinated Common System for the Designation of Marine Forecast Areas in Metarea III(W) as given in the annex to this resolution;

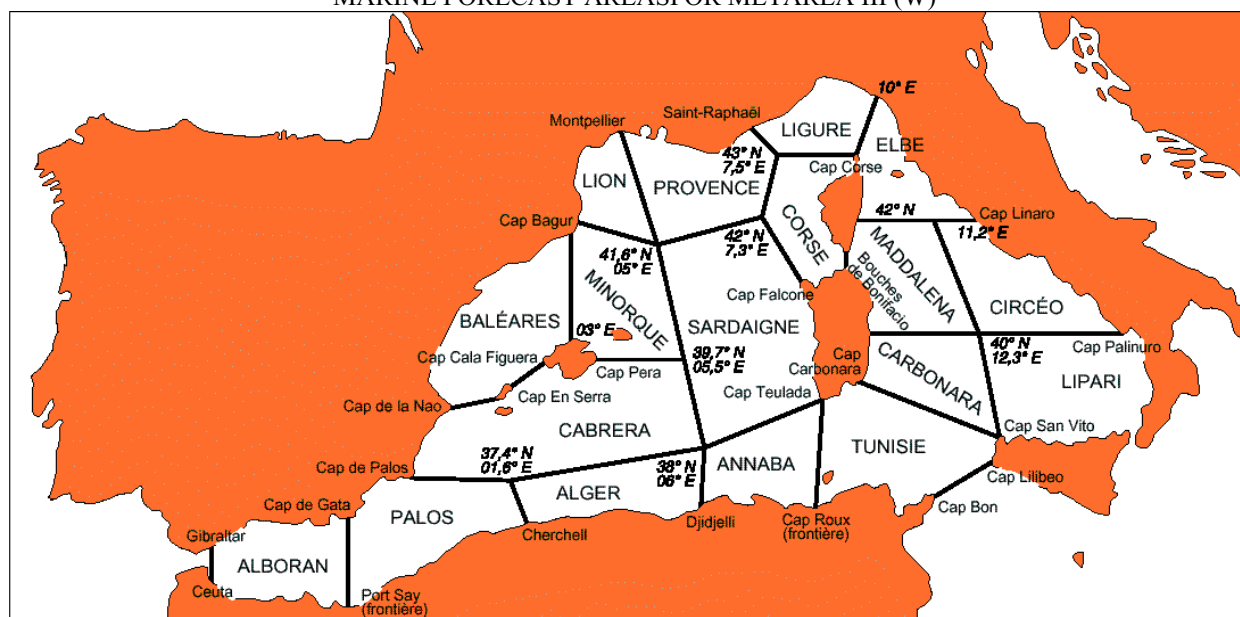
**REQUESTS** the Secretary-General of WMO to include the substance of the annex to this resolution in *Weather Reporting* (WMO-No. 9), Volume D and in the *Manual on Marine Meteorological Services* (WMO-No.558).

ANNEX TO RESOLUTION 12 (XIII-RA I)  
**COORDINATED COMMON SYSTEM FOR THE DESIGNATION OF  
 MARINE FORECAST AREAS IN METAREA III(W)**

**CONSIDERING** that the designation of common forecast areas in Metarea III(W) will enhance the coordination of marine meteorological support to various marine activities, Regional Association I has adopted the Coordinated Common System for the Designation of Marine Forecast Areas as described

below. The basis for the uniform system is a two-level division of the forecast areas, main areas, sub-areas. Sub-areas within the main area are described, in general, according to the point of compass, e.g. eastern part, southern part, etc.

COORDINATED COMMON SYSTEM FOR DESIGNATION OF  
 MARINE FORECAST AREAS FOR METAREA III (W)



Characteristic points	Latitude in degrees/minutes	Longitude in degrees/minutes
GIBRALTAR	36°09'N	005°21'W
CAP DE GATA	36°44'N	002°16'W
CAP DE PALOS	37°38'N	000°40'W
CAP DE LA NAO	38°44'N	000°14'E
CAP EN SERRA	38°54'N	001°36'E
CAP GALA FIGUERA	39°20'N	003°10'E
CAP PERA	39°43'N	003°28'E
CAP BAGUR	41°57'N	003°12'E
MONTPELLIER	43°36'N	003°53'E
SAINT RAPHAEL	43°26'N	006°46'E
CAP CORSE	43°00'N	009°21'E
BOUCHES DE BONIFACIO	41°23'N	009°10'E

Characteristic points	Latitude in degrees/minutes	Longitude in degrees/minutes
CAP TEULADA	38°52'N	008°38'E
CAP CARBONARA	39°07'N	009°33'E
CAP FALCONE	40°57'N	008°12'E
CAP LINARO	42°01'N	011°52'E
CAP PALIMURO	40°02'N	015°15'E
CAP SAN VITO	38°12'N	012°43'E
CAP LILIBEO	37°48'N	012°26'E
CAP BON	37°01'N	011°08'E
CAP ROUX	36°57'N	008°47'E
JIJEL	36°50'N	005°43'E
CHERCHEL	36°36'N	002°11'E
PORT SAY	35°04'N	002°30'W
CEUTA	35°53'N	002°15'W

## RESOLUTION 13 (XIII-RA I)

### SUPPORT FOR THE JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)

REGIONAL ASSOCIATION I (AFRICA),

**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),
- (3) *Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology, First Session – Abridged Final Report with Resolutions and Recommendations* (WMO-No. 931),

**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 World Weather Watch (WWW), Global Climate Observing System (GCOS) and Global Ocean Observing System (GOOS) and with international coordination effected through JCOMM;
- (2) To participate actively in the planning and implementation of these systems and in the work of JCOMM;
- (3) To coordinate with appropriate national oceanographic agencies and institutions to ensure the long-term operational maintenance of oceanographic observing systems;
- (4) To coordinate with appropriate national oceanographic agencies and institutions in developing oceanographic data management capabilities and oceanographic services;
- (5) To enhance two-way ship-shore telecommunication arrangements for oceanographic data and products, in particular through the greater use of satellite-based telecommunications facilities such as the Inmarsat and Argos systems;

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

NOTE: This resolution replaces Resolution 10 (XII-RA I) which is no longer in force

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## RESOLUTION 14 (XIII-RA I)

### WORKING GROUP ON HYDROLOGY

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) The report of its Working Group on Hydrology (WGH),
- (2) Resolution 16 (Cg-XIII) - Hydrology and Water Resources Programme,
- (3) Resolution 37 (Cg-XIII) – Terms of Reference of the Technical Commissions,
- (4) The results and recommendation of important events in the field of hydrology and water resources, particularly those relating to issues

raised at the World Summit on Sustainable Development (Johannesburg, South Africa, 2002) and the African Ministerial Conference on Water (Abuja, Nigeria, June 2002),

- (5) The Fifth WMO Long-term Plan (5LTP), 2000-2009,
- (6) The Accra and Abuja Declarations on African water issues,
- (7) The African Water Vision 2025 and its Framework for Action (FFA),



**CONSIDERING:**

- (1) The value of National Hydrological Services (NHSs) in the socio-economic development of the countries of the Region,
- (2) The important role of Regional Association I in the implementation of WMO's regional activities in the field of hydrology and water resources,
- (3) The proposal by the WGH of RA I to continue its activities during the next intersessional period,

**DECIDES:**

- (1) To establish a Working Group on Hydrology consisting of a core membership of a chairperson and five coordinators of Subregional Steering Committees for Eastern, Western, Central, Northern and Southern Africa, plus national experts designated by Members, with terms of reference as given below:

*(a)* The core group will:

- (i) Cooperate with the Commission for Hydrology (CHy), other WMO bodies and international organizations on projects related to hydrology and water resources;
- (ii) Provide assistance and advice to the president of the Association on all questions pertaining to the regional aspects of the Hydrology and Water Resources Programme (HWRP);
- (iii) Collaborate with the WMO Secretariat, as required, in implementing Hydrological Cycle Observing System (HYCOS) projects in the Region;
- (iv) Carry out relevant case studies based on experiences in the Region on the role of water resources assessment;
- (v) Continue to provide liaison with the Tropical Cyclone Committee (TCC) on the hydrological component of its technical plan;

*(b)* Each Subregional Steering Committee will:

- (i) Review the status of implementation of African Initiatives in Water Resources;
- (ii) Promote the implementation of the priority activities in the African Water Resources Action Plan as identified during the Regional Seminar on Water Resources;
- (iii) Work in coordination with the relevant regional economic

grouping having programmes in water resources;

- (2) To invite Members to designate national hydrological experts, who should preferably be the National Hydrological Advisers of the Permanent Representatives, to serve on the Working Group and its respective Subregional Steering Committees and attend their meetings. The chairperson of the Working Group is requested to designate experts to serve on the Subregional Steering Committees for Eastern Africa, Western Africa, Central Africa, Northern Africa and Southern Africa;
- (3) To designate, in accordance with Regulations 167 (b) and 32 of the WMO General Regulations, Mr J. Wellens-Mensah (Ghana) as the Regional Hydrological Adviser and chairperson of the Working Group on Hydrology;

**REQUESTS** the Regional Hydrological Adviser and chairperson of the Working Group on Hydrology:

- (1) In his capacity as Regional Hydrological Adviser, to assist the president of RA I according to the duties stipulated in WMO General Regulation 167(b);
- (2) As chairperson of the Working Group on Hydrology, to prepare a work plan and, in consultation with the president of the Association, assign to members of the working group identified case studies to be carried out on the role of water resource assessment;
- (3) In both these capacities, to submit to the president of the Association an annual report on 1 December of each year, and a final report not less than six months prior to the fourteenth session of RA I;

**URGES** the Members concerned to provide full support to the coordinators from their countries in order to ensure that they are able to fulfil the tasks assigned to them;

**REQUESTS** the Secretary-General to publish the technical report containing the case studies prepared during the previous international period by the Working Group in the technical documents series and distribute it to all concerned.

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

## RESOLUTION 15 (XIII- RA I)

### Co-RAPPORTEURS ON EDUCATION AND TRAINING

REGIONAL ASSOCIATION I (AFRICA),

#### NOTING:

- (1) *The Fifth WMO Long-term Plan (2000-2009)* (WMO-No. 908), Chapter 6, section 6.6, WMO Education and Training Programme, 2000,
- (2) Resolution 17 (Cg-XIII) — Education and Training Programme,

#### CONSIDERING:

- (1) The continued pressing need by Members for capacity building and human resource development in meteorology, operational hydrology and related fields essential to economic and social development,
- (2) The need to carry out an in-depth study of regional needs in the field of education and training in meteorology and related fields,
- (3) That guidance is needed for a proper implementation of the new WMO classification of meteorological and hydrological personnel in the Region,

#### DECIDES:

To appoint Co-Rapporteurs on Education and Training with the following terms of reference:

- (a) To keep under review the evolution of training techniques and programmes at the international level and advise on their applicability and adaptability to Region I;
- (b) To review the activities and/or training programmes of Regional Meteorological Training Centres (RMTCs) and national meteorological and hydrological training centres in Region I, and suggest ways of improving and enhancing their levels of performance;
- (c) To update and compile a list of national meteorological and hydrological training centres in Region I and their fields of specialization;

- (d) To identify practical issues relevant to the Region, aimed at finding adequate solutions for a smooth implementation of the new WMO classification and curricula recommended in *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology* (WMO-No. 258) (fourth edition, 2002);
- (e) To review the effectiveness and suitability to Members' needs of the current training programmes of the RMTCs, and advise on new training programmes and courses to comply with the new WMO classification of meteorological and hydrological personnel;
- (f) To assess needs in the training of instructors in the Region;
- (g) To study the existing library facilities in the Region, examine their capacities and capabilities to meet Regional needs, and recommend areas of improvement;
- (h) To assist in the development of WMO Long-term Plans for the Implementation of the Education and Training Programme;
- (i) To invite F. Gnoumou (Niger) and W. Jordaan (South Africa) to serve as Co-Rapporteurs on Education and Training Matters;

**REQUESTS** the co-rapporteurs to submit annual progress reports and a final report to the president of the Association not later than six months prior to the fourteenth session of the Association.

NOTE: This resolution replaces Resolution 12 (XII-RA I), which is no longer in force.

## RESOLUTION 16 (XIII-RA I)

### ADVISORY WORKING GROUP OF REGIONAL ASSOCIATION I (AFRICA)

REGIONAL ASSOCIATION I (AFRICA),

#### RECOGNIZING:

- (1) That due to budgetary constraints the number of working groups to be established or re-established by the Association would have to be limited,
- (2) The need to have a mechanism to address issues not handled by other working groups or rapporteurs,

#### DECIDES:

- (1) To re-establish an Advisory Working Group of RA I with the following terms of reference:

- (a) To advise the president on matters related to the work of the Association, in particular on matters requiring actions which cannot await the next regular session of the Association;
- (b) To advise the president in planning and coordinating the work of the Association and its subsidiary bodies;
- (c) To review the structure and working of the subsidiary bodies of the Association,

- including implementation of their recommendations;
- (d) To address other issues not covered by working groups or rapporteurs;
- (e) To assess and evaluate the implementation of the Regional Programme in relation to the WMO Long-term Plan and advise the president on appropriate actions, in particular on:
- (i) Decisions requiring review and restructuring of the World Weather Watch (WWW) Basic Systems;
- (ii) Requirements and priorities of events to be organized in the Region;
- (f) To advise the president on ways and means of enhancing technical assistance to Members in the Region for the

implementation of national and regional meteorological and hydrological programmes and projects;

- (2) To invite the president to act as chairperson of the Advisory Working Group, which is composed of the president, the vice-president and five directors of NMHSs to be invited by the president;

**REQUESTS:**

- (1) The president to designate members of the Advisory Working Group and to ensure that all subregions are represented on the Advisory Working Group;
- (2) The president to report to the Association at its regular sessions on the activities of the Advisory Working Group.

