

WORLD METEOROLOGICAL ORGANIZATION



REPORT OF THE MEETING OF THE MANAGEMENT GROUP OF THE COMMISSION FOR CLIMATOLOGY

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Members of CCI Management Group, invitees and Secretariat staff attending the October 2013 meeting
(Photo: Kosmos Akande-Alasoka)

1. OPENING OF THE MEETING

1.1 The meeting of the Management Group (MG) of Commission for Climatology (CCI) was opened by Dr Thomas Peterson, President of the Commission at the WMO Headquarters, at 09:30 hrs on Tuesday, 01 October 2013 (List of Participants is given in Annex 1). Dr Peterson welcomed all the members of the MG and representatives of Regional Association Working Groups on climate related matters. He noted that this is one of the most important meetings of the MG during the current intersessional period, keeping in view of its agenda focusing on a review of the work done by the Commission so far and planning for the next intersessional period. After his welcome remarks, Dr Peterson invited Mr J. Lengoasa, Deputy Secretary-General of WMO, to deliver his opening speech.

1.2 On behalf of the Secretary-General of WMO, Mr Lengoasa welcomed the president of the Commission, members of the MG and invited participants to the meeting. He noted that the current intersessional period has been particularly important for CCI, considering that its work plan has been closely aligned with the outcomes of World Climate Conference-3 (WCC-3) encapsulated in the establishment of the Global Framework for Climate Services (GFCS). He added that the GFCS has brought new challenges and opportunities to WMO, most of which are directly relevant to CCI. He hoped that with the implementation of the GFCS, it will continue to be a major driving factor in shaping the future work of the CCI.

1.3 The Deputy Secretary General highlighted that the technical work and products of CCI are widely used by experts in NMHSs and outside communities. For example, the Annual Statement on the Status of the Global Climate is widely welcomed and referred to by climate change community and the UN System, every year at the UNFCCC COP sessions.

1.4 He noted that the release of the Working Group I report as part of IPCC Fifth Assessment Report (AR5) highlights a number of issues such as the increasing trend in surface temperature and evolution of extreme events. He recognized that these are some examples directly reflecting the core responsibilities and expertise of CCI, which WMO relies upon, as its key constituent body providing world leadership in promoting expertise and international cooperation in climatology.

1.5 Mr Lengoasa stressed that the Commission should foster appropriate linkages with the GFCS and equivalent programmes in other UN agencies, to pave the way for effective uptake of the Commission's contributions, particularly in the development of the User Interface Platform pillar of the GFCS. He assured the MG of continued support of the Secretariat to CCI activities in general and the meeting in particular. In response to a question on the future structure of the Commission to support capacity development activities, he noted that appropriate working structure with a solely dedicated group to this topic will be able to integrate the work of other thematic initiatives such as those for observations, data management, climate prediction, etc., and create coherence in a value added manner, contributing to the pillar on capacity development in GFCS.

2. ADOPTION OF THE AGENDA

2.1 The provisional agenda of the meeting (Annex 2) was reviewed by the MG. The MG adopted the agenda without any changes.

2.2 The MG agreed on the working hours of the working hours and work plan of the meeting.

3. PLANNING FOR THE SIXTEENTH SESSION OF CCL (PART I)

3.1 The MG was informed that, at the kind invitation from the Government of Germany, the Sixteenth Session of CCI (CCI-16) is scheduled to be held from 3 to 8 July 2014 in Heidelberg, Germany. The 35th Session of the Joint Scientific Committee (JSC) of the World Climate Research Programme (WCRP) will also be held at the same venue at the same time, following the successful co-located events for CCI-XV in 2010. CCI-16 will be preceded by a Technical Conference from 30 June to 2 July 2014 including one-day joint session with WCRP, at the same venue.

3.2 The President briefed the MG on the documentation requirements for CCI-16, and provided his own perspectives on how the documents need to be developed. Keeping in view the fact that the documents contain the key decisions to be taken at CCI-16, he urged active participation of the members of the MG in the document preparation process. He further shared his perspectives for optimum selection of the members and co-chairs of expert teams in the composition of the Open Panels of CCI Experts (OPACEs), including the need to provide adequate opportunities for WMO Regional Associations to propose their representatives and to ensure the right balance of regional representation and required expertise. This topic is further elaborated in Section 4.

3.3 The meeting then considered preparations and planning for the the CCI/WCRP Technical Conference (TECO) preceding CCI-16. The theme, possible titles and a draft outline for the TECO were presented and discussed. The Chair constituted an ad-hoc Working Group to consider the various issues and to formulate recommendations to plan and organize the conference. Dr Rodney Martinez coordinated this working group and formulated recommendations for holding the TECO.

