

WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR CLIMATOLOGY

TWELFTH SESSION

GENEVA, 4–14 AUGUST 1997

ABRIDGED FINAL REPORT WITH RESOLUTIONS AND RECOMMENDATIONS

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Secretariat of the World Meteorological Organization - Geneva - Switzerland

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GENERAL SUMMARY OF THE WORK OF THE SESSION

1. OPENING OF THE SESSION (agenda item 1)

1.1 The twelfth session of the Commission for Climatology (CCI) was held at the International Conference Centre (CICG) in Geneva from 4 to 14 August 1997. It was opened at 10 a.m. on 4 August by the president of the Commission, Mr W. J. Maunder (New Zealand). Having expressed the pleasure of the participants at meeting in Geneva, Mr Maunder highlighted a few issues that he suggested should be in focus during that session of the Commission. In particular he mentioned the further development of Climate Information and Prediction Services (CLIPS), the issues related to the deteriorating climatological observational networks and the lack of appropriate quality control of data in the various databases. In conclusion, he stressed the need to place more emphasis on the risks associated with present climate variability as a basis for assessing the potential socio-economic factors of climate change.

1.2 In his opening statement, Professor G. O. P. Obasi, Secretary-General of the World Meteorological Organization (WMO), welcomed the participants to Geneva and pointed to a number of important developments of worldwide significance and of special relevance to the climate-related activities of WMO. In particular he referred to the entering into force of the United Nations Framework Convention on Climate Change (UN/FCCC) and of the International Convention to Combat Desertification, as well as to the Second Assessment Report of the WMO/United Nations Environment Programme (UNEP) Intergovernmental Panel on Climate Change (IPCC).

1.3 Professor Obasi referred to the Special Session of the United Nations General Assembly which had been held in June 1997. The conclusions and recommendations from the review of the implementation of Agenda 21 might have implications for the Commission, especially as Agenda 21 provided a blueprint for action for the protection, proper management and sustainable development of the global environment. With regard to the atmosphere, it was recognized that concern about climate change and climate variability, air pollution and ozone depletion had created new demands for scientific, economic and social information to reduce the remaining uncertainties in those fields. A better understanding and prediction of the various properties of the atmosphere and of the affected ecosystems and their impacts on human health and well-being was necessary. How that interacts with socio-economic factors needed to be studied further. The Secretary-General was pleased to note that CCI had responded to the challenges and opportunities provided by the developments in climatology, and had taken significant steps to ensure that its programme and work plan were adjusted so as to adequately address the many priority areas adopted.

1.4 The Secretary-General continued by drawing attention to some of the major issues on which the views of the session would be sought, including the overall WMO involvement in international developments concerning climate-related matters, the further development of the World Climate Programme (WCP), especially in the context of the *Climate Agenda*, and the focus on the new CLIPS project. Professor Obasi concluded by expressing his conviction that the session would result in a set of recommendations which would contribute substantially to the development of WMO's position and standing in regard to many matters of global concern.

1.5 There were 127 participants at the session, including representatives of 75 Member countries of WMO and four international organizations. A complete list of participants is given in Appendix A to this report.

1.6 The Commission noted with satisfaction that the number of delegations present at the session had increased since the last session; however, it still remained less than the number of Members permanently represented on the Commission. The Commission therefore reiterated the request made at the last session to the president to bring that matter to the attention of the Executive Council.

2. ORGANIZATION OF THE SESSION (agenda item 2)

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

2.1.1 In accordance with General Regulation 22, a list of the persons present and the capacities in which they were attending the session was prepared on the basis of the examination of credentials and presented to the session. This list was unanimously accepted as the report on credentials and it was consequently decided not to establish a Credentials Committee.

2.2 ADOPTION OF THE AGENDA (agenda item 2.2)
Following several amendments to the provisional agenda, the Commission adopted a revised agenda. The agenda of the session is given in Appendix B to this report.

2.3 ESTABLISHMENT OF COMMITTEES (agenda item 2.3)

2.3.1 A Nomination Committee was established, consisting of Messrs W. Kirchhofer (Switzerland), H. Kondo (Japan), J. C. de Moraes (Brazil), A. Rolle (Bahamas), S. I. Avdjushin (Russian Federation), E. Rudel (Austria), Mrs P.M. Lesolle (Botswana) and Ms A.M.S. Catalina (Philippines). Mr Kirchhofer was elected chairman of the Nomination Committee.

2.3.2 A Committee for the Selection of Working Group Members and Rapporteurs was established,

consisting of the following delegates: Mr R. Basher (New Zealand), Mr A. A. Faris (Egypt), Mr A. A. Almakaleh (Republic of Yemen), Mr S. Guoquan (China), Mr J. C. de Moraes (Brazil), Mr J. Laver (United States of America), Ms E. Nieplová (Slovakia), Mr R. Heino (Finland), Mr V. Trenin (Russian Federation), Mr O. Moch (France), Mr H. Kondo (Japan), Mr S. Njoroge (Kenya). Mr Basher was elected chairman of that committee.

2.3.3 In accordance with General Regulation 28, a Coordination Committee was established, consisting of the president and vice-president of the Commission, the chairmen of the committees established for the duration of the session other than the Nomination Committee, and the representative of the Secretary-General.

2.3.4 Two working committees were established to examine in detail various agenda items:

- (a) Committee A to examine agenda items 5, 6 and 10. Ms J. Masterton (Canada), Mr S. Njoroge (Kenya) and Mr M. Z. Shaimardanov (Russian Federation) were elected co-chairpersons of the committee;
- (b) Committee B to examine agenda items 7, 8 and 12. Mr K. Davidson (United States of America), Mr M. Nicholls (United Kingdom) and Ms M. Voice (Australia) were elected co-chairpersons of the committee. Items 3, 4, 9, 12, 13, 14, 15 and 16 were discussed in the Committee of the Whole and chaired by the president and, on his behalf, the vice-president and Mr Moch (France) (agenda item 9).

2.4 OTHER ORGANIZATIONAL MATTERS (agenda item 2.4)

2.4.1 It was agreed that the working hours of the session would be from 9.30 a.m. to 12.30 p.m. and from 2.30 p.m. to 5.30 p.m.

2.4.2 The Commission felt that, in accordance with General Regulation 111, and in view of the technical nature of its discussions, it was not necessary to prepare minutes of its plenary meetings. The Commission therefore decided that such minutes would not be prepared for the twelfth session.

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

3.1 The Commission noted with appreciation the report of its president, which contained a review of the activities of the Commission and its various bodies and rapporteurs since the eleventh session. The Commission further noted that the in-depth report on these activities had been submitted by the president of CCI to the forty-eighth session of the Executive Council (Geneva, June 1996). The president stated in his presentation to Executive Council that the Commission could look back over the last decade with considerable pride. He noted that the Commission was considered one of the key technical commissions of WMO and it was imperative that the Commission accept the challenges of the future in a bold and positive manner. The president pointed to the challenge for the Commission during the next four years as it had to focus on the issues of the provision of climate services for sustainable development. Those include the support, especially through the *Climate Agenda*, of the

process of the assessments by IPCC of climate change, and of implementation of the UN/FCCC. It was a firm belief that the Commission had opportunities for assisting people throughout the world to reduce the risks of adverse climatic effects and to take advantage of the many developments that had led to improved understanding of how our rich climate resources could better serve society in the future.

3.2 The Commission agreed with the president that a most important task was to make sure that the climate observations and in particular the observation sites that were currently in place were not undermined any further. It was agreed that the continual closing of standard climatological observation stations in many parts of the world must be regarded as a very serious issue, and that WMO should take the initiative to reduce those closures. It was noted that even though many users were willing to pay for climatological information, it was still vital that government authorities continue to collect, quality control and archive basic climatological data. The president considered that the ability to cope with future climate and to capitalize on and reduce the risks of its impacts needed to be further demonstrated. In that regard he welcomed the successful initiative leading to the establishment of the WMO CLIPS project. The Commission emphasized that future action in the development of climate services would be compromised if meteorologists could not deal with the challenge of the present climate variability. In that regard, it was especially important to understand the impact of present climate on various socio-economic activities as WMO attempts to assess the potential risks caused by future climates, which may be different due to human-induced climate change or to normal climate variability. The Commission agreed with the president that it should continue to play a leading role in providing both the scientific and associated human dimension expertise to climate and the climate change issues in a world of ever-increasing environmental complexity.

3.3 The president reported that the membership of the Commission continued to increase and that as of 26 March 1997 CCI had 277 members representing 136 Member countries.

3.4 The president made several suggestions in his report and reviewed the extensive activities of the working groups and rapporteurs since the eleventh session of the Commission. It was agreed that technical matters would be considered under the relevant agenda items in order to avoid unnecessary duplications.

3.5 The Commission expressed appreciation for the comprehensive and useful periodic reports issued as circular letters by the president, which had provided detailed information on the Commission's activities. Those reports would also serve as background information during the present session. The Commission agreed with the president's view that CCI should concentrate its efforts on a number of important subjects and recorded its decisions in this respect under agenda item 9.

3.6 It was noted that the Advisory Working Group of CCI held two sessions. The first was in Norrköping, Sweden,

in October 1993 where a full discussion was held on a number of matters, including: reference climatological stations and the Heritage Climate Data Collection (HCDC); the exchange of data and products from a CCI viewpoint; the preparation and content of the statement on the status of the global climate, which was primarily the responsibility of the CCI Working Group on Climate Change Detection; the Tropical Urban Climate Experiment (TRUCE) and the Technical Conference on Tropical Urban Climates (TECTUC); the *Guide to Climatological Practices* (WMO-No. 100); issues related to the formulation of the Fourth WMO Long-term Plan; and the terms of reference of CCI. The subjects considered at the second session in Geneva, September 1995 included problems concerning CLIMAT messages (use of the old code and poor availability on the GTS), the need for identifying scientifically-endorsed indicators designed to detect the anthropogenic climate change signal, elaboration of the CLIPS project, and the need for providing further evidence of the total value of climate services.

3.7 The president stated that sessions of the Advisory Committee on Climate Applications and Data (ACCAD), which were chaired by the president of CCI, were held each year in connection with the annual Meetings of Presidents of Technical Commissions. The Commission took note of the recommendations made by ACCAD at its recent sessions on several major issues related to World Climate Data and Monitoring Programme (WCDMP) or World Climate Applications and Services Programme (WCASP). Those included the exchange of climatological data and products, the relationship between WCDMP and Global Climate Observing System (GCOS), climate change detection, development of the CLIPS project, and the implementation of relevant aspects of the *Climate Agenda*.

3.8 The president reported on the coordination of the World Climate Programme, and the Commission noted with satisfaction that governing bodies of organizations — partners in the development of the *Climate Agenda* — had expressed their general support of the *Climate Agenda*. The Commission also noted with appreciation the actions taken by the Secretary-General to obtain support by the Executive Heads of partner organizations for the establishment of the Inter-Agency Committee on the Climate Agenda (IACCA) as requested by Twelfth Congress. The outcome of the first meeting of IACCA, held in Geneva in April 1997, was noted and related discussions were recorded under relevant agenda items below.

3.9 The Commission decided to re-establish its Advisory Working Group. It was agreed that, in addition to fulfilling the overall task of assisting the president in guiding and coordinating the activities of the Commission and its working groups and rapporteurs, the Advisory Working Group should give special attention to some selected topics. The Commission recommended that chairmen of the CCI working groups be invited to the sessions of the Advisory Working Group. Resolution 1 (CCI-XII) was adopted.

3.10 The Commission noted that since the establishment of ACCAD by CCI at the request of the

forty-eighth session of the Executive Council, regular meetings of the Presidents of the Technical Commissions had become a forum to discuss various intercommissional issues. The Commission further noted that the IACCA, established at the beginning of 1997, specifically included representatives of other international organizations presently represented in ACCAD. It was noted that this would ensure those organizations would review contributions of the WCDMP and WCASP to the *Climate Agenda*, including monitoring progress and identifying priority areas. The Commission therefore concluded that the advisory functions of ACCAD could be effectively carried out through the meetings of the presidents of technical commissions or other mechanisms within WMO and by the IACCA, as far as inter-agency issues were concerned. The Commission therefore recommended that its president would represent WMO at IACCA.

3.11 It was further suggested that, alternatively, an ad hoc Climate Advisory Expert Group could be established, possibly on the basis of the CCI Advisory Working Group, which could include experts, selected on the basis of their specific expertise in the following subjects: climate observations, climate data, climate monitoring, climate applications, climate forecasts, climate services, climate users, operational climatology, and the commercial business sector. The Commission considered that it would be appropriate for the president of CCI to be the chairman of that group, and that other members of the group could be selected on a rotating basis for terms of two or three years. The president of CCI would convey the results of the recommendations of that group to the Executive Council in his regular reports.

3.12 The Commission noted the report from the last session of the Executive Council and agreed that issues referred to the Commission would be covered under the appropriate agenda items. In particular, it noted the great emphasis placed on the further development of CLIPS by the Executive Council.

3.13 As that was to be the last session chaired by Dr Maunder as president of CCI, he wished to place on record acknowledgements and thanks to all those who contributed to the activities of the Commission during the last four years, for their support. In particular, the president thanked the vice-president, the chairmen of the working groups, the rapporteurs and the Secretariat for their excellent assistance.

4. REPORTS OF THE WORKING GROUPS AND RAPPOREURS OF THE COMMISSION FOR CLIMATOLOGY (CCL) (agenda item 4)

4.0.1 The Commission recalled that at its previous session several working groups had been established and a number of rapporteurs appointed, as described in Resolutions 1 through 18 (CCI-XI). The Commission decided that although the reports received from chairmen of working groups and rapporteurs were introduced under that agenda item, they would primarily be considered and discussed under the relevant agenda items, and

new resolutions establishing working groups and rapporteurs for the next inter-sessional period would be considered under agenda item 9.

5. CLIMATE SYSTEM MONITORING (agenda item 5)

5.0.1 The Commission noted that the challenge of detecting climate change, whether due to natural variability or as a result of human activity, and the ever-increasing demand for authoritative and reliable evaluations of current climate, continued to be a powerful motivating force behind all activities within the WCDMP. It was recognized that the complementary activities of the Climate Change Detection and Climate System Monitoring Projects within the WCDMP had been particularly well focused on meeting those challenges by striving to obtain maximum value from existing climate system data.

5.0.2 The Commission expressed its appreciation to UNEP for its considerable financial support of the Climate System Monitoring Project during the period from 1993 to 1995, which included covering most of the costs associated with the publication of the fifth *Global Climate System Review* (WMO-No. 819). The Commission welcomed the increased collaboration with GCOS in both the Climate Change Detection and Climate System Monitoring Projects. It also welcomed collaboration with Commission for Basic Systems (CBS) in developing the GCOS Surface Network, in implementing the new CLIMAT message code, in monitoring the increasing use of the Internet by national Meteorological and Hydrological Services (NMHSs) and in the experimental distribution of a few Climate System Monitoring (CSM) products over the GTS.

5.0.3 The Commission expressed satisfaction with the publication of annual WMO Statements on the status of the global climate covering each of the four years 1993 through 1996, and emphasized the importance of WMO being recognized as the authoritative source of such valuable information. It recognized the important role played by members of the CCI working groups and the leading role of the Working Group on Climate Change Detection in the provision of input of material and review comments.

5.0.4 With regard to content, the Commission urged that the Statements incorporate, where possible, additional climate system parameters such as indicators from the cryosphere, environment, and hydrosphere, taking due regard for timeliness, and that input be sought from a greater number of centres. In that regard, it appreciated the offer of Japan and China to provide input. In recognizing the importance of reporting on climate-related natural disasters, the Commission urged that, wherever possible, an associated historical perspective be included.

5.0.5 The Commission urged that distribution of information in the annual Statements be as timely and as widespread as possible, taking full advantage of modern communications technology. To enhance the value of the product, the Commission recommended that the salient information be collected as soon as possible to

ensure that a press release summarizing the main features of the global climate in the past year be issued at the beginning of January and that the final version of the Statement be issued by the end of January each year.

5.1 CLIMATE CHANGE DETECTION (agenda item 5.1)

5.1.1 A number of rapporteurs presented the Commission with reports on topics that related to climate change detection, including data-series homogeneity, statistical methods, metadata and gridded datasets. The Commission noted and agreed with the plans of the GCOS/Global Ocean Observing System (GOOS)/Global Terrestrial Observing System (GTOS) Joint Data Information and Management Panel (JDIMP) to register rather than try to certify a number of relevant datasets. The Commission noted the written reports of these rapporteurs on climate change detection topics and those of a few rapporteurs who were absent.

5.1.2 The presentation of Mr C. Ropelewski (United States of America), chairman of the Working Group on Climate Change Detection, focused on the proposal to re-establish the working group jointly with the Study on Climate Variability and Predictability (CLIVAR). The Commission agreed with this proposal. The Commission endorsed the working group's role to serve as an advisory group on data and activities related to the detection and assessment of climate change.

5.1.3 Noting the suggestion made by the Twelfth Congress that consideration be given to reconstituting the CCI Working Group on Climate Change Detection as a joint CCI/CLIVAR working group and the subsequent actions of the working group in support of this suggestion, the Commission proposed to establish such a joint working group and suggested revised terms of reference of the existing working group (see agenda item 9).

5.1.4 The Commission noted the outcome of a meeting held in June 1997 in Asheville, North Carolina, United States of America on developing indices for climate extremes and a follow-up meeting in July in Melbourne, Australia of a special CCI task group to consider the development of a broader set of indices to monitor climate variability and detect climate change in collaboration with CLIVAR. The Commission welcomed the initiative to develop a subset of indices related to socio-economic aspects that could be easily understood and used by policy makers. It urged the continuation of this priority activity within WCDMP and furthermore, that the Commission play a leadership role.

5.2 REVIEW OF THE STATE OF THE GLOBAL AND REGIONAL CLIMATE AND ITS VARIABILITY (agenda item 5.2)

5.2.1 The Commission noted with interest the discussion that evolved from the earlier agenda item on the WMO Statements on the status of the global climate that related to the broader issue of CSM. In particular, the Commission noted that there is some duplication and overlap in the content of the various CSM publications published by the WMO Secretariat and urged that efforts be taken to minimize duplication and at the same time look for ways to expand the readership of this material.

The Commission also noted the publication of annual climate bulletins in Regional Association (RA) VI, which began for the year 1994 and which could serve as a good example to encourage the publication of similar bulletins in other WMO Regions. Additionally, the Commission noted that a growing number of countries are producing national, annual, seasonal and monthly climate bulletins. It urged more Members to put their national CSM products on the Internet and suggested that the WMO Secretariat continue to help facilitate access to these national products through the WMO Web site.