RESOLUTION 17 (XIII-RA I)

**THE AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR DEVELOPMENT (ACMAD)**

REGIONAL ASSOCIATION I (AFRICA),

**RECALLING:**

- (1) That the African Centre of Meteorological Applications for Development (ACMAD) was established in 1987 by the Economic Commission for Africa (ECA) Conference of Ministers through its Resolution 540 (XX),
- (2) That the ECA and WMO Secretariats had been entrusted by the ECA Conference of Ministers to assist in the development and implementation of ACMAD activities,
- (3) Resolution 24 (X-RA I) and Resolution 20 (XI-RA I) as well as Resolution 13 (EC-XLV) on ACMAD,

**CONSIDERING:**

- (1) That the Governments of African countries have been participating actively in ACMAD activities and have provided financial, human and material contributions to the Centre,
- (2) That ACMAD still needs to be supported and further developed to meet its objectives,
- (3) That several Members had not been able to pay their contributions to ACMAD,

**NOTING** that since May 1997 the ECA Conference of Ministers has decided to redefine its relationship with ECA sponsored institutions including ACMAD through its Resolution 827(XXXII),

**NOTING** also that such a decision was notified to the Director General of ACMAD in March 2000 requesting that the present statutes or constituent instruments of ACMAD be revised accordingly, and that there is a need to take an urgent action in this regard,

**DECIDES** to establish a Task Force with the following terms of reference:

- (a) To review the decision of ECA on the

present statutes or constituent instruments of ACMAD and its implication on the future operation of the Centre;

- (b) To propose a revised statutory text and appropriate institutional arrangements for the proper functioning of the Centre;
- (c) To bring its proposal to the attention of directors of African National Meteorological Services NMHSs by May 2003;

**REQUESTS** the president of the Association to convene and chair the Task Force, which will be composed of Directors of National Meteorological and Hydrological Services (NMSs) of the following countries:

Algeria, Angola, Burundi, Congo, Côte-d'Ivoire, Ethiopia, Kenya, Malawi, Mauritius, Morocco, Niger and Nigeria.

**REQUESTS** the Secretary-General of WMO and the Executive Secretary of ECA to designate representatives to participate in the work of the Task Force, and to provide support to the Task Force for its activities;

**REQUESTS** the chairperson to invite the Director General of ACMAD to participate in this exercise;

**REQUESTS** The Secretary-General of WMO to bring the proposals of the Task Force to the attention of the Governments of African countries and to follow-up on their responses, in collaboration with the Executive Secretary of ECA;

**URGES** the Members to make special efforts to pay their contributions to ACMAD;

**REQUESTS** the president of the Association to keep the Members informed of developments and to report to the next session of the Association on this matter.

## RESOLUTION 18 (XIII-RA I)

### TRIBUTE TO PROFESSOR G.O.P. OBASI, SECRETARY-GENERAL OF WMO

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) That the contract of the Secretary-General, Professor G.O.P. Obasi, will terminate on 31 December 2003 and that he will then have completed 20 years of continuous service in that office,
- (2) That prior to his appointment as Secretary-General, Professor Obasi had served as Director of the Education and Training Department in the WMO Secretariat, and as a WMO expert in the field for 15 years in total,
- (3) That by the end of his contract in December 2003, Professor G.O.P. Obasi would have rendered dedicated service to the Organization for a total of 35 years,

**RECALLING** that the Executive Council and the regional associations had on several occasions commended Professor Obasi for his outstanding contributions in support of the activities of the Organization and for the initiatives launched by him for the promotion of meteorology and operational hydrology globally,

**RECOGNIZING:**

- (1) That Professor Obasi has played an important and continuous role in the activities of the Organization,
- (2) That he has, in particular, performed his duties as Secretary-General at all times in a manner which merits the highest praise and commendation,
- (3) That he has thereby rendered outstanding services to the World Meteorological Organization and hence to the cause of international cooperation, policy-making and understanding in the fields of meteorology and hydrology and related geophysical and environmental sciences,

**PLACES ON RECORD** its deep appreciation, gratitude and respect for Prof. G.O.P. Obasi; and

**RECOMMENDS** to the Fourteenth Congress that Professor Obasi be accorded at the conclusion of his contract as Secretary-General the honorary title of 'Secretary-General Emeritus';

**REQUESTS** the president of the Association to bring this Resolution to the attention of Fourteenth Congress.

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## RESOLUTION 19 (XIII-RA I)

### APPOINTMENT OF THE SECRETARY-GENERAL

REGIONAL ASSOCIATION I (AFRICA),

**RECALLING** Resolution 16(XII-RA I) – Appointment of the Secretary-General

**NOTING:**

- (1) That the post of Secretary-General will be vacant 31 December 2003,
- (2) The need to address the filling of this most important position by presenting to the international meteorological community a suitable candidate with integrity and relevant qualifications and experience,

**NOTING WITH GREAT SATISFACTION** Decision CM/Dec 37 (LXXVII) - Decision on African Candidatures for Posts within the International System, of the Seventy-seventh Ordinary Session of the Council of Ministers and Thirty-eighth Summit of the Heads of State and Government of the Organization of African Unity (OAU)/African Union (AU) on African Candidatures for posts within the International System lending the support of the OAU/AU to the candidature of Mr Evans Arthur Mukolwe for appointment as Secretary-General of the World Meteorological Organization,

**NOTING FURTHER:**

- (1) That Mr Evans Mukolwe:
  - (a) Received two Presidential Awards; the Silver Star of Kenya (1998) for good service and the Order of the Grand Warrior of Kenya (2002) for long and dedicated services to his country, has the requisite integrity required for the post;
  - (b) Holds post-graduate, meteorological, management and other relevant academic qualifications, relevant and continuous practical experience of over thirty years in the science and practice of meteorology and therefore has the relevant qualifications and experience;
  - (c) As Director Coordinator for Scientific and Technical Programmes of the Organization since December 2000, has successfully demonstrated, to the complete satisfaction of all concerned;
    - (i) His outstanding international leadership qualities;
    - (ii) His complete impartiality in dealing with all peoples of the

- world and his equal treatment of all Members;
- (iii) His clear strategic vision, which contributes towards ensuring WMO's uniqueness in its sustained pursuit of excellence in the fields of meteorology and operational hydrology for outstanding global performance within the UN system;
  - (iv) His unique ability in pooling together all peoples, harnessing and bringing together Members, and creating respect and understanding among peoples, regions and cultures within the Organization;

**CONSIDERING** The valuable role of Mr Mukolwe in the formulation of the Preparation for the Use of Meteosat Second Generation (MSG) in Africa (PUMA) Project and its successful funding by the European Union as well as in the extension of this project to the Arab regions,

**AFFIRMS** its full confidence in the high integrity, outstanding ability, enthusiasm, dedication and commitment of Mr Mukolwe to continue to sustain and further develop this prestigious Organization for the benefit of all Member countries of the Organization;

**URGES** Members to give their full support with a view to appointing Mr Mukolwe as the Secretary-General of the Organization for the fourteenth financial period to enable him to continue with his efforts and initiatives for the development of meteorology, operational hydrology and related disciplines;

**RECOMMENDS** to Fourteenth Congress that Mr Mukolwe be appointed Secretary-General of the Organization for the fourteenth financial period;

**REQUESTS** the president of the Association to bring this resolution to the attention of the Fourteenth Congress.

## RESOLUTION 20 (XIII-RA I)

### REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION

REGIONAL ASSOCIATION I (AFRICA),

**NOTING** paragraph 3.7.1 of the general summary of the ninth session of the Executive Council,

**CONSIDERING:**

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

**DECIDES:**

- (1) To keep in force the following resolutions: 29 (VI-RA I); 6 (X-RA I); 13 (X-RA I); 20 (X-RA I); 6 (XI-RA I); 8 (XI-RA I); 10 (XI-RA I); 15 (XI-RA I); 19 (XI-RA I).
- (2) Not to keep in force the other resolutions and recommendations adopted before its thirteenth session;
- (3) To publish the text of the resolutions kept in force in the annex to this resolution.

**NOTE:** This resolution replaces Resolution 18 (XII-RA I), which is no longer in force.

## ANNEX TO RESOLUTION 20 (XIII-RA I)

**REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION**

Resolution 29 (VI-RA I)

**MARINE POLLUTION MONITORING**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) WMO Sixth Congress conclusion concerning the role of IGOSS in respect of marine pollution monitoring,
- (2) IOC Executive Committee Resolution 11 (EC-II) requesting IPLAN to pursue the planning of a Marine Pollution Monitoring Programme Pilot Project, addressed to oil and petroleum hydrocarbons,
- (3) Recommendation 90 of the first United Nations Conference on the Human Environment,
- (4) Recommendation 13 (CMM-VI) — Marine pollution monitoring,
- (5) Resolution 25 (VI-RA I) — Role of meteorology and climatology in economic development and human environmental problems in Africa,
- (6) That the monitoring of marine pollution, in particular observations of oil slicks, should be accompanied by observations of the standard meteorological variables such as wind, air and sea-surface temperature, and atmospheric pressure,

**CONSIDERING:**

- (1) That the Mediterranean Sea and the ocean areas around Africa are heavily traversed by tankers,
- (2) That existing coastal meteorological facilities suitably developed could significantly support the implementation of the Pilot Project and that some Members have already expressed their willingness to give such support,

**URGES MEMBERS:**

- (1) To ensure that their Meteorological Services are represented on national environment-monitoring bodies;
- (2) To take, without delay, the preparatory steps that will permit their Meteorological Services to provide the requested services in the field of marine pollution monitoring;
- (3) To make their coastal meteorological observing stations available for marine pollution monitoring purposes, including the taking of water samples, as well as a more extensive monitoring of the relevant ocean-atmosphere physical parameters;

**WELCOMES** the arrangements made by WMO and IOC to promote the training of technical personnel in developing countries in observational aspects of marine pollution monitoring.

Resolution 6 (X-RA I)

**THE FURTHER DEVELOPMENT OF THE GLOBAL OBSERVING SYSTEM**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

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

**CONSIDERING:**

- (1) The importance of an effective RBSN and the need to integrate the RBSN within the overall GOS,
- (2) 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 WWW;

**INVITES** Members bordering seas to consider the joint establishment of upper-air stations (on fixed platforms or using ASAP) in sea areas;

**URGES MEMBERS TO:**

- (1) Provide additional surface observations in ocean areas using the VOS 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 GOS appointed under Resolution 2 (X-RA I) to keep abreast of developments in the implementation of this resolution by Members and to report to the next session of the Association.

Resolution 13 (X-RA I)

**TECHNICAL PLAN OF THE RA I CYCLONE COMMITTEE FOR THE SOUTH-WEST INDIAN OCEAN**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) Resolution 5 (Cg-X) — Tropical Cyclone Programme,
- (2) The series of resolutions by the General Assembly of the United Nations calling for international cooperation and action by WMO for the mitigation of the harmful effects of storms, in particular in connection with IDNDR,
- (3) With appreciation the final reports of the eighth and ninth sessions of TCC for the South-West Indian Ocean,
- (4) Resolution 12 (X-RA I) — Tropical Cyclone Committee for the South-West Indian Ocean,

**CONSIDERING:**

- (1) The need for the Members affected by tropical cyclones 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 Technical Plan of the RA I TCC for the South-West Indian Ocean as given in the annex\* to this resolution;

**AUTHORIZES** the president of RA I to approve on behalf of the Association amendments to the plan, as recommended by the RA I TCC for the South-West Indian Ocean;

**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 20 (X-RA I)

**MARINE METEOROLOGICAL SERVICES IN REGION I**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) Resolution 19 (IX-RA I) — Marine meteorological services in Region I,
- (2) Resolution 20 (IX-RA I) — Port meteorological services
- (3) Second WMO Long-term Plan, Part II, Volume 4, Section 4.3 — Marine Meteorology and Associated Oceanographic Affairs Programme,
- (4) Resolution 14 (Cg-X) — Marine Meteorology and Associated Oceanographic Activities Programme for the period 1988–1991,
- (5) Resolution 11 (EC-XLI) — Development of a global operational ocean observing system,
- (6) Recommendation 6 (CMM-X) — The WMO VOS scheme,
- (7) Final report of the first session of the CMM Subgroup on Observations and Telecommunications (Geneva, February 1990), general summary, section 4,

**CONSIDERING:**

- (1) That, in addition to shipping and deep-sea fishing, marine activities such as coastal fisheries, offshore operations, coastal development works, harbour development, etc. call for increased marine meteorological support,
- (2) That NMSs should be in a position to provide the necessary marine meteorological services for the safety and economy of these activities,
- (3) That an adequate forecast service to coastal and offshore areas needs the backing of observational data from these areas and that, in

addition, these data are essential in support of climate monitoring, research and prediction,

- (4) That the real-time collection of observational data from the sea areas surrounding the continent and islands of RA I is of fundamental importance to the provision of meteorological services for marine activities,
- (5) That the establishment or expansion of port meteorological services will be of particular importance in obtaining increased observations, especially from the ocean areas in the tropics and the southern oceans,

**URGES MEMBERS:**

- (1) To develop their national marine meteorological services to meet the growing demands for combined meteorological and related oceanographic information in support of marine activities on high seas, in coastal and offshore waters and in and near ports;
- (2) To make every effort to establish a network of stations in coastal areas for providing the necessary meteorological and related oceanographic observations for marine services and in support of climate and global change studies;
- (3) To take steps to improve communications links between their national centers (NMCs) and GTS centers in the countries operating INMARSAT Coastal Earth Stations (CES);
- (4) To take all possible steps to improve the operation of coastal radio stations (CRSs) responsible for collecting observational data and ensure that the CRSs are kept in force and operational at least until 1999;
- (5) To establish or strengthen port meteorological services in all major ports in their countries in support of ships operating in the Region and with a view to increased data collection from these ocean areas;
- (6) To cooperate fully with the two Regional Rapporteurs in the discharge of their tasks;

**REQUESTS** the Secretary-General:

- (1) To arrange for the two Rapporteurs to meet with a view to harmonizing their work programme within the Region;
- (2) To assist countries in the setting up of marine meteorological and oceanographic observation networks and in providing appropriate information and assistance as required.

