

**WORLD METEOROLOGICAL ORGANIZATION  
&  
GLOBAL CLIMATE OBSERVING SYSTEM**

**CBS LEAD CENTRES FOR GCOS  
COORDINATION MEETING**

**Fourth SESSION**

(Santiago, Chile, 8-10 October 2013)

**FINAL REPORT**

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## **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).



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## EXECUTIVE SUMMARY

The CBS Lead Centres for GCOS (CBS-LC-GCOS) Coordination Meeting was held at the Hotel Bonaparte, Santiago, Chile (hosted by Meteorologica de Chile), from 8 to 10 October 2013. Unfortunately because of some last minute issues/events the representatives from Morocco, Iran and USA could not attend. The representatives from Antarctica and USA were able to participate for part of the meeting, primarily for their presentations, via WebEx.

The Coordination Meeting considered reports from individual Lead Centres' activities, GCOS Monitoring Centres and of the GCOS Archive Centre; it reviewed their activities, results of monitoring performance reports and their Terms of Reference. The current status of the WIGOS Implementation Plan and the associated Task Teams was presented to the meeting, including areas for future collaboration and contribution.

The Coordination Meeting agreed on a number of [recommendations](#) that will be channeled to various WMO and GCOS bodies through the WMO and GCOS Secretariats.

The Coordination Meeting expressed its appreciation to its hosts, Meteorologica de Chile, for its excellent organisation and hospitality. Of particular note was the opportunity to visit their headquarters in Santiago, the time given by its Director in explaining his service and his vision for the future and finally the visit to the archives and the important work to digitalise the paper records for Chile, some of which date back over a 100 years.



## GENERAL SUMMARY

### 1. OPENING OF THE SESSION

The CBS Lead Centres for GCOS (CBS-LC-GCOS) Coordination Meeting was held at the Hotel Bonaparte, Santiago, Chile (hosted by Meteorologica de Chile), from 8 to 10 October 2013.

The meeting was opened by Mr Jorge CARRASCO, the Director of Climatology at Meteorologica de Chile. Mr Carrasco expressed his appreciation to the CBS Lead Centres for GCOS for their important contributions to GCOS and welcomed the participants to Santiago. He also was asked to act as chairperson for the meeting.

Dr Miroslav Ondráš, WMO Secretariat highlighted the role of CBS-LC-GCOS play in ensuring availability and quality of climate data that is an important aspect of the two WMO's high priorities, namely the Global Framework for Climate Services (GFCS) and the WMO Integrated Global Observing System (WIGOS).

Mr Tim Oakley, GCOS Secretariat, also welcomed the Lead Centre representatives to the meeting. This was his first at this coordination meeting, in his role of GCOS Implementation Manager, and he looked forward to the discussions on the work of the Lead/Monitoring Centres and building relationships for the future.

The Coordination Meeting adopted the [Agenda](#) for the meeting, which is reproduced at the beginning of this report.

The list of participants is given in [Annex I](#).

### 2. REVIEW OF CBS-LC-GCOS-2 RECOMMENDATIONS

The Coordination Meeting reviewed the recommendations from the Third meeting held in Hamburg in October 2011. Most had been implemented or were discussed further during the Coordination Meeting. Some were carried over as open [recommendations](#) from the present meeting

### 3. RECENT DECISIONS OF WMO CONSTITUENT BODIES

Dr Ondráš informed the Coordination Meeting on the relevant decisions from recent meetings of WMO constituent bodies.

### 4. UPDATE FROM GCOS SECRETARIAT

Mr Tim Oakley provided an overview of the work, aims and priorities of GCOS, with a particular reference to all the essential climate variables (ECVs) and their advisory panels. He then informed the Coordination Meeting on the relevant decisions of the GCOS Atmospheric Observation Panel on Climate (AOPC) and GCOS Steering Committee (GCOS-SC), such as:

(1) Third Adequacy Report to Subsidiary Body for Scientific and Technical Advice of the UNFCCC SBSTA in 2015, and a new Implementation Plan in 2016.