5.2.2 The Commission welcomed the streamlining efforts that had been made to ensure the continuation of the *Climate System Monitoring Monthly Bulletin*, and encouraged those Members having access to the World Wide Web through the Internet to use this as the source of timely CSM information, thereby further reducing the need for paper distribution. The Commission endorsed the concept of a WMO-coordinated near-real-time climate alert system which could be used with, or replace, the *CSM Monthly Bulletin*. Realizing that this concept needed more thought and consultation, the Commission recommended that it be given further consideration by its Advisory Working Group.

5.2.3 Following the presentation of the Rapporteur on CSM, the Commission endorsed the WMO initiative to produce a publication on the climate of the twentieth century in collaboration with other organizations such as the IPCC. It encouraged members to support and provide input to the project. It proposed to take advantage of this opportunity to publicize the role that the Commission has performed this century in facilitating the access to and use of climate data for scientific climate-related research and for the development of climate applications.

5.2.4 The Commission welcomed plans to approach commercial publishers with a view to entering into co-sponsorship arrangement in order to reduce WMO costs of the Climate of the twentieth century publication and possibly make more funds available for other high priority activities. It also welcomed plans to engage one or more science writers to ensure that the publication would appeal to a large audience. The Commission expressed its appreciation to Australia for initiating and taking the lead in this project.

5.2.5 The Commission expressed its appreciation to the climate centers and individual scientists who supported the project, including providing input to the *CSM Monthly Bulletin*, the fifth *Global Climate System Review* (1995), and the sixth *Global Climate System Review* (expected to be released in 1998). It also suggested that additional means be sought to provide for more widespread distribution of such excellent publications, for example through commercial publishing houses.

5.3 REFERENCE CLIMATE OBSERVATION NETWORKS (agenda item 5.3)

5.3.1 Following the presentation by the Rapporteur on the Global Climate Observing System (GCOS), the Commission noted with satisfaction the joint CCI/CBS/GCOS initiatives to establish a GCOS upper air

network (GUAN) and a global surface network (GSN) for the purpose of monitoring global climate variability and detecting change. It urged continued vigilance and encouragement to ensure that WMO Members maintain observation programmes at designated sites and routinely distribute data over the Global Telecommunication System (GTS) using the appropriate CLIMAT and CLIMAT TEMP message codes. The Commission expressed concern at the dwindling observational network and urged Members to regard these GSN stations as a standard for developing and improving the denser national reference climatological networks that are needed for climate change studies at the regional to national scale and to facilitate the implementation of the WMO CLIPS project. The Commission continued to encourage all WMO Members to establish national reference climatological station networks at a higher density than the GSN and to maintain consistent and homogeneous climate data from these networks.

5.3.2 The Commission welcomed the plans to finalize and maintain the GSN that were formulated at a joint CBS/CCI/GCOS meeting of experts at De Bilt, Netherlands at the end of June 1997, and it agreed with the recommendations made. These plans included seeking a commitment from involved WMO Member countries to maintain observations at designated sites, routinely transmit CLIMAT messages, and provide historical climate and related metadata for each of these sites to central repositories. The Commission agreed that the World Data Centres A and B for meteorology would be the most appropriate locations for these repositories and that the data and metadata associated with CLIMAT reports be deemed essential in accordance with Resolution 40 (Cg-XII — WMO Policy and Practice for the Exchange of Meteorological and Related Data and Products Including Guidelines on Relationships in Commercial Meteorological Activities). The Commission also agreed that the availability and quality of CLIMAT messages being distributed over the GTS be globally monitored by monitoring centres, with the assistance of regionally-designated focal points. In this regard, the Commission welcomed the offers of Germany and Japan to serve as monitoring centres. The recommended use of an Internet site to provide up-to-date information on the status of the GSN was also welcomed by the Commission.

5.3.3 The Commission noted the process of automating meteorological observations and urged Members to systematically compare data obtained from automated stations with those from climatological reference stations to ensure homogeneity in data.

5.3.4 The Commission recognized the need to improve GSN data coverage in some parts of the world, especially in the Antarctic. In this regard, it welcomed the establishment of a new Antarctic base by South Africa and invited other Members to consider joint participation in its operation and maintenance.

5.3.5 Noting that a new version of the CLIMAT code was introduced in December 1994 and that several WMO Members are still using the old CLIMAT code (36 countries at

the end of January 1997), the Commission urged its Members to assist the WMO Secretariat in ensuring that all WMO Members have adopted the new procedures and that they are being used correctly. In noting a similar concern in the report of the eleventh session of CBS (general summary paragraph 6.4.8) and a related proposal to improve the timeliness of distribution (transmission of CLIMAT reports by the fifth day of each month, but not later than the eighth day), the Commission recommended collaboration between the appropriate CCI and CBS working groups to resolve these problems as soon as possible.

5.3.6 The Commission expressed concern that only about 60 per cent of the messages from stations that have been designated in Volume A of *Weather Reporting* (WMO-No. 9) for routine GTS distribution of monthly CLIMAT and CLIMAT TEMP messages are actually available internationally on the GTS. It recommended that steps be taken to improve the completeness of datasets available on the GTS, which should include encouraging all WMO Members to update the listings in *Weather Reporting*, Volume A of those stations designated for routine transmission of CLIMAT and CLIMAT TEMP messages on the GTS.

6. CLIMATE DATA MANAGEMENT (agenda item 6)

6.0.1 The Commission recognized the importance of all aspects of managing climate data and its associated metadata, which include: searching for existing data and metadata; retrieving, documenting, preserving and archiving them; performing quality control; creating datasets of original or derived data (e.g. homogenized or gridded data sets); and making the data and associated metadata accessible to potential users. The Commission stressed that these aspects of climate data management form the fundamental basis for the uses of climate data in climate-related research and in applications such as the WMO CLIPS project.

6.0.2 The Commission appreciated that the data management aspects of the WCDMP have been implemented through three projects: Climate Computing (CLICOM) and World Climate Data Information Referral Services (INFOCLIMA), Development of Climate Databases, and Assistance to Members to Improve Climate Data Management. CLICOM and INFOCLIMA are usually referred to as separate activities and, similarly, the DARE and Archival Climate History Survey (ARCHISS) projects, both falling within the project entitled Assistance to Members to Improve Climate Data Management, are usually referred to as separate projects in their own right.

6.0.3 The Commission recognized that the implementation of the data management projects within the WCDMP will continue to rely heavily on contributions from outside the WMO regular budget, especially from WMO Members. In this regard, the Commission noted with appreciation significant contributions made by a number of Members to the WCDMP projects. The Commission also noted with appreciation the contribution of UNEP in purchasing of microfilming equipment for DARE I and to the International Council on Archives

and the United Nations Educational, Scientific and Cultural Organization (UNESCO) for the coordination support in implementing the ARCHISS project.

6.0.4 The Commission received with appreciation an overview presentation on a variety of activities of the Working Group on Climate Data given by its chairman, Mr K. Davidson (United States of America), as well as reports from a number of rapporteurs on topics related to climate data management, including data rescue, data from automatic observing stations and satellite data. The Commission noted the written reports of these rapporteurs and a few rapporteurs who were absent that had been published in the WCDMP report series.

6.1 DATA COLLECTION, INCLUDING DATA RESCUE (DARE) (agenda item 6.1)

6.1.1 The Commission welcomed the initiative to begin preparations to publish a document that will provide comprehensive guidance on the rescue, preservation and management of climate data with particular emphasis on data rescue needs of developing countries. It noted that this guidance document is intended to complement the new *Guide to Climatological Practices* (WMO-No. 100). In view of the importance of this type of guidance, the Commission urged that the document be published as soon as possible under the WCDMP report series and that consideration be given to publishing it in the other official languages of WMO.

6.1.2 The Commission noted the shrinking meteorological observation networks on the one hand and, on the other hand, the welcome growth of automated surface observations. It agreed with plans to include guidance on the management of climate data from automatic stations and metadata into the guidelines on the preservation and management of climate data (general summary paragraph 6.1.1). In cases where it is planned to automate an observation site, the Commission urged WMO Members to allow for a suitable period of parallel observations to facilitate the maintenance of a homogeneous historical climate record at the site, particularly for reference climatological stations, including those in the GCOS Surface and Upper Air Networks. The Commission welcomed other related recommendations on automatic stations put forth by the Rapporteur on Processing of Data from Automatic Observing Stations.

6.1.3 The Commission noted that a total of 41 countries in Africa had benefited from Belgium's support of the DARE project, which ended at the end of June 1997. It welcomed the initiative to establish an ongoing DARE support function at the African Centre of Meteorological Applications for Development (ACMAD) in Niamey, Niger while maintaining an International Data Rescue Coordination Centre (IDRCC) in Brussels, Belgium. The Commission urged that the data access policy of the IDRCC be adopted by ACMAD. Noting that very little of the data contained in the nearly five million documents that have been rescued on microfilm and microfiche has been digitized, it urged African countries to continue their DARE activities and make every effort possible to digitize the data, especially using CLICOM equipment, in

order to significantly improve its utility in the development of climate applications and services.

6.1.4 The Commission noted that, despite the development of a well-defined DARE plan for RA IV and the availability of funds, progress on implementation had been slowed by the difficulties in finding suitable computer optical scanning technology. It welcomed the implementation of a pilot DARE project in Belize using microfilming equipment for preserving data and a desktop computer for digitization and recommended that other countries in the Region consider adopting this more traditional data rescue approach. The Commission encouraged the implementation of DARE activity in other WMO Regions in this regard, and congratulated Japan for its ongoing digitizing of millions of marine meteorological observations for the period 1890-1932.

6.1.5 The Commission noted the recent progress made in implementing the ARCHISS project, especially during the last two years when valuable instrumental climate data was found in the national archives of Cuba and Mexico. It urged support of plans to continue to implement the project in several countries in Regions III and IV.

6.1.6 The Commission noted the plans of the International Geosphere-Biosphere Programme (IGBP) Past Global Changes (PAGES) Project, and the Climatic Research Unit of the University of East Anglia, United Kingdom, to convene workshops on historical climatology in 1998. It considered that this would be a good opportunity for ARCHISS project collaboration on how to exploit the potential treasure of historical and other proxy climate data that exist in national archives.

6.2 DATA PROCESSING, INCLUDING CLIMATE COMPUTING (CLICOM) (agenda item 6.2)

6.2.1 The Commission noted with satisfaction that the total number of countries that have installed the CLICOM software exceeded 130 and regional CLICOM Area Support Centres (ASCs) have been established to serve RA I in ACMAD, RA III in Chile, RA IV in the Caribbean Meteorological Institute (CMI) and RA V in Malaysia. In addition, equipment has been ordered for an ASC in the Russian Federation to serve the Newly Independent States (NIS). The Commission noted the decentralization of the maintenance and development of the CLICOM core software to regional ASCs and welcomed the recent practice to include training on CLIPS in regional CLICOM training seminars, and the involvement of the ASCs in ACMAD and the CMI in the DARE I and DARE IV projects, respectively.

6.2.2 In view of the success of recent CLICOM seminars combined with CLIPS and DARE issues that have involved the newly established CLICOM ASCs, the Commission recommended more CLICOM training, including ASC-organized training seminars integrated with training on CLIPS and DARE. It also recommended that a regional CLICOM rapporteur be designated from each ASC. Based on the ACMAD experience, the Commission also urged that selected trainees from different regions be given the opportunity to spend a few months at an appropriate ASC to take

advantage of the available equipment and expertise to advance their capabilities.

6.2.3 The Commission noted the effort that was under way in 1997 to add specific enhancements to the CLICOM core software which will result in the planned release in 1998 of an updated version 3.1 of the CLICOM software. It also noted the initiative to examine existing climate database management systems (CDMSs) that could be adapted to meet the needs of those countries wanting a system more advanced than CLICOM. The Commission recognized that the release of CLICOM 3.1 should be the last version of that particular system but could remain in use in individual countries as a transient version until a successor system becomes operational.

6.2.4 The Commission recommended continuation of the WMO-coordinated initiative that was launched at a May 1997 meeting of experts in Toulouse, France to satisfy those WMO Members wanting a CDMS more advanced than CLICOM. It also recommended that this evolutionary development take maximum advantage of commercially-developed software, and that users be involved in developing and testing a prototype. Furthermore, the Commission agreed with recommendations of the meeting; in particular, the Commission requested the Working Group on Climate Data to establish a small Task Group to work closely with users to specify a future CDMS, which will be available as a replacement for the current CLICOM system. It was further noted that the Czech Republic, Finland, the Russian Federation, and the United States of America expressed their wish to participate in the work of the Task Group. The Commission noted that a user group to involve others who work with climatological databases would be initiated by the WMO Secretariat through the Internet to encourage the exchange of expertise and skills.

6.2.5 Noting that many of the CLICOM installations occurred before 1991 and that there have been dramatic advances in technology since then, the Commission strongly urged donor countries to contribute and facilitate upgrading of CLICOM hardware in developing countries, on a priority basis. The Commission further noted that for the next few years CLICOM should be provided with hardware that is expected to be capable of supporting the future CDMS design, and proposed an acceleration of the CDMS work so that appropriate hardware can be purchased.

6.2.6 The Commission expressed its wish that it would be necessary to define specifically the potential role of Regional Climate Centres. The Commission considered that, after this, Members could be approached to identify those who may wish to host such Centres, bearing in mind a possibility to build up already existing centres such as those for CLICOM and DARE.

6.3 CLIMATE DATASETS PRODUCTION (agenda item 6.3)

6.3.1 The Commission noted with satisfaction the progress made in this project, much of which was attributable to the work done by the National Climatic Data Center (NCDC), in Asheville, North Carolina,

United States of America in assembling of the standard *WMO Climatological Normals for the Period 1961-1990*, publishing the remaining volumes of the *World Weather Records 1971-1980* and Volumes I and II of the 1981-1990 series which include data from RA IV and RA VI respectively. It was additionally noted that the NCDC released CD ROMS with updated global baseline datasets of surface land and ocean data, and radiosonde data. Whist noting that some countries produce climatological normals on a more frequent basis and outside the standard normals period, the Commission considered it advisable for WMO not to change its established procedure to produce and make available standard normals every 30 years, i.e. 1931—1960, 1961—1990, etc. The Commission urged that the utmost care be taken in the observation and management of data from climatological normals stations to ensure that high quality data are available for users.

6.3.2 Noting the establishment of the GCOS upper-air network (GUAN) and the imminent establishment of the GCOS surface network (GSN), the Commission considered that the historical data and metadata for all sites that have been identified for these networks should be compiled into two respective individual datasets and made widely available.

6.3.3 Noting the growing use of satellite data in the monitoring and analysis of climate variability and change and in the development of global climate models, the Commission urged its members in general, and the Working Group on Climate Data in particular, to give greater consideration to the quality and use of this valuable source of climate information in the creation of climate databases. The Commission recommended that a rapporteur on remotely-sensed data be established within the Working Group on Climate Data.

6.4 CLIMATE DATA EXCHANGE (agenda item 6.4)

6.4.1 The Commission noted the plans to make all the information that is contained in the World Climate Data Information Referral Services (INFOCLIMA) database catalogue of climate system datasets available through the World Wide Web on the Internet. It considered that this initiative and future developments within the INFOCLIMA project should respond to new requirements, including those related to climate change detection. Furthermore, the Commission urged close collaboration with the GCOS/GOOS/GTOS Joint Data and Information Management Panel (JDIMP) and in the implementation of the WMO Distributed Databases (DDBs) concept. In this connection, the Commission noted the need to define more clearly the WMO DDB concept.

6.4.2 Recognizing the need for users of CLIMAT message reports to know the normals values of elements included in the messages, the Commission was satisfied with the NCDC proposal to use the routine publication of the *Monthly Climatic Data for the World* to inform WMO Members of new standard normals values when the WMO Secretariat has been notified of the new values. It urged WMO Members to submit their new normals data on a digital rather than paper medium.

Furthermore, it recommended that the standard normals period (e.g. 1961-1990) be maintained as the basis for preparation of relevant parts of CLIMAT messages.

6.4.3 The Commission noted with satisfaction the distribution to all WMO Members and to subscribers of the *Bulletin of the American Meteorological Society* a CD-ROM containing a selection of global grid-point data from the NCEP/NCAR Reanalysis data set donated by National Oceanic and Atmospheric Administration (NOAA). Additionally, it noted the offer of a CD-ROM containing a global gridded surface dataset that has been prepared jointly by the Hadley Centre United Kingdom and the Jet Propulsion Laboratory United States of America. The Commission recommended continued efforts to make gridded datasets widely available in digital format, especially to developing countries to promote capacity building and improve the input of data from developing countries that are needed to create the gridded datasets.

6.4.4 The Commission took note of Resolution 40 (Cg-XII), as a new practice designed to strengthen the international exchange of meteorological and related data and products. In response to the request of the forty-ninth session of the Executive Council, the Commission invited the president to set up, with some urgency, a small ad hoc Task Team to help clarify those aspects of WMO Resolution 40 (Cg-XII) pertaining to the international exchange of climate data and products, taking into consideration the needs of NMHSs, GCOS, IPCC, UN/FCCC, and other users of climate data and products. In particular, the Commission felt that the deliberations of the Task Team on the International Exchange of Climate Data and Products should provide recommendations to the president which could be brought to the attention of the Executive Council during its next session.

6.5 THE YEAR 2000 PROBLEM (agenda item 6.5)

6.5.1 The Commission noted the action initiated by the WMO Secretariat in July 1997 to inform all WMO Members on the year 2000 problem, which is the generic term used for the problems that may occur with computer hardware and software at the change of date from 31 December 1999 to 1 January 2000. WMO Members were invited by correspondence to examine their automated systems with respect to the year 2000 compliancy and, if necessary, to undertake measures to overcome the problem. The Commission urged all Members to respond to this invitation, paying particular attention to the possible effects on the management of climate data and provision of climate services. Furthermore, it was strongly encouraged that Members simulate and test their data systems using observational dates of the next century. The Commission also requested the Working Group on Climate Data to recommend a contact point for advice about this problem.

6.6 USE OF INTERNET, INCLUDING THE WMO HOME PAGE (agenda item 6.6)

6.6.1 The Commission noted that access to the Internet is growing among NMHSs and is critical for climate information management, including the imple-

mentation of the WMO CLIPS Project. It further noted that climate data and products are increasingly being made available through the World Wide Web (WWW) sites established at numerous climate centres and at the WMO Secretariat. The Commission requested that the e-mail and Web site addresses of those centres disseminating CLIPS products be made available to Members by the WMO Secretariat.

6.6.2 The Commission recommended that the Working Group on CLIPS consider means to increase NMHSs' electronic access capability to climate monitoring and forecast products with a view to improving the quality and timeliness of the products and reducing cost. Furthermore, it suggested additional material to go on the WMO home page, including drafts of *Guides* when available, guidance documents and pointers to sites at which climate alert information may be available.