3.4 The Ad-hoc Working Group met twice (1 and 3 October 2013) and recommended that the focus of the TECO be a balanced mix of operational and research topics. Taking into account the longstanding leadership role that the Commission played in the implementation of WMO's Climate Information and Prediction Services (CLIPS) project ever since its establishment in 1995, and the decision of the Congress to conclude CLIPS in 2015 and transition its ongoing activities into the emerging GFCS, the MG agreed that the theme for the TECO be based on CLIPS. After some discussion, the MG agreed to adopt the title "**Climate Services – Building on CLIPS Legacy**" for the TECO.

3.5 It was proposed to constitute a Science Committee to formulate a detailed agenda with well thought out topics for sessions and invited talks, and also identify potential speakers. The ad-hoc Working Group also made some suggestions for the sessions (see Annex 3). After due consideration the MG recommended a Science Committee for the TECO with Mr. Rodney Martinez (Chair), Dr. Manola Brunet, Ms. Barbara Tapia, Dr. William Wright, Mr. Jean-Pierre Ceron, and Dr. G. Srinivasan. The MG agreed that the Committee may be expanded in due course with additional members from WCRP and also to ensure regional balance.

3.6 The MG also suggested that the joint CCI/WCRP session in the TECO should focus on three main issues – latest advances and research goals; research findings that are ready for operationalization and outstanding problems that are faced by operational agencies and how they could be taken up by the research communities. These issues could be possibly taken up in a suitable panel discussion.

3.7 The MG requested the TECO Science Committee to consider all relevant aspects and give suggestions for the science agenda, including the identification of suitable names for invited talks in close consultation with CCI MG, WCRP JSC and the Secretariat.

4. CCL WORK PROGRAMME: CURRENT STATUS AND FUTURE PLANS

4.1 OPACE-I: Climate Data Management

4.1.1 The meeting considered the report of Dr W. Wright on behalf of the co-chairs of OPACE-I. The full submission of OPACE-I is in Annex 4 to this report. The meeting took note of achievements and lessons learnt during the current intersessional period by this OPACE. The following proposals were made for the future scope of OPACE-I.

4.1.2 It is suggested that, with the increasing focus on data and data management, the scope of OPACE-I should be expanded.

- a) Task or Expert Teams in CDMS and Data Rescue should continue into the next Intersessional Period to round off some activities that were progressed but not finished in this Intersessional Period, or which threw up new lines of work such as the need to develop an integrated resource mobilisation strategy, as above;
- b) It is proposed that ET-CDMS be re-established with some revision of its Terms of Reference (ToRs) and that TT-DARE be transformed into an ET-DARE with a new set of ToRs aligning with the increased need for DARE projects in addition to the oversee of I-DARE development and update;
- c) A Task team or Expert Team specifically devoted to climate observational issues should be established to pursue relevant tasks and issues (e.g., solid precipitation measurement; contributions to various Implementation Plans), and to provide a pool of experts to better engage in the relevant representative activities, which should also include JCOMM;
- d) Establish and lead a cross-program team (IPET-CDMF) for progressing the establishment of a HQ-GDMFC, and establish small temporary working groups for undertaking tasks such as reviewing and updating guidance documents, defining new technical regulations, and recommending a training/capacity building strategy;
- e) All Teams should work closely with the GFCS, and align their work-plans accordingly.

4.2 OPACE II – Climate Monitoring and Assessment (Dr Fatima Driouech and Dr Manola Brunet)

4.2.1 The meeting considered the report of OPACE-II, jointly presented by the two co-chairs. The full report of OPACE-II can be found in Annex 5 of this report.

4.2.2 The meeting took note of the main achievements and progress in the work of OPACE-II. It recommended the following for the future work of this OPACE.

- a) There is need to expand the mandate of the TT in the next intersession period to guide and monitor the regular production and dissemination of the NCMPs by WMO Members;
- b) It is preferable that the future task team includes at least one or two members from the actual one. This should allow continuity and effective progress;
- c) Capacity building should play an important role during the implementation phase. The future team should include persons with good background. Sustainability of these efforts for long time is important (ETCCDI example).
- d) It is strongly recommended to continue this activity in the future. Prof Cervený is an excellent candidate for continuation as (Lead) Rapporteur. The concept of two Rapporteurs should only be considered if equally motivated persons can be identified.
- e) A continuation of respective activities beyond this intersessional period should be envisaged with the following main topics: (i) to identify and provide a set of tools and univocal definitions to analyse climate extremes both point-based and of regional extent indices, (ii) to implement an inter-operable Web Portal holding a data base for regional extreme weather and climate events, and (iii) to address the more specific indices mentioned above that couldn't be addressed in this intersessional period.