(2) The status and plans for the Global Reference Upper Air Network (GRUAN)

(3) The gratitude from AOPC, to DWD and JMA for their continued monitoring of the receipt and quality of CLIMAT messages, and for their coordinated reporting of results. It also encouraged the Monitoring Centres to extend their activities to include monitoring of CLIMATs in BUFR format, as well as from RBCN stations.

(4) The recognition from AOPC that annual GSN CLIMAT data receipts from the Global Telecommunication System (GTS) have been about the same for the last few years, and that the number of GUAN stations meeting minimum performance requirements had increased slightly.

## **5. REPORTS FROM CBS LEAD CENTRES**

Detailed presentations were made by the representatives of CBS-LC-GCOS as follows:

### **5.1. RA IV (North and Central America, Caribbean) – USA (NOAA/NCDC)**

Mr Bryant Korzeniewski gave two presentations via WebEx on behalf of the NCDC. The "Report of the CBS-LC-NOAA/NCDC for GCOS" gave an overview of how NCDC collects GSN and GUAN Data and troubleshoots any detected issues with both networks, an overview and schedule of NCDC's Monthly Summary Reports and the State of the CLIMAT Reporting for WMO Regions. The "Report of the NCDC's GCOS Archive Centre" covered how GSN Data were being used as a subset of the Global Historical Climatology Network - Daily (GHCN-D) Dataset, how CLIMAT Messages were being utilized in the Global Historical Climatology Network - Monthly (GHCN-M) Version 4 Dataset and provided an overview of NCDC's efforts and role in the International Surface Temperature (IST) Initiative and the Global Land Surface Databank. Additionally, Korzeniewski detailed Metadata and Data needs for Non-U.S. Stations and the ways that NCDC's International Data Partners could help with this particular effort.

### **5.2. RA-III (South America) – Chile (DMA)**

Mr Gaston Torres presented a summary of the lead centre report for RA-III (South America), highlighting the performance of the networks, successes and any ongoing issues. There followed a general discussion, with any generic issues/items discussed in more detail under agenda items 10 & 15.

### **5.3. RA-II (Asia) - Japan Meteorological Agency (JMA)**

Mr Kazuyoshi Yoshimatsu presented a summary of the lead centre report for RA-II (Asia). JMA contributed to the improvement of the CLIMAT messages such as the restart of the Myanmar CLIMAT messages, the discontinuance of the Mongolia 10-day data via GTS and the capability development in the CLIMAT messages.

### **5.4. RA-IV (Europe) – Germany (DWD)**

Ms Christiana Lefebvre presented a summary of the lead centre report for RA-IV (Europe). At DWD, the CBS Lead Centre (CBS LC) controls the receipt and quality of all reporting CLIMAT stations of the Regional Basic Climatological Network (RBCN). Countries, whose reports are missing in the course of a month, are informed via the national focal point or the telecommunication unit and asked to provide these. Errors in the keyword CLIMAT and the month-year-indicator are corrected to save the messages for the data base and mostly, the countries are informed and asked to send a correction. Some examples of errors were presented, which are partly country-specific. To increase the availability of CLIMAT data from countries, whose connection to the GTS does not work (well), DWD ingests into the GTS CLIMAT reports received via e-mail or air mail. CLIMAT reports via air mail are obtained from Ethiopia, Jordan and Curacao. In RA VI five GSN stations are silent since at least March 2012 (13615 Tirana / Albania, 17600 Paphos / Cyprus, 16734 Methoni / Greece, 13572 Lazaropole / Macedonia and 08506 Horta / Portugal). The CBS LC at DWD continued to provide the monitoring results for the GSN stations to the chairs of the CBS LC for their area of responsibility via e-mail. The software fulfilling this task was improved for the case, that all GSN stations reported and that there was no error in a month, what actually happened in North and Central America (RA IV) for May 2013. Information was provided to the national focal points, if incorrect data were detected or a software error in the generation of the CLIMAT reports could be assumed as well as to the chairs of the CBS LC in some special cases of detected errors. The CBS LC for RA VI also decoded CLIMAT reports in BUFR and extracted information being not included in the ASCII reports. Recently, about 30 countries provide BUFR CLIMATs.