7. CLIMATE INFORMATION AND PREDICTION SERVICES (CLIPS) (agenda item 7)

7.0.1 The Commission noted with satisfaction that the ideas relating to a CLIPS initiative discussed within the framework of the CCI had received approval by the Twelfth Congress, which established the WMO CLIPS project within the WCASP. It further noted that following the request by Congress, several activities had been initiated by CCI and the WMO Secretariat, including the organization of expert meetings, special expert and fact-finding missions to Member countries, capacity-building and training events, development of several pilot project proposals, as well as the preparation of an action plan for CLIPS. The Commission recognized that CLIPS is a project that bridges the gaps among the various projects within the Commission, from issues concerning climate data utilization to the provision of services to the users. The Commission further recognized that users were creating increasing pressure for the provision of information. The Commission urged Members to respond to this demand, putting into practice their vast competence and knowledge, since this will create many opportunities for meteorologists and climatologists.

7.0.2 The Commission noted the expedient measures taken by the Secretary-General regarding establishment of a CLIPS Project Office (CPO) within the World Climate Programme Department and the allocation, following the decision of the forty-eighth session of the Executive Council, of substantial funds towards this purpose. The Commission further noted with appreciation the extra-budgetary support provided by some Member countries as well as the valuable in-kind contributions in the form of lecturers and experts in support of CLIPS-related capacity building. The Commission endorsed actions taken by the CPO and the plans for further implementation of the project. The Commission particularly encouraged the rapid initiation of the pilot and demonstration projects.

7.0.3 The Commission noted that the CLIPS project consists of several components including training, pilot projects, liaison with research programmes, and networking, and considered that in general the concepts and

plans for the project reflect initial considerations by CCI experts and the recommendations of the expert and working groups. The Commission recommended that a prudent approach should be taken when describing climate information and prediction services and their potential skill and benefits to users and decision makers. It was stressed that seriously negative results can come from overselling the capabilities of predictions and applications, noting that seasonal predictions in some parts of the world were not sufficiently accurate at this time. The Commission, however, noted that fast development of climate prediction models should lead to significant gains in climate prediction in the coming years and that Members should be encouraged to evaluate and use these predictions.

7.0.4 The Commission noted the difficulties faced by many Members in the preparation of climate information and predictions which were caused by lack of uniformity of formats and data exchange procedures. It encouraged Members to adhere to internationally accepted methods of data archiving and exchange, and to promote such practices among other national institutions.

7.0.5 The Commission noted the emphasis on capacity building within the CLIPS project. It agreed that the coordination of the training in automated data management (CLICOM) and CLIPS was beneficial, as it took advantage of the concentration of expertise and presented the full spectrum of modern climate services, from well organized and quality controlled climatological data and information to climate predictions of known skill, to applications with strong user involvement (see also agenda item 11).

7.0.6 The Commission noted the recent developments in capacity building in the CLIPS area in Region I, in particular through the involvement of ACMAD. The Commission considered that this would help in introducing enhanced climate services aspects in the operations of the NMHSs in the Region. The Commission strongly recommended that similar developments be pursued as soon as possible in other Regions.

7.0.7 The Commission recalled that the Twelfth Congress emphasized the need for joint CLIPS activities with the research programmes, particularly WCRP. The Commission noted that the research community was involved in the development of the concept of the project. The Commission welcomed the actions taken to ensure proper coordination with international organizations and institutions involved in climate issues. It urged that appropriate steps be taken by WMO to ensure the coordination achieves the maximum cooperation in activities while avoiding overlap and duplication. In this regard, the Commission recommended that WMO pursue strong links among institutions and organizations and programmes, and appropriate forecasting centres and international research networks in other regions. The Commission noted that the work was under way to address the problem of conflicting forecasts and variety of formats. It stressed that in coordination with the research community on the issues concerning climate predictions, the CLIPS project focus should be on the guidelines for the publication of predictions and outlooks, rather

than in the creation of such products. The Commission noted with satisfaction the joint training conducted with the IRI at the ACMAD.

7.0.8 The Commission noted the information provided by UNEP on the World Climate Impact Assessment and Response Strategies Programme (WCIRP) and took particular interest in the development of a handbook for climate change impact and adaptation assessment. The Commission urged WMO to take appropriate actions to ensure that the handbook fully represented the views of the climate community.

7.0.9 The Commission received with appreciation the report of the Chairman of the Working Group on Operational Use of Climatological Knowledge, Mr O. Moch (France), who noted that there was a need to evaluate the uncertainties in climate prediction, and also uncertainties in the output of those predictions, and proposed that the CLIPS project address uncertainties within climate predictions. The Chairman expressed the need to give additional attention to the following issues: urban climatology, quality of climate services and spatial interpolation of observational data.

7.1 INTERPRETATION OF CLIMATE PRODUCTS (agenda item 7.1)

7.1.1 The Commission noted the activities organized under the CLIPS project to enhance the capacity of NMHSs to interpret and disseminate climate products. The Commission urged the Secretariat to include this topic in all regional/subregional workshops and pilot/demonstration projects. In particular, the Commission noted the integral role of the Climate Outlook Fora (COF) in building capacity among the NMHSs, and urged the Secretariat to work to promote the conduct of such fora in all Regions as appropriate. The Commission received with appreciation the report of the Rapporteur on Climate System Monitoring Products and their Application (Mr R. Basher, New Zealand) who noted the importance of monitoring in the early warning of the emergence of persistent climate anomalies. He stressed that NMHSs had to become closely aligned with users to understand clearly how climate affects them and how climate information could be used effectively.

7.1.2 The Commission noted that the presidents of CCI and CBS had considered jointly the recommendations of CBS on revised definition of forecast ranges and consequently a proposal on this subject had been submitted to the forty-ninth session of the Executive Council. The Commission further noted that the Executive Council had requested CBS, in consultation with CCI and the Commission for Atmospheric Studies (CAS), to reconsider the definitions of forecasting ranges. The Commission therefore asked the president to arrange for consultations with members of relevant working groups of CCI and to ensure that the CCI-related practices in defining forecast ranges would be adequately included in the proposals to the Executive Council.

7.2 INTERACTION WITH USERS (agenda item 7.2)

7.2.1 The Commission noted with satisfaction that in the CLIPS project, priority was given to the issues related to closer interaction with the potential users of

climate services. It recalled that the Commission always considered this as very important, and that the relevant and still valid reports had been prepared by CCI rapporteurs. The Commission noted that interaction with the users had formed an important component of the capacity-building efforts of the CLIPS project, and urged Members to give particular attention to strengthening their interactions with users through all phases of the implementation of climate services.

7.2.2 The Commission also noted with pleasure the progress made in the coordination of activities with the South Pacific Regional Environment Programme (SPREP). It recommended that WMO assist in setting up a regional bulletin within the SPREP region as it relates to the CLIPS project.

7.2.3 The Commission noted with gratitude the offer of China to conduct a pilot project within the framework of CLIPS, noting both China's climate sensitivity and its considerable progress in climate science and technology.

7.3 SOCIO-ECONOMIC AND ENVIRONMENTAL BENEFITS FROM CLIMATE SERVICES (agenda item 7.3)

7.3.1 The Commission noted with appreciation the comprehensive report prepared by Mr J. M. Nicholls for the CLIPS project on *Economic and Social Benefits of Climatological Information and Services: A Review of Existing Assessments*, WCASP Report No. 38 (WMO/TD-No. 780). The Commission encouraged Members to incorporate relevant information from the report in budget planning documents and information packages for public consumption. The Commission urged Members 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 the decision maker, and to quantify the actual or potential value of applying the information, especially at the market sector, regional or national levels. The Commission further urged Members to involve users in the assessment of economic benefits.

7.3.2 The Commission noted with appreciation the report of the Rapporteur on Economic and Social Benefits of Climate Services, (Mr V. Trenin, Russian Federation), on the results of a survey to determine the relationship between national climate services and the evaluation of socio-economic efficiency. The rapporteur recommended the report be published in the WCASP series. The Commission considered it important to generate information that NMHSs may use to persuade governments of the value of climate services and to improve coordination of activities on the evaluation of socio-economic benefits of climate services. Resolution 2 (CCI-XII) was adopted.

7.3.3 The Commission noted with appreciation information provided by the delegation of Mauritius on national CLIPS activities and by the delegation of New Zealand on the survey conducted on benefits of climate prediction for New Zealand.

7.4 EVALUATION AND REVIEW OF OPERATIONAL CLIMATE PREDICTIONS (agenda item 7.4)

7.4.1 The Commission noted the complexity involved in the use of climate predictions, arising from the variety of types of prediction methods, time periods, areal coverages

and skills. It was recognized that the term predictions meant teleconnections, database analyses and empirical/statistical projections, not just numerical model forecasts. The Commission considered that the need for information on assessing the types and quality of prediction methods was urgent, and that ways should be developed to enable users to be informed of the quality associated with a given method. The benefits and problems associated with the free flow of the predictions on the Internet was noted, and the Commission concluded that while there were no means or will to stop anyone from putting climate information on the Internet, it could be proposed that official predictions be accompanied by information on uncertainties and quality.

7.4.2 The Commission further wished to emphasize the importance it attached to the concept of, and international standards for, indices for evaluation of quality of climate predictions. This was to allow for a comparison of performance of different models in various situations, which was essential for both users and scientists who developed these models.

8. DEVELOPMENT OF CLIMATE APPLICATION METHODOLOGIES FOR VARIOUS SOCIO-ECONOMIC SECTORS (agenda item 8)

8.0.1 The Commission noted with satisfaction the progress made under the WCASP and emphasized the importance of further development of this programme, particularly with respect to the WMO CLIPS project in close cooperation with NMHSs. It was recognized that activities have been carried out within the framework of the three WCASP projects included in the Fourth WMO Long-term Plan:

- (a) CLIPS;
- (b) Assistance to Members in developing their climate application services; and
- (c) Development of methodologies to assess climate and climate change effects on various socio-economic activities.

It was further recognized that, regarding sector-oriented activities, major focus had been on issues relating climate to urban development, human health and energy.

8.0.2 The Commission noted with appreciation the report by the chairman of the Working Group on Operational Use of Climatological Knowledge (Mr O. Moch, France), as well as the various reports by rapporteurs with terms of reference focusing on climate application and services. The Commission recognized that a major thrust within the WCASP programme during the past inter-session period had been the development of CLIPS and recommended that the CLIPS project should be a high priority activity in the coming years.

8.0.3 The Commission noted that the working group had met in two sessions: the first in Mauritius in November 1994, the second in Geneva in May 1996. It was recognized that the reports of these sessions were contained in WCASP Nos 31 and 37 respectively and constituted the basic report of the group to CCI-XII.

8.0.4 The Commission was informed that at its second session, the working group reviewed and discussed the progress reports submitted by its members

as rapporteurs on specific subjects. It further considered the development of the CLIPS project and made specific proposals in this regard. The Commission decided to consider the recommendations made concerning the selection and specification of applications and services methods, to be described in the third edition of the *Guide to Climatological Practices* (WMO-No. 100), under agenda item 10.

8.0.5 In considering the development of the applications and services programmes of Members, the Commission noted a marked increase in activities in many countries. It was considered useful to continue to monitor the progress of climate applications and services in various socio-economic sectors. The information contained in the WCP database was considered a valuable source which should facilitate the work of the CCI working groups and rapporteurs in the future.

8.0.6 Regarding the Commission's mechanism for dealing with WCASP issues during the coming inter-session period, it was decided to establish working groups composed of rapporteurs on principal relevant applications subjects and to appoint several individual rapporteurs. The establishment of liaison with other bodies, e.g. other WMO technical commissions, was arranged partly through the attribution of specific tasks to members of the Advisory Working Group.

8.0.7 The Commission noted that the recommendation of the 1992 Meeting of Presidents of Technical Commissions, i.e. that a new and more flexible approach should be taken by forming so-called Task Groups consisting of experts from technical commissions to investigate specific questions, as well as foreseen budgetary restraints, had been followed. It thus noted that the work of the CCI Working Group on Energy-Meteorology had been conducted through correspondence. Members of the CCI working groups had, however, formed the core of task groups on TRUCE and on CLIPS. The Commission agreed that the task group approach should be pursued even more widely to ensure that the Commission would respond efficiently and effectively to the emerging issues.

8.0.8 The Commission noted the contributions and potential contributions of the research community and the private sector to the development of applications.

8.0.9 The Commission was informed, and noted with appreciation, the close collaboration between WCASP and the WCIRP, handled by UNEP, on matters of applications of climate, particularly on the urban climate, climate and human health and in the area of matters of energy.

8.1 URBAN DEVELOPMENT (agenda item 8.1)

8.1.1 The Commission noted that the growing concern over the deteriorating and changing urban environment had led to intensification of activities in related areas within several WMO Programmes. The Commission emphasized the need to develop and disseminate methods to describe the urban climate and its spacial and temporal variations. It noted that WMO had played a major role in the preparatory process for, as well as during, the Second United Nations Conference on

Human Settlements (HABITAT II) held in Istanbul, Turkey in 1996. The resulting HABITAT Agenda was considered an important guide in formulating future policies and activities for WMO, and in particular CCI, in the area of urban climatology.

8.1.2 The Commission noted with appreciation the activities of the rapporteurs on related topics (Messrs E. Jauregui, Mexico and E. Moralijski, Bulgaria — see also agenda item 4). It noted with appreciation the work of the vice-president of the Commission as chairman of the International Programme Committee for the TECTUC, held in Dhaka, Bangladesh in 1993. The Commission also expressed its appreciation to the former rapporteur (Mr S. Hassan, Bangladesh) who had been in charge of the local arrangements for TECTUC.

8.1.3 The Commission noted the results from the international conferences focusing on urban climatology, i.e. *TECTUC, Dhaka, Bangladesh, 28 March – 2 April 1993: report, recommendations*, WCASP Report No. 30 (WMO/TD-No. 641) and the International Conference on Urban Climate (ICUC '96) organized in Essen, Germany in June 1996. It was agreed that these results would form the basis for future actions in the area of Urban and Building/Climatology UBC as proposed by the Task Force on TRUCE during their meeting in Geneva in October 1996. In particular, the Commission endorsed the proposal to coordinate the next major international conference on urban climates (ICUC '99) with the next International Congress on Biometeorology, both planned to be held in Sydney in 1999.

8.1.4 In reviewing the activities in UBC since CCI-XI, the Commission noted with satisfaction that several technical documents had been finalized and disseminated. The booklet on *Climate and Urban Development* (WMO-No. 844), which was produced with the help of the CCI rapporteurs, was a major contribution from WMO to the HABITAT II event. The two bibliographies on urban climate, especially in tropical/subtropical areas, covering the time up to 1995, by Mr E. Jauregui (WCASP Reports Nos 25 and 36) were appreciated and considered important contributions to the TRUCE-related activities. The Commission emphasized the importance of building design codes, especially in developing countries, and of the requirement for guidance on the acceptance of codes by the relevant authorities and planners.

8.1.5 The Commission recognized that several other activities had contributed to focusing attention on urban issues. In particular it was recalled that the theme for the World Meteorological Day in 1997 was Weather and Water in Cities. The material prepared for the celebration of this event, including a short video film, had been successfully used in many countries. The Commission was also pleased to note that its views had been represented in a meeting of Experts on Atmospheric Urban Pollution and the Role of the National Meteorological and Hydrological Services (NMHSs).

8.1.6 The Commission was pleased to note that WMO, in several cases represented by CCI members or staff from national Meteorological Services, had participated in various national and international meetings related to UBC. It was

also noted that several Members now had significant activities in the area of UBC. The Commission endorsed the revised "Plan of Action for the Tropical Urban Climate Experiment (TRUCE)" (included as an Annex to this report), as proposed by the task group on TRUCE. It was suggested that the end of the last sentence of the first goal in paragraph 3(b) be amended to read "... the consumption of energy (heating and cooling, etc.) and source and dispersion of pollutants". The Commission recommended that CCI take the lead in organizing "Show Case Projects" proposed by the task group with the focus on warning systems for heat waves and other extreme weather events. Furthermore, the Commission recommended that the urban issue be included as a priority area within the WCASP (see also agenda item 9).

8.2 HUMAN HEALTH (agenda item 8.2)

8.2.1 The Commission noted with appreciation the reports and reference material provided by the two rapporteurs (Mr G. Jendritzky, Germany and Mr L. Kalkstein, United States of America) who had been actively participating in the work of the IPCC and with the International Society of Biometeorology (ISB). Special appreciation was expressed for the work they had afforded to the preparation of the Monograph on Climate Change and Human Health (available through the World Health Organization (WHO)) and the booklet on *Climate and Human Health* (WMO No. 843).

8.2.2 The Commission considered the recommendations made by the *Meeting of Experts on Climate and Human Health*, WCASP Report No. 42 (WMO/TD-No. 822), held in Freiburg, Germany in January 1997 and agreed that these should form the basis for future activities within the framework of CCI. It emphasized the need for continued close inter-agency coordination in this and related areas, especially with organizations such as UNEP and WHO.

8.2.3 The Commission agreed that various aspects of bioclimatology, especially as it related to human health under varying climatic conditions, needed to be further emphasized in the development of climate information and prediction services. Special focus should be on conditions in the tropics, especially on the rapidly growing very large urban areas in which a large sector of the populations are already directly affected by climate, its variation and change. The Commission considered that a task force may be established to give added priority and impact in the area of climate, human health and the urban environment.

8.2.4 The Commission noted with appreciation that the Rapporteur on Tourism and Recreation (with special reference to human health), (Mr L.B. Lecha Estela, Cuba), had been instrumental in organizing the *Meeting of Experts on Climate, Tourism and Human Health, Topes de Collantes, Cuba, January 1995*, WCASP Report No. 33 (WMO/TD-No. 682). It was noted that the rapporteur had been most active in cooperating with several other CCI rapporteurs and that special working relations had been established with the Rapporteurs on Climate and Human Health and with the World Tourism Organization (WTO).

8.2.5 The Commission noted the wide circulation of publications and leaflets on climate and human health. The Commission further noted the important nature of information in these publications, which were provided for outside users, and that careful wording and data use were required.

8.2.6 The Commission noted further that a technical paper prepared by Mr Lecha on the effects of weather and climate on tourism had been included in *Meeting of Experts on Climate and Human Health*, WCASP Report No. 42 (WMO/TD-No. 822). This paper reviewed in particular the health aspects of tourism and in his report to Commission, the rapporteur elaborated on the possibilities of further development of climatotherapy in the touristic industry, and the development of a health watch and warning system on a regional scale using CLIPS products in the field of tourism and recreation.

8.3 ENERGY PRODUCTION AND CONSUMPTION (agenda item 8.3)

8.3.1 The Commission noted with appreciation the activities of the CCI Working Group on Energy Meteorology and its rapporteurs, and the report by the chairman of the working group (Mr W. R. Kininmonth, Australia). The Commission reiterated that climate application and services were of particular importance in relation to the climate change issue, especially the use of fossil fuel, but also through excessive use of other resources, such as biomass and water. The Commission agreed that CCI activities should continue to emphasize aspects related to energy and meteorology.