4.2.3 The MG also noted the additional thoughts and general comments provided by Dr Brunet, on the future structure of OPACE-II for the next intersessional period (see Section 6 of Annex 5 for additional details):

- a) JCOMM inputs on marine indices for ETCCDI work;
- b) ETCCDI structure and its future beyond the current intersessional period;
- c) Continuation of TT-NCMP in the next intersessional period with a clear mandate of identifying, gathering and making accessible the tools to calculate operationally the agreed national climate monitoring products in closer coordination with other relevant teams;
- d) Avoiding overloading of OPACE Co-Chairs by engaging them in other CCI focus groups, while ensuring coordination among related activities;

- e) Cross-cutting task team between OPACEs I and II on long-term and high-quality climate data series development.

4.3 OPACE III - Climate Products and Services and their Delivery Mechanisms

4.3.1 The meeting considered the report of Dr Céron on behalf of the two co-chairs of OPACE-III. It noted the status of the implementation of Regional Climate Centers (RCCs) in six Regional Associations. The MG took note of the achievements and main outcomes of OPACE-III activities (detailed report submitted by OPACE-III is provided in Annex 6). The MG noted following ongoing/additional work suggested for the next intersessional period:

- Promotion of RCOFs in new regions
- Technical Guide on downscaling/tailoring methodology available in English and French (preliminary version)
- Updating of RCOF Position Papers
- Participation in the review of the draft implementation plan for GFCS (chapter 2,3 and 4 + CSIS annex).
- CCI/CBS Guidance on establishment and operation of WMO Regional Climate Centres.

4.3.2 The MG noted the proposal to retain the same thematic focus for OPACE-III, but with a stronger focus on the Climate Services Information System (CSIS) and related topics (like RCCs, LRF, etc.). Further, the need for close liaison with the User Interface Platform (UIP) was emphasized, so some explicit linkages with OPACE-IV may be developed (e.g., user targeted COFs, etc.).

4.3.3 The MG noted the proposal of OPACE-III to retain the Expert Team on CSIS, CCI/CBS Expert Team on RCCs (ET-RCCs), CBS/CCI Expert Team on Operational Prediction on Sub-seasonal to Longer Scales (ET-OPSLs) and the Task Team on the Global Seasonal Climate Update (TT-GSCU). Considering the overarching nature of CSIS cutting across all the OPACEs, the MG was also invited to consider setting up an Implementation Coordination Team (ICT) focused on the CSIS, with membership spanning all the OPACEs. It is also suggested to keep one communications advisor, chairing a small task team on vocabulary issues and associated communication concerns (e.g. GSCU).

4.3.4 The MG noted that capacity development (CD) activities should be addressed in a better way, with more explicit focus within the OPACE-III (e.g., review, update, follow-up of existing training material, etc.). Also, specification and preparation of training involving users and providers may be encouraged to build the shared knowledge necessary to the GFCS implementation. For this purpose, the CCI structure may be suitably adapted to strengthen the CD activities.

4.3.5 The MG highlighted verification beyond the products (e.g. verification of the quality of decision making processes using climate information, weight/importance of the climate information in decision making), and uncertainty topics (including the ensembles of ensembles). The MG agreed that there is a need to identify the best way to convey this information up to the stakeholders (including some related topics like the tolerability of the uncertainty in the decision making processes).

4.3.6 The MG noted the OPACE-III perspective that it is important to convey, from the seamless modelling concept itself, that the climate models used on all the range of climate forecasts/projections could be as close as possible to one another. This will ensure that all experience gained from one time scale (e.g., century, decadal, seasonal and even monthly) could be of benefit to the other time scales (e.g., knowledge of the climate trend to be incorporated into seasonal forecasts). More importantly, there is the concept of the seamless use of the climate forecasts, whereby we have to learn and train our users to optimize all the available information across all time scales in order to get the greatest benefit of using the climate information. It is very important that some common approaches and diagnostics could be shared over all time scales (and even including the monitoring aspects so that we get the best consistency across the different time scales). In this viewpoint, the inclusion of climate change scenarios in the CSIS product portfolio will certainly be one of the greatest challenges to face in the coming years. In addition, the implementation of “Climate Watch” using monitoring and sub-seasonal/medium range forecasts is also important as a shorter time scale activity.

