WORLD METEOROLOGICAL ORGANIZATION
&
GLOBAL CLIMATE OBSERVING SYSTEM

CBS LEAD CENTERS FOR GCOS
COORDINATION MEETING/WORKSHOP

FIRST SESSION

(Teheran, 5-8 November 2007)

FINAL REPORT

18-Dec-07 09:00

WMO General Regulations 42 and 43

Regulation 42

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups, the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

Regulation 43

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

AGENDA

1. OPENING OF THE SESSION
   - 1.1 Opening of the session
   - 1.2 Adoption of the agenda
   - 1.3 Working arrangements
2. REPORT OF CBS AND WWW ACTIVITIES
3. REPORTS FROM CBS LEAD CENTERS FOR GCOS
4. REPORT FROM GCOS ARCHIVE CENTER
5. REVIEW OF GUAN/GSN REQUIREMENTS
6. REVIEW OF GCOS ACTIVITIES
7. PERFORMANCE REPORTS
8. WWW MONITORING REPORTS
9. MIGRATION TO BUFR
10. TROUBLESHOOTING PROCEDURES
11. METADATA REQUIREMENTS
12. HANDBOOK ON CLIMAT AND CLIMAT TEMP REPORTING (WWW/TD No. 1188) AND CLIREP SOFTWARE
13. ADDITIONAL GSN AND GUAN STATIONS, AOPC PRIORITIES
14. REVIEW OF THE TERMS OF REFERENCE OF THE CBS LEAD CENTERS FOR GCOS
15. CLOSURE OF THE SESSION

EXECUTIVE SUMMARY

At the kind invitation of the Government of the Islamic Republic of Iran, the CBS Lead Centers for GCOS Coordination Meeting/Workshop was held at the Headquarters of the of the Islamic Republic of the Iran Meteorological Organization (IRIMO) in Teheran and in its Regional Office in Isfahan, Iran, from 5 to 8 November 2007.

The Coordination Meeting/Workshop considered reports from individual Lead Centers' activities and of the GCOS Archive Center, it reviewed GUAN/GSN requirements and GCOS activities, results of monitoring performance reports and Terms of Reference (TOR) of the Lead Centers, it discussed migration to BUFR, troubleshooting procedures, metadata requirements, and was informed on the additional GSN/GUAN stations and AOPC priorities and on the availability of Handbook on CLIMAT and CLIMAT TEMP Reporting.

The Coordination Meeting/Workshop made recommendations for the next session of the Commission for Basic Systems (CBS), related to: (a) Coordination among Lead Centers; (b) Revised TOR of the Lead Centers; (c) Benefits of Lead centers; (d) Remedy action; (e) Metadata Guide; (f) Expanding scope of the work of Lead Centers; (g) Internet gateway for CLIMAT data entry; (h) Archive of historical data; (i) Modification of performance reports at NCDC; (j) Quality control reports; and (k) Verification of completeness of CLIMAT and TEMP reports.

GENERAL SUMMARY

1. OPENING OF THE SESSION

1.1. At the kind invitation of the Government of the Islamic Republic of Iran, the CBS Lead Centers for GCOS Coordination Meeting/Workshop was held at the Headquarters of the Islamic Republic of the Iran Meteorological Organization (IRIMO) in Teheran and in its Regional Office in Isfahan, Iran, from 5 to 8 November 2007.

1.2. The meeting was opened by Ms Mina Jabbari, Chief of the International Affair Bureau of IRIMO. Ms Jabbari expressed her appreciation to the CBS Lead Centers for GCOS for their important contributions to GCOS and welcomed participants to Teheran.

1.3. Following the proposal from the GCOS representative, Ms Jabbari was elected the chairperson of the meeting.

1.4. At the official opening, scheduled for the afternoon of the first working day, Dr Ali-Mohammad Noorian, Vice-Minister of Roads and Transportation and General Administrator of the Islamic Republic of the Iran Meteorological Organization and the First Vice-President of WMO, stressed the important role of observations for detection of climate change and climate variability and the role of GCOS played in guaranteeing the availability of climate observations for user community.