Resolution 6 (XI-RA I)

**ASSIGNMENT OF THE RESPONSIBILITIES OF RSMCs WITH GEOGRAPHICAL SPECIALIZATION IN CENTRAL AND SOUTHERN AFRICA**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) Resolution 15 (EC-XLVI) - Restoration of rights and privileges of the Republic of South Africa as a Member of WMO;

- (2) Recommendation 2 (VII-RA I) - Designation of new RMCs for replacement of RMC Pretoria;
- (3) Resolution 1 (EC-XXX) - Report of the seventh session of RA I;
- (4) Resolution 5 (Cg-VIII) - World Weather Watch, Plan and Implementation Programme, 1980-1983;
- (5) Abridged Final Report of X-RA I, paragraph 4.1.40;
- (6) Recommendation 2 (CBS-Ext(94)), Annex 1, Attachment 1.3 to the Manual on the GDPS - Guidelines to review the status of RSMCs with Geographical Specialization;
- (7) Final Report of the Task Team on Revision and Assignment of Regional WWW Responsibilities in Africa (3-7 October 1994, Nairobi);
- (8) Manual on the GDPS, Part I, Paragraph 4.1.2.1.

**CONSIDERING:**

- (1) That the outcome of the decision of the Regional Association referred to under NOTING (5) above required a review of the requirements for the establishment of RSMCs with Geographical Specialization and of the operational capabilities of the existing designated RSMCs;
- (2) That the status of implementation of the NMC Pretoria, in particular, its forecasting, data processing and telecommunication facilities and its ability to communicate with other NMCs and issue products in response to requirements stated by other NMCs, meets:
  - (a) The needs of the Members in RA I;
  - (b) The criteria specified in the guidelines for review of the status of RSMCs with Geographical Specialization (referred to under NOTING (6));
  - (c) The criteria specified in the Manual on the GDPS (referred to under NOTING (8)).

**EXPRESSES** its gratitude to the Government of the Republic of South Africa for its willingness to accept the responsibilities of an RSMC with Geographical Specialization.

**Invites:**

- (1) The Republic of South Africa to demonstrate the capabilities of the NMC Pretoria to CBS with a view to it being designated as an RSMC with Geographical Specialization;
- (2) The Member operating the potential RSMC to make available its products as required to Members and to coordinate such activities with the relevant WMO programme, i.e. WWW.

**Requests:**

- (1) CBS to consider the designation process of the NMC Pretoria as a matter of urgency;
- (2) The Secretary-General to facilitate the implementation of this resolution.

Resolution 8 (XI-RA I)

**IMPLEMENTATION AND OPERATION OF NEW SATELLITE-BASED TECHNOLOGIES AS PART OF WWW SYSTEMS COMPONENT IN REGION I**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) The continuing difficulties with the operation of GTS in Region I,
- (2) The final reports and recommendations on OWSE-AF,
- (3) The potential to improve meteorological telecommunications in Region I through the use of satellite-based systems,
- (4) Resolution 1 (CBS-X) — Support for OWSE-AF,

**EXPRESSES:**

- (1) Satisfaction that both Phases I and II of the OWSE-AF were completed with positive results;
- (2) Gratitude to those who participated in the OWSE-AF and made it a success, especially the donors France, Germany, United Kingdom and the United States;
- (3) Gratitude to the OWSE-AF Steering Group for its successful management of the implementation of the OWSE-AF;

**CONSIDERING:**

- (1) The potential for greatly improved information bases to be achieved by the effective integration of the DCS/DRS and MDD into the WWW in Region I,
- (2) The lessons gained from the OWSE-AF as guidance on the efficient implementation and use of the satellite capabilities in RA I,
- (3) That the implementation and use of these new technologies require the establishment of an infrastructure for long-term support and operational management of the DCS/DRS at regional level,
- (4) The critical role of assistance programmes in enhancing the capabilities of developing countries to participate in the activities of the WWW,

**ENDORSES** the designation of RSMCs Nairobi and Dakar as operational management and monitoring centres of the DCS/DRS, at regional level;

**URGES:**

- (1) Members to implement DCP/DRS systems and MDD service as an integral part of the African component of WWW systems;
- (2) Donors to support the implementation and use of DCS/DRS and MDD as an integral part of the WWW in Region I;
- (3) RA I Member countries and donors to coordinate their support for the establishment of a management and monitoring function in RA I;

**REQUESTS** the Secretary-General to assist in the implementation of the contents of this resolution.

Resolution 10 (XI-RA I)

**TROPICAL CYCLONE OPERATIONAL PLAN FOR THE SOUTH-WEST INDIAN OCEAN**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**



- (1) A series of resolutions by the General Assembly of the United Nations calling for international cooperation and action by WMO for the mitigation of the harmful effects of storms, in particular in connection with IDNDR,
- (2) Resolution 6 (Cg-XI) — Tropical Cyclone Programme,
- (3) The final report of the eleventh session of the RA I TCC for the South-West Indian Ocean,
- (4) Resolution 9 (XI-RA I) — TCC for the South-West Indian Ocean,

**CONSIDERING:**

- (1) The need to enhance cooperative efforts by countries within the tropical-cyclone-prone south-eastern part of Region I in carrying out effectively their roles in coordinated arrangements for preparing and issuing meteorological forecasts and warnings of all tropical cyclones affecting the area,
- (2) That, to achieve this aim, it is essential to have an agreed tropical cyclone operational plan for the South-West Indian Ocean describing the coordinated arrangements and defining the observing, forecasting and warning responsibilities of all cooperating countries,

**DECIDES** to adopt the Tropical Cyclone Operational Plan for the South-West Indian Ocean issued in the TCC Report series (Report No. TCP-12) as WMO/TD-No. 577;

**AUTHORIZES** the president of RA I to approve, on behalf of the Association, amendments to this Tropical Cyclone Operational Plan, as recommended by the RA I TCC for the South-West Indian Ocean;

**REQUESTS** the Secretary-General to inform all Members concerned of any amendments to and updating of the operational plan.

**NOTE:** This resolution replaces Resolution 14 (VIII-RA I), which is no longer in force.

## Resolution 15 (XI-RA I)

**USE OF INMARSAT FOR THE COLLECTION OF SHIPS' METEOROLOGICAL AND OCEANOGRAPHIC REPORTS**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) Resolution 19 (Cg-XI) — The collection and dissemination of marine meteorological and oceanographic information using INMARSAT,
- (2) Resolution 16 (V-RA I) — Collection, exchange and distribution of ships' weather reports,
- (3) The equipping of an increased number of ships participating in the WMO VOS scheme with Ship Earth Stations (SES) of INMARSAT, in particular with the INMARSAT-C facility,

**CONSIDERING:**

- (1) The need to increase the number of ships' meteorological and oceanographic reports from most of the sea areas of Region I,

- (2) The considerable improvements to be expected in the receipt of marine meteorological and oceanographic observations from ships at sea through the enhanced use of the INMARSAT system,
- (3) The cost savings which will accrue to those Members collecting such reports through INMARSAT by the increased use of the new INMARSAT-C facility for this purpose,

**RECOGNIZING** with appreciation that certain Members operating INMARSAT CESs have already arranged through their CES to accept ships' meteorological and oceanographic reports that are of general value to all Members of WMO,

**BEING CONCERNED** however, that problems continue to be related to the timely redistribution to the countries closest to their geographical origin of reports collection through INMARSAT,

**URGES:**

- (1) Members concerned to make every effort to ensure the timely global redistribution on the GTS of reports collected through INMARSAT to all Members and in particular to countries in the areas of the geographical origins of those reports;
- (2) All Members in the Region operating VOS equipped with INMARSAT-C to make every effort for ships to be supplied with new software package for the compilation and transmission of meteorological reports through INMARSAT-C, to ensure the maximum efficiency and cost-effectiveness of such an operation;
- (3) All Members which have designated coastal radio stations to continue their operation for the next five to ten years, or until INMARSAT becomes fully operational, so that ships not yet equipped with INMARSAT-C stations can continue to provide meteorological reports;

**REQUESTS** the Secretary-General to assist Members in the implementation of this resolution.

**NOTE:** This resolution replaces Resolution 16 (V-RA I), which is no longer in force.

## Resolution 19 (XI-RA I)

**SUPPORT TO THE TECHNICAL COOPERATION (TCO) PROGRAMME**

REGIONAL ASSOCIATION I (AFRICA),

**NOTING:**

- (1) With concern the decline in UNDP funding available for technical cooperation activities in support of meteorological and hydrological services at national and regional levels,
- (2) The negative consequences of the above decline of the resources of the WMO Secretariat in support of technical cooperation activities and on the operations of the NMHSs and national and regional institutions, as well as on the operation of the vital WWW facilities in the Region,

**RECOGNIZING:**

- (1) That the TCO Programme is vital to the Members of the Region and is one of the core responsibilities of the WMO,
- (2) That several national and regional institutions have benefited from external assistance to establish and sustain their activities,

**NOTING FURTHER:**

- (1) The efforts deployed by the Secretary-General to mobilize new and additional resources,
- (2) The proposals to be submitted by the Secretary-General to the Eleventh Congress on the future structure of the TCO Programme in light of the recommendations of the Study Group on Technical Cooperation established by the

Secretary-General and of the forty-sixth session of the Executive Council,

**CONSIDERING** the serious economic difficulties being encountered by most Members in the Region,

**URGES MEMBERS** to deploy additional efforts in seeking funding for traditional as well as new sources, in support of national, regional and international meteorological and hydrological services;

**REQUESTS** the Secretary-General:

- (1) To ensure that continued adequate secretariat support is available for technical cooperation activities;
  - (2) To continue his efforts in mobilizing resources for the benefit of Members, including the WMO VCP.
-

# ANNEXES

## ANNEX I

Annex to [paragraph 4.1.19](#) of the general summary

### THE WORLD WEATHER WATCH STRATEGIC PLAN ON THE IMPLEMENTATION AND IMPROVEMENT OF THE BASIC SYSTEMS IN RA I - AFRICA (Essential elements)

#### 1. SUMMARY

1.1 The purpose of the WWW Programme is to facilitate the development, operation and enhancement of worldwide observing telecommunications for data collection and retransmission, data processing and forecasting systems for meteorological and related data, information, products and services, and to ensure that NMHSs of all Members have access to information they need to provide effective services. These objectives are achieved through the Basic Systems of the WWW, which are the GOS, GTS and GDPS. The PWS Programme facilitates the exchange and application of meteorological information, forecasts and warnings. The DM provides the support functions needed for the orderly and efficient overall management of meteorological data and products of the WWW, and coordinates the monitoring of data and product availability and quality.

1.2 WMO's AGM and SMM have, over the years, indicated that data availability in RA I is not satisfactory. The non-availability of data has largely been attributed to the shortcomings of the implementation and efficiency of the GOS and GTS in the Region. Recent WMO survey missions showed the key causes of inefficient operation of the GOS and GTS in the Region as:

- (a) The failure to catch up with rapid technological developments;
- (b) The poor economic environment and scientific innovation in many African countries;
- (c) Difficulties in establishing stations in remote or inhabitable areas and large water bodies;
- (d) Inadequate funds to rehabilitate and operate equipment;
- (e) Inadequate personnel caused, in some countries, by the pressure on governments to reduce their workforces;
- (f) Insufficiently trained technical staff to operate and maintain equipment;
- (g) Poor telecommunication infrastructure in many African countries;
- (h) High telecommunication tariffs and costs of consumables;
- (i) Lack of legally binding service contracts between the majority of NMHSs and TSPs; and
- (j) Civil strife in some countries.