4.3.7 In the perspective of Climate Services delivery, the MG agreed that the products themselves should evolve from “basic” products like temperature or rainfall to better tailored products able to represent the impact onto the stakeholders activity. With respect to priority sectors, there is clearly a need to develop tailored products such as forecasts of hydrological characteristics, forecasts of energy production and/or consumption, early warnings relevant to the health domain, agriculture and crop production outlooks, etc. These emerging needs will become more and more prominent and the CSIS will have to propose relevant interface for the impact models and/or relevant integrated climate indices in order to make the decision making processes more efficient and more beneficial to the stakeholders and the societies.

4.4 OPACE IV - Climate Information for Adaptation and Risk Management (Dr Rodney Martinez and Albert Martis)

4.4.1 The meeting considered the report of OPACE-IV and took note of achievements, constraints and challenges experienced by the OPACE, since its performance. For full report of OPACE-IV, please refer to Annex 7. The Group recommended the following actions:

- Review existing ET-CRSCI membership
- consider inviting new members
- Continue to seek the expert guidance from external sector and climate experts
- Consider either having a pilot workshop in another region or continuing the workshop format in the Western S. America region
- Develop *ClimPACT* to include indices derived from other climate variables that are relevant for sector impacts

4.4.2 The MG proposed to keep the *ClimPACT* Expert Team with updated terms of reference and membership until it accomplishes its tasks.

4.4.3 The MG noted the following overarching aspects highlighted by OPACE-IV:

- Three Experts Teams proposed for the next intersessional period, bearing wider and more complex terms of reference.
- All three proposed Expert Teams will be the contribution from CCI to the User Interface within GFCS
- It is not just a wonderful CV, we need volunteers willing to work and dedicate time to WMO-CCI.
- It is suggested that proposed experts for the Expert Teams work as a steering committee but interacting and receiving support from other volunteers to serve in OPACE IV. If a steering committee member is not active, a replacement with other volunteer should be done quickly.

4.5 Other Focus Groups

4.5.1 The meeting considered brief reports on the following activities:

- Task Team on Climatological Normals
- Expert Team on Strategy for Capacity Building for Climate Services
- Rapporteurs to review the Guide for Climatological Practices

4.5.2 The MG recalled that CCI-XV had approved the third edition of the Guide to Climatological Practices (WMO- 100) and proposed that a group of selected experts within the Commission continue monitoring the content of the publication for regular updates in the fifteenth intersessional period. To this effect, the MG had selected Dr Ned Guttman (USA) and Dr M. Rajeevan (India) to serve as co-rapporteurs to the update of the Guide. The Terms of Reference of the co-rapporteurs have also been drawn up, who will deliver their preliminary report for consideration by the CCI-16 session.

4.5.3 The MG noted that the co-rapporteurs had provided a draft timeline of future revisions of chapters and sections in the Guide. According to the current simplified process, any updates and revisions on the Guide, which are proposed by co-rapporteurs will be circulated by correspondence to the MG for its comments and confirmation. It will then be forwarded to the President of the Commission for his approval. In the meantime, the President will request the Secretary-General to facilitate consideration and approval of the Executive Council which in such cases is authorized to act on behalf of the Congress.

4.5.4 The MG was briefed by Mr Sensoy on the experience gained in promoting CCI on social media such as Facebook. The MG was assisted by Ms Clare Nullis, Communications Officer in WMO Secretariat, in considering the ways to effectively use the emerging social media technologies, who also offered to share the guidelines being developed as part of the overarching WMO communications strategy for this purpose. The MG agreed that this topic needs to be considered by a small team for developing proposals for CCI approach towards social media.

4.5.5 The MG was briefed by Mr Sensoy on the activities of the Expert Group on Quality Management for Climatology (see report in Annex 8). The MG agreed that there is a need to pursue the quality management aspects more vigorously in climate services, including development of standards and guidelines, as part of the mandate provided to the Commission, and that the expert group should be continued in the next intersessional period for this work.

4.5.6 The MG was briefed by Mr Sensoy on the activities of the Expert Team on Strategy for Capacity Building for Climate Services (see report in Annex 9). The MG appreciated the contributions of the team, particularly on its proposals for education and training strategy for climate services. The MG agreed that education and training needs a special focus to help consolidate and sustain the various training modules developed under the different OPACEs.

4.5.7 The MG noted the activities of the Rapporteurs for Volunteer Observing Networks, and agreed that their activities should be more directly brought under OPACE I. The MG also recognized that the Commission's focus on volunteer networks is likely to increase, and that the relevant activities need to be closely coordinated with CHy and CAgM.