1.5. At the official opening, the representative of the WMO Secretariat also welcomed participants and explained that WMO continued its leading role in international efforts to monitor and protect the environment. Along with traditional tasks in the field of hydrometeorology, WMO spearheaded the efforts to alert the world community to the potential effects such as global warming and climate change. He confirmed that acquisition and exchange of information of the state of the atmosphere and ocean have been always considered key elements in the above WMO activities.

1.6. The representative of GCOS joined the WMO representative in thanking on behalf of the Director of the GCOS Secretariat, the local organizers for hosting the meeting in such as excellent manner and gave a brief summary of what are the expectations from the coordination meeting.

1.7. The Coordination Meeting adopted the Agenda for the meeting, which is reproduced at the beginning of this report.

1.8. The list of participants is given in Annex I

2. REPORT OF CBS AND WWW ACTIVITIES

2.1. The Coordination meeting was informed on the activities related to the establishment and running of the CBS lead Centers for GCOS since the extraordinary session of CBS in Cairns, Australia in 2002.

2.2. Activities to assist Members in the production of CLIMAT reports were mentioned. Especially, three training workshops held in RA I (Morocco, December 2005), RA II (Russian Federation, November 2004) and RA III (Argentina, October 2006) for countries, which have problems in generating and exchanging climate data. The training workshop for RA V is preliminary planned to be held in Fiji in March 2008. These workshops are organized and sponsored by the WWW, the World Climate Program, and the GCOS Secretariat.

2.3. Reference was made to the Terms of Reference (ToR) of the lead centers as well as the National Focal Points for GCOS and related climatological data (RBCN) and a possible need to revise them. It was also noted that the areas of responsibility that were originally identified are exactly specified and need to be revised.

3. REPORTS FROM CBS LEAD CENTERS FOR GCOS

3.1. Detailed presentations were made by individual participating CBS Lead Centers for GCOS, namely: Morocco (responsible for a part of RA I), Mozambique (responsible for a part of RA I), Iran (responsible for a part of RA II and RA VI), Japan (responsible for a part of RA II), Chile (responsible for RA III), USA (responsible for large parts of RA IV), Germany (responsible for RA VI) and UK (responsible for the Antarctic).

3.2. For personal reasons a representative of the Lead Center from Australia (RA V) did not participate in the coordination meeting. A representative from the British Antarctic Survey (UK) responsible for the Antarctic participated through telephone conference.

3.3. The presentations covered actions taken by lead centers since their establishment, their capabilities to monitor the stations under their areas of responsibilities and the problems identified. The coordination meeting discussed findings of the lead centers and agreed on the set of recommendations that are attached in Annex II.

4. REPORT FROM GCOS ARCHIVE CENTER

4.1. The representative of the NOAA National Climatic Data Center that serves also as the GCOS Archive Center reported on the development of the GSN historical daily data. Since February 2004, there are data from at least 40 countries, the earliest data ranges being from 1869 (Sri Lanka). Information was also provided on the collection of metadata from GSN and GUAN stations.

5. REVIEW OF GUAN/GSN REQUIREMENTS

5.1 The representative of GCOS reviewed the requirements of the GSN and GUAN networks which have been slightly revised in recent AOPC meetings. The CLIMAT report is the minimum required report from GSN stations and daily data (max/min temperature, precipitation) are the desired or target requirements. For the GUAN the CLIMAT TEMP report is no longer needed and the minimum height for soundings is 30 HPa with the target being set as “as high as possible” rather than a specific height. The TEMP report is the report that is archived at the NCDC and performance reports are available from ECMWF, NCEP, and NCDC based on the TEMP reports. The monitoring report based on CLIMAT TEMP reports has been discontinued by the Hadley Center of the UK Met Office.