The monitoring of the GUAN stations showed for 2012, that there were no radiosoundings at station 2254 Arhangel'sk / Russia since 2011 and that the stations 37789 Yerevan / Armenia and 15120 Cluj-Napoca / Romania were silent for several months. Concerning the collection of World Weather Reports (WWR) for RA VI the CBS LC only succeeded in providing the data from 18 of 44 countries up to August 2013. In her presentation, Christiana Lefebvre stated, that the annual collection of WWR as decided by WMO EC (EC-64, Res. 14) requires a more effective proceeding.

#### **5.5. RA-I (Africa) – Mozambique (INM)**

Mr Jose Alberto Sequeira presented a summary of the lead centre report for RA-1 (Africa). Although there were many difficulties in his region, the performance of the GSN stations relating to the availability of CLIMAT Bulletins has been improved. However, the efforts should be continued. Only four countries in this Region sent all CLIMAT report of the period considered (January –July 2013). The National Focal Points or Met Services whose countries had more problems concerning the availability of CLIMAT Bulletins were contacted. Every month we have been received report of CLIMAT errors coming from DWD of some sent CLIMAT. The main constraints concerning the report flux are:

- GTS problems
- Inappropriate headings of Bulletins
- The delay of Bulletin sending
- Some Countries/focal points don't give answer when we send emails asking for some information.

#### **5.6. RA-V (South-West Pacific) – Australia (BOM)**

Mr Kevin Smith presented a summary of the lead centre report for RA-V (South West Pacific), highlighting the performance of the networks, successes and any ongoing issues. There followed a general discussion, with any generic issues/items discussed in more detail under agenda items 10 & 15.

#### **5.7. Antarctica – British Antarctic Survey (BAS)**

Mr Steve Colwell gave a presentation via WebEx summarizing the lead centre report for Antarctica.

The monitoring carried out at the British Antarctic survey showed an average of 94% of the CLIMAT message being sent on the GTS for the GSN stations in Antarctica and the sub-Antarctic island from January 2012 until August 2013. Reports from the manned stations generally arrive before the 5<sup>th</sup> of the month but messages from the Automatic Weather stations are delayed as the full dataset does not arrive from ARGOS until the middle of the month.

They do some quality control by comparing values in the CLIMAT message with those generated from SYNOP messages. They also run scripts to see if SYNOP messages from stations stop going out on the GTS. This has revealed one or two issues and these have been resolved by contacting the relevant operators (i.e. Dumont d'Urville (89642), Concordia (89625) and Mario Zuchelli Station (89662))

There is an ongoing issue with a Dutch AWS (89016) which has been relocated to Svalbard in the Arctic but the data is still being sent out on the GTS by ARGOS.

An issue was identified with the radiosonde messages from Mawson stations (89564) and it was identified that the parts CC and DD were not going out on the GTS. This has now been resolved by the Australians.

**5.8. RA-I (Africa) – Morocco (DMN) & RA-II & IV (Asia & Europe) – Iran (IRMO)** were unable to attend the meeting but a report was provided and summarized by Dr Ondráš.

## **6. REPORT FROM GCOS ARCHIVE CENTER**

Mr. Bryant Korzeniewski, the representative of the NOAA National Climatic Data Center (NCDC) that serves also as the GCOS Archive Center, reported via WebEx on the activities of the centre. (See 5.1)

## **7. REPORT FROM GCOS IMPLEMENTATION MANAGER**

Mr Tim Oakley introduced himself as the new GCOS Implementation Manager, taking over in March 2013 from Mr Richard Thigpen who retired at the end of 2012. He summarized his 29 year career in the UK Met Office, with his primary experience in Upper-Air Instrumentation.

He went on to explain the importance of the Quality Monitoring System (QMS) in his role in supporting the GCOS Surface Network (GSN) and GCOS Upper-Air Network (GUAN) and the significant contribution from the CBS Lead Centres. It was agreed that accurate and regular communication was key in both identifying and resolving network issues and as such all parties would work towards an improved method of reporting.