4.5.8 The MG noted with appreciation that a number of CCI Representatives have facilitated CCI contributions to other WMO bodies/programmes. Dr G. Srinivasan, CCI Focal Point on Disaster Risk Reduction, presented his report on CCI activities relevant to the work plan of WMO's Disaster Risk Reduction (DRR) programme (see Annex 10).

4.5.9 The MG noted that these focus groups, while dealing with a wide range of thematic areas, have an overarching relevance to capacity development for climate services. Keeping this in view, and the need to consolidate and coordinate their efforts more effectively, the MG agreed that a new OPACE be proposed to CCI-16, to cover this domain.

5. PLANNING FOR THE SIXTEENTH SESSION OF CCI (PART II)

5.1 CCI-16 Structure, Logistics and Documentation Planning

The meeting discussed in detail, the future structure of the Commission and agreed on the provisional structure, in Annex 11 in this report.

5.1.1 At the kind invitation of the Government of Germany, the Sixteenth Session of the Commission for Climatology (CCI-16) will be held from 3-8 July 2014 at Heidelberg, Germany. 5 July 2014 (Saturday) will be a working day for the session, but there will be no sessions on 6 July 2014 (Sunday). Logistic arrangements are being worked out with the hosts.

5.1.2 The opening ceremony is expected to take place at 10 AM on Thursday, 3 July 2014. The hosts have requested confirmation of this timing, for their planning purposes.

5.1.3 Following the current practice of WMO constituent body sessions, the documents for CCI-16 will be issued in Arabic, Chinese, English, French, Russian and Spanish except for those mentioned under (c) below:

- (a) Initial draft papers presented to the session in support of the agenda items, which will be listed as "CCI-16/Doc.x.x-draft1_en.doc";
- (b) Revised draft papers, if any, emanating from the plenary meetings. These will be listed as "CCI-16/Doc.x.x-draft2_en.doc". They will contain changes from previous versions of texts in "track changes" format;

- (c) Information papers containing items of general information which may be of use to delegates attending the session. These will be listed as “CCI-16/INF.x.x” and will be issued in English and French only;
- (d) Text and resolutions contained in the draft documents may be approved by the plenary at any time, through on-screen editing if required, provided no substantive changes are proposed.

5.1.4 The principal means of distribution of all pre-session as well as in-session documents will be electronic. Documents issued before the session are made available in electronic format on a dedicated web site for CCI-16, and WMO Members and members of the Commission are notified about the location in due course. In order to avoid wastage of paper and thereby reduce the carbon footprint, hard copies of documents will be mailed to participants only on explicit request. Electronic versions of all documents produced in-session will be posted to the CCI-16 web site as soon as they are available.

5.1.5 The MG considered a preliminary list of the documents required to be developed for CCI-16, provided by the Secretariat based on the document structure used for CCI-XV. Of these, the most important documents of interest to the MG are those defining and describing the future structure of the Commission. The MG agreed that these documents will need substantial contributions from the MG members and also the relevant OPACE teams.

5.1.6 As there is considerable work load on the Languages unit of the Secretariat due to back-to-back sessions of WMO constituent bodies around the time of CCI-16, the MG noted that the documents for CCI-16 are required to be submitted much earlier than the usual.

5.1.7 In order to facilitate discussion of issues relevant to the agenda and documentation, the MG recalled that the Secretariat had made arrangements for an e-forum prior to CCI-XV. However, the e-forum did not receive substantive response. Keeping this in view, the MG agreed that an e-forum may not be required this time, and to use email communications for related discussions.

6. ADDITIONAL ASPECTS TO BE CONSIDERED FOR CCI-16 PLANNING

6.1 REPORT FROM THE PRESIDENT OF CCI

The President of the Commission reported on the achievements, challenges and constraints of CCI-XV, as follows:

What worked well:

- Bringing two people together in Geneva to write a document.
- CCI CBS cooperation
- Regular WebEx teleconferences (coordinated by the Secretariat).
- Raising the visibility of the topic by other groups.
- Collaboration with other teams such as the ETCCDI.
- Piggy-backing meetings so heavy travellers like CCI OPACE co-chairs can address two meetings on one set of travel.
- Training that gets integrated into and by the NMHSs.

- Having team leads and co-leads as co-lead can step forward when lead is too busy.
- External experts, people not officially on a team, often make key contributions to the teams.
- OPACE wide letters.
- Action items from CCI MG meeting were generally acted upon.