6. REVIEW OF GCOS ACTIVITIES

6.1. The representative of GCOS informed on the revitalization activities aimed at restoring the operations in the number of GUAN and GSN stations. He also informed on the outcome of the GUAN Upper-Air Workshop in Namibia, September 2007 and plans for holding the Workshop on CLIMAT reporting in Fiji in 2008.

6.2. For the improved operation of the GSN and GUAN stations, three Technical Support Projects were established to support for Pacific Islands, Caribbean and SADC Africa. There are plans to extend the support projects to other sub-regions.

6.3. One of the critical aspects in the revitalization activities has the GCOS Cooperative Mechanism (GCM). The participants were informed of recent activities of the GCM and requested to support participation of their countries in the GCM.

7. PERFORMANCE REPORTS

7.1. The representative of GCOS informed on results of the monitoring done by GCOS and pointed out the performance metrics. Results showed that number of GUAN silent stations has fallen from about 20 stations out of the 163 in the network to about 5. CLIMAT reports are now received, more or less regularly from 768 out of about 1000 GSN stations. Only 31 GSN stations are actually silent (producing no reports at all).

8. WWW MONITORING REPORTS

8.1. The representative of WMO Secretariat provided results from the recent Annual Global Monitoring (AGM), Special MTN Monitoring (SMM), indicating the main findings and proposed recommendation to address the deficiencies. The meeting went through the WWW Operational Information Service dedicated website for the Lead centers to be able to find required information in case of need and with a view of improving the exchange of CLIMAT reports.

8.2. The meeting was also informed on the status of implementation of the Integrated WWW Monitoring project and its main objectives.

8.3. Finally, the Lead centers were informed on deficiencies in the application of the WMO standards for the presentation of CLIMAT bulletins with a number of recommendations for the meeting to consider.

9. MIGRATION TO BUFR

9.1. The representative of WMO Secretariat informed on the current status of migration to Table-Driven Code Forms (TDCF), presenting the available information on the WWW website, such as migration table, access to templates for global and regional exchange, list of national focal points, site for validation of BUFR data, coding procedure and site for free access of encoding(decoding BUFR software.

9.2. The meeting was also informed on the EC-LVIII request to CBS to address the data representation requirements of the user community, in view of the demand for the use of modern industry standards, such as XML, and the activities of the Secretariat in this regard.

10. TROUBLESHOOTING PROCEDURES

10.1. After the first coordination/training session of the original 5 Lead centers, the representative from Australia prepared a troubleshooting guide: *Operational Guide for CBS Lead Centre for GCOS Contact Persons*. The author has since retired. It was planned that this guide be attached to the report of this meeting, however many of the cited performance reports in the guide have been changed leaving the guide somewhat out of data. The representative from the USA Lead Center agreed to validate the report locations and to generally bring the guide to a current state.

11. METADATA REQUIREMENTS

11.1 Lead Centers were requested by the AOPC to begin placing emphasis on the collection of important metadata about the stations in the GSN and GUAN networks. This metadata should include accurate information about the location of the station, a history of instrument changes, and even a series of photographs showing any obstructions about the station. NCDC is working to implement an archive for this kind of information and the Technical Support Projects have begun collecting the data. The Lead Centers believed that additional guidance material concerning details of what information is needed, such as the format of metadata file, before contacting Focal Points. The representative of GCOS agreed to prepare a guide for this purpose.

12. HANDBOOK ON CLIMAT AND CLIMAT TEMP REPORTING (WWW/TD No. 1188) AND CLIREP SOFTWARE

12.1. The Coordination meeting was informed that the WMO Secretariat had developed guidelines for CLIMAT and CLIMAT TEMP Reporting and along with the WCP and GCOS had organized a series of training workshops to increase the climate data availability worldwide. The WMO Handbook on CLIMAT and CLIMAT TEMP Reporting is specifically addressed to the personnel who are responsible for compiling and transmitting CLIMAT and CLIMAT TEMP messages at the national level and was published in four official WMO languages.