He outlined the work of the GCOS Cooperation Mechanism (GCM) and the status of the ongoing projects. As support funding was increasing getting less and more difficult to identify, it is necessary to priorities within the baseline networks. The knowledge and contribution from the Lead Centres within their region is important in defining some of these priorities.

## **8. REPORT FROM GCOS MONITORING CENTRES**

### **8.1. GSNMC - Germany (DWD)**

Up to now, the GSNMC monitors only the reports in ASCII format (FM71) of GSN stations regarding the receipt, timeliness and correctness. An extension of the monitoring activities to all RBCN stations including reports in BUFR format as recommended by AOPC as well a redesign of the GSNMC homepage operated by DWD needs the work of three months and cannot be performed at the GSNMC at DWD.

In RA VI, the number of GSN stations reporting in FM71 varied between 85 to 95 % of a total of 1023 GSN station in 2012 and 1018 stations in 2013. During the previous months the reception rate slightly decreased. Some differences in the reception rate of GSN stations at DWD and JMA especially across parts of eastern Asia in 2012 diminished in 2013. Relating to WMO regulations (WMO-No 870, 1997a) CLIMAT reports shall be transmitted by the 5<sup>th</sup> of the following month, but not later than the 8<sup>th</sup> day. The monthly arrival time varies for the first five days between 60 and 75 % of the GSN stations and for the 6<sup>th</sup> to 8<sup>th</sup> day between 2 and 25 %. An amount of 2 to 15 % of the GSN stations is received from the 9<sup>th</sup> to the 21<sup>th</sup>, 0 UTC, which is the cut-off date for the monitoring. The timeliness of the reports differs between the different WMO regions. While nearly all reports from RA II (Asia) are received in time, about 38 % of the reports from Antarctica arrive from the 9<sup>th</sup> onward (results for 2012).

The quality control shows that errors in the monthly precipitation totals are more often than in monthly mean temperatures, maximum temperatures and minimum temperatures. In Africa (RA I) 7.5 % of the GSN stations report an erroneous precipitation total in 2012. Most of these errors can be attributed to the know "factor 10" problem (precipitations totals are reported in tenth of millimeters like in SYNOP and not in entire millimeters) and an incorrect coding of precipitation amounts less than 1 mm as 9990-9999 like in SYNOP. These kinds of error is mostly corrected manually by the Monitoring Centres. The next highest error rate is 5 % in Asia and South West Pacific (RA V). The highest amount of errors in one of the three evaluated temperatures ranges by 3 to 4 %. But only a total of 0.7 % of the mean air temperatures are not correctable and are flagged as 'trash'.

## **8.2. GSNMC - Japan (JMA)**

JMA gave a detailed report about the investigation of the difference between DWD and JMA in the number of received CLIMAT messages from GSN stations in 2011. JMA also reported on the reception rates and errors of the BUFR for CLIMAT. The number of received BUFR in JMA increased to about 1000 after June 2013, but it was less than 30% of all RBCN stations.

## **9. REPORTS FROM NATIONAL ACTIVITIES RELEVANT TO THIS MEETING**

The Swiss GCOS Office informed about their activities, presenting the data center report (Swiss GCOS Data in International Data Centers, available at [www.gcos.ch](http://www.gcos.ch)) and their effort in improving atmospheric and terrestrial measurements worldwide within the international project CATCOS (Capacity Building and Twinning for Climate Observing Systems).

## **10. REVIEW AND DEMONSTRATION OF THE PERFORMANCE REPORTS**

Mr Oakley led a brain-storming session with regards the QMS being used to access and resolve issues within the GSN networks. It was agreed that this needs to be extended where possible to include the Regional Baseline Climate Networks (RBCN).