What did not work so well:

- Need better GFCS visibility.
- TOR not specific enough.
- When OPACE Co-chairs are too busy to attend a team meeting, the team can struggle to understand priorities and get off to a good start.
- Some people who promise to work on a task don't actually do any work.
- Action items from CCI meetings have to be clear enough that people reading these two years later will remember exactly what is involved.
- Could use follow up reminders about CCI action items from MG meetings. From Secretariat?
- Selection of teams – ask nominees to OPACES to not only mention which teams they are interested in but welcome a paragraph on their past activities as related to each team's tentative TOR.
- Only consider scheduling team meetings in safe countries
- Avoid overloading OPACE co-chairs
- TOR can be too demanding and unreachable and cover too many topics.
- Sharing information between ETs, RAs and CCI
- Cooperation between RAs and CCI – stronger liaison needed
- Training that only involves one individual from a NMHS as the information often doesn't get turned into action.
- Best expert, based on CV, may not be the best person for a team as they can be too busy. So look for people who have more time even if they have less expertise. Perhaps having nucleus of key people who can coordinate broader participation from within the OPACE.
- Very late meetings.

6.2 BRIEF APPRAISAL OF CCI RELEVANT ASPECTS IN WMO CONSTITUENT BODY SESSIONS SINCE THE LAST MEETING

The Group considered relevant decisions and recommendations of the following meetings:

6.2.1 Sixty-Fourth Session of WMO Executive Council (Geneva, 15-23 May 2012)

- Review of the First Order Draft Implementation Plan of GFCS
- WMO contribution to GFCS
- Guidance on definitions of extreme weather and climate events
- WMO Annual Statements on the Status of Global Climate
- Terms of Reference (ToR) of the Executive Council Working Group on Climate and Related Weather, Water and Environmental Matters (ECWG-CWE).

The meeting particularly referred to the request of EC-64 on liaising with WMO Space Programme on additional satellite products that can improve WMO's Climate System Monitoring project. It noted that CCI mainly focuses on in situ data for climate monitoring operations; however, it will consider satellite data applications for inclusion in the Terms of Reference of relevant Expert Teams of OPACes I and II. The MG noted that combined use of in situ and satellite data can increase the value of climate monitoring products, provided that the spatial scale is well defined and adequately taken into consideration.

6.2.2 World Meteorological Congress (Extraordinary session, Geneva, 29–31 October 2012)

The extraordinary session of Congress approved a resolution to establish an Intergovernmental Board on Climate Services (IBCS). Congress also approved a resolution on the implementation of the GFCS. A third resolution dealing with budgetary issues was also approved, stating the immediate importance for voluntary contributions by Member States to secure quick wins for the Framework.

6.2.3 Annual meeting of the Presidents of Technical Commissions (PTC) - Geneva, 2013

The meeting appreciated the need for each programmatic area to clearly define the user community of the products and services developed, implemented and provided by the programmatic area, as Quality in the sense of QMS is defined as the degree to which products and services fulfil the stated requirements of a "customer". For programmatic areas providing basic systems, data and services, such as WIS, WIGOS, ARE, Climate (including GFCS) the meeting noted that both internal and end-user requirements are to be exchanged between the relevant programmatic areas. The PTC-2013 reconfirmed strong and continuing support for the principles, application and implementation of Resolutions 40 – Cg-VII and 25 – Cg-VIII. It further advised any new resolution could be a clarification of the application of the existing resolutions 40 and 25 versus a stand alone resolution for climate data only, noting that if a stand alone resolution was created there would still be a need to de-conflict it with the existing resolutions 40 and 25 which already have application to climate data;

6.2.4 Executive Council Working Group on Climate and related Weather, Water and Environmental Matters (ECWG-CWE)- January- February, 2013

The ECWG-CWE considered its Terms of Reference, approved by EC-64 and prioritized the tasks, among other issues, for the remaining period of work leading up to EC-65 and Cg-17 as follows:

- ***Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA):*** PROVIA would develop a strong research agenda in coherence with WCRP, underpinning ongoing adaptation work, and contribute to better uptake of climate services as they are developed under the Climate Services Information System (CSIS) component of the GFCS.
- ***Role and Operation of NMHSs:*** The ECWG-CWE noted that the WMO Statement on the Role and Operation of National Meteorological and Hydrological services

(NMHSs) presents information on the role and operation of National Meteorological and Hydrological Services (NMHSs) worldwide focusing on the needs for the GFCS.