12.2. The Coordination meeting was also informed that the specialized climatological software CLIREP has been developed to fully automate the process of encoding the observations for CLIMAT and CLIMAT TEMP messages. This software is available in English, French and Spanish.

13. ADDITIONAL GSN AND GUAN STATIONS, AOPC PRIORITIES

13.1. The representative of GCOS reviewed the activities of the Atmospheric Observation Panel for Climate (AOPC) related to improved geographic coverage of the GSN and GUAN. Some areas of the globe still lack good observations and priority is placed on working with members to identify additional stations. Information provided by the AOPC showing areas of sparse coverage were reviewed. The Lead Centers can play an important role in working with Members to identify stations that might be good candidates for inclusion in these networks. Lead Centers were reminded that stations in these networks should be stations with a long available data record and good prospects for continuing operation.

14. REVIEW OF THE TERMS OF REFERENCE OF THE CBS LEAD CENTERS FOR GCOS

14.1. The representatives of Lead Centers discussed in detail scope of their work vis-à-vis the approved TOR by the CBS and a need to revise the TOR to reflect the changes in their responsibilities since their establishment.

14.2. The Coordination meeting agreed on the revised TOR of the CBS Lead Centers for GCOS that will be submitted to CBS-XIV for approval. See Annex III. The meeting also updated their areas of responsibilities attached as Annex IV. Proposal was also made to update the TOR of the National Focal Points for GCOS and related Climatological Data, see Annex V.

15. CLOSURE OF THE SESSION

15.1. The session closed on Thursday, 8 November 2007 at 16 hours.

ANNEX I

LIST OF PARTICIPANTS

Mr Gaston TORRES	Direccion Meteorologica de Chile Avenida Portales 3450 Estacion Central Santiago Chile Tel.: +562 43 6 4520 Fax. +562 43 78 512 E-mail. gtorres@meteochile.cl
Mr Tobias FUCHS	Deutscher Wetterdienst Global Precipitation Climatology Centre (GPCC) Kaiserleistrasse 44 D-63067 Offenbach Germany Tel.: +49 69 8062 2872 Fax: +49 69 8062 3987 E-mail: tobias.fuchs@dwd.de
Ms Christiana LEFEBVRE	Deutscher Wetterdienst Bernhard Nocht-Str. 76 20359 Hamburg Germany Tel.: +49 40 6690 - 1460 Fax: +49 40 6690 1499 E-mail: christiana.lefebvre@dwd.de
Ms Mina JABBARI	Director of International Affairs Iran Meteorological Organization P.O. Box 13185-461 Tehran Iran Tel.: +9821 66025047 Fax: +9821 66000417 Mobile: +98219123842060 E-mail: jabbari@irimet.net or mina747@gmail.com
Dr Hidehiko ISOBE	Japan Meteorological Agency 1-3-4 OtemachI, Chiyoda-ku 100-8122 Tokyo Japan Tel.: +813 32114966 Fax: +813 3211 2032 E-mail: h_isobe@met.kishou.go.jp

Mr Rachid SEBBARI	Direction Météorologie Nationale B.P. 2106 Casa-Oasis Casablanca Morocco Tel. : +212 6149 3648 Fax: +212 22 913 687 E-mail: sebbari@gmail.com or sebbari@marocmeteo.ma
Mr Domingos Mosquito PATRICIO	Instituto Nacional de Meteorologia (INAM) P.O. 256 Rua Mukumbura No. 164 Maputo Mozambique Tel. : +258 1 49 0064 / 490148 / 492530 Fax: +258 1 491 150 E-mail: domingos_p@inam.gov.mz
Prof. J. SHANKLIN **(participated by teleconference)**	British Antarctic Survey Madingley Road Cambridge CBS OET United Kingdom Tel.: +44 1223 24 14 00 Fax: +44 1223 22 12 79 E-mail: J.Shanklin@bas.ac.uk
Mr Gregory R. HAMMER	National Environmental Satellite, Data and Information Service (NOAA-NESDIS) NOAA (E/CC21) Federal Building 145 151 Patton Avenue Asheville, NC 28801-5001 USA Tel. : +1 828 271 4263 Fax: +1 (828) 271 4876 E-mail: Gregory.R.Hammer@noaa.gov
Dr Matthew J. MENNE	National Environmental Satellite, Data and Information Service (NOAA-NESDIS) NOAA (E/CC21) Federal Building 514 151 Patton Avenue Asheville, NC 28801-5001 USA Tel.: +1 828 271 4449 Fax : + 1 828 271 4328 E-mail : Matthew.Menne@noaa.gov