Some of the monitoring reports and methods were demonstrated at the meeting, in particular those for the GUAN network. Unfortunately this session was limited owing to the non-availability of NOAA NCDC (GOSIC) website. It was agreed that the Lead Centres would take some involvement in the QMS for the GUAN network as defined in their terms of reference. Initially this will only be an awareness of the performance of these stations in their region plus any work to resolve issues with silent/poor performing stations.

## **11. WIGOS FRAMEWORK IMPLEMENTATION PLAN**

Dr Ondráš informed the meeting on the work of WIGOS and in particular that of the WIGOS Framework Implementation Plan (WIP). He described WIGOS as an over-arching framework for the coordination and evolution of WMO observing systems, including the contributions of WMO to co-sponsored observing systems. He stressed that it is about doing more and better with what we have now, to enable more efficient and effective service delivery, and that the WIGOS Vision is a system providing reliable & trusted observations for WMO in a coordinated, comprehensive and sustainable manner, with enhanced coordination with partner and external organizations

The meeting was informed on the ten, below mentioned, WIGOS Key Activity Areas and what could be the role of the CBS-LC-GOS in the WIGOS Framework Implementation:

- KAA 1: Management of WIGOS Implementation (including WIGOS Regulatory Material)
- KAA 2: Collaboration with co-sponsored and external organizations
- KAA 3: Design, planning and optimized evolution of WIGOS component observing systems
- KAA 4: Observing System Operation and Maintenance
- KAA 5: Quality Management
- KAA 6: Standardization, System Interoperability and Data Compatibility
- KAA 7: The WIGOS Operational Information Resource
- KAA 8: Data Discovery, Delivery and Archival
- KAA 9: Capacity Development
- KAA 10: Communications and Outreach

## **12. STATUS OF METADATA RECORDS BY THE CBS-LC-GCOS**

Dr Ondráš updated the meeting with regards the status of metadata records in CBS, with much of the work/plans being taken forward by the WIGOS Task Team on Metadata.

**13. GTS/WIS Issues**

13.1 There were no reports or items to be considered/discussed under this agenda item.

**14. REPORT TO CBS-Ext (2014)**

14.1 It was agreed at the meeting that there was nothing at this time that needed to be raised at the forthcoming Extraordinary Meeting of CBS in September 2014.

**15. ITEMS FOR DISCUSSIONS**

As planned several items were discussed in more detail, as follows.

The meeting was informed by the Lead Centres on their activities in support of the collection of the WWR, according to EC-64, Res 14. It was thought that this was just a one of process to capture the data from the previous 10 years, yet a recent letter sent from WMO to the Lead Centres has requesting their support again for 2013 and on a recurring annual basis. The letter suggests that this request has been approved by CBS. The Secretariat accepted that this was a significant extra work-load on those Lead Centres concerned.

**16. NEXT MEETING**

16.1. The next meeting is planned to be held in October 2015. There were no offers at this time to host the next meeting.

**17. CLOSURE OF THE SESSION**

17.1. The session closed on Thursday, 10 October 2013 at 1700 hours.

### Open RECOMMENDATIONS from previous CBS-LC-GCOS

1. CBS-LC-GCOS noted that there was an active community that was eager to obtain monthly means as soon as possible after the end of the month, either for climate research, or for issues of public awareness (e.g. record values). For some stations quality control was carried out by a single individual, which on occasion led to delays in message production. Best practice was for the message to be compiled on station, and for them to get the message out by the 5<sup>th</sup> of the month. A corrected version could be sent later if necessary.
2. The GSN Monitoring CENTRES are requested to revise their performance reports by re-running them after late arriving data comes in so that the performance reports more accurately reflect the actual receipt of CLIMAT reports.  
*[Post meeting NCDC reported that they can re-run their GSN Monthly Reports to where they update available data for the data-month from 6 months ago. For example, this calendar month (November 2013), they would run the October 2013 Data-Month GSN Report and ensure that they've retrieved the latest copy of the May 2013 Data-Month GSN values for its inclusion.]*