The key causes of deficiencies in the GDPS, DM and PWS include:

- (a) Non-automation of NMCs and lack of facilities and human resource capacities to take advantage of the GDPS, DM and PWS products, including interpretation, verification, and use of model outputs and data code formats such as BUFR, CREX and GRIB;
- (b) A number of countries with potential have not made any notable progress in the operation of NWP models;
- (c) In some countries, PWS studios are lacking; and
- (d) The data in the majority of the countries was kept in paper form or obsolete electronic media and need rescue and automation.

1.3 Previous efforts by WMO and individual NMHSs have provided marked improvements in the GOS, GTS, GDPS, PWS and DM. However, there are still countries that have significant deficiencies in the operation and maintenance of these programmes. The strategies for providing sustainable solutions include:

- (a) Acquiring and implementing AWSs equipped with DCPs in remote or inhabitable areas and water bodies, where manning of stations is difficult;
- (b) Reactivating an optimum number of upper-air stations by deploying systems using the GPS and any advances in technology such as glider-sondes, AMDAR, etc., and ensuring continuous operation;
- (c) Enhancing new satellite data applications such as in monitoring and controlling pests, bush and forest fires, estimating rainfall, etc;
- (d) Rehabilitating the current station network where possible, and implementing stations at critical data-sparse areas;
- (e) Providing national and regional capability to produce basic equipment and consumables;
- (f) Rehabilitating and implementing telecommunication facilities including automation of data collection and exchange at NMCs and RSMCs;
- (g) Establishing subregional centre(s) for equipment maintenance;
- (h) Providing e-mail and Internet facilities at observatories to improve data collection,

and providing e-mail and Internet facilities to rural communities to reduce the digital divide and enhance the visibility of NMHSs;

- (i) Integrating GDPS facilities, providing subregional and regional institutions and NMCs with the capacity to carry out research and operationally issue weather, climate and water resources forecasts, and improving long-term and seasonal forecasts using regional NWP models;
- (j) Enhancing the research and development facilities and capacity of ACMAD, subregional centres and NMCs;
- (k) Building capacity for the operation and maintenance of equipment;
- (l) Building capacity for GDPS, PWS and DM, including the interpretation, verification and use of NWP model outputs, and implementation and use of table-driven formats such as BUFR, CREX and GRIB; and
- (m) Rescuing and automating national and subregional databases.

These solutions should be implemented according to the requirements of the African subregions as proposed in the Strategy.

1.4 The solutions to the deficiencies in the GOS, GTS, GDPS, PWS and DM take into consideration the following:

- (a) These programmes act together as an integrated system, like the valves of a single heart, in regard to the provision of meteorological and hydrological services, and any solutions must address all the components, since the failure of any one of them would affect the entire system;
- (b) Deficiencies in the systems affect not only the communities in the Region, but the entire global community in regard to aviation safety, marine safety, general public safety, safety of property, climate change monitoring and detection with socio-economic implications, disaster reduction, poverty reduction, food security and economic growth amongst many other weather and climate-related activities; and
- (c) The solutions, which include implementation and improvement of these programmes at the national and regional levels, need national, regional and global attention to ensure timely availability of meteorological and hydrological data and products at NMCs, RMCs, WMCs and WAFCs for the safety and sustainable development of humankind.

This document is a synthesis of problems and proposed solutions for the deficiencies in the GOS, GTS, GDPS, PWS and DM. It provides useful information for the formulation of projects to

implement the WWW Strategic Plan on the Implementation and Improvement of the Basic Systems in RA I - Africa.

## 2. BACKGROUND

2.1 The worldwide availability of meteorological and hydrological data and products is influenced by the efficiency of the WWW Basic Systems components, which are GOS, GTS and GDPS. PWSs facilitate the delivery and application of meteorological information, forecasts and warnings. The DM provides the support functions needed for the orderly and efficient overall management of meteorological data and products of the WWW system, and coordinates the monitoring of data and product availability and quality.

2.2 The WWW's AGM and SMM have, over the years, indicated that data availability in RA I has not been satisfactory. The non-availability of data has largely been attributed to the shortcomings in the implementation and efficiency of the GTS and GOS in the Region. Previous efforts by WMO and individual NMHSs have provided marked improvements in the GOS, GTS, GDPS, PWS and DM.

2.3 However, there are still countries that have significant deficiencies in the operation and maintenance of these programmes, leading to inefficient provision of meteorological services by NMCs, RMCs, WMCs and WAFCs for the safety and sustainable development of humankind. The studies conducted by WMO have provided a detailed analysis of the causes of the deficiencies and possible solutions.

2.4 The deficiencies in these programmes are a concern not only for the Region, but also for the entire global community. To this end, the Members of the Region, in collaboration with WMO, developed a Strategy to rehabilitate and improve the GOS, GTS, GDPS, PWS and DM in the Region, with a view to improve the availability of data and products at the NMCs, RMCs, WMCs and WAFCs. The problem analysis and proposed solutions in this document provide useful information for the formulation of the projects to implement the Strategy.

## 3. JUSTIFICATION

3.1 The economies of the 56 Member states in Africa are very sensitive to extreme weather and climate events. The Region often experiences losses of life and property resulting from extreme weather and climate events such as heavy rains resulting in floods and landslides, tropical cyclones, strong wind, lightning and droughts. The majority of the rural communities in the Region live under dire poverty since agriculture, on which they depend for their livelihood, has become more sensitive to extreme weather and prevalent climate events. It thus requires proper planning to get meaningful yields. The increases in the frequency and intensities of extreme climate events, as projected by the IPCC, are a threat

to the survival of humankind in the Region.

However, skillful and timely weather and climate forecasts can help the governments and communities in the Region mitigate the negative impacts of extreme weather and climate events, and tap the high economic potential related to weather and climate. The skill of any forecast or prediction depends on the quality and quantity of data used in the models.

3.2 Data availability in the Region has not been satisfactory, as revealed by survey missions and regular monitoring conducted by WMO. Previous efforts by WMO and individual NMHSs provided marked improvements in data availability, but did not have a continental approach and only addressed a few areas in the Region. These efforts are not sustainable and have not provided the expected solutions. The non-availability of the data and products has been attributed to the deficiencies in the operations of the GOS, GTS, GDPS, DM and PWS.

3.3 The deficiencies in the collection and retransmission of meteorological data and products not only affects meteorological services in the Region, but the entire globe, in regard to aviation safety, marine safety, road safety, general public safety, safety of property, climate change monitoring and detection with socio-economic implications, food security, disaster reduction, poverty reduction, conservation of biodiversity and economic growth, amongst many other weather and climate-related activities. The wide extent of the effects is a result of interdependence of the global weather and climate patterns. Hence, no one nation can be entirely self-sufficient in the provision of all of its meteorological, hydrological and related environmental services. Uneven distribution of data leads to bias in model results and erroneous weather and climate simulations and forecasts.

3.4 The improvements in the modes of transport have made the world a small village. The entire global community is, to some extent, exposed to risk due to the deficiencies in the collection and retransmission of meteorological data and products in countries with weak economies, as is the case in Africa. It is therefore important that the availability of data from countries with weak economies gets collective international attention. Hence, the best support for the Region, and for the benefit of the entire global community, is to rehabilitate and improve meteorological observing, telecommunications, data processing, data management and forecasting facilities, so as to improve the quality and quantity of data and products available at the NMCs, RMCs, WMCs and WAFCs, and make them accessible to user communities.

3.5 The Members of the Region, in collaboration with WMO, have developed a Strategy to rehabilitate and improve GOS, GTS, GDPS, DM and PWS in the Region. The successful implementation of the Strategy should help solve the majority of the problems related to weather and climate in the Region and beyond. The support the Region has

frequently received from the international community when under distress caused by weather and climate-related disasters is highly appreciated, but does not provide a long-lasting solution. The Strategy provides proposals for sustainable solutions. Its successful implementation should be the concern not only of the Region, but also of the entire global community.

#### 4. PROJECT AREAS

4.1 To enhance the availability of weather, climate and environmental data and information for sustainable socio-economic development in Africa:

4.1.1 Implement AWSs at the RBSN stations with appropriate communications to NMCs. Highest priority will be given to GCOS stations.

4.1.2 Reactivate the upper-air observing programmes by deploying at each station a system using GPS, associated with reliable hydrogen-producing equipment. Highest priority will be given to GCOS stations.

4.1.3 Implement regional AMDAR projects and operational programs addressing observations on ascent and descent at the main local airports during the en-route flight.

4.1.4 Enhance marine observations through active participation of the countries in the VOS programme and the other JCOMM and scientific programmes such as ASAP, SOOP, DBCP, PIRATA, etc.

4.1.5 Identify potential VOSs and provide shipboard equipment and organization of training of port meteorological officers.

4.1.6 Identify and prioritize remote locations and inland and coastal waters, where there is a need for observational data. Prepare specifications for AWSs for the priority remote locations, purchase and install.

4.1.7 Rehabilitate the climatological network of stations based on conventional instrumentation.

4.1.8 Enhance environmental observations.

4.1.9 Implement the maintenance capability for the observational equipment on a subregional basis. (See project area 4.)

4.1.10 Institute a programme of training in the use and maintenance of the equipment. (See project area 4.4.)

4.2 Preparation, distribution and application of products necessary for sustainable socio-economic development of Africa:

4.2.1 Strengthen connectivity between NMCs and RTHs and between RTHs by taking advantage of advances in communication technologies, and improve the efficiency of data collection and exchange by installing AMSSs equipped with facilities for automatic request and retrieval of data. (Those countries where ASECNA operates have special requirements.)

- 4.2.2. Promote the use of satellite-based dissemination systems such as RANET, MDD and RETIM, to enhance data availability to and from NMCs.
- 4.2.3 Improve the capacities of subregional and regional institutions and NMHSs with potential to carry out research and development, and operationally issue weather, climate, and water resources forecasts, and improve long-term and seasonal forecasts by acquiring and implementing high-speed workstations or PC clusters and servers, related model code and software for running NWP and climate models.
- 4.2.4 Improve the capability for post-processing of NWP products and other information to deliver end-user products.
- 4.2.5 Improve the dissemination and applications of weather and climate products.
- 4.2.6 Carry out training on PWS skills.
- 4.2.7 Carry out training on computer and communications operation and maintenance.
- 4.2.8 Carry out training on data processing, modelling and applications support and development (e.g. GIS).

For each of the above project areas, the activities would be formulated into projects in line with the formats of targeted funding partners.

4.3 Use of the Internet in Africa for improving exchange of meteorological and environmental information:

- 4.3.1 Distribute products to users by e-mail – Delivery of cost-effective and applicable products directly to users by NMHSs. This will improve the timeliness and quality of products and services by close integration with end-users' business needs. This assumes that end-users or intermediaries have access to e-mail. The project will also use the existing observation network of the NMHSs to extend access to these e-mail products and provide e-mail and Internet facilities to rural communities to reduce the digital divide and enhance the visibility of NMHSs.
- 4.3.2 Implement NMHS Web sites for end-users – Web sites of the NMHSs are essential to make available attractive, culturally relevant products, including use of languages. These link to other efforts to bridge the 'Digital Divide'.
- 4.3.3 Acquire forecast model products and other information by NMHSs – This leads to improved forecasting skill due to ability to select relevant model products. Also leads to feedback for improved quality of observation reports and model products.
- 4.3.4 Collect and interchange observation reports both nationally and internationally – Using common carrier technologies, in conjunction with existing methods, collect meteorological

and other environmental data, which should lead to more reliable, timely and affordable transmission.

- 4.3.5 Set up remote support, maintenance and distance training – This should lead to better availability of systems (e.g. MSG receiver system) and increase the skills of NMHS staff.
- 4.4 Procurement, manufacture, maintenance, repair and calibration facilities:
  - 4.4.1 Establish subregional equipment and instrument maintenance, repair and calibration workshops.
  - 4.4.2 Prepare and disseminate training and instruction manuals for standard instrument systems and institute a programme of training in the use and maintenance of the equipment.
  - 4.4.3 Develop manufacturing capability within the Region for meteorological observing systems.
  - 4.4.4 Develop strategic partnerships with industrial enterprises to implement manufacturing capability in the Region.
  - 4.4.5 Harmonize and standardize compatible technologies and resource sharing to reduce operational costs.
  - 4.4.6 Harmonize joint procurement procedures and set up joint procurement for the Region or subregions.

For the preceding two project areas, project proposal formulation, outline of goals, specific objectives, decision indicators and support implications are given in the Annex to this paragraph. This would be useful guidance in formulation of projects in line with the formats of targeted funding partners.

4.5 Project-specific to the Indian Ocean Commission (IOC) countries:

- 4.5.1 Implement a network of weather radar for cyclone warning and tracking.

## 5. CAPACITY BUILDING STRATEGIES

- (a) Training in operation and maintenance of equipment and instruments;
- (b) Training in the use of modern and new Basic Systems techniques;
- (c) Training activities on Basic Systems procedures and IT for WWW development;
- (d) Capacity building for GDPS, PWS and DM, including the interpretation, verification and use of NWP model outputs and data code formats such as BUFR, CREX and GRIB;
- (e) Enhancement of the research and development facilities and capacity of ACMAD, subregional centres and NMCs; and
- (f) Capacity building on weather presentation and dissemination techniques, including GIS; and
- (g) Capacity building in climate modelling.