WMO SECRETARIAT:	
Dr Miroslav ONDRÁŠ	Chief, Observing System Division World Weather Watch Department World Meteorological Organization (WMO) 7 bis, avenue de la Paix CH-1211 Geneva Switzerland Tel.: +41 22 730 8409 Fax: +41 22 730 8021 E-mail: MOndras@wmo.int
GCOS SECRETARIAT:	
Mr Richard K. THIGPEN	GCOS Implementation Project Manager GCOS Secretariat c/o WMO, P.O. Box 2300 1211 GENEVA 2, Switzerland Tel: +41 22 730 8068 Fax: +41 22 730 8052 E-mail: RThigpen@wmo.int

ANNEX II

RECOMMENDATIONS

1. The interaction and coordination within the group is very important, therefore it is recommended to organize CBS Lead Centers for GCOS Coordination Meeting/Workshop every two years.

2. The meeting recommended to update the Terms of Reference (TOR) of the CBS Lead Centers for GCOS as proposed in Annex III.

3. The meeting recommend that, following the approval of the revised TOR, WMO Secretariat and/or GCOS inform all Members by a letter on the TOR of the CBS Lead Centers for GCOS, informing them of the expected benefits of Lead Centers' activities for Members and GCOS, encouraging the Members to support the activities of the Lead Centers, and encouraging Members who have not done so to nominate a National GCOS Focal Point.

4. The WWW produces many useful GTS performance reports but there does not seem to be effective follow-up actions to actually resolve the observed problems. All of the Lead Centers have encountered data flow problems and there is a need to identify the entity who would resolve the problems. The Lead Centers believed that the WWW should be that entity. The GCOS Secretariat should cooperate and assist the WWW in that activity. Therefore, the meeting recommended that the World Weather Watch take proactive and specific actions to improve the receipt of data over the GTS.

5. The Lead Centers recognized the need for a "Guide to GSN and GUAN Meta Data" before collecting this information. The Guide should identify what information is needed, the accuracy of such information, and the format. The meeting recommended that the GCOS Secretariat prepares such a Guide using input from its relevant AOPC Advisory Panel.

6. It was felt that the scope of activities of the Lead Centers should be expanded to include the entire RBCN network in their areas of responsibilities. The meeting encouraged Lead Centers to expand their activities to entire RBCN on a voluntary basis, if feasible, and recommended that this matter be discussed at the next coordination meeting/workshop when more experience is gained by those volunteered Lead Centers.

7. The Lead Center in Germany has offered to act as an "internet gateway" (joern.kallies@dwd.de) for CLIMAT reports in cases where the GTS is not working well. This is not seen by the Lead Centers as a substitute for correcting GTS problems but it is a very useful temporary method of ensuring continuity of the climate records. The meeting welcomed this offer and recommended that the next meeting is informed on the results of this approach. The monitoring centers were reminded that CLIMAT reports in BUFR are imminent and centers were requested to include monitoring of CLIMAT BUFR in their activities.

8. The Archive Center at NCDC has offered to send a yearly summary report of the increase of historical data going into the Archive to the Lead Centers. This is an important performance measure for the Lead Centers and the meeting recommended that NCDC proceed accordingly.

9. Several of the performance reports produced by the Lead/Analysis Center at NCDC will be modified to make them even more useful. Country names will be added to

reports for example to make them easier to use. The meeting recommended that NCDC proceed accordingly.