### RECOMMENDATIONS from CBS-LC-GCOS-4

1. CBS-LC-GCOS requested that the Secretariat ensures that the recommendation from AOPC with regards the daily climate reports is raised at the next meeting of CCL.
2. The meeting noted that CLIMAT messages can be transmitted both by the GTS and Email but for some countries this can be both methods. NCDC are requested to distinguish between those countries that only provide CLIMAT through Email and those that do both. In addition to the above, the Chilean Meteorological Service asked about which GSN (or CLIMAT) data transmissions from Chile and Bolivia are being received concurrently by NCDC via GTS and E-mail Communication. The expressed concern is that duplicate messages are being submitted via the aforementioned avenues and want to ensure that the data are the same and, if so, amend the process to where the data are only being received via GTS.
3. Many of the Lead Centres in their reports noted the difficulties in establishing contact with the National GCOS Focal Points, resulting in many of the quality issues continuing for long periods of time. The process to escalate this 'no contact' to the WMO Secretariat was reinforced at the meeting and all Lead Centres were asked to compile a list of those focal points who did not respond and to send this to the Secretariat. It was agreed that the guidance as to what to do when a focal point does not respond (or the Email address is not valid) will be updated on the website.
4. The report from the Antarctica region highlighted the issue of a station which had closed and the equipment relocated to the Arctic, yet the Argos identifier had not been updated and thus was transmitting as it was still in the original location. The Lead Centre is in the process of getting this changed. It was agreed that this needs to be raised as an issue at the next meeting of the Satellite Communication forum and in the meantime the Secretariat will attempt to hasten the resolution through WMO contacts.

5. There is a need to make an extensive study to change the scenario in Africa, in an attempt to increase the quantity and improve the quality of reports. Africa was showed as being the most critical region concerning the availability of reports, and many of the reports that are received have errors. In part this is due to the deficient communication system and because most of the stations are conventional and thus there is a higher probability of errors in the reports.
6. The meeting agreed that it would be good to conduct a survey for all GSN/RBCN stations as to how they are generating their CLIMAT, including, if doing so, the production of the BUFR CLIMAT. The GCOS Implementation Manager agreed to draft a list of questions and circulate this to the Lead Centres for their comments. Once agreed the survey would be distributed to GCOS Focal Points through the Lead Centres.
7. It was shown in Region 5 that there are a significant number of GSN stations which are reporting a SYNOP but not the CLIMAT. This was mainly due to a lack of training and availability of suitable software. The Lead Centre for region 5 agreed to investigate the possibility/outline plan for a CLIMAT workshop in Australia and if feasible approach WMO and GCOS for funding.
8. Tim Oakley, GCOS Implementation Manager, requested that NCDC consider an amendment to their GUAN Monthly Reports, or create a new report, that shows the number of observations received at the AA, BB, CC and DD levels (e.g. TTAA, TTBB, PPBB). At times, the second part of the message, CC and DD, is missing or left out of the GUAN transmission and the suggested addition to the reports would give a clearer picture as to how many observations exceed the 100 hPa (or 100 mb) level and be an additional troubleshooting mechanism for NCDC, WMO and the other Lead Centres.
9. The discussions on Metadata at the meeting included the work of WIGOS in developing a Core Metadata standard for all observing systems and the progress in several Lead Centre regions in capturing the photographs of the individual GSN stations. It was agreed that any further work to collect additional Metadata for the GSN network would be put on hold until the agreed WIGOS document was made available in 2014.
10. The report from the GSNMC at DWD highlighted the issue of the website which is long overdue for a complete update. Estimates show that a minimum of 3 months effort is required and it is not clear whether this will be offered by DWD. The meeting recommended that this requirement be raised with the appropriate WMO office who can investigate the provision of funds to support this work.
11. Following the report on WIGOS Implementation and in particular the work on Quality Management Systems (QMS), it was suggested that the task team would benefit from the contribution of the lead centres. The Lead Centres were asked to review the documents provided for the meeting and consider whether they could volunteer to be a member of the WIGOS Task Team on Quality Management.
12. As a result of the presentation on the monitoring of the GUAN network, all Lead Centres were requested to monitor the monthly NCDC statistics and contribute to any communication between the NCDC GUAN lead, the GCOS Implementation manager and the GCOS focal point, for their region. Advice would be provided on the monitoring principles and tools for the GUAN network, which initial will only be an awareness of the performance and issues of the stations in their region. The NCDC's GCOS Team, at [GCOS.NCDC@noaa.gov](mailto:GCOS.NCDC@noaa.gov) offered their assistance with inquiries or to troubleshoot any issues with our GUAN Monthly Reports.