8.3.2 The Commission expressed appreciation for the report on "Estimation of the relationship between Gas Usage and Weather" by the Rapporteur on Energy-Meteorology and Economics (Mr H. Warren, United States of America), and to the Rapporteur on Solar Energy (Ms S. Robles-Gil, Mexico) for her report on *Climate Information for the Application of Solar Energy*, WCASP Report No. 41 (WMO/TD-No. 816). The Commission was also pleased to note that the Guidelines on "Meteorological Aspects and Recommendations or Utilizing the Wind as an Energy Source in the Tropics" were prepared by Mr Anders Daniels and Mr T. Schroeder (United States of America).

8.3.3 The Commission noted the collaboration with other international organizations in the field of energy. In particular, it noted the participation of WMO in the DECADES project, dealing with comparative environmental impact assessments of various ways of producing electric energy and projects related to energy efficiency.

8.4 AGRICULTURE (agenda item 8.4)

8.4.1 The Commission noted with appreciation the report by the Rapporteur on Agriculture and Food (Mr H. Bhalme, India), entitled "Agriculture, food and climate", which is published in WCASP No. 42 and the report by Mr J. L. Le Blanc, entitled "Climate Information and Prediction Services for Fisheries", which is published as WCASP No. 39. It was agreed that climate application and services aspects related directly to Food Production, which is dealt with by Agriculture Meteorology Programme (AGMP), should be considered by CCI with respect to the further development of the CLIPS project.

8.5 WATER RESOURCES (agenda item 8.5)

8.5.1 The Commission noted with appreciation the reports of the Rapporteur on Water Resources (with special reference to drought and desertification) and to serve as liaison with the Commission for Hydrology (CHy) (Mr K. Li, China) and the contribution to the CLIPS project prepared by the rapporteur and published as WCASP No. 37 in September 1996. It was agreed that climate application and services aspects related directly to Water Management, which is dealt with by WCP-Water, should be considered by CCI with respect to the further development of the CLIPS project. The Commission also stressed the need to pay special attention to application and services related to drought prediction, warning and preparedness plans, combating desertification and to the impact of climate change on water resources.

9. PRIORITIES FOR THE FUTURE WORK OF THE COMMISSION (agenda item 9)

9.0.1 The Commission decided to formulate the CCI priorities for the implementation of the WCDMP and WCASP on the basis of deliberations under agenda items 4 through 8. It was agreed that the Commission's view on capacity-building aspects, which should be given general priority in both the WCDMP and the WCASP, would be recorded under agenda item 12.

9.0.2 The Commission noted that the overall objectives and work programme of CCI, its working groups and rapporteurs for the coming intersessional period, should be guided as far as possible by the Fourth WMO Long-term Plan and considered that the following issues, listed under general policies of the Fourth WMO Long-term Plan, should receive particular attention:

- (a) Identification of probable future needs for long-term meteorological, hydrological and related environmental records on a worldwide and regional basis;
- (b) Promotion of awareness of the role of climate in sustainable socio-economic development;
- (c) Establishment of the timely delivery of expert opinion on global and regional geophysical and geochemical issues; and
- (d) Enhancement of contribution to monitoring, research and assessment related to the global environment.

9.0.3 The Commission considered the structure of its subsidiary bodies with relation to the WCDMP and WCASP and decided to establish working groups and to appoint rapporteurs in order to carry out relevant activities, especially the priority activities, agreed to during the session. The terms of reference of working groups and rapporteurs were formulated to enable the Commission to meet the present community needs and to support the implementation of Agenda 21 as outlined in the WMO strategy. Besides the Advisory Working Group (AWG) (see item 3), the Commission established working groups and rapporteurs (see agenda item 15).

9.0.4 The Commission furthermore agreed that the finalization of the third edition of the *Guide to Climatological Practices* (WMO-No. 100) should be given

priority and the Commission therefore instructed its working groups and rapporteurs to give due consideration to the necessary actions relative to this process.

9.1 THE ROLE OF THE COMMISSION IN THE DEVELOPMENT OF GLOBAL CLIMATE OBSERVING SYSTEM (GCOS) (agenda item 9.1)

9.1.1 The Commission recalled that during the eleventh session it urged its president, as a matter of priority and together with the chairman of the Joint Scientific and Technical Committee (JSTC) for GCOS, to consider details of coordination between GCOS and WCDMP. It noted with satisfaction that several actions had been taken in response to this request. In particular, CCI rapporteurs had been actively participating in the preparation of the GCOS programme plans, such as the GCOS Plan for Space-based Observations and the GCOS Data and Information Management Plan, implemented through the WMO mechanisms where appropriate. The Commission considered that present coordination between the two programmes functioned satisfactorily. At the same time, the Commission wished to emphasize that, since GCOS and the WCDMP were both working on gathering data required to support monitoring and forecasting climate, it was vital for the two activities to be very closely linked. The Commission therefore requested its president and the Secretary-General to make their best efforts to ensure that the coordination of GCOS and WCDMP be optimized as much as possible, noting the terms of reference of the Commission in this regard.

9.1.2 The Commission noted that monitoring and predicting climate at the national, regional and global levels required in situ and remotely sensed environmental data, and that the GCOS Surface Network (GSN) is aimed at global climate monitoring and therefore does not supplant regional and/or national observations. The Commission further noted with appreciation the offers made by Germany and Japan to serve as monitoring centres for the network.

9.1.3 The Commission noted that three global observing systems (Global Climate Observing System (GCOS), Global Ocean Observing System (GOOS), and Global Terrestrial Observing System (GTOS)), collectively referred to as the G3OS, have been proposed as international mechanisms to secure required observations. It was considered important that close coordination of these activities continue. The Commission emphasized that because of its comprehensive nature, GCOS addresses not only atmospheric, but also oceanic and terrestrial observations needed for understanding global climate. The Commission welcomed the invitation by the Director of the GCOS Office, Mr T. Spence, to participate actively in the planning and implementation of the GCOS.

9.1.4 The Commission noted that the GCOS Data and Information Management Plan has been published with a strategy that calls for distributed data centres with common standards and protocols where feasible. It was suggested that future development of the INFOCLIMA *Catalogue of Climate System Datasets* would take into

account the implementation of the GCOS Data and Information Management Plan.

9.2 INTERACTION WITH INTERNATIONAL CLIMATE-RELATED ACTIVITIES WITHIN THE CLIMATE AGENDA (agenda item 9.2)

9.2.1 The Commission noted the report from the first session of the Inter-Agency Committee on the Climate Agenda (IACCA) and considered the actions proposed for further development of inter-agency collaboration as well as the priorities suggested. It emphasized the importance with which WCDMP and WCASP (including the CLIPS project) continue to strengthen the linkages with other international programmes related to climate data, monitoring and services. The Commission agreed that its contribution in this regard could best be achieved by emphasizing the role of the liaison rapporteurs, especially within the CCI working groups.

9.2.2 The Commission noted with appreciation the valuable work by its president in the context of development of the Climate Agenda process, especially as chairman of ACCAD and member of the CCWCP and its successor, the IACCA. The Commission asked the president and the Advisory Working Group to make every effort to ensure the important role of CCI in the inter-agency activities as the WMO leading body on many climate-related issues, especially those concerning climate data, applications, and services.

9.3 DEVELOPMENT OF THE RELEVANT PARTS OF THE FIFTH WMO LONG-TERM PLAN (5LTP) (agenda item 9.3)

9.3.1 The Commission noted that the Twelfth Congress had approved the Fourth WMO Long-term Plan (4LTP) as a comprehensive plan of WMO for the period 1996-2005. It was especially noted that the role of WMO will involve two major thrusts, namely:

- (a) Strengthening the core activities of NMHSs; and
- (b) Contributing to endogenous capacity building and sustainable development.

9.3.2 In this context it was agreed that a major objective concerning climate — “To ensure that WMO exerts effective international leadership in climate monitoring, research and applications, including global climate prediction, and provides an authoritative international scientific voice on matters related to climate and climate change” — would remain valid for inclusion in the Fifth WMO Long-term Plan. The Commission requested its president and the Advisory Working Group to take into full account this objective in the preparation for the CCI input to the development for the Fifth WMO Long-term Plan.

9.3.3 The Commission recalled that the WMO Twelfth Congress, while considering procedures for preparation of the Fifth WMO Long-term Plan, made important recommendations and noted in particular that “the planning process and the plan should encompass not just the activities of the constituent bodies and the Secretariat, but should have, as their foundation, agreed total intentions of WMO and its Members”. Furthermore,

it was pleased to note that Congress emphasized that interprogramme and intercommission coordination, particularly the role of technical commissions, in formulating objectives and priorities within scientific and technical programmes under their respective responsibility, which were seen as essential for ensuring the integrity of the planning process.

9.3.4 The Commission noted with special interest that the WMO Twelfth Congress had “recognized that a broad new thrust to which WMO should attach special attention when elaborating the Fifth WMO Long-term Plan, was urban environment”. The Commission therefore urged the president, working groups and rapporteurs to consider this important new major thrust in their deliberations.

9.3.5 The Commission discussed the specific developments foreseen in the area of its responsibility and identified the following issues which would merit particular consideration when preparing for the Fifth WMO Long-term Plan, bearing in mind the need to support sustainable development:

- (a) Continued emphasis on assistance to Members in the development of national climate services;
- (b) Crucial need for preservation, maintenance and expansion of climate observation networks needed to provide essential data for climate analyses and the provision of climate services;
- (c) Promotion of the development of advanced national climate database management systems and the activities on data rescue (DARE);
- (d) Promotion of the international exchange and use of global and regional climate datasets and climate system monitoring products, including those based on satellite data;
- (e) Climate System Monitoring (CSM) and climate change detection, including the development of indices and timely preparation of authoritative annual statements and assessments related to climate variability and change;
- (f) Development of services based on interannual and seasonal climate prediction;
- (g) Development of methodologies of climate applications, guidance materials for the provision of climate services, including those contributing to formulating strategies for adaptation to climate variability and change;
- (h) Development of climate services concerning urban development, especially bearing in mind the relationship between the urban climate/environment and regional to global scale climatological effects, and support to the implementation of the Tropical Urban Climate Experiment (TRUCE);
- (i) Development of climate services in support of human health;
- (j) Continued assessment of social and economic benefits of climate services and development of the interface between producers and users of these services; and
- (k) Continued development of other sectorially-related climate services, including those for water resources management, food production, energy conservation

and renewable energy sources, land use planning, tourism and recreation, and combatting drought and desertification.

9.4 COMMISSION SUPPORT FOR WMO'S AND OTHER INTERNATIONAL CLIMATE-RELATED PROGRAMMES (agenda item 9.4)

9.4.1 Under this agenda item, the Commission wished, in addition to its views recorded under agenda item 9.2, to emphasize its important role in and contribution to a number of major international activities, including the work of the IPCC on climate change assessments, the process of the implementation of the UN/FCCC, and the activities of the UN Commission on sustainable development concerning promotion and implementation of Agenda 21. The Commission further noted that the implementation of the United Nations Convention to Combat Desertification also would require special attention of CCI. The Commission agreed that in future the involvement of CCI in these activities will require an even more proactive approach by the Commission's bodies.

9.4.2 The Commission asked its president and the Advisory Working Group to consider, in consultation with other technical commissions, specific actions to be taken to ensure enhanced support by the Commission to international climate-related activities.

9.5 TERMS OF REFERENCE OF THE COMMISSION (agenda item 9.5)

9.5.1 The Commission reviewed its Terms of Reference, as approved by Twelfth Congress, in the light of the established WMO general policies. The Commission noted that the rapid development of climate-related issues and relevant international activities would require appropriate adjustments to its Terms of Reference. It was considered that the vast area of support provided by the Commission to various climate-related activities within and outside WMO, especially contribution to the work of IPCC, implementation process of the UN/FCCC, WCRP, WCIRP and GCOS, should be adequately acknowledged in the Terms of Reference. The Commission recommended that the support provided by the Commission be pointed out to other WMO technical commissions and relevant WMO bodies.

9.5.2 The Commission requested the president and the Advisory Working Group to review expeditiously various proposals on the adjustments to the terms of reference so that the conclusions by this review could be included in the president's reports to the fiftieth session of the Executive Council.

10. *GUIDE TO CLIMATOLOGICAL PRACTICES (WMO-NO. 100) AND TECHNICAL REGULATIONS (WMO-NO. 49)* (agenda item 10)

10.1 The Commission recalled that at its last session it considered the recommendations of the Meeting of Experts on the *Guide to Climatological Practices* (Geneva, 25-27 November 1991) concerning the preparation of a third edition of the *Guide*. After reviewing the related comments, the Commission had decided that a third edition of the

Guide should be prepared along the lines proposed by the meeting of experts referred to above.

10.2 The Commission agreed that the new *Guide* should provide information about climate practices and procedures important in the development and implementation of all climate services. It should include information on: organization and functions of a national climate service; observations and data processing; methods and techniques of climate applications; and publication and presentation, marketing and delivery of climate data and information. It should also cover specialized topics, such as sectorial applications related to food production, water resources management, energy (with special attention to renewable energy), and issues associated with economics, upper-air, meso- and micro-climatology, etc.

10.3 The Commission also agreed that the new *Guide* should be divided into two parts. The titles of the chapters of the first part would be as follows:

- Part I: Basic principles and practices
 Chapter 1: Introduction
 Chapter 2: Climate observations, stations and networks
 Chapter 3: Climate data and management
 Chapter 4: Climate services and information
 Chapter 5: Supporting activities in climate applications

10.4 The Commission noted with appreciation the contribution of its president, vice-president and several rapporteurs in editing and rewriting sections of the *Guide*, especially of Part I. The Commission noted that since 1985, when the last edition of the *Guide* was issued, there had been an increase in the demand for accurate information on present and past climate, in order to provide input to projections of climate change and its potential impacts. As a consequence there had been substantial re-examinations of the requirements for climatological information in support of climate studies and predictions.

10.5 The Commission agreed that as the first part of the *Guide* was almost ready for publication, except for some minor editorial changes, it was important to arrange for its early publication. The Commission recommended that publication should be preceded by a final peer review by a small number of experts, including CCI rapporteurs, as appropriate.

10.6 It was suggested that the second part needed some re-organizing and updating. The Commission noted that proposals were being received as to which topics should be dropped from the current version and which ones should be added to the next one, including examples of standard methods in operational climatology, such as computation of return periods of extreme events and climatic indices pertaining to human health and comfort. The Commission agreed that the content of Part II of the *Guide* should include a selected list of methodologies and techniques with substantial information about "Network design; quality control; climate statistics; data handling, including CLICOM and climate monitoring, as well as climate products, such as maps, summaries and climate predictions". Furthermore,

Annexes should be included containing terminology and definitions; extracts from relevant WMO regulations, including climate codes; lists of relevant publications and information systems, as well as examples of sector specific applications, structures of national climate programmes, description of historical data, etc.

10.7 The Commission suggested that contributions from Members, especially relevant CCI rapporteurs, should be requested urgently, so that the second part of the *Guide* could be finalized and prepared as early as possible. It was considered important to investigate additional ways to disseminate guidance material, including the use of the Internet. In this context, the Commission stressed that the revised *Guide* will immensely help further capacity building within Member countries of WMO, in the area of climate information and services.

11. PARTICIPATION OF WOMEN IN THE WORK OF THE COMMISSION (agenda item 11)

11.1 The Commission recognized that the issues relating to gender equality in various socio-economic sectors had received increased attention in recent years. It noted the recommendation made by the United Nations Conference on Women, held in Beijing, China, in 1995, and that Chapter 24 of Agenda 21 focuses on "Global action for women towards sustainable and equitable development". Furthermore, the Commission was informed that China had organized a special Workshop on Women in Meteorology in 1996 and that WMO will organize a global seminar on Women and Meteorology in Bangkok, Thailand in December 1997.

11.2 The Commission re-emphasized the request to Members by the Executive Council to encourage the advancement of women in meteorology and operational hydrology. Resolution 18 (CCI-XII) was adopted.

12. CAPACITY BUILDING (agenda item 12)

12.1 The Commission noted with appreciation the reports by the Rapporteurs on Capacity Building. It was agreed that one of the many ways in which capacity building was defined was the strengthening of Members', capabilities to enable them to meet the needs of their respective communities, in particular in developing countries. The Commission expressed the belief that capacity building should aim mainly at improved understanding and facilitating the application of meteorology and climatology in order to increase efficiency in food production, water resources management, energy production, urban planning and management and industrial operations. It should also provide for the safety and well-being of populations through appropriate services in the areas related to human health, tourism and recreation.

12.2 The Commission noted that the rapporteurs had been involved in several activities at the WMO Regional level. It noted the changing emphasis in capacity-building activities amongst Members. Earlier focus was limited to the traditional climatological issues, while the current tendency is to focus also on the critical socio-economic issues, including those directly related to air pollution, greenhouse gases and climate change, and variability and its consequences, such as sea level

rise and the problems related to drought and desertification. The Commission emphasized the need for efforts at enhancing Members' awareness and knowledge about climate change and variability, and of ways and means to reduce the emissions of greenhouse gases and other air pollutants.

12.3 The Commission agreed that there was need for continued awareness building and guidance within the NMHSs and amongst the users through preparation of special guides on specific sectorial applications, such as urban climatological methodologies. This could be pursued in close cooperation with other international organizations, such as the Food and Agricultural Organization of the United Nations (FAO), UNHCS, UNEP, UNESCO and WHO within the framework of the *Climate Agenda* initiative. It was suggested that increasing public consciousness by earmarking days for specific issues, such as the Ozone Day (16 September) is also considered to be helpful in capacity building.

12.4 The Commission noted with appreciation that at the international level, the vice-president of CCI contributed to and participated in several events and activities related to the Global Climate Observing System (GCOS), meetings with Commission for Instruments and Methods of Observation (CIMO) expert groups on automation and measurements of climatological parameters, the IPCC and as chairman of the International Programme Committee for TECTUC. The Commission shared the view expressed by him at the CIMO expert group meeting where he stressed the need for Members to be aware of all aspects of automation. Automation of measurements of climate parameters should not preclude precision and the homogeneity of data. Capacity-building activities should include this specific field.

12.5 The Commission examined the suggestions of the rapporteurs and agreed that capacity building could be enhanced through the following actions:

- (a) Training seminars should be continued with increasing focus on specific issues such as use and dissemination of CLIPS-related products, use of modern technology in data management, particularly through the CLICOM area support activities, and in specific fields of application considering regional and national priorities and needs;
- (b) Preparation and dissemination of training and capacity-building material by the use of techniques such as video cassettes, diskettes, CD-ROMs, brochures and electronic mail, including the Internet;
- (c) Systematic monitoring and follow-up of progress by Members after provision of training and related capacity building in order to assure desired impact and success;
- (d) Continued encouragement and guidance in establishment of functional National Climate Programmes (NCPs); and
- (e) Enhanced use, including acquiring and maintaining, of Internet services together with traditional means of information exchange to be considered within the WMO Education and Training (ETR) Programme.