- **Capacity Development:** Capacity Development is critical in improving the quality and delivery of climate, weather, water and other related environmental services by NMHSs. The Group gives priority to this task, particularly through collaboration with the EC Working Group on Capacity Development (ECWG-CD) to advice on enhanced resource mobilization in support of climate services and related climate change adaptation needs of NMHSs in developing and least developed countries.
- **Climate-related international conferences:** The outcomes of conferences dealing with climate and related weather, water and environmental matters may affect WMO's climate-related programmes. Reviewing the outcome of such conferences will help identify the needs of developing and least developed countries to recommend appropriate actions.

The ECWG-CWE believed that the updated WMO Statement should duly reflect the '**Central**' role of NMHSs in the delivery of climate services under the GFCS, while acknowledging the importance of partnerships with relevant stakeholders both at national, regional and international levels.

6.2.5 Sixty-fifth Session of the Executive Council, Geneva, 15-23 May 2013

EC-65 emphasized on the GFCS as a cross-cutting international initiative spearheaded by WMO and requested that user-friendly climate services be made available to those who need them most. It noted that several countries are rolling out climate services at national level and WMO is promoting the expansion of regional climate centres to address the regional impacts of climate variability and climate change.

6.2.6 The First Meeting of the Intergovernmental Board for GFCS (IBCS-1, Geneva, 1-5 July 2013)

The IBCS-1 meeting agreed on a 28-member Management Committee to provide advice on a number of key tasks until the next meeting of the Intergovernmental Board, which will be hosted by Switzerland in November 2014.

The Commission was represented at IBCS-1 by Mr Serhat Sensoy, Vice-President. IBCS-1 recognized the value of CCI initiatives to the GFCS implementation priorities, and noted its central role in facilitating WMO contributions to the GFCS.

IBCS-1 considered the GFCS implementation plan, including progress in the initial priority areas of food security, water management, disaster risk reduction and health. It also considered a compendium of projects, resource mobilization and pillars of the GFCS, including a platform to bring the providers and users of climate services together. The following are the initial implementation activities and projects identified:

- Establish frameworks for climate services at the national level in developing countries
- Strengthening capacity for disaster risk reduction and early warning
- Improving communications between the climate and agriculture and food security

communities

- Partnering climate services and water resources management
- Developing National Climate and Health Working Groups
- Improving decision-making processes concerning climate-related risks
- Strengthening regional systems for providing climate services
- Large-scale data recovery and digitisation

6.3 IMPLEMENTATION OF THE GLOBAL FRAMEWORK FOR CLIMATE SERVICES: CCI PERSPECTIVES

6.3.1 High priority was given to the GFCS by CCI-XV, which expressed need to fully utilize the skills and knowledge of the members of all the four OPACEs in this regard. While the OPACEs have appropriately integrated the relevant aspects in their work plans, this needs to be further elaborated keeping in view the report of the High Level Taskforce on GFCS (HLT-GFCS), and ongoing developments in GFCS implementation strategy following the Congress, EC and the IBCS decisions. The MG noted that this is a critical phase in the implementation of the GFCS, and that it is important to facilitate greater engagement of the Commission in all relevant aspects.

6.3.2 Cg-XVI endorsed the broad thrust of the HLT-GFCS Report, and entrusted the EC with the responsibility of developing the draft implementation plan for GFCS including governance. Cg-XVI recognized that CCI will have a central role in the implementation of the GFCS, but that the other technical commissions will also have important roles to play.

6.3.3 Two decisions made by Cg-XVI are of crucial importance to CCI in supporting the GFCS: (i) reorganization of the World Climate Programme (WCP), with a new World Climate Services Programme (WCSP), and (ii) acceptance of CCI-XV proposal to conclude the Climate Information and Prediction Services (CLIPS) project by 2015 and work towards its transition into the GFCS. CCI will have an overall responsibility to steer the WCSP implementation in a way that it effectively contributes to the GFCS, and also to consolidate CLIPS achievements and determine CLIPS legacy.

6.3.4 EC-64 requested CCI to scope out the development of a CSIS Technical Reference Manual. The manual could provide, inter alia, definitions, product elements and standards, technical procedures and organizational structures for the generation and dissemination of climate products and services.

6.3.5 On the exchange of climate and related data, Cg-XVI had decided to task the EC with reviewing Annex 1 – Data and products to be exchanged without charge and with no conditions on use, to 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, with a view to ensuring that the climate data and products needed for the GFCS climate services are included therein. EC-64 established an EC Task Team on the WMO Policy for International Exchange of Climate Data and Products to support the implementation of the GFCS.