10. As the Lead Centers in Germany and Japan are also GSN Monitoring Centers, responsible for quality monitoring of monthly total precipitation and mean temperature, respectively, the meeting recommended that those centers modify the performance reports to provide more detail about some of the quality control reports such as improved labeling, specific information about rejected reports, etc.

11. In many cases not all important sections of CLIMAT messages are being reported by the station operators. In the move from the initial primary focus on quantity of observations to a focus on quality of observations, the additional performance monitoring tools will be needed to assist the Lead Centers. The meeting recommended that the Lead Centers must also verify the “completeness” of the CLIMAT and the TEMP reports.

12. The meeting requested that GCOS Secretariat show examples of correct CLIMAT reports on its website.

ANNEX III

REVISED TERMS OF REFERENCE OF THE CBS LEAD CENTERS FOR GCOS FOR SUBMISSION TO CBS-XIV

1. Diagnose problems in the GSN and GUAN by using the monitoring reports produced by the GCOS Monitoring and Analysis Centers;

2. Liaise with nominated National Focal Points for GCOS and related Climatological Data, and other responsible officials, to improve data and meta data availability and quality;

3. Co-ordinate activities with other GCOS Centers and/or other centers as appropriate;

4. Monitor and report to CBS and GCOS on actions taken, progress achieved, concerns and recommendations on a yearly basis in a time frame that corresponds to planned AOPC and CBS meetings;

5. Assist AOPC in the revisions of GSN and GUAN stations;

6. Assist the WMO Secretariat in maintaining the list of National Focal Points for GCOS and related Climatological Data.

ANNEX IV

AREAS OF RESPONSIBILITIES OF THE CBS LEAD CENTERS FOR GCOS

1. **RA I : Morocco**
   GSN and GUAN Stations in : Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Côte d'Ivoire, Egypt, Gabon, Ghana, Gambia, Guinea, Guinea Bissau, Guinea Equatorial, Liberia, Libyan Arab Jamahiriya, Madagascar, Mali, Niger, Nigeria, Mauritania, Morocco, Senegal, Sierra Leone, Sao Tome and Principe, Sudan, Togo, Tunisia.

2. **RA I: Mozambique**
   GSN and GUAN Stations in: Angola, Botswana , Burundi, Canary Island, Comoros Island, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, the Ocean Islands (St. Helena Island, Ascension Island, Martin de Vivies, Iles Crozet, Iles Kerquelen), Rwanda, Seychelles, Somalia, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

3. **RA II and part of RA VI: Iran**
   GSN and GUAN stations in: Afghanistan, Armenia, Azerbaijan, Bahrain, India, Iran, Jordan, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Oman, Pakistan, Qatar, Russian Federation, Saudi Arabia, Sri Lanka, Syria, Tajikistan, Turkey, United Arab Emirates, Yemen.

4. **RA II: Japan**
   GSN and GUAN stations in: Brunei, Cambodia, China, Japan, Laos, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Singapore, Vietnam.

5. **RA III: Chile**
   All GSN and GUAN stations in RA III.

6. **RA IV: USA**
   GSN and GUAN stations in: most of WMO RA IV plus Hawaii.

7. **RA V: Australia**
   GSN and GUAN stations in the most of RA V, except those countries noted for Japan and Hawaii (USA).

8. **RA VI: Germany**
   GSN and GUAN stations in the most of RA VI, except those countries noted for Iran.

9. **Antarctica: UK (British Antarctic Survey).**
   All GSN and GUAN stations in: Antarctica.

ANNEX V

REVISED TERMS OF REFERENCE OF THE NATIONAL FOCAL POINTS FOR GCOS AND RELATED CLIMATOLOGICAL DATA

(a) Liaise within the NMHS on GSN and GUAN issues related to data and metadata availability and quality;
(b) Inform Lead Centres on current and potential problems that might impact data and metadata availability and quality;
(c) Respond to requests from CBS Lead Centres for GCOS Data regarding data and metadata availability and quality.