12.6 The Commission agreed that there is a need to enhance the capacities amongst the NMHSs to contribute to awareness building and to the provision of proper guidance and advice to the relevant authorities on issues related to climate variability and change and their impacts. It noted that the rapporteurs suggested that special efforts were called for regarding the capacities to assess the potential impact in sectors such as human health and tourism. The Commission noted that awareness building and liaison with national authorities was often a management function, and considered that these activities should be an important element in the document *Guidelines on Management of National Meteorological and Hydrological Services (NMHSs)* prepared by WMO.

12.7 The Commission recognized the importance of adequate climate databases to ensure that capacity-building activity is based on comprehensive and reliable information, especially in order to develop capabilities to advise decision makers on the state and trends of climate.

12.8 The Commission considered that fast development of climate data management techniques and methodologies for climate services, together with the increased demand for training in these areas, should require expeditious updating of WMO training materials, including *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology* (WMO-No. 258). The Commission also considered that parts of the *Guide to Climatological Practices* related to capacity building should be further reviewed with the view to providing the best possible response to Members' needs.

12.9 The Commission noted that the Assistant Secretary-General served as a focal point on capacity-building issues within WMO.

12.10 The Commission decided to appoint rapporteurs on capacity building (see agenda item 9).

13. ANY OTHER MATTERS (agenda item 13)

13.1 During the session, a number of participants provided information on forthcoming CCI-related international and national events in their respective countries, including the "International Workshop on Monitoring, Prediction and Services for Climate Change" to be held in Kobe, Japan (7-8 December 1997), and the international specialized exhibition and symposium Hydrometeorology for Humanity, to be held in St. Petersburg, Russia (11-15 December 1997).

13.2 The session endorsed the proposal by the president of the Commission to present certificates for outstanding long-period services to CCI to Messrs E. Jauregui and T. Oke. The certificates will be presented to the recipients at a suitable time and place.

14. SCIENTIFIC LECTURES AND DISCUSSIONS (agenda item 14)

14.1 Part of the session was devoted to scientific lectures and discussions under the chairmanship of the president of the Commission. The lectures were as follows:

- (a) National climate services — from data collectors to environmental consultants (H. Landsberg Memorial Lecture)
(B. Aune, Norway);

- (b) The importance of biometeorological information for people living in urban areas (T. Cegnar, Slovenia);
- (c) The CLIPS Project: A new step in the provision of climate services (F.H.M. Semazzi, WCP/WMO);
- (d) Integration of agricultural management systems with seasonal climate forecast information in North-East Australia (R. C. Stone, Australia).

14.2 The Commission thanked the lecturers for their interesting presentations, which had also been reflected in the discussions of the corresponding technical-scientific items on the agenda.

14.3 The commission suggested that one theme to be considered as a scientific lecture at CCI-XIII should be "Use of Geographical Information Systems in Climatology".

15. NOMINATION OF MEMBERS OF WORKING GROUPS AND RAPORTEURS (agenda item 15)

To carry out its programme during the inter-sessional period the Commission established working groups and appointed rapporteurs as listed below:

Advisory Working Group of CCI, Working Group on Climate Data, including:

- (a) Rapporteur on Global and Regional Climatological Datasets and Station Networks, including aspects related to INFOCLIMA and to serve as liaison with the CCI Working Group on Climate Change Detection;
- (b) Rapporteur on the Evolution of Climate Database Management, including CLICOM Systems and to serve as liaison with the CBS Working Group on Data Management;
- (c) Rapporteur on Climate Data Rescue, Preservation and Digitization;
- (d) Rapporteur on Climate Data Management, including CLICOM and Climate Observing Station Networks in Developing Countries;
- (e) Rapporteur on Climate System Monitoring;
- (f) Rapporteur on Automatic Observing Station Systems and on Processing and Quality Control of Data from such stations in liaison with CIMO;
- (g) Rapporteur on the Use and Quality of Remotely Sensed Observations (satellite, radar, etc.) for Climate Purposes;
- (h) Rapporteur on Data Homogeneity, Statistical Properties of Data, Dataset Registration and Metadata and to serve as liaison with the GCOS/GOOS/GTOS Joint Data, Information and Management Panel (JDIMP); and
- (i) An expert to be designated by CBS.

Working Group on Climate Change Detection, including:

- (a) Rapporteur on the Surface and Upper Air Networks and Datasets from Climate Observation Systems such as GCOS, GTOS and GCOS;
- (b) Rapporteur on the Application of Reanalyses and other Global Gridded Datasets for Climate Change Detection;
- (c) Rapporteur on Capacity Building in Climate Change Detection; and

(d) Rapporteur on Climate Change Detection Indices. Working Group on Climate Information and Prediction Services (CLIPS), including:

- (a) Rapporteur on Climate Services to the Food Production Sector and to serve as liaison with CAgM;
- (b) Rapporteur on Climate Services to the Water Resources Sector (with special reference to drought and desertification) and to serve as liaison with CHy;
- (c) Rapporteur on Climate Services to the Urban Planning and Building Sector;
- (d) Rapporteur on Climate Services to the Health Sector, including aspects of services to the Tourism and Recreation Sector;
- (e) Rapporteur on Climate Services to the Energy Sector;
- (f) Rapporteur on Methods of Climate Prediction, including Model Output (with special reference to criteria for evaluating skill); and
- (g) Rapporteur on the WMO CLIPS Project.

Rapporteurs not directly connected with CCI working groups:

- (a) Rapporteurs on the International Exchange of Climate Data and Products;
- (b) Rapporteurs on Urban and Building Climatology;
- (c) Rapporteurs on Climate and Human Health;
- (d) Rapporteurs on Energy-Meteorology, including Solar and Wind Energy;
- (e) Rapporteur on Tourism and Recreation;
- (f) Rapporteurs on Capacity Building;
- (g) Rapporteurs on Interaction with Users, and Public Awareness;
- (h) Rapporteurs on GTS and Internet Utilization;
- (i) Rapporteurs on CLICOM and its Future Development;
- (j) Rapporteurs on Statistical Methods;
- (k) Rapporteurs on Climatological Aspects of Water Resources Management in Dry Climates; and
- (l) Rapporteurs on Climate Change Detection Methodologies and Indices.

16. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS (agenda item 16)

16.1 The Commission examined the resolutions and recommendations adopted at its previous sessions that were still in force at the time of the twelfth session. It also examined those Executive Council resolutions based on previous recommendations of the Commission that were still in force. Resolution 19 (CCI-XII) and Recommendation 1 (CCI-XII) were adopted.

17. ELECTION OF OFFICERS (agenda item 17)

17.1 Mr Y. Boodhoo (Mauritius) was unanimously elected president of the Commission for Climatology.

17.2 Mr J. M. Nicholls (United Kingdom) was elected vice-president of the Commission for Climatology.

18. DATE AND PLACE OF THE THIRTEENTH SESSION (agenda item 18)

18.1 The Commission noted with appreciation the information given by the delegate from Australia, on

behalf of her country, that Australia will consider extending an official invitation to WMO to host the thirteenth session of CCI, to be held in the year 2001. The Commission also noted that the date and place of its thirteenth session would be determined in accordance with WMO General Regulation 186.

19. CLOSURE OF THE SESSION (agenda item 19)

19.1 In his closing address, the president of the Commission thanked all those who had contributed to the successful completion of the work of the session, in particular the vice-president, the co-chairmen of the working committees, the chairman of the Nomination Committee and the chairman of the Committee for the Selection of Working Group Members and Rapporteurs,

delegates, as well as the staff of the WMO Secretariat, including the interpreters, translators and those producing the documents behind the scenes. He congratulated the newly-elected president and vice-president, and wished them and all the elected working group members and rapporteurs a successful and fruitful intersessional period as they attack all the challenging issues facing the Commission at the turn of the century.

19.2 Many speakers expressed satisfaction at the results of the session achieved under the dynamic leadership of the president of the Commission. The president and the vice-president were congratulated on their election.

19.3 The twelfth session of the Commission for Climatology closed at 12.25 p.m. on 14 August 1997.

RESOLUTIONS ADOPTED BY THE SESSION

RESOLUTION 1 (CCI-XII)

ADVISORY WORKING GROUP OF THE COMMISSION FOR CLIMATOLOGY

THE COMMISSION FOR CLIMATOLOGY,
NOTING the report of the president of the Commission to CCI-XII,

CONSIDERING that there is need for continued guidance in the organization of the Commission's activities in helping to meet the objectives of the World Climate Programme,

DECIDES:

- (1) To establish an Advisory Working Group of CCI with the following terms of reference:
 - (a) To coordinate the activities of the Commission, including the work of the working groups and rapporteurs, in the implementation and further planning of the World Climate Programme, and in particular the WCASP and WCDMP;
 - (b) To assist the president of the Commission in providing advice or taking action on urgent matters referred to the Commission which cannot be dealt with by the technical working groups or rapporteurs;
 - (c) To advise on and to plan the future programme of the Commission; and
 - (d) To advise the president on changes that may be required in the terms of reference of the Commission;
- (2) To invite the following experts to serve on the working group:
Mr Y. Boodhoo (Mauritius) president of CCI (chairman);

Mr J. M. Nicholls (United Kingdom) vice-president of CCI;

Mr K. Davidson (United States of America);

Mr Y. Ding (China);

Mr M. Kadi (Algeria);

Mr H. Kondo (Japan);

Ms J. Masterton (Canada);

Mr J. Maunder (New Zealand — until December 1998)

Ms E. Nieplova (Slovakia);

Mr S. Njoroge (Kenya);

Mr V. Trenin (Russian Federation) — Rapporteur on Interaction with Users and Public Awareness with emphasis on socio-economic benefits;

(A member from RA III to be nominated later)*

Mr V. Vent-Schmidt (Germany); and

Ms M. Voice (Australia).

- (3) To request the president to organize the work of the working group, considering that appropriate attention be given to issues such as capacity building, economic and social aspects of climate services, and liaison with regional associations, which may not be covered by specific terms of reference in other resolutions;

REQUESTS the chairman to report to the Commission on the activities of the Advisory Working Group as appropriate.

NOTE: Mr L. C. B. Molion (Brazil) has been nominated.

RESOLUTION 2 (CCI-XII)

SOCIO-ECONOMIC BENEFITS OF CLIMATE SERVICES

THE COMMISSION FOR CLIMATOLOGY,
NOTING various reports on the socio-economic benefits of the utilization of climate data and products, including reports of CCI members and rapporteurs,

CONSIDERING that there is a need to further develop studies on evaluation of socio-economic benefits of climate services,

CONSIDERING further that evaluation of socio-economic benefits which can be obtained through the activities of

National Meteorological and Hydrological Services (NMHSs) can serve as an important factor in governments' consideration of funding and development of NMHSs,

REQUESTS the president of CCI and the WMO Secretariat to consider actions to ensure efficient and effective exchange of information on socio-economic benefits among relevant experts of WMO technical commissions, and timely distribution of this information to WMO Members.

RESOLUTION 3 (CCI-XII)

WORKING GROUP ON CLIMATE DATA

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan* (WMO-No. 831), Part I and Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The report to CCI-XII of the chairman of the Working Group on Climate Data,

CONSIDERING the need for CCI, as the technical commission having the lead role in the World Climate Data and Monitoring Programme, to have an effective mechanism to guide the implementation and the further development of the Programme,

DECIDES:

- (1) To re-establish the Working Group on Climate Data with the following terms of reference:
 - (a) To advise on the requirements for the preparation and maintenance of global and regional climatological data sets, including those based on data and metadata from the GCOS Networks and the ongoing World Weather Record publications, in collaboration with the Working Group on Climate Change Detection;
 - (b) To continue providing guidance on requirements for data set registration and the incorporation of additional data categories, including metadata, catalogues and inventories into INFOCLIMA and, in collaboration with GCOS, advise on the future development of INFOCLIMA data set registration and national climate data catalogues;
 - (c) To provide, in collaboration with the CCI Working Group on Climate Information and Prediction Services (CLIPS) for guidance for the Climate System Monitoring project, including data needs for developing climate prediction services;
 - (d) To keep abreast of the development of the Global Climate Observing System (GCOS) and the transmission of climate information and to liaise as appropriate with individuals and bodies involved in the GCOS planning process and the CBS bodies related to the transmission of climate information over the GTS and the Internet;
 - (e) To participate, together with other relevant CCI rapporteurs and relevant CBS working groups, in the preparation and updating of guidelines on data and metadata management techniques, to assist developing countries to upgrade data-management procedures, and to review the implementation of those guidelines;
 - (f) To cooperate with GCOS, CBS and the CCI Working Group on Climate Change Detection on the implementation and maintenance of the GCOS Surface and Upper-Air Networks and promote the establishment of national Reference Climatological Station (RCS) networks;
 - (g) To provide, in cooperation with GCOS, CBS and the CCI Working Group on Climate Change Detection, guidance on the management of data from remotely-sensed observations, especially satellite data;
 - (h) To review existing and recommend new criteria for the quality control of data for research and applications, including data from satellites, automatic stations and other remote-sensing platforms, bearing in mind changes in the environment and instrumentation of the stations;
 - (i) To review data-processing and quality-control procedures involved in the conversion of manually operated stations to automatically operated stations and to provide the guidance needed to preserve continuity and homogeneity of data records;
 - (j) To oversee procedures for the determination of standards and other normals;
 - (k) To review and advise on the coordination and implementation of the CLICOM project, including the evolution of climate database management systems more advanced than the CLICOM 3.0/3.1 systems;
 - (l) To coordinate activities on climate data management with the chairmen of the Regional Associations working groups related to climate data management;
 - (m) To review requirements and data-management procedures to keep pace with the technological advances foreseen in the WMO 4LTP;
 - (n) To promote and advise on the rescue, preservation and digitization of useful climate data from NMHS archives, national archives and other sources;
 - (o) In collaboration with the Working Group on Climate Change Detection, to review Chapter B.1 — Climatology — of Volume I of the Technical Regulations as well as other relevant parts of the Technical Regulations (including its annexes), and to propose amendments as necessary;
 - (p) To provide liaison between the CCI data activities and those of the other WMO bodies, especially the Commission for Basic Systems (CBS) and the Commission for Instruments and Methods of Observations (CIMO); and
 - (q) To contribute to the study of the homogeneity and the statistical properties of the long-term data series of climate-related parameters and to advise on procedures for ensuring the homogeneity of climate data;
- (2) To select the following experts to serve on the working group:

Mr M. Crowe (United States of America) — Rapporteur on Global and Regional Climatological Data Sets and Station Networks including aspects related to INFO-

CLIMA and to serve as liaison with the CCI Working Group on Climate Change Detection;
 Mr F. Benichou (France) — Rapporteur on the Evolution of Climate Database Management, including CLICOM Systems and to serve as liaison with the CBS Working Group on Data Management;
 Mr R. Senna (Brazil) — Rapporteur on Climate Data Rescue, Preservation and Digitization;
 Mr P. Ambenje (Kenya) — Rapporteur on Climate Data Management, including CLICOM and Climate Observing Station Networks in Developing Countries;
 Mr R. Basher (New Zealand) — Rapporteur on Climate System Monitoring;
 Mr E. Rudel (Austria) — Rapporteur on Automatic Observing Station Systems and on Processing and Quality Control of Data from such stations in liaison with CIMO;
 Mr Y. Tahara (Japan) — Rapporteur on the Use and Quality of Remotely Sensed Observations (Satellite, Radar, etc.) for Climate Purposes;

Mr G. Müller-Westermeier (Germany) — Rapporteur on Data Homogeneity, Statistical Properties of Data, Data Set Registration and Metadata and to serve as liaison with the GCOS/GOOS/GTOS Joint Data, Information and Management Panel (JDIMP);
 An expert to be designated by CBS;
 To select, in accordance with General Regulation 32, Mr R. Basher (New Zealand) as chairman of the working group;

REQUESTS:

- (1) The rapporteurs to submit to the president of the Commission, through the chairman of the working group, annual progress reports and a final report not later than 10 months before the thirteenth session of the Commission;
- (2) The chairman to ensure overall coordination within the working group and submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

RESOLUTION 4 (CCI-XII)

JOINT WORKING GROUP ON CLIMATE CHANGE DETECTION

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The role of the WCRP Climate Variability and Predictability (CLIVAR) Study and its Modelling and Detection of Anthropogenic Climate Change (CLIVAR-ACC) component,
- (3) The role of IPCC,
- (4) The objectives and plans of GCOS,
- (5) Resolution 5 (EC-XLIII) — Climate Change Detection — and the action taken by the president of CCI in accordance with this resolution,
- (6) Paragraph 3.2.4.12 of the general summary,
- (7) The report to CCI-XII of the chairman of the Working Group on Climate Change Detection,

CONSIDERING that, because of major interest and concern regarding the variability of climate and the early detection of climate change, there will be a long-standing requirement for an ongoing evaluation of climate on global and regional scales,

DECIDES:

- (1) To establish a joint Working Group on Climate Change Detection between CCI and the CLIVAR project with the following terms of reference:
 - (a) To serve as an advisory body to the WMO Commission for Climatology with the Scientific Steering Group of CLIVAR and GCOS on activities related to the detection of climate change;

- (b) To collaborate with the JSC/CLIVAR Working Group on Coupled Modelling on activities related to the detection and attribution of climate change, including incorporating the effects of forcing from greenhouse gases and sulphate aerosols;
- (c) To collaborate with the working groups on meteorological and climatological data of the WMO Commissions, the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP) and other institutions and programmes on the development and maintenance of appropriate data sets, including metadata for climate change detection;
- (d) To oversee the preparation of authoritative reports on the state of the worldwide climate, paying particular attention to the regular assessment process conducted by the Intergovernmental Panel on Climate Change (IPCC);
- (e) To promote the development of and make recommendations on the use of indices and indicators for climate change detection on regional and global scales;
- (f) To assess, in collaboration with GCOS and other groups, the capabilities of surface and upper air networks and other climate monitoring systems to provide adequate data for studies on climate change detection and, as required, develop proposals for new networks;

- (g) To provide guidance on the utilization and validity of gridded, historical, climate forcing and proxy data sets for climate change detection;
- (h) To contribute to the capacity-building process in the area of climate change detection;
- (2) To select the following experts to serve on the working group:
Mr A. Sun (China) — Rapporteur on the Surface and Upper Air Networks and Data Sets from Climate Observation Systems such as GCOS, GTOS and GOOS;
Mr C. Ropelewski (United States of America) — Rapporteur on the Application of Reanalyses and other Global Gridded Datasets for Climate Change Detection;
Ms S. Dolgikh (Kazakhstan) — Rapporteur on Capacity Building in Climate Change Detection;
Mr C. Folland (United Kingdom) — Rapporteur on Climate Change Detection Indices;
- (3) To request the CLIVAR Scientific Steering Group to nominate four experts to serve on the working group to cover the following four topics:

- (1) Climate forcing data and liaison with the IPCC;
- (2) The use of glacier and other proxy data for climate change detection;
- (3) Climate change detection strategies and techniques;
- (4) Aerosol forcing;
- (4) To select, in accordance with Regulation 32 of the General Regulations, Mr C. Ropelewski (United States of America) as chairman of the working group;

REQUESTS:

- (1) The rapporteurs to submit to the president of the Commission, through the chairman of the working group, annual progress reports and a final report not later than 10 months before the thirteenth session of the Commission;
- (2) The chairman to submit to the president of the Commission annual progress reports (for submission to the annual sessions of the Executive Council), a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

RESOLUTION 5 (CCl-XII)

WORKING GROUP ON CLIMATE INFORMATION AND PREDICTION SERVICES (CLIPS)

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996-2005,
- (2) Resolution 9 (Cg-XII) — Climate Information and Prediction Services (CLIPS),
- (3) General summary paragraphs 4.1.16 - 4.1.19 (Forty-eighth session of the Executive Council);
- (4) The report to CCl-XII of the chairman of the Working Group on the Operational Use of Climatological Knowledge,

CONSIDERING:

- (1) The need for enhanced climate information, including predictions, in support of socio-economic development,
- (2) The changing roles of NMHSs in the provision of sector-specific information,
- (3) The increasing availability of broad scale climate products on media such as the Internet,

DECIDES:

- (1) To establish a Working Group on Climate Information and Prediction Services (CLIPS) with the following terms of reference:
 - (a) Review and keep abreast of developments of national climate services;
 - (b) Provide scientific and technical guidance on the optimal use of climate services, in particular with respect to the implementation of the WMO CLIPS project, including:
 - (i) Application of methods of climate analysis and climate prediction;

- (ii) Results of demonstration/pilot projects;
- (iii) Methods of communication of climate information using means such as the GTS and Internet;
- (c) Review and recommend ways to optimize the applicability of climate products, with emphasis on:
 - (i) User involvement in design, development, modification, and implementation of CLIPS products and services;
 - (ii) Cost/benefits of CLIPS and of CLIPS-related demonstration/pilot projects;
 - (iii) Climate prediction products' impacts on actual decision-making, and on the enhancement of these impacts;
 - (iv) Preparation of information packages to increase awareness of need for and methods involved in climate information and prediction services through the various educational levels;
- (d) To review the quality of products, especially seasonal forecasts, provided within the CLIPS system, including services to users, and recommend how information on quality should be presented to users;
- (2) To select the following experts to serve on the working group:
 - Mr O. Ghalem (Algeria) — Rapporteur on Climate Services to the Food Production Sector and to serve as liaison with CAgM;
 - Mr K. Li (China) — Rapporteur on Climate Services to the Water Resources Sector (with special reference to

drought and desertification) and to serve as liaison with CHy;

Mr K. Gallo (United States of America) — Rapporteur on Climate Services to the Urban Planning and Building Sector;

Mr V. Razuvaev (Russian Federation) — Rapporteur on Climate Services to the Health Sector, including aspects of services to the Tourism and Recreation Sector;

Ms S. Robles-Gil (Mexico) — Rapporteur on Climate Services to the Energy Sector;

Mr K. Tada (Japan) — Rapporteur on Methods of Climate Prediction including models output (with special reference to criteria for evaluating skill);

Mr O. Moch (France) — Rapporteur on the WMO CLIPS Project;

(3) To select, in accordance with Regulation 32 of the General Regulations, Mr O. Moch (France) as chairman of the working group;

REQUESTS:

(1) The rapporteurs to submit to the president of the Commission, through the chairman of the working group, annual progress reports and a final report not later than ten months before the thirteenth session of the Commission;

(2) The chairman to submit to the president of the Commission annual progress reports (for submission to the annual sessions of the Executive Council), a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

RESOLUTION 6 (CCI-XII)

RAPPORTEURS ON THE INTERNATIONAL EXCHANGE OF CLIMATE DATA AND PRODUCTS

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) Resolution 40 (Twelfth Congress),

CONSIDERING:

- (1) The increasing requirement for global exchange of all types of climate data and related products for the enhancement and improvement of climate services, as well as for climate research and monitoring,
- (2) The need to clarify those aspects of WMO Policy in Resolution 40 pertaining to climate data and products, taking into consideration the development of GCOS and the requirements for climate data and products for IPCC assessments and negotiations on the implementation of the UN Framework Convention on Climate Change,
- (3) The growing use of the Internet in facilitating the exchange of climate data and products and its importance in the implementation of the CLIPS project,
- (4) That the future development of the GTS will provide opportunities for enhanced exchange of climate data and products,

DECIDES:

- (1) To appoint Rapporteurs on the International Exchange of Climate Data and Products with the following terms of reference:

- (a) To keep abreast of the development of the Internet and the GTS;
- (b) To advise the president of CCI on technical and policy matters pertaining to the international exchange of climate data and products;
- (c) To liaise, as appropriate, with relevant rapporteurs and working groups of other technical commissions, on the issues of:
 - (i) Monitoring the exchange of climate data and products over the GTS and Internet;
 - (ii) Development of the GTS;
 - (iii) Interpretation and implementation of Resolution 40 (Cg-XII);
- (2) To invite Mr C. Hall (United Kingdom), Mr W. Kinenmonth (Australia)*, Mr D. Miskus (United States of America) and Mr M. Payen (France) to serve as Rapporteurs on the International Exchange of Climate Data and Products;

REQUESTS rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

NOTE: Mr Kinenmonth later informed that he was unable to accept rapporteurship.

RESOLUTION 7 (CCI-XII)

RAPPORTEURS ON URBAN AND BUILDING CLIMATOLOGY

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The report to CCI-XII of the Rapporteurs on Urban and Building Climatology,
- (3) The Report from the Meeting of the Taskforce on TRUCE, October 1996,
- (4) Twelfth Congress, paragraph 7.3.8,

CONSIDERING:

- (1) The emphasis placed on sustainable development in the areas related to human settlements and land use in documents such as the HABITAT Agenda, Agenda 21 and the United Nations Framework Convention on Climate Change,
- (2) The need to promote the optimal use of climate information and knowledge in land use, urbanization and building activities,

DECIDES:

- (1) To appoint Rapporteurs on Urban and Building Climatology with the following terms of reference:
 - (a) To review the needs for climate data products and services in the urban planning sector and to the building and construction industry;
 - (b) To provide material for continued bibliographies on urban and building climatology;
 - (c) To contribute to the implementation of the Tropical Urban Climate Experiment (TRUCE);
- (2) To invite Mr K. Gallo (United States of America), Ms S. Hassan (Bangladesh), Mr E. Jauregui (Mexico), Ms N. Kobysheva (Russian Federation) and Mr B. Padmanabhamurthy (India) to serve as Rapporteurs on Urban and Building Climatology;
- (3) To request rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

RESOLUTION 8 (CCI-XII)

RAPPORTEURS ON CLIMATE AND HUMAN HEALTH

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The report to CCI-XII of the Rapporteurs on Climate and Human Health, including the Report from the Meeting of Experts on Climate and Human Health, January 1997,

CONSIDERING:

- (1) That there is a continuous need to take into account applications of climate information and knowledge in connection with human health as expressed in documents such as Agenda 21 and the Framework Convention on Climate Change,
- (2) The need for promoting systematic cooperation between national Meteorological Services and health professionals, institutions, authorities and decision makers responsible for human health and welfare in general,
- (3) That, from the human health point of view, the steady deterioration of climate in the increasingly large cities, especially in tropical countries, adds to the urgency of the need to enable national Meteorological Services to contribute to the mitigation of the difficulties,
- (4) That there is a need to assist many national Meteorological Services, especially in developing countries, to promote the applications of climatology to human health,

- (5) The potential impacts of climate change on human health,

DECIDES:

- (1) To appoint Rapporteurs on Climate and Human Health, including aspects related to tourism and recreation with the following terms of reference: In collaboration with experts from the meteorological and other professions dealing with human health, biology, architecture, building, housing, human settlements, land-use planning, tourism and recreation, clothing and decision-making, to accomplish the following tasks:
 - (a) To assist in the drafting of guidance material and to prepare, as necessary, further guidelines on the role and activities of Meteorological Services in the area of weather/climate and human health, focusing on the needs and conditions in developing countries. Special consideration should be given to the feasibility of mitigating impacts of severe natural hazards, e.g. drought, taking into account the different response of populations to meteorological phenomena and their ability to adapt to them;
 - (b) To review information on the interaction between climate/weather and human health, with special emphasis given to the conditions in large cities and in tropical areas;
 - (c) To determine more accurately the impacts of climate change on human health, including mortality;

- (d) To foster the development of activities in coordination with international medical associations and health organizations, especially WHO, with a view to uniting efforts to extend the sphere of climate applications in the field of human health;
- (2) To invite Mr G. Jendritzky (Germany), Ms T. Cegnar (Slovenia), Mr A. McMichael (United Kingdom),

Mr L. Kalkstein (United States of America), Mr L. Lecha Estela (Cuba) and Mr V. Razuvaev (Russian Federation) to serve as Rapporteurs on Climate and Human Health;

REQUESTS rapporteurs to submit to the president of the Commission annual progress reports and a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

RESOLUTION 9 (CCI-XII)

RAPPOREURS ON ENERGY – METEOROLOGY, INCLUDING SOLAR AND WIND ENERGY

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The report to the Commission's chairman of the Working Group on Energy-Meteorology,

CONSIDERING that the application of climatological information and data can be useful and cost-effective in the planning, design and operation of many energy systems, that there is a continuous surge of interest in the development of renewable sources of energy, in particular solar and wind energy, as expressed in documents such as Agenda 21 and the Framework Convention on Climate Change, and thus a continuous need to study the interaction between the environment and different forms of energy utilization, exploration, production, transport, conservation and consumption,

DECIDES:

- (1) To appoint Rapporteurs on Energy-Meteorology, including solar and wind energy, with the following terms of reference:

In collaboration with experts from the energy sector and other professions dealing with issues related to climatological aspects and energy to accomplish the following tasks:

- (a) To review development in the area of energy-meteorology;
- (b) To assist in the implementation of WMO activities related to energy;
- (c) To contribute to the preparation of guidance material on the use of climate information and services in the planning, design and operation of conventional and renewable energy systems;
- (2) To invite Mr H. Dobesch (Austria) and Ms S. Robles-Gil (Mexico) to serve as Rapporteurs on Energy-Meteorology, including solar and wind energy;
- (3) To request the rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

RESOLUTION 10 (CCI-XII)

RAPPOREUR ON TOURISM AND RECREATION

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan* Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The reports of the Commission's Rapporteurs on Tourism and Recreation,
- (3) The working arrangements agreed to between WMO and the World Tourism Organization (WTO),
- (4) The great economic importance of tourism, recreation and use of leisure time in many national budgets, in particular for developing countries in tropical and sub-tropical areas,
- (5) The emphasis on sustainable development expressed in documents such as Agenda 21 and reports from the WTO,

CONSIDERING:

- (1) That climate is often a decisive factor which provides the resource base for tourism and recreation,
- (2) That there is a need for relevant climatological information in planning for tourism, recreation and the use of leisure time,
- (3) That special forecasts are important for tourism and recreation, particularly in relation to the safety of human life,

DECIDES:

- (1) To appoint a Rapporteur on Tourism and Recreation, with the following terms of reference:
- (a) To complete the preparation for publication of guidance material for Members on climate applications and services for tourism and recre-

- ation, including aspects related to climate and weather insurance for the sector;
- (b) To complete the preparation of a brochure on tourism and climate;
 - (c) To encourage major international tourism and sport/recreation associations to:
 - (i) incorporate climatic considerations into their activities; and
 - (ii) use national Meteorological Services for obtaining climatic data, information and expertise;
 - (d) To promote the development of climatotherapy, climatic products and services in support

- (e) of the tourism and recreation sectors, especially in developing countries;
- (e) To interact with other CCI rapporteurs whose responsibilities have implications for the tourism and recreational activities in developing countries, especially with the Rapporteurs on Climate and Human Health;
- (2) To invite Mr L. Lecha Estela (Cuba) to serve as Rapporteur on Tourism and Recreation;
- (3) To request the rapporteur to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract not later than six months before the thirteenth session of the Commission.

RESOLUTION 11 (CCI-XII)

RAPPORTEURS ON CAPACITY BUILDING

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The report to CCI-XII of the Rapporteur on Education and Training with Special Reference to Capacity Building in Developing Countries,

CONSIDERING:

- (1) The need to preserve the role of the National Meteorological and Hydrological Services as the pre-eminent national authorities on operational meteorological and climatological information and predictions,
- (2) The need to improve the scientific capacities in National Meteorological and Hydrological Services (NMHSs), particularly in developing countries, with emphasis on major issues associated with global climate change, pollution and renewable energy,
- (3) The rapid gains in access to scientific and educational materials that have been made possible in many countries through the Internet and computer aided learning (CAL) modules that are available on CD-ROM and through the Internet,
- (4) That many NMHSs do not have access to the Internet, have insufficient technical resources, or insufficient skills to make use of the Internet,

DECIDES:

- (1) To appoint Rapporteurs on Capacity Building, with the following terms of reference:
 - (a) To assist in the evaluation of the efficiency of training courses, seminars and workshops in climatology, including correspondence courses, audio-visual materials, and CAL in climatology;

- (b) To maintain liaison with other WMO rapporteurs on capacity building, including education and training, and to keep abreast of developments in the education and training activities of UNESCO, FAO, WHO, UNCHS and other international organizations;
- (c) To explore ways to introduce subjects on operational climate information and prediction services at the WMO Regional Meteorological Training Centres and to recommend the preparation of relevant material;
- (d) To explore innovative ways to enable NMHSs to access the Internet;
- (e) To review the *Guidelines for the Education and Training of Personnel in Meteorology and Operational Hydrology* and propose amendments, as relevant.
- (2) To invite the following to serve as Rapporteurs on Capacity Building:
 - Mr B. Dahlstrom (Sweden) — with emphasis on the use of GIS;
 - Mr G. Maracchi (Italy) — with emphasis on the use of GIS;
 - Mr L. du Pisani (Namibia) — with emphasis on conditions in developing countries;
 - Mr J. Rabadi (Jordan) — with emphasis on prediction quality and CLIPS; and
 - Mr N. Ward (United Kingdom) — with emphasis on prediction quality and CLIPS.
- (3) To request rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract, not later than six months before the thirteenth session of the Commission.

RESOLUTION 12 (CCI-XII)

RAPORTEURS ON INTERACTION WITH USERS AND PUBLIC AWARENESS

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The report to CCI-XII of the chairman of the Working Group on the Operational Use of Climatological Knowledge,
- (3) The report of the Meeting of Experts on CLIPS (Melbourne, 1995),
- (4) The report of the Meeting of Experts on CLIPS (Geneva, 1996),

CONSIDERING

- (1) The emphasis placed on involvement of users in all phases associated with the implementation of climate services,
- (2) The need to provide Members with information on how to educate users in understanding and using climate information,
- (3) The need to help Members find ways to understand users' processes and modify climate services and products,

DECIDES:

- (1) To appoint Rapporteurs on Interaction with Users, and Public Awareness, with the following terms of reference:
 - (a) To study the ways to explore with users their operations, processes and the decisions that could be improved by using climate information;

- (b) To make appropriate recommendations on methods to help users make optimal decisions with probabilistic climate predictions, other types of climate predictions, and climate data and monitoring information;
- (c) To focus on the priority areas in CLIPS, such as food production, water resources management (with special reference to drought and desertification), human health and tourism, and urban planning and building;
- (d) To study ways to promote public awareness of the types of climate information and predictions as well as to give advice on their use;
- (e) To collaborate with the CCI Working Group on CLIPS, and with the CCI Rapporteur on Types and Quality of Operational Climate Prediction Methods;

- (2) To invite the following to to serve as Rapporteurs on Interaction with Users, and Public Awareness:
 - Ms E. Koch (Austria) — with emphasis on financial and legal aspects;
 - Mr L. Song (China) — with emphasis on socio-economic benefits; and
 - Mr V. Trenin (Russian Federation) — with emphasis on socio-economic benefits;
- (3) To request rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract, not later than six months before the thirteenth session of the Commission.

RESOLUTION 13 (CCI-XII)

RAPORTEURS ON GLOBAL TELECOMMUNICATION SYSTEM (GTS) AND INTERNET UTILIZATION

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996–2005,
- (2) The report to CCI-XII of the chairman of the Working Group on the Operational Use of Climatological Knowledge,
- (3) The report of the Meeting of Experts on CLIPS (Melbourne, 1995),
- (4) The report of the Meeting of Experts on CLIPS (Geneva, 1996),

CONSIDERING:

- (1) The rapidity with which global and regional climate information is becoming accessible throughout the world on the Internet,
- (2) The need to preserve the role of the National Meteorological and Hydrological Services (NMHSs) as the pre-eminent national authorities on operational

meteorological and climatological information and predictions,

- (3) The need to improve Members' access to regional and global climate information and predictions,
- (4) The need to provide Members with information on how to exploit the telecommunications means in providing their products to users,
- (5) The escalating cost of organizing workshops, training seminars, and publication of reports,

DECIDES:

- (1) To appoint Rapporteurs on GTS and Internet utilization, with the following terms of reference:
 - (a) To study the potential and capability to transmit climate information and predictions via the GTS;
 - (b) To provide guidance on the ways to access, store, and display climate information via the Internet, including downloading software to process and analyze such data;

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| <p>(c) To study ways to establish an Internet dialogue among selected NMHSs to carry out the following functions:</p> <ul style="list-style-type: none"> (i) Distribution of Climate Outlooks; (ii) Distribution of pilot/demonstration project progress reports; (iii) Initiate activity on bringing the users closer to the climate information providers through the Internet; (iv) Conduct experimental online training events and other meetings; (v) Generate feedback to the climate information and predictions providers; | <ul style="list-style-type: none"> (d) To collaborate with the the Working Group on Teleconnections/Study Group on Communication Techniques and Protocols (WWW), the CCI Working Groups on CLIPS and on Climate Data, and the WMO Webmaster; (2) To invite Mr E. Ekuwen (Nigeria), Ms E. Farman (Iran), Mr J. Laver (United States of America) and Mr A. Sterin (Russian Federation) to serve as Rapporteurs on GTS and Internet Utilization; (3) To request rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract, not later than six months before the thirteenth session of the Commission. |
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RESOLUTION 14 (CCI-XII)

RAPPORTEURS ON CLIMATE COMPUTING (CLICOM) AND ITS FUTURE DEVELOPMENT

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996 - 2005,
- (2) General summary paragraph 3.2.1.9 (Twelfth Congress),
- (3) The requirements for a future integrated climate database management system developed by the Expert Meeting on the Future Evolution of WMO Coordinated Climate Database Management Systems held in Washington DC, United States of America, in August 1994,
- (4) Recommendations from the Expert Meeting to Review and Assess the Oracle-based Prototype for Future Climate Database Management Systems (CDMS) held in Toulouse, France, in May 1997, *Summary Notes and Recommendations for CCI*, WCDMP No-31 (WMO/TD-No. 832),

CONSIDERING:

- (1) The need for computer-managed data sets to address the continuing concerns and uncertainty with regard to climate change and its potential impacts on global and regional scales,
- (2) The value of climate data as a national resource to support and help develop the economy,
- (3) The need to promote the international exchange of climatological data and products,
- (4) The rapid technological advances that have taken place in desktop PC hardware and relational database management software,
- (5) The recommendation of experts that there be no further development beyond version 3.1 of the existing CLICOM software,
- (6) The climatological data management needs of WMO Members who want a climate data management system (CDMS) more advanced than the current version (3.1) of the CLICOM software,

DECIDES:

- (1) To appoint Rapporteurs on CLICOM and its future Development with the following terms of reference:

- (a) To use as guidance the three-tier approach to climate data management that was agreed to by the expert meeting in Toulouse in May 1997;
- (b) To advise the president of CCI and the chairman of the CCI Working Group on Climate Data on CLICOM-related matters, particularly on the utilization of Climate Data Management Systems for climate data management for climate monitoring, climate change detection, and research purposes;
- (c) To liaise, as appropriate, with other relevant CCI and/or CBS rapporteurs, working groups or special task groups on the issues of:
 - (i) Development of climate applications and services;
 - (ii) Implementation of professional training;
 - (iii) Future Climate Data Management Systems (CDMS) — development and possible linkage with related database management systems;
- (d) To advise on and promote the use of software for the coding and transmission of CLIMAT and CLIMAT TEMP messages and to ensure compatibility with GTS circuits;
- (e) To optimize the use of readily available commercial software;
- (f) To ensure sufficient database compatibility between those developed by pre-1998 versions of the CLICOM software and those developed by more advanced future CDMSs;
- (2) To invite Mr P. Ambenje (Kenya), Mr A. Besprozvannykh (Russian Federation), Mr R. Tolasz (Czech Republic), and others* to be appointed by the president of CCI to serve as Rapporteurs on CLICOM and its Future Development;
- (3) To request the rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract, not later than six months before the thirteenth session of the Commission.