**6. POSSIBLE PARTNERS**

- 6.1 The benefits of successful implementation of the Strategy go beyond the Region. They address all the weather and climate-related initiatives such as aviation safety, marine safety, general public safety, safety of property, climate change monitoring and detection with socio-economic implications, disaster reduction, poverty reduction, food security and economic growth amongst many other weather- and climate-related activities. The institutions and organizations interested in these initiatives form potential partners in the implementation of the Strategy.

**7. INSTITUTIONAL ARRANGEMENTS**

- 7.1 It is expected that resource mobilization efforts will be coordinated through the African Subregional Economic Groupings (CEMAC, ECOWAS, IGAD, IOC and SADC), including COMESA. Regional/subregional institutions such as

ACMAD, the DMCs and AGRHYMET will be integral partners in the implementation of the Strategy.

**8. CIRCULATION TO MEMBERS**

The full RA I Strategy was circulated to Members in July 2002. It was available as an appendix to the report of the Implementation/Coordination Meeting on the Strategy for Enhancement and Improvement of the WWW Basic Systems in RA I, held in Nairobi, 8-12 April 2002, and accessible through the WMO home page ([www.wmo.ch](http://www.wmo.ch)). In addition to the above essential elements, the Strategy includes problem analysis and proposed strategies for implementation and improving the Basic Systems and relevant ongoing projects such as PUMA, RANET, HAM radio, DMCs, food security early warning, EU, IOC and Southern Africa AMDAR projects. Annex to Paragraphs 4.3 and 4.4 of the Strategic Plan

**A. Use of Internet in Africa for Improving Exchange of Meteorological and Environmental**

- (a) Strengthening application of meteorology and other environmental data for end-users. This contributes to sustainable development, which includes food security, poverty alleviation and disaster management;
- (b) Improving international and national exchange of observational data. Observations are essential for applications such as climate change monitoring and early warning systems.

**SPECIFIC OBJECTIVES**

- (a) Distribution of products to users by e-mail and delivery of cost-effective and applicable products directly to users by NMHSs. This will improve the timeliness and quality of products and services through close integration with end-users' business needs. This assumes that end-users or intermediaries have access to e-mail. The project will also use the NMHSs' existing observation network to extend access to these e-mail products;
- (b) Implementation of Web sites of NMHSs for end-users. Web sites of the NMHSs are essential to make available attractive, culturally relevant products, including use of languages. This links to other efforts to bridge the 'Digital Divide';
- (c) Acquisition by NMHSs of forecast model products and other information, and improved forecasting skill due to ability to select relevant model products. This also leads to feedback for improved quality of observation reports and model products;

- (d) Collection and interchange of observation reports both nationally and internationally. Using common carrier technologies, in conjunction with existing methods, to collect meteorological and other environmental data, this should lead to more reliable, timely and affordable transmission;
- (e) Remote support, maintenance and distance training. This should lead to better system availability (e.g. MSG receiver system) and increase NMHS staff skills.

**DECISION INDICATORS**

- (a) Internet techniques do not necessarily replace current effective systems; they may be supplemented or adapted;
- (b) The best choice for each situation will vary according to the circumstances, and will change over time, especially as Internet access becomes cheaper and more widely available;
- (c) A permanent connection is strongly recommended;
- (d) NMHSs should establish their own domain names;
- (e) Use of a local ISP Web host versus a host in the NMHS will need to be evaluated;
- (f) The continuity of service, including contracts or service level agreements, is vitally important.

**Support implications**

- (a) Finance. There will be a periodic cost to the NMHS for the connection, which may include charges from the TSPs as well as the ISP. However, there is a tendency for these costs to decrease and

the services to improve due to the prevailing competitive environment in the industry;

- (b) People. Internet systems will imply support personnel, training and management costs. There are problems of staff being lost to commercial enterprises.

#### PROCUREMENT, MANUFACTURE, MAINTENANCE, REPAIR AND CALIBRATION FACILITIES

##### SUMMARY

The African NMHSs have difficulties with the procurement, maintenance, repair and calibration of meteorological observing systems.

##### GOAL

To increase the quality and quantity of observations by improving availability of meteorological observing systems.

##### SPECIFIC OBJECTIVES

- (a) Develop manufacturing capability for meteorological observing systems within Region I;
- (b) Develop strategic partnerships with industrial enterprises to implement manufacturing capability in the Region;
- (c) Set up regional centres for maintenance, repair and calibration of meteorological equipment;
- (d) Harmonize and standardize compatible technologies and resource sharing to reduce operational costs;
- (e) Prepare and disseminate training and instruction manuals for standard instrument systems;
- (f) Harmonize joint procurement procedures and set up joint procurement for the Region or subregions.

#### ANNEX II

Annex to [paragraph 4.2.5](#) of the general summary

#### EXAMPLES OF TRQS AND MRQS FOR RBSN STATIONS, THEIR CLASSIFICATION AND SPATIAL DISTRIBUTION CRITERIA:

	TRQ Surface	MRQ Surface	TRQ Upper-Air	MRQ Upper-Air
Parameters	Pressure Temperature Wind Humidity Weather Visibility Cloud cover Cloud base	Pressure Temperature Wind (not for buoys) Humidity (not for buoys)	Pressure/ geopotential Temperature Wind Humidity	Pressure/ geopotential Temperature Wind Humidity
Level	Surface	Surface	Up to 10 hPa	Up to 100 hPa
Observations at main hours	4	3	2 (at 00 and 12)	1
Observations at main and intermediate hours (3-hourly)	8	5	-	-
Availability of data	100%	50%	100%	50%

##### Classification of Station

Stations are classified according to their performance with reference to the above requirements:

- (a) OK classification is assigned to stations meeting all TRQs;
- (b) IP (incomplete programme) classification is assigned to stations meeting all MRQs;
- (c) BC (below criteria) classification is assigned to operational stations not meeting all MRQs; and
- (d) NO (not operating) classification is assigned to silent stations.

##### Spatial Distribution

The spatial distribution is considered as follows:

- (a) FG stations are acceptable to fill void areas, according to Mr Daan criteria,

i.e. an isolated station outside the circular zone of influence covered by a reference station (OK or IP classification). The radius of the zone is  $R=D/\sqrt{2}$  with D being the horizontal resolution of the proposed RBSN;

- (b) OK stations are acceptable if they are at a distance of at least 60 km from the nearest current network;
- (c) IP stations are acceptable if they are at a distance of at least 90 km from the nearest current network station;
- (d) GSN and GUAN stations are acceptable; and
- (e) BC stations and NO stations are not acceptable as network stations.



## ANNEX III

Annex to [paragraph 11.8](#) of the general summary  
**DRAFT GUIDELINES FOR WMO MEMBERS**

In developing their own communications strategies, Members are encouraged to incorporate the following guidelines as far as possible:

- (a) Take account of and conform with the WMO SECS, including:
  - (i) Using the WMO logo;
  - (ii) Using the key message;
  - (iii) Aiming to build awareness about WMO;
  - (iv) Conveying information about WMO; and
  - (v) Establishing the relevance of WMO;
- (b) Develop an integrated approach through communications plans for key target audiences including:
  - (i) The general public and civil society;
  - (ii) WMO Members, key influencers and decision makers in governments;
  - (iii) The United Nations System and IGO organizations;
  - (iv) NGOs;
  - (v) The private sector;
  - (vi) The media; and
  - (vii) The scientific community;
- (c) Each communication plan will include a

mix of approaches through various media, including:

- (i) The internet and e-mail;
- (ii) The media (print, radio, television, etc.);
- (iii) Brochures and posters;
- (iv) Events and conferences;
- (v) IPA focal points;
- (vi) UNDP country offices and United Nations Information Centres;
- (vii) Joint statements and activities with other organizations; and
- (viii) Merchandising;
- (d) Capitalize on free publicity and the ‘multiplier effect’;
- (e) Carefully focus on key activities and avoid unnecessary ones;
- (f) Have a clear and simple communications strategy;
- (g) Have a clear and simple message;
- (h) Identify potential resources to capitalize on new opportunities;
- (i) Train relevant staff to gain the skills necessary for successful implementation (e.g. media training); and
- (j) Obtain and analyze feedback on the implementation and effectiveness of communications plans.

## ANNEX IV

Annex to [paragraph 16.5.3](#) of the general summary

**CONCLUSIONS AND RECOMMENDATIONS OF THE SIXTH TECHNICAL CONFERENCE ON  
 MANAGEMENT FOR DEVELOPMENT OF METEOROLOGICAL SERVICES IN AFRICA**

**1. GENERAL**

1.1 The Conference agreed for the need to codify the core mission of NMSs in national legislation or some other formal instruments, recognizing that the primary role of NMSs is in the domain of public good. In this regard, NMSs should give adequate attention to the visibility and status of NMSs through effective public information activities and assessment of the socio-economic benefits of meteorological services;

1.2 The Conference emphasized that NMSs should remain the single authoritative national source of meteorological warnings to the public, especially in potentially dangerous weather situations involving safety of life and property;

1.3 The Conference encouraged NMSs to strengthen cooperation with the media, the private sector and the academic community, without impairing the effective operational and scientific nature of NMSs;

1.4 The Conference further encouraged NMSs to develop a human resources development (education and training) plan to attain the appropriate technical

and professional levels required to meet present and future needs. Staff motivation should be built into such plans. Training should also be included for management and supervisory levels. NMSs are also encouraged to promote the inclusion of meteorology in school curricula.

1.5 The Conference noted that climate has been the most talked-about environmental issue because of the potential implications on humanity. It is now clear that climate science has come of age and is no longer a matter of scientific curiosity. Climate change is evidenced through the monitoring of the global mean temperature of the earth and the greenhouse gas concentrations in the earth’s atmosphere. Such measurements have also contributed to improved understanding and predictability of ENSO and its global impacts. Although considerable progress has been made in understanding the earth’s climate system as well as in the prediction of climate change and its impact on sustainable development, the Conference noted that there is still much work to be done by NMSs,

especially in Africa, including availability of the required skilled multi-disciplinary human resources, improvement of regional climate modeling capacity and climate change impacts assessment studies, among many others.

1.6 The Conference requested WMO to continue to support the efforts of the NMSs in Africa in their endeavour to address the expected challenges in the area of climate change. WMO and the NMSs should also continue to give support to the IPCC, GCOS, UNFCCC and UNCCD, and contribute to the authoritative assessment of climate change.

## **2. THE USE OF NEW TECHNOLOGY TO INCREASE APPLICATION CAPABILITIES OF NMSS**

2.1 The Conference noted that the introduction of new technology will have considerable impact on the operations of NMSs in Africa and the exchange and delivery of services. The Conference agreed that NMSs should take the appropriate capacity building activities in order to benefit from Information Technology, especially the Internet Protocol, through exchange and sharing information, and reduce the digital divide that exists between developing and more developed countries.

2.2 The Conference encouraged NMSs to have strategies to implement and operate, as a matter of urgency, relevant new technologies. NMSs should introduce modern technology to enhance the meteorological observing, telecommunication and data processing capabilities. In this regard, NMSs should endeavour to improve the availability of data, particularly where the network is deficient, by using affordable new technologies such as automatic stations, AMDAR aircraft reports and remote sensing data, including those from the new generation of satellites.

2.3 The Conference noted the importance of the good quality of national and regional telecommunication systems for NMSs to benefit from IT. It also noted the serious deficiencies in the collection and exchange of data and products in Africa.

2.4 To address the data and product exchange problem, the Conference noted that a Regional Meteorological Data Communication Strategy and Rehabilitation and Capacity building of the Basic Meteorological Systems in Africa was being developed by the Working Group on the Planning and implementation of the World Weather Watch in RA 1 for approval by the Association for implementation by Members with the support of WMO. The Conference requested the Working Group to be dynamic in the development and implementation of the strategy. It supported the initiative and recommended that relevant and affordable Information Technology should be taken into account in the Strategy to enable particularly the less developed NMSs in Africa to benefit from the facilities of the WMO basic meteorological systems. In this context, WMO should enhance its training activities in the use of IT.

2.5 NMSs in Africa have, up to now, largely been left out on the developments in data processing and forecasting technology due to limitation of resources. NMSs should benefit from establishment of networks of researchers coordinated through RSMCs and other appropriate centres and institutions, which should have appropriate high-end workstation/PC facilities. Capability of NMSs to run NWP models, and to interpret and use the output of these models should therefore be enhanced. The products they produce should be useful, easy to use and relevant to customers.

2.6 The Conference noted that there was a need for NMSs to train meteorological personnel on Information Technology in order to fully exploit and benefit from the new technology. In this regard, WMO, in collaboration with the RMTCs, DMCs and ACMAD, could develop the appropriate training programmes.

2.7 The Conference was informed of the status of MSG, which would be launched by EUMETSAT in 2002. The Conference welcomed that MSG satellites would have enhanced capabilities to enable the monitoring of more parameters. The Conference commended EUMETSAT to arrange for the smooth transition in order to ensure continuity of observations.

2.8 The Conference expressed appreciation to the PUMA Task Force for its efforts in resource mobilization to assist most countries in Africa acquire the ground equipment for the MSG. A total of 47 countries would benefit from the PUMA project through the funding by the EU. It was reported that WMO, in collaboration with other development partners, was putting in place a financial arrangement to integrate the remaining countries that would not benefit from E.U. assistance.