13. The GSNMC agreed to produce a list of the ongoing performance issues with the GSN CLIMAT messages (i.e. missing reports and those with format errors), in principle, concatenating the monthly performance list to show countries and/or stations with ongoing problems. This will be distributed to both the Secretariat and the Lead Centres.
14. The meeting agreed that all Lead Centres would produce a GSN performance table for their region using the monthly performance statistics provided on the GSNMC web site, similar to that presented at the meeting by the Lead Centre for Region 3. This should be provided, in a standard format, on an annual basis (minimum) but all agreed at the meeting that 6 monthly would be of greater benefit. The Lead Centre for Region 3 agreed to produce a draft template for standard report and circulate to all Lead Centres for their comments.
15. The GSNMC will expand their monthly monitoring to all CLIMAT messages of the RBCN network and the CBS-LC-GCOS for RA VI will distribute these results to all Lead Centres via e-mail. It was recognised that this would increase the work-load for the Lead Centre but they were requested to attempt to address as the RBCN issues as time permits, noting that the GSN remains the priority.
16. GCOS requested the help of the Lead Centres in identifying, through the Focal Points in their regions, contacts for the Terrestrial Network on Lakes and Reservoirs (GTN-L). Any contacts provided should be sent to the GCOS Implementation Manager.
17. The meeting agreed, subject to funding, that the 5<sup>th</sup> CBS Lead Centre for GCOS Meeting should be arranged for October 2015. There was no offer to host this next meeting and thus all Lead Centres, who have not previous hosted, were requested to consider this.

**TERMS OF REFERENCE  
OF THE CBS LEAD CENTRES FOR GCOS FOR SUBMISSION TO CBS-XIV**

In support of the Global Framework for Climate Services, especially by improving quality and sustainability of climate data, the Lead Centres for GCOS will:

1. Diagnose problems in the Regional Basic Climatological Networks (RBCNs) and the Antarctic Observing Network (AntON), with the emphasis on the GSN and GUAN, by using the available monitoring reports, such as those produced by the GCOS Monitoring and Analysis CENTRES and major WMO NWP Centres;
  2. Liaise with nominated National Focal Points for GCOS and related Climatological Data, and other responsible officials, to rectify identified problems so as to improve data and meta data availability and quality;
  3. Coordinate activities with other GCOS CENTRES and/or other WMO CENTRES as appropriate;
  4. 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 design of GSN and GUAN and Regions in the design of RBCNs/AntON;
  6. Assist the WMO Secretariat in maintaining the list of National Focal Points for GCOS and related Climatological Data.
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**AREAS OF RESPONSIBILITIES OF THE CBS LEAD CENTRES FOR GCOS**

- **Morocco (RA I)** is responsible for stations in: Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Comoros Island 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.
  - **Mozambique (RA I)** is responsible for 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 Kerguelen), Rwanda, Seychelles, Somalia, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.
  - **Iran (RA II and part of RA VI)** is responsible for 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.
  - **Japan (RA II)** is responsible for stations in: Brunei, Cambodia, China, Hong Kong China, Japan, Laos, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand, Vietnam.
  - **Chile (RA III)** is responsible for all stations in RA III.
  - **USA (RA IV)** is responsible for most stations in RA IV plus Hawaii.
  - **Australia (RA V)** is responsible for most stations in RA V, except those countries noted for Japan and Hawaii (USA).
  - **Germany (RA VI)** is responsible for most stations in RA VI, except those countries noted for Iran.
  - **UK (British Antarctic Survey)** is responsible for stations in Antarctica.
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