* NOTE: Mr B. M. Pathack (Mauritius) has been appointed.

RESOLUTION 15 (CCI-XII)

RAPPORTEURS ON STATISTICAL METHODS

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996B2005,
- (2) The requirements for the use of climatological data and knowledge in climate research and in the provision of services to various fields of application,

CONSIDERING that the use of objective data analysis methods is indispensable for the identification of the specific characteristics of observational data series, particularly in climate monitoring and climate change detection, and for the creation of and interpretation of the results of climate prediction models,

DECIDES:

- (1) To appoint Rapporteurs on Statistical Methods, with the following terms of reference:
 - (a) To study the most appropriate methods for solving statistical problems in the use of climate data for applications and services, including climate monitoring and characterization of the diversity of climate evolution on different parts of the Earth, in particular:
 - (i) To investigate and report on statistical aspects of the problems of spatial interpolation of data and optimal design of climatological networks;

- (ii) To investigate and report on statistical aspects of the problem of time series analysis;
- (iii) To investigate and report on the statistical aspects of analysis of extreme events and extreme values;
- (iv) To advise on the use of statistical methods in the interpretation of and quality control of the output of general circulation models (GCMs);

- (b) To recommend, in consultation with other CCI rapporteurs and chairmen of working groups, appropriate methods for the analysis and presentation of climatological data in applied climatology;

- (2) To invite the following to serve as Rapporteurs on Statistical Methods:

Mr C. Merlier (France) — with emphasis on spatial interpolation;

Mr T. Peterson (United States of America) — with emphasis on analyses of extreme events;

Mr R. Sneyers (Belgium) — with emphasis on time-series;

Mr T. Szentimrey (Hungary) — with emphasis on data homogenization;
- (3) To request the rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract, not later than six months before the thirteenth session of the Commission.

RESOLUTION 16 (CCI-XII)

RAPPORTEURS ON CLIMATOLOGICAL ASPECTS OF WATER RESOURCES MANAGEMENT IN DRY CLIMATES

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996-2005,
- (2) The reports to the Commission of the Rapporteur on Water Resources,
- (3) Agenda 21, the IPCC reports, the Framework Convention on Climate Change and the Convention to Combat Desertification,
- (4) The ongoing work at the Drought Monitoring Centres and plans for further development of related programmes,

CONSIDERING:

- (1) That water resources management is an important component in mitigating the impact of drought and desertification, which can result in considerable human suffering, damage and loss in many sectors of the national economy,

- (2) The need for the Commission to contribute in its field of competence to WMO activities, especially to those related to WCP-water and CHy,

DECIDES:

- (1) To appoint Rapporteurs on Climatological Aspects of Water Resources Management in Dry Climates, with the following terms of reference:
 - (a) To study and propose climate scenarios in relation to water resources management in various dry regions;
 - (b) To follow the progress in the area of climate/seasonal forecasting, especially as it relates to water resources management and mitigation of adverse impact of droughts;
 - (c) To promote the realization of studies on the use of climate information and services (including monitoring, warning, impact assessment, prediction and mitigation) especially in developing countries in dry regions;

- (d) To provide liaison with CAgM, CAS and CHy, as well as with UNEP and FAO, on relevant matters;
- (2) To invite Mr A. Komuscu (Turkey) and Mr K. Li (China) to serve as Rapporteurs on Climatological Aspects of Water Resources Management in Dry Climates;
- (3) To request the rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract, not later than six months before the thirteenth session of the Commission.

RESOLUTION 17 (CCI-XII)

RAPPORTEURS ON CLIMATE CHANGE DETECTION METHODOLOGIES AND INDICES

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The *Fourth WMO Long-term Plan*, Part II, Volume 2 — The World Climate Programme 1996B2005,
- (2) The plans and objectives of CLIVAR, IPCC and GCOS,
- (3) Resolution 5 (EC-XLIII) — Climate Change Detection — and the action taken by the president of CCI in accordance with this resolution,
- (4) Paragraph 3.2.4.12 of the general summary of Cg-XII and the subsequent resolution 9/2 of CCI-XII,
- (5) The report to CCI-XII of the chairman of the Working Group on Climate Change Detection,
- (6) The recommendations of a June 1997 CLIVAR/GCOS/WMO Expert Meeting on Indices and Indicators of Climate Extremes,

CONSIDERING that, because of major interest and concern regarding the variability of climate and the early detection of climate change, there will be a long-standing requirement for an ongoing evaluation of climate on global and regional scales which will require the development of relevant indices for use in detecting climate change,

DECIDES:

- (1) To appoint Rapporteurs on Climate Change Detection Methodologies and Indices with the following terms of reference:
- (a) To collaborate with the Working Group on Climate Change Detection in the development

of climate change detection indices and in reviewing relevant parts of WMO programmes and activities, including the Technical Regulations;

- (b) To keep abreast of scientific developments involving the monitoring, detection and modelling of climate change, in general, the characterization of evolution of past climate, and especially to study the underlying principals for compiling reference climate data sets and the development of indices and indicators for use in detecting climate change;
- (c) To contribute to the study of the homogeneity and the statistical properties of the long-term data series of climate-related parameters and to advise on procedures for ensuring the homogeneity of climate data;
- (d) To collaborate closely with experts working on the development of indices and indicators of climate extremes;
- (2) To invite Mr C. Folland (United Kingdom), Mr G. Gruza (Russian Federation), Mr W. Hogg (Canada), Mr I. Mokssit (Morocco) and Mr N. Plummer (Australia) to serve as Rapporteurs on Climate Change Detection Methodologies and Indices;
- (3) To request the rapporteurs to submit to the president of the Commission annual progress reports, a final report and a one- or two-page abstract, not later than six months before the thirteenth session of the Commission.

RESOLUTION 18 (CCI-XII)

PARTICIPATION OF WOMEN IN THE WORK OF THE COMMISSION

THE COMMISSION FOR CLIMATOLOGY,

NOTING:

- (1) The United Nations Conference on Women (Beijing, China, 1995) and its recognition of the importance of women and their contributions to sciences,
- (2) The appeals made in Chapter 24 of Agenda 21: Programme of Action for Sustainable Development (Rio de Janeiro, 1992) on "Global action for women towards sustainable and equitable development",

- (3) The UNDP emphasis and priority of the advancement of women in meteorology and operational hydrology,
- (4) That the forty-eighth and forty-ninth sessions of the Executive Council had requested Members to encourage the advancement of women in meteorology and operational hydrology,

CONSIDERING discussions held at this session reflect the need for more women to become involved in climatological activities in general and the work of the Commission in particular,

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

URGES Members to respond to the "Questionnaire on the Participation of Women and Men in the Activities of the World Meteorological Organization and in the Fields of Meteorology, Operational Hydrology and Related Geophysical Sciences" distributed by the secretariat;

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

RECOMMENDS that Members:

- (1) Actively provide encouragement and support for an increased number of women to work as professional

staff and at decision-making levels in NMHSs, other meteorological and hydrological institutions and in regional, national and international cooperation programmes;

- (2) Increase the representation of women in their delegations to sessions of the Commission for Climatology and participation in CCI working groups, expert meetings and training activities to the extent possible;

REQUESTS the president of CCI to report to the thirteenth session of the Commission (CCI-XIII) on progress in the implementation of this resolution during the intersessional period.

RESOLUTION 19 (CCI-XII)

REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION FOR CLIMATOLOGY

THE COMMISSION FOR CLIMATOLOGY,

NOTING the action taken on its previous recommendations,
CONSIDERING that all its previous resolutions are now obsolete,

DECIDES:

- (1) Not to keep in force any of its resolutions adopted prior to its twelfth session;
- (2) That the recommendations of its previous sessions are now redundant.

RECOMMENDATION ADOPTED BY THE SESSION

RECOMMENDATION 1 (CCI-XII)

REVIEW OF RESOLUTIONS OF THE EXECUTIVE COUNCIL BASED ON PREVIOUS RECOMMENDATIONS OF THE COMMISSION FOR CLIMATOLOGY

THE COMMISSION FOR CLIMATOLOGY,

NOTING with satisfaction the action taken on its previous recommendations by the Executive Council,

RECOMMENDS:

(1) That the following Executive Council resolutions be maintained in force:

18 (EC-XXII), 6 (EC-XXXVI), 8 (EC-XXXVIII), 9 (EC-XXXVIII), 10 (EC-XXXVIII) and 5 (EC-XLVI);

(2) That Resolution 6 (EC-XLVI) be replaced by a new resolution, relating to the report of the twelfth session of CCl.

ANNEX

Annex to paragraph 8.1.6 of the general summary

PLAN OF ACTION FOR THE TROPICAL URBAN CLIMATE EXPERIMENT (TRUCE)

1. INTRODUCTION

Tropical cities face an enormous expansion in population and probable degradation in environmental quality, including aspects of urban climate such as air pollution, heat stress and flash floods, with significant negative implications for health, safety, productivity and conservation. In order to address these problems, a proposal that an international meteorological experimental programme be developed in order to improve our understanding of the tropical urban atmosphere, as well as its impact on human and urban development, was made at the WMO Technical Conference on Urban Climatology and its Applications with Special Regard to Tropical Areas, held in 1984 in Mexico, D.F. The WMO Commission for Climatology (CCI) at its tenth session (Lisbon, April 1989) adopted a recommendation on "Tropical Urban Climate Experiment (TRUCE)", outlining such a programme.

The project is named TRUCE, an acronym of TRopical Urban Climate Experiment. In fact, TRUCE is not meant to be one experiment but rather a set of experiments, including observations, analysis of data and model studies designed to further the knowledge of the urban atmosphere, i.e. environmental conditions and climate of tropical conurbations in various climatic regimes and urban situations. The information from these experiments would form a database and should help in the development of tools and methods to be used in planning for more sustainable urban environments, and thus improve the living conditions in urban areas in the tropics.

A major review of TRUCE-related activities was made at the Technical Conference on Tropical Urban Climates (TECTUC), Dhaka, Bangladesh, 1993. The WMO Executive Council endorsed the recommendations and suggested that TRUCE should be included as one of the priority activities in the Fourth WMO Long-term Plan (1996-2005). It was further stressed that WMO should seek active participation in TRUCE from other international and national organizations, including UNEP, UNHCHS (Habitat), UNESCO, UNDP, WHO, the World Bank, ICSU, IGU, CIB and IFHP.

The present revised version of the Plan of Action for TRUCE takes account of the decisions, recommendations and comments referred to above.

2. RATIONALE — THE CLIMATE-RELATED PROBLEMS OF URBAN GROWTH IN THE TROPICS

Accelerated urban growth in developing countries (most of them in the tropics/subtropics) has been observed in

recent decades. The uncontrolled flow of migrants to the cities has led to the proliferation of large metropolitan areas. By the year 2000, the number of cities with more than 1 million inhabitants will have increased threefold from the 52 such cities that existed in 1982. Besides putting pressure on high-priority services such as sewage, water supply, education and other facilities, the mainly chaotic urbanization is leading to environmental degradation (e.g. air pollution, heat stress). Despite the acclimatization to heat by the inhabitants of the tropics, increased morbidity and loss of productivity may result from the extra stress contributed by the heat island growth in large cities.

The IPCC reported as "major findings" in its first assessment in 1990, that throughout the world the most vulnerable populations include the urban poor in slums and shanty towns, especially in megacities. IPCC concluded that a principal issue is the impact of climate change on human settlement and related socio-economic activity. The concerns are also reflected in Agenda 21 and in the FCCC. TECTUC (1993) emphasized that the "Urban System" interacts in a complex way with the regional and global climate. It is the major source of GHGs and other environmental pollutants because it is a major user of energy. Potential large-scale environmental/climatic change will have an important impact on the "Urban Systems", including urban populations and sensitive infrastructures, such as transport systems, thermal comfort facilities and shoreline structures. Furthermore, changes in the "Urban System and Morphology" have distinctive impacts upon micro climate. Those climatic impacts have lasting consequences over life and living of urban people.

Oke (1993) discussed the interaction between "global change and urban climates" and formulated the following questions:

"To what extent are urban areas the cause of global change, the possible victims or beneficiaries of change, the source of scientific confusion about the reality of change, useful laboratories in which to study change, and appropriate agents to aid mitigation of the negative impacts of global change?" He shows that the answers to these questions confirm the central role of cities in global change and states, "It seems critical to involve this scale of enquiry more centrally in research programmes and plans of action."

Furthermore, the "Urban System" is highly vulnerable to natural disasters. Known technology and design methodology in building and construction can today provide for increased safety and improved preparedness, provided this is considered in urban planning and build-

ing, and based on reliable assessments of risks for disasters such as cyclones, floods, heatwaves, etc.

The IPCC refers to "Options for limiting greenhouse gas emissions" with an example in the building sector, in which new homes could be roughly twice as energy-efficient and new commercial buildings up to 75 per cent as energy-efficient as existing buildings, and retrofitting existing homes could average 25 per cent improvement and existing commercial buildings around 50 per cent. Even though air conditioning is not yet generalized in the tropics, new buildings show a tendency to move away from traditional passive means of cooling and, as cities and their heat islands have grown, the demand for power to run air conditioning equipment is expected to spiral.

Our understanding of the physical processes regulating the urban atmosphere, and moreover the interaction between the urban climate and regional/global climates is still poor, especially in the tropics. The reasons for this can be traced to the relatively poor base of meteorological resources available to research workers in the tropics. There are insufficient numbers of trained personnel, and a lack of research funding, equipment and computer facilities.

3. MAIN OBJECTIVES OF TRUCE

- (a) The main objectives of TRUCE are:
 - (i) To provide a basis for urban environmental planning and operation which will achieve more sustainable human settlements and aim at attainment of an environmental quality which provides for improved health, well-being and productivity of the population, and also meets the global concern about energy issues; and
 - (ii) To provide for capacity building through improved scientific understanding of the physical mechanisms and processes controlling the modification of the atmospheres of tropical urban areas, including their interaction with regional and global scale climatic variability and change.
- (b) The main goals of TRUCE are:
 - (i) To initiate, coordinate and implement observational and theoretical research programmes, which should include studies on the ways in which various features of the physical structures of cities affect the urban climate and the thermal stress of the inhabitants, the consumption of energy (cooling, etc.) and dispersion of pollutants;
 - (ii) To conduct experiments and develop models to better understand the tropical urban and building climate and improve, through urban and building design, the urban environment;
 - (iii) To make available the results in a coordinated database from activities related to TRUCE, with the aim of promoting the use of climate information for improving building and urban design; and

- (iv) To provide for capacity building in sustainable urban development by establishing links between researchers and encouraging international collaboration, coordination and networks of research in urban meteorology and related fields.

4. INITIAL SCIENTIFIC TASKS

Initially, priority should be given to the following scientific tasks/studies:

- (a) Understanding the physical basis of urban climates in tropical cities, e.g. modelling the urban atmosphere, the urban heat islands, the city breeze, etc.;
- (b) Elucidating the effects of the physical characteristics of urban developments on climate, including effects on energy issues and air quality, as well as the impact of the urban climate on human health/well-being;
- (c) Understanding the complex interaction between climate, place and people in an integrated approach towards sustainable urban development from the point of view of effective application in design and urban planning; and
- (d) Assessing the role of urban areas as sources of atmospheric contaminants, including GHGs and aerosols in cooperation with IPCC.

5. CAPACITY BUILDING/EDUCATION AND TRAINING

An important aspect of TRUCE relates to capacity building in developing countries. This is suggested to be through provision of expert missions; preparation of educational materials and guides; curricula; information transfer for application, use and evaluation; monitoring studies and feedback; attachments to joint projects; roving seminars; and regional TRUCE-related workshops. There could also be arrangements with exchange of scientists.

6. ONGOING ACTIVITIES

Several activities have already been initiated within the framework of TRUCE. Urban climate studies have been or are under way in many cities. Reporting of results from such studies has been made at international conferences, e.g. TECTUC (1993) and ICUC '96. Bibliographies and literature reviews showing a significant increase in activities relating to the tropical urban climate have been published. Many universities offer special courses directly related to urban climates and curricula focusing on the tropical urban conditions are under preparation within the framework of TRUCE.