2.9 The Conference appreciated the willingness of the EU to fund the PUMA project and called for a swift decision to be taken in this regard.

2.10 Concerning the management structure in the implementation of the PUMA project, the Conference was informed that a Project Steering Committee would be established. The host country, Kenya, would be the Delegated Regional Authorizing Officer and a Project Management Unit was to be established. In this regard, the Conference:

- (a) Noted that the work of the PUMA Task Force was entering a critical phase of implementing the Project after the approval of the funding by the EU. In this regard, the Conference endorsed the membership of PUMA as follows:
  - (i) Chairperson: Mr E.A. Mukolwe
  - (ii) Members:
    - Five, representing subregional economic grouping Secretariats (CEMAC, ECOWAS, IGAD, SADC, IOC).
    - Six representing the meteorological community from the

subregional economic groupings (CEMAC, ECOWAS, IGAD, SADC,IOC), and North Africa.

- EUMETSAT representative.
  - WMO representative.
  - ACMAD representative
  - Invited Member: President of WMO Regional Association 1 (Africa)
- (b) Agreed that the PUMA Task Team should report to the Directors of NMSs in Africa through the president of RA 1:
- (c) Encouraged WMO and PUMA to continue with their efforts to ensure that the countries not covered by the EU funding are not left out when the MSG becomes operational:
- (d) Requested PUMA to ensure a smooth transition to MSG and consequently noted the need for EUMETSAT to confirm its previous decision to ensure a three-year overlap period between the current METEOSAT Programme and MSG:
- (e) Encouraged WMO and EUMETSAT to continue supporting Members in Africa to ensure sustained reception and use of satellite products:

2.11 The Conference agreed that the ACMAD, and RANET would contribute significantly in delivery of meteorological products to end-users and in particular to farmers to enhance agricultural practices in support of food security. In this respect, the Conference requested WMO and Member countries to support its implementation.

2.12 The Conference noted with satisfaction that the programmes proposed in the ACMAD implementation plan were relevant for the future needs of NMSs. It appreciated the achievements of the ACMAD demonstration phase as a whole and in particular, underscored the relevance of the RANET initiative, which has proven to be simple and easy to operate, affordable, convenient and an effective tool that meets the needs of the NMSs to deliver meteorological information and products to the end-users, even in remote rural areas. Its low cost and portability makes it handy and would allow the NMS to contribute fully in poverty alleviation in rural Africa, in natural disaster preparedness and mitigation. Considering these demonstrated achievements, the Conference recommended that ACMAD:

- (a) Publish a brochure of all available technologies and the strategies for implementing them;
- (b) Carry out a capacity building programme that would ensure all NMSs were able to operate available tools and thus ensure sustainability;
- (c) Work in coordination with NMSs and develop a RANET Pilot Project for each country within the framework of poverty alleviation as demonstrated in Niger;

2.13 The Conference proposed that the Working Group on the Planning and Implementation of the World Weather Watch in RA I undertake an evaluation of the whole RANET system with a view to make recommendations that would address technical issues of product type, delivery rates and capacity etc., and allow NMSs prepare adequately for its effective implementation.

2.14 The Conference emphasized the importance of seasonal forecasts for several socio-economic applications. It appreciated the organization of climate outlook forums through the WMO CLIPS Project and recommended for its continuation through appropriate and sustainable institutional arrangements. The Conference recommended to NMSs to develop expertise in the area of seasonal forecasting and to create networks with the users of the forecast.

2.15 Within the context of modern information technologies, the Conference noted with appreciation the various HYCOS projects in Africa for the collection, processing and dissemination of water resources related information. It encouraged Members in Africa and WMO to continue the development and implementation of the HYCOS projects.

2.16 The Conference encouraged NMSs to harness urgently and more effectively the facilities and opportunities accorded by the electronic media, television and radio to disseminate weather forecasts and warnings.

2.17 The Conference encouraged the use of the experts in the Region to reinforce the capacities of the NMSs for utilization of new technologies.

### **3. STRENGTHENING OF NMSs TO PROVIDE ACCURATE AND TIMELY INFORMATION TO END-USERS, INTERACTIONS BETWEEN THE END-USERS AND INFORMATION PROVIDERS**

3.1 Considering the problems and uncertainties in data and information, the Conference recommended the following actions be taken by all concerned:

- (a) Promoting public awareness on the need and capacity to apply meteorological information to economic and social development;
- (b) Promoting user-tailored meteorological data and information and thus ensuring that NMSs meet users' requirements and needs by producing and distributing accurate information on warnings and forecasts;
- (c) Increasing research on environmental impacts on socio-economic systems;
- (d) Organizing better channels of communication between meteorologists and decision makers (urgent need for transforming and eliminating bureaucratic processes and creating institutional basis for partnership between decision makers and NMSs); and

- (e) Establishing National Meteorological Societies strongly supported by NMSs.

3.2 Considering the important role of meteorology in national policy and socio-economic development planning, the Conference reviewed the meteorological application activities and recommended the following:

- (a) The establishment of synergies between the meteorological programmes and the national programme concerning the socio-economic sector, particularly in relationship to poverty alleviation;
- (b) The adoption of global and integrated approach in preparation of strategic development plan for meteorology taking into account the framework of Agenda 21;
- (c) The strengthening of national capabilities in the area of formulation of coherent and integrated programmes;
- (d) The adaptation of meteorological programmes to the criteria of funding mechanisms such as the GEF; and
- (e) Strengthening the capacities and resources of WMO subregional offices and enhancing of collaboration with subregional economic groupings.

3.3 The Conference noted the occurrence of disastrous climate and weather-related events in several African countries, which were causing serious disruption of life and socio-economic development. NMSs should, therefore, be more involved in the management of these disasters. The conference recommended the following:

- (a) The improvement of dissemination mechanisms of early warning towards the users and the population including via modern means such as the Internet and the tools of the RANET project;
- (b) A major shift from reacting to hazards to the reduction of vulnerability, in line with the ISDR and considering the increasing social, economic and environmental cost of natural disasters on the African continent;
- (c) Institutional strengthening at a national level to ensure all the ministries and constituencies that are receiving and providing disaster information do so in a coordinated fashion; and
- (d) NMSs should continue working closely with national disaster management programmes, in particular with regard to risk reduction activities. Meteorologists and hydrologists increasingly need to be involved in the multidisciplinary and inter-sectoral efforts to assess risk. (They should provide appropriate information on occurrence of risks).

#### **4. ALTERNATIVE SERVICE DELIVERY AS RELATED TO SERVICES PROVIDED BY NMSs**

4.1 The Conference agreed that meteorological services were basic community necessities, supporting the safety of life and property, and therefore their provision has always been accepted as a responsibility of government.

4.2 The Conference proposed that cost recovery and alternative ways of provision of services by NMSs should be implemented in the most efficient and cost-effective manner without destabilization of the national and international system. Where applicable, the basis for allocating charges and fees should be cost-related and high-level transparency with customers should be observed and consultations with customers encouraged.

4.3 Despite many constraints and challenges the Conference agreed that NMSs in Africa could still improve on the provision of meteorological services. In this regard, the Conference recommended that exchange of experiences among African NMSs should be encouraged. The experiences of Ethiopia, Morocco and United Republic of Tanzania were found to be good examples regarding cost recovery schemes.

4.4 The Conference was informed of the result of the work of the Task Group on the Implementation of WMO Resolution 40 (Cg-XII) and related issues in RA I, which was distributed in the form of a guide to RA I Members and its update on the basis of the decisions of Thirteenth Congress (1999) and the fifty-second session of the Executive Council (May 2000). The Conference congratulated the Task Group for the important work accomplished. It endorsed the recommendations of the Task Group and encouraged Members to implement these recommendations.

#### **5. SUPPORTING MEASURES FOR THE DEVELOPMENT OF NMSs IN AFRICA**

5.1 The Conference noted the increasing resource requirements of the NMSs in order for them to maintain adequate infrastructure and provide the services and products required by the user community as well as by decision makers. In this regard, it noted that new trends in the provision of development assistance had emerged, thus impacting negatively on the level of resources allocated in support of national, regional and international programmes and projects in meteorology, hydrology and related fields. The Conference therefore agreed on the need to develop and implement new strategies for mobilizing new resources for the development of NMSs in the Region.

5.2 The Conference noted the potential for mobilization of more resources at national level and encouraged Directors of NMSs to ensure that their requirements and concerns are taken into account when relevant national programmes are being developed and funded. Collaboration with other institutions in areas of common interest

could also generate revenues. Continued efforts should be made by NMSs to secure, through cost recovery measures, funds in compensation for services rendered.

5.3 The Conference agreed that in addition to national resources, several potential sources of funding such as GEF, UNDP, trust funds and multilateral and bilateral funding agencies could be tapped by NMSs. In this regard, the Conference recommended that the WMO Secretariat continue to assist Members by providing guidance and support to the countries in liaising with these sources of funding and in the formulation and submission of appropriate project proposals. In particular, the Conference recommended that further support be provided to ensure that, at the national level, the requirements of the NMSs are included in the priority programmes of the countries.

5.4 The Conference noted that an MOU was signed between WMO and the World Bank to strengthen cooperation between the two institutions in the areas of natural disaster preparedness and mitigation, climate change, water resources and the protection of the environment. The Conference recommended that Directors of NMSs make full use of the potential offered by the World Bank and regional development banks such as the African Development Bank to secure funding through grants or loans in support of their relevant activities.

5.5 The Conference recommended that priority attention be given to resource mobilization and to assigning resources to those areas that may generate greater benefits in terms of governmental and public support.

The Conference reiterated the need to establish solid partnerships between the NMSs concerned, the

WMO Secretariat, funding institutions and relevant intergovernmental organizations in order to avoid duplication of efforts and to maximize the use of available resources for NMSs. In this connection, the Conference recommended that more active collaboration be established and maintained between WMO and economic groupings and organizations such as ASECNA, CILSS, ECOWAS, NBA, IGAD, SADC, CEMAC, COMESA, EAC, IOC and AMU. Such collaboration will enhance the development and implementation of regional programmes and the support to regional and subregional institutions such as ACMAD, AGRHYMET and the DMCs.

5.7 The Conference took note of the pilot clearing house system set up by IGAD to facilitate the access and search of meteorological and other geospatial meta-data over the Internet.

5.8 The Conference recommended that special attention continue to be provided to countries affected by natural disasters in order to ensure that the most urgent requirements for the re-establishment of operations are met as soon as possible and that support is provided for the medium term requirements of the NMSs concerned. In this regard, the Conference recommended that the NMSs participate actively in the scheme adopted by the WMO Executive Council for responding to emergencies when countries are affected by natural disasters.

5.9 The Conference recognized the efforts made by the WMO Secretariat to assist NMSs of the Region and encouraged the Secretariat to continue providing support to NMSs in the area of resource mobilization.

APPENDIX A

LIST OF PERSONS ATTENDING THE SESSION

1. OFFICERS OF THE SESSION

M. Mhita President

2. REPRESENTATIVES OF MEMBERS OF RA I

<i>Member</i>	<i>Name</i>	<i>Capacity</i>
<b>Algeria</b>	F. Ounnar	Principal Delegate
	S. Meghzi	Delegate
	A. Kirouane	Delegate
	A. Lagha	Delegate
	H. Oukaci	Delegate
	A. Ould-Amara	Delegate
<b>Benin</b>	A.F. Lawson	Principal Delegate
<b>Botswana</b>	G.K. Ramothwa	Principal Delegate
	(Ms)	
<b>Burkina Faso</b>	N.F. Ouattara	Principal Delegate
<b>Cape Verde</b>	J. Silva	Principal Delegate
<b>Congo</b>	P. Ondongo	Principal Delegate
<b>Côte d'Ivoire</b>	A. Kignaman-Soro	Principal Delegate
<b>Democratic Republic of the Congo</b>	A.V. Paluku	Principal Delegate
<b>Djibouti</b>	Osman Saad Said	Principal Delegate
<b>Egypt</b>	M. Arafa,	Principal Delegate
<b>Ethiopia</b>	B. Kassahun	Principal Delegate
<b>France</b>	J.-P. Beysson	Principal Delegate
	F. Duvernet	Alternate
	L. Zerbib	Delegate
	L. Perron	Delegate
<b>Gabon</b>	A.R. Mackosso	Principal Delegate
	(Ms)	
<b>Ghana</b>	F.P. Mote	Principal Delegate
	J. Wellens-Mensah	Alternate
<b>Guinea</b>	M.L. Bah	Principal Delegate
<b>Kenya</b>	J.R. Mukabana .	Principal Delegate
	W.M. Chebukaka	Alternate
	J.K. Waititu	Delegate
	W.S Mutua	Delegate
<b>Lesotho</b>	B.T. Sekoli	Principal Delegate
<b>Madagascar</b>	N. Raelinera	Principal Delegate
<b>Malawi</b>	M.J. Chitimbe .	Principal Delegate
	D.R. Kamdonyo	Alternate
<b>Mali</b>	M. Konate	Principal Delegate
<b>Mauritius</b>	S.N. Sok Appadu	Principal Delegate
<b>Morocco</b>	A. Diouri	Principal Delegate
<b>Mozambique</b>	F.D. Lucio	Principal Delegate
<b>Namibia</b>	F. Uirab	Principal Delegate
	E. Kambueza	Alternate

<i>Member</i>	<i>Name</i>	<i>Capacity</i>
<b>Niger</b>	M. Labo	Principal Delegate
	I. Also	Delegate
<b>Nigeria</b>	L.E. Akeh	Principal Delegate
	A.C. Anuforum	Delegate
	O.O. Odumosu	Delegate
	I.D. Nnodu	Delegate
	J. Chabo	Adviser
<b>Portugal</b>	O. Rasquinho	Principal Delegate
<b>Rwanda</b>	D. Musoni	Principal Delegate
<b>Sao Tome and Principe</b>	A.M. Fernandes Santana	Principal Delegate
<b>Senegal</b>	A. Ndiaye	Principal Delegate
<b>South Africa</b>	G. Schulze	Principal Delegate
	M.F. Mashamba	Delegate
	Kamoetie	Delegate
	M. Majodina	Delegate
<b>Spain</b>	J. Segovia	Principal Delegate
<b>Sudan</b>	F.E. Elsayem .	Principal Delegate
	E. Hamed	Delegate
<b>Swaziland</b>	N.P. Dlamini.	Principal Delegate
<b>Togo</b>	A.A. Egbare	Principal Delegate
<b>Uganda</b>	Bwango-Apuuli	Principal Delegate
<b>United Kingdom of Great Britain and Northern Ireland</b>	S. Stringer	Principal Delegate
<b>United Republic of Tanzania</b>	M. Mhita	Principal Delegate
	P.F. Tibaijuka	Alternate
	J.M. Mihayo	Delegate
	M.R. Matitu	Delegate
	K.A. Suleiman	Delegate
	A.R. Kayola	Delegate
	(Ms)	
	B.A.S.	Delegate
	Luhumbika	
	D.G.	Delegate
	Rutashobya	
<b>Zambia</b>	M. Muchinda	Principal Delegate
<b>Zimbabwe</b>	A. Makarau	Principal Delegate

3. REPRESENTATIVES OF MEMBERS OUTSIDE REGION I

<b>Australia</b>	J. Zillman	Observer
<b>Russian Federation</b>	A. Vasiliev	Observer
<b>United States of America</b>	R. Crouthamel	Observer

**4. Representatives of International Organizations**

<i>Organization</i>	<i>Name</i>
<b>International Civil Aviation Organization (ICAO)</b>	B. Sekwati
<b>United Nations Convention to Combat Desertification (UNCCD)</b>	A.S. Cissoko
<b>United Nations Economic Commission for Africa (ECA)</b>	S.M.K. Donkor
<b>World Health Organization (WHO)</b>	A. Nejjar
<b>World Health Organization (WHO) African Centre of Meteorological Applications for Development (ACMAD)</b>	A.D. Zwane M. Boulahya
<b>African Centre of Meteorological Applications for Development (ACMAD)</b>	P. Ladoy
<b>Agency for Air Navigation Safety in Africa and Madagascar (ASECNA)</b>	A. Miampika
<b>Agency for Air Safety in Africa and Madagascar (ASECNA)</b>	A.C. Andriamalaza (Ms)
<b>Southern African Development Community (SADC)</b>	A.S. Dlamini
<b>Southern African Transport and Communications Commission (SATCC)</b>	E.D. Dlamini

**5. Secretariat**

<i>Capacity</i>	<i>Name</i>
<b>Secretary-General</b>	G.O.P. Obasi
<b>Secretary-General's Representative</b>	M. Jarraud E. Mukolwe
<b>Director, Technical Cooperation Department</b>	H. Diallo
<b>Director, World Climate Programme</b>	K. Davidson K. Konare
<b>Acting Director, World Weather Watch – Applications Department</b>	E. Sarukhanian
<b>Chief, Fellowship Division</b>	M. Hassan M. Mlaki M. Tawfik H. Teunissen M. Boulama S. Njoroge E. Dar-Ziv (Ms)

## APPENDIX B

### AGENDA

<i>Agenda Item</i>	<i>Document No.</i>	<i>PINK No., submitted by</i>	<i>Resolutions and recommendations adopted</i>
<b>1. OPENING OF THE SESSION</b>		1, president of RA I	
<b>2. ORGANIZATION OF THE SESSION</b>		2, president of RA I	
2.1 Consideration of the report on credentials			
2.2 Adoption of the agenda	2.2(1); 2.2(2),		
2.3 Establishment of committees			
2.4 Other organizational matters			
<b>3. REPORT BY THE PRESIDENT OF THE ASSOCIATION</b>	3	3, president of RA I	
<b>4. WORLD WEATHER WATCH (WWW) PROGRAMME - REGIONAL ASPECTS</b>			
4.1 WWW Planning and Implementation Programme, RA I Strategy for Enhancement of the WWW-Basic Systems, including the report of the chairperson of the Working Group on Planning and Implementation of the WWW (WG/PIW) in Region I	4.1(1); 4.1(2)	4.1(1); 4.1(2), co-chairperson, Committee A	Res. 1
4.2 Observing systems, including Instruments and Methods of Observation Programme (IMOP) and WMO Satellite Activities (WMOSA)	4.2(1)	4.2(1), co-chairperson, Committee A	Res. 2, 3
Report of the Rapporteur on Regional Aspects of Instrument Development, Related Training and Capacity Building	4.2(2)	4.2(2), co-chairperson, Committee A	Res. 4
Report of the Rapporteur on Solar Radiation	4.2(3)	4.2(3), co-chairperson, Committee A	Res. 5
4.3 Information Systems and Services (ISS), including Operational Information Service (OIS), Data Management(DM) and Regional Codes	4.3	4.3, co-chairperson, Committee A	
The RETIM Africa Project	4.3(2)	4.3(2), co-chairperson, Committee A	
4.4 Data-Processing and Forecasting Systems (DPFS), including Emergency Response Activities (ERA)	4.4	4.4, co-chairperson, Committee A	
4.5 Tropical Cyclone Programme (TCP), including the report of the chairperson of RA I Tropical Cyclone Committee (TCC)	4.5	4.5, co-chairperson, Committee A	Res. 6
<b>5. WORLD CLIMATE PROGRAMME (WCP) - REGIONAL ASPECTS</b>	5(1)	5(1), co-chairperson, Committee B	Res. 7
5.1 Climate Programme Coordination and Support Activities (CPCSA), including the report of the Rapporteurs on Climate Change	5(1)		



<i>Agenda Item</i>	<i>Document No.</i>	<i>PINK No., submitted by</i>	<i>Resolutions and recommendations adopted</i>	
5.2	World Climate Data and Monitoring Programme (WCDMP)	5(1)		
5.3	World Climate Applications and Services Programme (WCASP), including Climate Information and Prediction Services (CLIPS) and the reports of the Rapporteurs	5(1)		
5.4	World Climate Research Programme (WCRP)	5.4	5.4, co-chairperson, Committee B	
5.5	Global Climate Observing System (GCOS)	5.5	5.5, co-chairperson, Committee B	
<b>6.</b>	<b>ATMOSPHERIC RESEARCH AND ENVIRONMENT PROGRAMME (AREP) – REGIONAL ASPECTS</b>	6	co-chairperson, Committee A	
6.1	Support to ozone and other environment-oriented conventions	6		
6.2	Global Atmosphere Watch (GAW)	6		
6.3	World Weather Research Programme (WWRP)	6		
6.4	Tropical Meteorology Research Programme (TMRP)	6		
6.5	Programme on Physics and Chemistry of Clouds and Weather Modification Research	6		
<b>7.</b>	<b>APPLICATIONS OF METEOROLOGY PROGRAMME (AMP) – REGIONAL ASPECTS</b>			
7.1	Public Weather Services Programme (PWSP)	7.1	7.1, co-chairperson, Committee A	
7.2	Agricultural Meteorology Programme (AgMP), including the report of the Rapporteurs	7.2	7.2, co-chairperson, Committee B	Res. 8
7.3	Aeronautical Meteorology Programme (AeMP)	7.3	7.3, co-chairperson, Committee A	Res. 9
7.4	Marine Meteorology and Associated Oceanographic Activities Programme (MMAOAP), including the report of the Rapporteurs	7.4(1); 7.4(2)	7.4(1), co-chairperson, Committee A	Res. 10; 11; 12; 13
<b>8.</b>	<b>HYDROLOGY AND WATER RESOURCES PROGRAMME (HWRP) – REGIONAL ASPECTS, INCLUDING THE REPORT OF THE CHAIRPERSON OF THE RA I WORKING GROUP ON HYDROLOGY (WGH)</b>	8(1)	8(1), co-chairperson, Committee B	Res. 14
	Report of the chairperson of the Working Group on Hydrology	8(2)		
<b>9.</b>	<b>EDUCATION AND TRAINING PROGRAMME (ETRP) – REGIONAL ASPECTS</b>	9	9, co-chairperson, Committee B	15
<b>10.</b>	<b>TECHNICAL COOPERATION PROGRAMME (TCOP) – REGIONAL ASPECTS</b>	10	10, co-chairperson, Committee B	

<i>Agenda Item</i>	<i>Document No.</i>	<i>PINK No., submitted by</i>	<i>Resolutions and recommendations adopted</i>
<b>11. INFORMATION AND PUBLIC AFFAIRS (IPA) PROGRAMME - REGIONAL ASPECTS</b>	11	11, co-chairperson, Committee B	
<b>12. LONG-TERM PLANNING (LTP) - REGIONAL ASPECTS</b>	12	12, president of RA I	
<b>13. ROLE AND OPERATION OF NATIONAL METEOROLOGICAL AND HYDROLOGICAL SERVICES (NMHSs)</b>	13	13, president of RA I	
<b>14. NATURAL DISASTER REDUCTION - REGIONAL ASPECTS</b>	14	14, president of RA I	
<b>15. INTERNATIONAL EXCHANGE OF DATA AND PRODUCTS</b>	15	15, president of RA I	
<b>16. OTHER REGIONAL ACTIVITIES</b>			
16.1 Internal matters of the Association	16.1(1); 16.1(2)	16.1(1), 16.1(2) president of RA I	Res. 16
16.2 Cooperation with regional and international organizations	16.2	16.2, president of RA I	Res. 17
16.3 Outcome and follow-up of the World Summit on Sustainable Development (WSSD)	16.3	16.3, president of RA I	
16.4 Preparation for the Fourteenth World Meteorological Congress	16.4	16.4, president of RA I	Res. 18; 19
16.5 Sixth Technical Conference on Management for Development of Meteorological Services in Africa	16.5	16.5, president of RA I	
<b>17. WMO REGIONAL AND SUBREGIONAL OFFICES FOR AFRICA</b>	17	17, president of RA I	
<b>18. SCIENTIFIC LECTURES AND DISCUSSIONS</b>	18	18, president of RA I	
<b>19. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE ASSOCIATION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS</b>	19	19, rapporteur	Res. 20
<b>20. ELECTION OF OFFICERS</b>		20, president of RA I	
<b>21. DATE AND PLACE OF THE FOURTEENTH SESSION</b>		21, president of RA I	
<b>22. CLOSURE OF THE SESSION</b>		22, president of RA I	

## APPENDIX C

### LIST OF ABBREVIATIONS

5LTP	Fifth WMO Long-term Plan
6LTP	Sixth WMO Long-term Plan
7LTP	Seventh WMO Long-term Plan
ACC	Advisory Committee on Coordination
ACMAD	African Centre of Meteorological Applications for Development (Niamey, Niger)
AeMP	Aeronautical Meteorological Programme
AfDB	African Development Bank
AFTN	aeronautical fixed telecommunications network
AGM	Annual Global Monitoring
AgMP	Agricultural Meteorology Programme
AGRHYMET	Regional Training Centre for Agrometeorology and Operational Hydrology and their Applications (Niamey, Niger)
AMCOW	African Ministerial Council on Water
AMDAR	Aircraft Meteorological Data Relay
AMESD	African Monitoring of the Environment for Sustainable Development
AMMA	African Monsoon Multidisciplinary Analysis
AMOSSG	Aerodrome Meteorological Observing Systems Study Group
AMSS	Automatic Message Switching System
AMU	Arab Maghreb Union
ANEEL	Agencia Nacional de Energia Eléctrica (Brazil)
AOC-HYCOS	West and Central Africa Hydrological Cycle Observing System
APFM	Associated Programme on Flood Management
APT	automatic picture transmission
ARCHISS	Archival Climate History Project
AREP	Atmospheric Research and Environment Programme
ASAP	Automated Shipboard Aerological Programme
ASDAR	Aircraft to Satellite Data Acquisition and Relay
ASEAN	Association of South-East Asian Nations
ASECNA	Agency for Air Navigation Safety in Africa and Madagascar (Dakar, Senegal)
ASMET	African Satellite Meteorological Education and Training
AVHRR	advanced very high resolution radiometer
AWG	Advisory Working Group
AWS	Automatic Weather Station
BOM	Australian Bureau of Meteorology
bps	bits per second
CACGP	Commission on Atmospheric Chemistry and Global Pollution (IAMAP)
CAeM	Commission for Aeronautical Meteorology
CAF	Corporation Andina de Fomento
CAGM	Commission for Agricultural Meteorology
CAL	Computer-aided learning
CAS	Commission for Atmospheric Sciences
CATCH	Coupling of the Tropical Atmosphere and Hydrological Cycle (original: French)
CBCG	Education, Training and Capacity Building Coordination Group
CBS	Commission for Basic Systems
CCD	Cold cloud duration
CCI	Commission for Climatology
CDMS	Climate Database Management System
CEMAC	Economic and Monetary Community of Central Africa