A task force for TRUCE has met on several occasions and activities under consideration by this group include:

- (a) Identification of a Member country to host a Data Bank on Urban Climate information;
- (b) Publication of regular TRUCE Newsletters using electronic media;
- (c) Identification of gaps in present knowledge and planning for further studies (including the proposed Mexico City project, which has been considered suitable for a pilot study);

- (d) Definition of links between the urban climate/environment and climate variability/change at the regional/global scale, e.g. using urban-rural datasets;
- (e) Development of climate-related guidelines for energy efficiency and conservation in urban areas, including guidelines for revision of building codes, concerning ventilation requirements at the urban and building scales;
- (f) Preparation of design guidelines with the aim of establishing bioclimatic design concepts and strategies among teachers and practitioners, as well as providing a basis for further development of related climate services;
- (g) Working to understand the complexity involved in the process of designing healthy settlements, developing climate-responsive applications to sustainable environment in megacities, and evaluating and monitoring the performance of buildings and urban areas;
- (h) Improvement of knowledge and information related to urban climates as input to assessments of potentials for natural disasters and in preparation of disaster mitigation and preparedness planning, i.e. as recommended by the IDNDR; and
- (i) Contribution of TRUCE in the development of legal instruments and encouragement of applications of climate-responsive regulations for sustainable development at the urban scale.

7. CRITERIA FOR SELECTION OF CITIES

Cities for TRUCE-related studies should be selected based on criteria such as local interest and thus the potential for valuable results. Physical conditions such as inland versus coastal locations, highland versus lowland situations, overall climate as well as geographical balance should all be considered. Availability of results from previous studies, and of a database which includes geography, topography, land use, etc. are important assets.

If a number of cities are selected for TRUCE experiments, the problem of resources being divided in several geographical locations might arise; but this solution would perhaps have the advantage that many cities would reflect local interest and needs while the basic research work would be undertaken by local climatologists with help from foreign (i.e. mid-latitude) expertise.

On the other hand, if efforts are targeted on a major experiment in one specific city, the advantage would be that many interested groups (local and foreign) could participate at one time.

APPENDIX A

LIST OF PERSONS ATTENDING THE SESSION

A. Officers of the session

<i>Name</i>	<i>Capacity</i>
W. J. Maunder	President
Y. Boodhoo	Vice President

B. Representatives of Members of WMO

<i>Member</i>	<i>Name</i>	<i>Capacity</i>
Algeria	E. Hammad A. Ould-Amara	Principal Delegate Delegate
Australia	M. E. Voice (Ms) R. G. Stone	Principal Delegate Delegate
Austria	E. Rudel	Principal Delegate
Bahamas	A. Rolle	Principal delegate
Bahrain	A. Isa	Principal delegate
Bangladesh	S. Islam	Principal delegate
Belgium	M. Vandiepenbeeck R. Sneyers	Principal delegate Delegate
Bosnia and Herzegovina	S. Fadzan S. Radjo (Ms)	Principal delegate Delegate
Botswana	P. Lesolle (Ms)	Principal delegate
Brazil	J. De Moraes	Principal delegate
Canada	J. Masterton (Ms)	Principal delegate
China	Shen Guoquan Kerang Li Xu Tang Zhu Changhan	Principal delegate Delegate Delegate Delegate
Costa Rica	J. Alvarez	Principal delegate
Croatia	Z. Katusin M. Gajic-Ćapka (Ms) N. Becirevic (Ms)	Principal delegate Alternate Delegate
Cuba	L. R. Paz Castro	Principal delegate
Czech Republic	L. Coufal	Principal delegate
Denmark	K. Jensen (4-8/8) B. C. Christensen (11-14/8)	Principal delegate Principal delegate
Egypt	A. A. M. Faris	Principal delegate
Estonia	P. Karing	Principal delegate
Finland	R. Heino J. A. U. Helminen	Principal delegate Delegate
France	O. Moch M. Payen	Principal delegate Delegate
Germany	V. Vent-Schmidt P. Hechler G. Jendritzky	Principal delegate Delegate Delegate

<i>Member</i>	<i>Name</i>	<i>Capacity</i>
Ghana	N. B. Yelifari	Principal delegate
Greece	C. Gagaoudaki (Ms)	Principal delegate
Hungary	S. Szalai	Principal delegate
Iceland	T. Palsdot'tir (Ms)	Principal delegate
Indonesia	E. Pratomo U. Hadi S. Kadarisman	Principal delegate Delegate Delegate
Iran, Islamic Republic of	A. Asgari I. Gharah	Principal delegate Delegate
Ireland	D. L. Fitzgerald	Principal delegate
Israel	S. Rubin	Principal delegate
Italy	G. Maracchi	Principal delegate
Jamaica	F. Hall	Principal delegate
Japan	H. Kondo K. Shida	Principal delegate Alternate
Jordan	J. Rabadi	Principal delegate
Kenya	S. J. M. Njoroge	Principal delegate
Kuwait	K. Shuaibi	Principal delegate
Lebanon	A. P. Bejjani	Principal delegate
Lithuania	P. Korkutis	Principal delegate
Libyan Arab Jamahiriya	T. Bargan M. T. El-Alem M. J. El-Ghadi	Principal delegate Delegate Delegate
Macao	A. Viseu Tong Si Man	Principal delegate Delegate
Malaysia	Yong Pok Wing	Principal delegate
Mauritius	Y. Boodhoo	Principal delegate
Morocco	M. L. Selassi	Principal delegate
Namibia	A. L. du Pisani	Principal delegate
Netherlands	G. P. Können A. F. van Engelen	Principal delegate Delegate
New Zealand	R. E. Basher W. J. Maunder	Principal delegate Delegate
Niger	I. Also	Principal delegate
Nigeria	M.O. Dosunmu S. A. Ettu	Principal delegate Delegate
Norway	B. Aune	Principal delegate
Oman	S. Al-Saifi T. A. A. Al-Farsi	Principal delegate Delegate
Philippines	M. A. Catalina (Ms)	Principal delegate
Poland	J. Pruchnicki	Principal delegate
Portugal	M. Espirito Santo (Ms)	Principal delegate

<i>Member</i>	<i>Name</i>	<i>Capacity</i>
Qatar	R. G. Al-Kubaisi M. H. Al-Sulaiti	Principal delegate Delegate
Republic of Korea	Chung-Kyu Park	Principal delegate
Republic of Yemen	A. A. Almakaleh A. Al-Sairafi	Principal delegate Alternate
Romania	P. Tuinea V. Cuculeanu	Principal delegate Delegate
Russian Federation	S. I. Avdjushin M. Shaimardanov V. Trenin	Principal delegate Delegate Delegate
Saudi Arabia	S. Mohalifi M. M. Asali S. Sumilan	Principal delegate Delegate Delegate
Slovakia	E. Nieplova (Ms)	Principal delegate
Slovenia	T. Cegnar (Ms)	Principal delegate
South Africa	M. V. Laing	Principal delegate
Spain	C. Almarza (4-8/8) L. Balairón (11-14/8)	Principal delegate Principal delegate
Sri Lanka	W. de Silva	Principal delegate
Sweden	B. Dahlström	Principal delegate
Switzerland	W. Kirchhofer	Principal delegate
Syrian Arab Republic	N. Al-Shalabi M. Ido	Principal delegate Delegate
The former Yugoslav Republic of Macedonia	P. Ristevski	Principal delegate
Tunisia	B. Bchir	Principal delegate
Turkey	A. U. Komuscu	Principal delegate

<i>Member</i>	<i>Name</i>	<i>Capacity</i>
Ukraine	N. Tokar (Ms) V. Grynshyn	Principal delegate Delegate
United Arab Emirates	H. Al-Ameri	Principal delegate
United Kingdom	J.M. Nicholls D. E. Parker	Principal delegate Delegate
United States of America	K. Davidson M. Yerg J. D. Laver G. D. Cartwright C. Ropelewski	Principal delegate Alternate Delegate Adviser Adviser
Venezuela	H. O. Sanz Lopez	Principal delegate
Viet Nam	Tran Duy Binh	Principal delegate
C. Invited Experts		
M. Baker		
M. J. Coughlan		
E. Jauregui		
D. Lectures		
B. Aune		
T. Cegnar (Ms)		
F. H. M. Semazzi		
R. C. Stone		
E. Representatives of International Organizations		
<i>Name</i>	<i>Organization</i>	
C. C. Wallen	United Nations Environment Programme (UNEP)	
A. Bitan	International Federation for Housing and Planning (IFHP)	
K.-G. Lingner	International Organization for Standardization (ISO)	
N. Graham	International Research Institute (IRI)	

APPENDIX B

AGENDA

<i>Agenda item</i>	<i>Documents</i>	<i>Resolutions and recommendations adopted</i>
1. OPENING OF THE SESSION	PINK 1	
2. ORGANIZATION OF THE SESSION	PINK 2; PINK 19	
2.1 Consideration of the report on credentials	2; PINK 19	
2.2 Adoption of the agenda	1, 2; PINK 2	
2.3 Establishment of committees	2; PINK 2	
2.4 Other organizational matters	2; PINK 2	
3. REPORT BY THE PRESIDENT OF THE COMMISSION	3; PINK 11	Res. 1
4. REPORTS OF THE CCL WORKING GROUPS AND RAPORTEURS	4; 4, ADD. 1; 4, ADD. 2; PINK 7	
5. CLIMATE SYSTEM MONITORING	4; 5; PINK 9	
5.1 Climate change detection	5; PINK 9	
5.2 Review of the state of the global and regional climate and its variability	5; PINK 9	
5.3 Reference climate observation networks	5; PINK 9	
6. CLIMATE DATA MANAGEMENT	4; 6; PINK 10	
6.1 Data collection, including data rescue (DARE)	6; PINK 10	
6.2 Data processing, including CLICOM	6; PINK 10	
6.3 Climate data sets production	6; PINK 10	
6.4 Climate data exchange, including policy issues	6; PINK 10	
6.5 "The year 2000" computer problem	PINK 10	
6.6 Use of Internet, including the WMO home page	PINK 10	
7. CLIMATE INFORMATION AND PREDICTION SERVICES (CLIPS)	4; 7; PINK 5	
7.1 Interpretation of climate products	4; 7; PINK 5	
7.2 Interaction with users	7; PINK 5	
7.3 Socio-economic and environmental benefits from climate services	7; PINK 5	Res. 2
7.4 Evaluation and review of operational climate predictions	PINK 5	
8. DEVELOPMENT OF CLIMATE APPLICATION METHODOLOGIES FOR VARIOUS SOCIO-ECONOMIC SECTORS	4; 8; PINK 4	
8.1 Urban development	4; 8; PINK 4	
8.2 Human health	4; 4, ADD. 1; 8; PINK 4	
8.3 Energy production and consumption	4; 8; PINK 4	
8.4 Agriculture	4; PINK 4	
8.5 Water resources	4, ADD. 2, PINK 4	
9. PRIORITIES FOR THE FUTURE WORK OF THE COMMISSION	4; 9; PINK 14; PINK 16; PINK 18	Res. 3-17
9.1 The CCI role in the development of GCOS	9; PINK 14	
9.2 Interaction with international climate related activities within the Climate Agenda	9; PINK 14	
9.3 Development of the relevant parts of the WMO Fifth Long-term Plan (5LTP)	9; PINK 14	
9.4 CCI support to the WMO's and other international climate-related programmes	PINK 14	
9.5 Terms of Reference of the Commission	PINK 14	

<i>Agenda item</i>	<i>Documents</i>	<i>Resolutions and recommendations adopted</i>
10. <i>GUIDE TO CLIMATOLOGICAL PRACTICES AND TECHNICAL REGULATIONS</i>	10; PINK 12	
11. PARTICIPATION OF WOMEN IN THE WORK OF THE COMMISSION	PINK 13	Res. 18
12. CAPACITY BUILDING	4; 11; PINK 15	
13. ANY OTHER MATTERS		
14. SCIENTIFIC LECTURES AND DISCUSSIONS	12; PINK 6	
15. NOMINATION OF MEMBERS OF WORKING GROUPS AND RAPORTEURS		
16. REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS	13; PINK 3	Res. 19 Rec. 1
17. ELECTION OF OFFICERS	PINK 8; PINK 17	
18. DATE AND PLACE OF THE THIRTEENTH SESSION	PINK 19	
19. CLOSURE OF THE SESSION		

APPENDIX C

LIST OF DOCUMENTS

<i>Doc. No.</i>	<i>Title</i>	<i>Agenda item</i>	<i>Submitted by</i>
I. "DOC" series			
1	Provisional agenda	2	President of CCI
2	Explanatory memorandum relating to the provisional agenda	2	President of CCI
3	Report by the president of the Commission	3	President of CCI
4	Reports of the CCI working groups and rapporteurs ADD. 1	4	President of CCI
5	Climate system monitoring ADD. 2	5	Chairman, Committee A
6	Climate data management	6	Chairman, Committee A
7	Climate information and prediction services (CLIPS)	7	Chairman, Committee B
8	Development of climate application methodologies for various socio-economic sectors	8	Chairman, Committee B
9	Priorities for the implementation of the WCDMP and WCASP	9	Chairman, Committee of the Whole
10	<i>Guide to Climatological Practices and Technical Regulations</i>	10	Chairman, Committee A
11	Capacity building	11	Vice President of the Commission
12	Scientific lectures and discussions	13	President of CCI
13	Review of previous resolutions and recommendations of the Commission and of relevant Executive Council resolutions	15	Vice president of CCI
II. "PINK" series			
1	Opening of the session	1	President of CCI
2	Organization of the session	2	President of CCI
3	Review of previous resolutions and recommendations of the Commission and of relevant Executive Council Resolutions	16	Vice president of CCI
4	Development of climate application methodologies for various socio-economic sectors	8	Chairman, Committee B
5	Climate Information and Prediction Services (CLIPS)	7	Chairman, Committee B
6	Scientific lectures and discussions	14	President of CCI
7	Reports of the CCI working groups and rapporteurs	4	President of CCI
8	Election of officers	17	Chairman, Nominations Committee

<i>Doc. No.</i>	<i>Title</i>	<i>Agenda item</i>	<i>Submitted by</i>
9	Climate system monitoring	5	Chairman, Committee A
10	Climate data management	6	Chairman, Committee A
11	Report by the president of the Commission	3	President of CCI
12	<i>Guide to Climatological Practices and Technical Regulations</i>	10	Chairman, Committee A
13	Participation of women in the work of the Commission	11	Vice president of CCI
14	Priorities for the future work of the Commission	9	Chairman, Committee of the Whole
15	Capacity building	12	Chairman on item 12
16	Priorities for the future work of the Commission	9	Chairman, Committee of the Whole
17	Election of officers	17	President of CCI
18	Priorities for the future work of the Commission	9	Chairman, Committee of the Whole
19	Consideration of the report on credentials	2	President of CCI
	Date and place of the thirteenth session	18	
	Closure of the session	19	

RECENT WMO PUBLICATIONS

Reports

WMO No.

- 734 — Annual Report of WMO, 1989.¹
736 — Regional Association VI (Europe). Abridged final report of the tenth session, Sofia, 8–15 May 1990.^{2*Δ}
743 — Commission for Atmospheric Sciences. Abridged final report of the tenth session, Offenbach, 17–26 April 1990.^{1†}
746 — Annual Report of WMO, 1990.¹
751 — Commission for Basic Systems. Abridged final report of the extraordinary session, London, 24 September–5 October 1990.^{1*Δ}
755 — Regional Association I (Africa). Abridged final report of the tenth session, Bamako, 29 November–7 December 1990.⁴
774 — Annual Report of WMO, 1991.¹
775 — Commission for Agricultural Meteorology. Abridged final report of the tenth session, Florence, 2–13 December 1991.¹
783 — Regional Association II (Asia). Abridged final report of the tenth session, Tehran, 5–16 September 1992.^{5*Δ}
784 — Commission for Basic Systems. Abridged final report of the tenth session, Geneva, 2–13 November 1992.^{1Δ}
787 — Annual Report of WMO, 1992.¹
789 — Commission for Hydrology. Abridged final report of the ninth session, Geneva, 5–15 January 1993.¹
791 — Commission for Climatology. Abridged final report of the eleventh session, Havana, 15–26 February 1993.^{1*}
792 — Commission for Marine Meteorology. Abridged final report of the eleventh session, Lisbon, 19–30 April 1993.¹
793 — Regional Association IV (North and Central America). Abridged final report of the eleventh session, Mexico City, 12–21 May 1993.³
797 — Regional Association III (South America). Abridged final report of the eleventh session, Asunción, 22–30 September 1993.³
800 — Annual Report of WMO, 1993.¹
807 — Commission for Instruments and Methods of Observation. Abridged final report of the eleventh session, Geneva, 21 February–4 March 1994.¹

WMO No.

- 808 — Commission for Atmospheric Sciences. Abridged final report of the eleventh session, Geneva, 5–14 April 1994.¹
811 — Regional Association V (South-West Pacific). Eleventh session, Nouméa, 18–28 May 1994. Abridged final report with resolutions and recommendations.⁴
812 — Regional Association VI (Europe). Eleventh session, Oslo, 2–13 May 1994. Abridged final report with resolutions and recommendations.²
815 — Commission for Basic Systems. Extraordinary session, Helsinki, 8–18 August 1994. Abridged final report with resolutions and recommendations.¹
818 — Commission for Aeronautical Meteorology. Tenth session, Geneva, 10–21 October 1994. Abridged final report with resolutions and recommendations.¹
820 — Regional Association I (Africa). Eleventh session, Gaborone, 14–25 November 1994. Abridged final report with resolutions and recommendations.⁶
824 — Annual Report of WMO, 1994.¹
825 — Commission for Agricultural Meteorology. Eleventh session, Havana, 13–24 February 1995. Abridged final report with resolutions and recommendations.¹
836 — Annual Report of WMO, 1995.¹
851 — Regional Association II (Asia). Eleventh session, Ulaanbaatar, 24 September–3 October 1996. Abridged final report with resolutions and recommendations.⁷
852 — Commission for Hydrology. Tenth session, Koblenz, 2–12 December 1996. Abridged final report with resolutions and recommendations.¹
854 — Commission for Basic Systems. Eleventh session, Cairo, 28 October–7 November 1996. Abridged final report with resolutions and recommendations.¹
859 — Annual Report of the World Meteorological Organization, 1996.¹
860 — Commission for Marine Meteorology. Twelfth Session, Havana, 10–20 March 1997. Abridged final report of the twelfth session (1997).⁸
868 — Regional Association IV (North and Central America). Abridged final report of the twelfth session (1997).⁹

Other publications issued by the WMO Secretariat are: Basic documents, operational publications, reports and proceedings of Congress and the Executive Council, WMO guides and the WMO *Bulletin*.

- 1 Publication issued in English, French, Russian and Spanish.
2 Publication issued in English, French and Russian.
3 Publication issued in English and Spanish.
4 Publication issued in English and French.
5 Publication issued in English, Arabic/English, Arabic/French, French and Russian.
6 Publication issued in Arabic, English and French.
7 Publication issued in Arabic, Chinese, English, French and Russian.
8 Publication issued in Arabic, English, French, Russian and Spanish.
9 Publication issued in English, French and Spanish.

- * English out of print.
• French out of print.
Δ Russian out of print.
† Spanish out of print.
‡ Arabic/English out of print.
Arabic/French out of print.