CEN-SAD	Community of Sahel-Saharan States
CHy	Commission for Hydrology
CILSS	Permanent Inter-State Committee on Drought Control in the Sahel (Ouagadougou, Burkina Faso)
CIMO	Commission for Instruments and Methods of Observation
CLICOM	Climate Computing
CLIMAG	Task Force on Climate Prediction and Agriculture
CLIMAR	Workshop on Advances in Marine Climatology
CLIPS	Climate Information and Prediction Services
CLIVAR	World Climate Variability and Predictability
CMA	China Meteorological Administration
CMM	Commission for Marine Meteorology
Co-Com	Coordinating Committee (of SCHOTI)
COMESA	Common Market for Eastern and Southern Africa
COP	Conference of the Parties
CPPS	Permanent Commission for the South Pacific
CRIA	Agency of Portuguese-Speaking Countries for Climate and Related Environmental Issues
CSM	Commission for Synoptic Meteorology
DARE	Data Rescue
DBCP	Data Buoy Cooperation Panel
DCP	data collection platform
DCS	Data Collection System
DDB	Distributed Database
DM	Data Management
DMC	Data Management Centre
DPFS	Data-processing and Forecasting Systems
DRS	data relay satellite
DVB	Digital Video Broadcast
DWD	Deutscher Wetterdienst
EAC	East African Community
EART	Emergency Assistance Response Team
EC	European Commission
EC	Executive Council
ECA	Economic Commission for Africa (UN)
EC-AGCE	Executive Council Advisory Group on Climate and Environment
EC/AGE	Executive Council Advisory Group on the Exchange of Meteorological and Related Data and Products
ECMWF	European Centre for Medium Range Weather Forecasts
ECOSOC	Economic and Social Council (UN)
ECOWAS	Economic Community of West African States
EDF	European Development Fund
EDRG	Emergency and Disaster Response Group
ENSO	El Niño/Southern Oscillation
EPS	Ensemble Prediction System
ERA	Emergency Response Activities
ESA	European Space Agency
ESCAP	Economic and Social Commission for Asia and the Pacific (UN; formerly ECAFE)
ET	Expert Team
ETR	Education and Training
ETRP	Education and Training Programme
EU	European Union
EUMETNET	European Meteorological Services Network
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites

FLG	filling gap
FRIEND	Flow Regimes from International Experimental and Network Data Sets (UNESCO)
GAW	Global Atmosphere Watch
GAWTEC	GAW Training and Education Centre
GCOS	Global Climate Observing System
GDPS	Global Data-processing System
GDSIDB	Global Digital Sea-Ice Data Bank
GEF	Global Environment Facility
GEWEX	Global Energy and Water Cycle Experiment (within WCRP)
GIS	Geographical Information System
GLOSS	Global Sea-level Observing System
GMDSS	Global Maritime Distress and Safety System
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
GOS	Global Observing System
GPCC	Global Precipitation Climatology Centre (WCRP)
GPS	Global Positioning System
GRDC	Global Runoff Data Centre
GSN	GCOS Surface and Upper-Air Networks
GTN-H	Global Terrestrial Network – Hydrology
GTS	Global Telecommunication System
GTSP	Global Temperature Salinity Profile Programme
GUAN	GCOS Upper-Air Network
GURME	GAW Urban Research Meteorological Environment Project
GWP	Global Water Partnership
HA	Hydrological Advisor
HF/SSB	high frequency/single side band
HIRS	high resolution infra-red sounder
HNRC	HOMS National Reference Centre
HOMS	Hydrological Operational Multipurpose System
HR	high resolution
HRIT	High Rate Information Transmission
HRM	HOMS Reference Manual
HRPT	high resolution picture transmission
HWRP	Hydrology and Water Resources Programme
HYCOS	Hydrological Cycle Observing System
IABM	International Association of Broadcast Meteorology
IAEA	International Atomic Energy Agency
IAHR	International Association of Hydraulic Engineering and Research
IAHS	International Association of Hydrological Sciences
IAMAP	International Association of Meteorology and Atmospheric Physics
IATA	International Air Transport Association
IATF	Inter-Agency Task Force
IAVW	International Airways Volcano Watch
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazil)
IBPIO	International Buoy Programme for the Indian Ocean
ICAO	International Civil Aviation Organization
ICAP	Interim Committee of ASDAR Participants
ICB	International Congress on Biometeorology
ICL	International Consortium on Landslides
ICSU	International Council for Science
ICT	Implementation/Coordination Team

ICTT	Intercommission [or Inter-commission] Task Team
ICUC	International Conference on Urban Climates
IDB	Inter-American Development Bank
IDNDR	International Decade for Natural Disaster Reduction
IFPRI	International Food Policy Research Institute
IFRC	International Federation of Red Cross and Red Crescent Societies
IGAD	Intergovernmental Authority on Development (former IGADD)
IGBP	International Geosphere-Biosphere Programme (ICSU)
IGOSS	Integrated Global Ocean Station System
IGRAC	International Groundwater Resources Assessment Centre
IGWA	Inter-Agency Group on Water in Africa
IHDP	International Human Dimensions Programme on Global Environmental Change
IHE	International Institute for Infrastructural, Hydraulic and Environmental Engineering (Delft)
IHP	International Hydrological Programme (UNESCO)
IMOP	Instruments and Methods of Observation Programme
INDOEX	Indian Ocean Experiment
INMARSAT	International Maritime Satellite System
INMET	National Meteorological Institute of Brazil (original Portuguese)
INPE	Brazilian Institute for Space Research
IOC	Indian Ocean Commission
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IODC	Indian Ocean Data Coverage
IOM	Instruments and Observing Methods
IOS	IGOSS Observing System
IP	Internet Protocol
IPA	Information and Public Affairs (WMO)
IPC	international pyrheliometer comparison
IPCC	Intergovernmental Panel on Climate Change
ISABP	International South Atlantic Buoy Programme
ISCS	International Satellite Communication Systems
ISDR	International Strategy for Disaster Reduction
ISO	International Organization for Standardization
ISS	Integrated WWW System Study
IT	Information Technology
ITU	International Telecommunications Union
IWTC	International Workshop on Tropical Cyclones
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM In Situ Observing Platform Support Centre
kb/s	kilobits per second
LAM	limited area model
LAN	Local Area Network
LBA	Large-scale Biosphere-Atmosphere Experiment in Amazonia
LDCs	least developed countries
LRF	long range forecasting
LRIT	Low Rate Information Transmission (Sat.) (formerly WEFAX)
LRPT	Low Rate Picture Transmission
LTP	Long-term Plan
mb/s	Megabits per second
MCSS	Marine Climatological Summaries Scheme
MDD	Meteorological Data Distribution
MERCOSUR	Southern Common Market

METEOREX	Exhibition of Meteorological Instruments, Equipment and Services
METEOSAT	EUMETSAT series of meteorological geostationary satellites
MMAOAP	Marine Meteorology and Associated Oceanographic Activities Programme
MOS	Model Output Statistics
MOU	Memorandum of Understanding
MPERSS	Marine Pollution Emergency Response Support System
MRQ	minimum requirement
MSG	METEOSAT second generation
MTN	Main Telecommunication Network
NASA	National Aeronautics and Space Administration (USA)
NBA	Niger Basin Authority (Niamey, Niger)
NCDC	National Climatic Data Center (USA)
NEPAD	New Partnership for African Development
NESDIS	National Environmental Satellite, Data and Information Service
NGO	non-governmental organization
NMC	National Meteorological Centre
NMHS	National Meteorological and Hydrological Service
NMS	National Meteorological or Hydrometeorological Service
NMTC	National Meteorological Training Centre
NMTN	National Meteorological Telecommunication Network
NOAA	National Oceanic and Atmospheric Administration
NRC	National Radiation Centres
NWP	Numerical Weather Prediction
OAS	Organization of American States
OAU	Organization of African Unity
OIS	Operational Information Service
OPAG	Open Programme Area Group
OPAG/PWS	OPAG on Public Weather Services
PC	Personal Computer
PCCWMR	Physics and Chemistry of Clouds and Weather Modification Research
PIRATA	Pilot Research moored Array in the Tropical Atlantic
PMO	Port Meteorological Officer
PR	Permanent Representative
PREANDINO	Regional Andean Programme for Risk Prevention and Mitigation
PROMET	Provision of Meteorological Information Required by Civil Aviation
PUMA	Task Team on the Preparation for the Use of Meteosat Second Generation in Africa
PWS	Public Weather Services
PWSP	Public Weather Services Programme
QA/SAC	Quality Assurance/Science Activity Centre
R&D	Research and Development
RA	Regional Association
RAFC	Regional Area Forecast Centre
RANET	Radio and Internet
RAOB	Radiosonde Observing System
RBCN	Regional Basic Climatological Network
RBSN	Regional Basic Synoptic Network
RCC	Regional Climate Centre
RCOF	Regional Climate Outlook Forum
RETIM	Réseau européen de transmission d'information météorologique (par satellite) (Original: French)
RHA	Regional Hydrological Advisor
RIC	Regional Instrument Centre

RMC	Regional Meteorological Centre
RMDCN	Regional Meteorological Data Communication Network
RMTC	Regional Meteorological Training Centre
RMTN	Regional Meteorological Telecommunication Network
ROSHYDROM ET	Russian Federal Service for Hydrometeorology and Environment Monitoring
RPC	Regional Pyrheliometer Comparison
RRC	Regional Radiation Centre
RSMC	Regional Specialized Meteorological Centre
RTH	Regional Telecommunication Hub
RTT	radioteletype
SADC	Southern African Development Community (formerly SADCC)
SADIS	(WAFS) Satellite Distribution System (ICAO)
SATCC	Southern African Transport and Communications Commission
SATCOM	Satellite Communications Agency (US Army)
SBSTA	Subsidiary Body for Scientific and Technological Advice
SBUV	solar backscatter ultraviolet instrument
SCHOTI	Standing Conference of Heads of Training Institutions of National Meteorological Services
SDSIDS	Sustainable Development of Small Island Developing States
SECS	Secretariat External Communications Strategy
SIGWX	Significant Weather
SMM	Special MTN Monitoring
SOLAS	International Convention for the Safety of Life at Sea (IMO)
SOOP	Ship-of-Opportunity Programme
SPARC	Stratospheric Processes and their Role in Climate
STAR 4	Satellite Telecommunication and Analysis for Region IV
START	SysTem for Analysis, Research and Training
SWIC	Severe Weather Information Centre
TAF	Terminal Aerodrome Forecast
TCC	Tropical Cyclone Committee
TCDC	technical co-operation among developing countries
TCO	Technical Cooperation Department
TCOP	Technical Cooperation Programme
TCP	Tropical Cyclone Programme
TCP/IP	Transmission Control Protocol/Internet Protocol
TECO	Technical Conference on Meteorological and Environmental Instruments and Methods of Observation
THORPEX	THE Observing system Research and Predictability EXperiment
TMRP	Tropical Meteorology Research Programme
Trend	Training, the Environment and New Developments
TRMM	Tropical Rainfall Measuring Mission
TRQ	target requirement
TRUCE	Tropical Urban Climate Experiment
TSP	telecommunication service provider
UBC	Urban and Building Climatology
UKSF	(UK) satellite facilities
UNCCD	United Nations Convention to Combat Desertification
UNCED	UN Conference on Environment and Development
UNCSD	UN Commission on Sustainable Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization



UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNV	United Nations Volunteers
USAID	U.S. Agency for International Development
UTC	universal time coordinated
UV	Ultraviolet
VAACS	Volcanic Ash Advisory Centres
VACS	CLIVAR Working Group on Variability of the African Climate System
VCP	Voluntary Cooperation Programme
VHF	Very High Frequency
VOS	Voluntary Observing Ship
VOSClm	Voluntary Observing Ships (VOS) Climate Subset Project
VPN	Virtual Private Network
VSAT	Very Small Aperture Terminal
VTL	Virtual Training Library
W AFC	World Area Forecast Centre
WAFS	World Area Forecast System
WAN	Wide Area Network
WB	World Bank
WCASP	World Climate Applications and Services Programme
WCDMP	World Climate Data and Monitoring Programme
WCP	World Climate Programme
WCRP	World Climate Research Programme
WDC	World Data Centre
WEFAX	Weather Facsimile Experiment
WGH	Working Group on Hydrology
WG/PIW	Working Group on Planning and Implementation of the WWW
WHYCOS	World Hydrological Cycle Observing System
WIOMAP	Western Indian Ocean Marine Applications Project (WMO/IOC)
WMC	World Meteorological Centre
WMO	World Meteorological Organization
WMOSA	WMO Satellite Activities
WOC	World Oceanographic Centre
WRC	World Radiation Centre
WRDC	World Radiation Data Centre
WRR	World Radiometric Reference
WSSD	World Summit on Sustainable Development
WWAP	World Water Assessment Programme
WWC	World Water Council
WWDR	World Water Development Report
WWF	World Water Forum
WWIS	World Weather Information Service
WWRP	World Weather Research Programme
WWW	World Weather Watch

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