6.3.6 A major priority for CCI in contributing to the GFCS implementation would be to address the needs of climate services at the national level. While the global and regional

levels of the GFCS, particularly its CSIS component, are reasonably well-defined and partially in place, the national structures are still to be adequately conceptualized.

6.3.7 The meeting requested the Secretariat to share with the President, Vice-President and OPACE Co-chairs, CCI relevant decisions of the WMO constituent bodies and invite their attention for further action.

6.3.8 The meeting noted that the Secretariat is in the budget planning process for 2016-2019 financial period. In that aspect, the Commission is suggested to provide advice on expenditure priorities for the mentioned time span.

6.4 REGIONAL CLIMATE ACTIVITIES

6.4.1 The meeting considered the reports of the Chairs of Six Regional Association (RA) Working Groups dealing with climate related matters including ongoing activities of all the OPACEs. The Group was also briefed on progress in implementation of RCCs and RCOFs, and relevant roles of the Regional Working Groups. OPACE co-chairs will be guided and assisted by the Secretariat in drafting documents allocated to their relevant area of responsibility. Reports of the representatives of Regional Associations are available in Annex 12.

6.5 CCI LINKAGES WITH CLIMATE RESEARCH COMMUNITY

6.5.1 Dr Rodney Matrinez made a presentation on CCI-WCRP joint session to explore more effective interaction between CCI and WCRP. The main motivations are among the WCRP mission and objectives; which support climate related decision making and planning adaptation to climate change by coordinating research required to improve climate predictions and understanding of human influence on climate.

6.5.2 The meeting noted that WCRP is focussing on actionable science, while facing grand challenges such as; regional climate information, regional sea level rise, cryosphere in a changing climate, clouds and so on. The Group deemed that CORDEX and ET-CSIS on long range forecasting, interaction with WG on seasonal to interannual prediction (WGSIP), and interaction with ET-OPSLS - operational predictions from sub-seasonal to long time scales provide strong basis for synergies.

6.5.3 On the other hand, sector specific indices, regional climate activities are among areas that WCRP can use TCOFs, RCCs to interact with OPACE III and OPACE IV, in the context of WCRP panels: Asian- Australian Monsoon Panel (AAMP) and RA-II CLIVAR panels, GEWEX.

6.5.4 The Group further noted that there were Some issue, such as communication of uncertainty to users and excavation of climate services (social and economical benefits). To that end, the Group recognized that part of the WCRP success comes from its joint projects with CAS, coordination of project office in UK and project offices in Korea. The Group further noted that the ET-CSIS stands as a main reason for cooperation between CCI and WCRP, particularly on regional climate scenarios. The meeting also identified ETCCDI and PROVIA of UNEP as a good example for cooperation and partnership with WCRP in the context of the World Climate Programme (WCP).

7. PLANNING FOR THE SIXTEENTH SESSION OF CCI (PART III)

7.1 Dr Kolli explained the documentation plan and types of expected documents for CCI-XVI. It was suggested that CCI starts first to draft the Terms of Reference of Expert Teams/Task Teams to facilitate documentation process. Taking into account the proposed organizational structure for the Commission agreed by the MG under this agenda item, the President led the discussion on document planning. The document list agreed is provided in Annex 10.

8. ANY OTHER BUSINESS

8.1 CCI Certificates of Appreciation

8.1.1 The meeting discussed the CCI Certificates of Appreciation to those who have served the objectives of the Commission with outstanding dedication. The meeting recalled that the MG had earlier discussed over email the possibility of sending Certificates of Appreciation for their efforts to each CCI volunteer who contributed their time and effort to CCI projects. It was also suggested that these would be for most team members but not all team members - only those who delivered.

8.1.2 The Group agreed to consider retroactive list of members for selection process. It also chose to send the certificate directly to the individuals with a copy to the Permanent Representative of relevant country. After considering the list of potential winners the Management Group selected Mr Randy for his exceptional work as 'Rapporteur on world weather and climate extremes'.

8.2 Centennial Climate Stations

8.2.1 The meeting considered an update on the work on the proposed designation of "centennial climate stations", in response to the request of EC-65 in May 2013. It noted that a centennial climate station is an observing station that provides continuous climate data for 100 years or more. Such data – carefully treated in terms of quality assurance and archiving - are of utmost importance for documenting and studying climate variability and change on decadal to centennial time scales, thereby providing basic input to relevant climate research and services.

8.2.2 A WMO initiative in this regard is intended to provide a global framework for identifying, assessing and designating centennial climate stations, whose data time series are valuable for research and services and which follow WMO standards where applicable. By raising the profile of centennial climate stations, the initiative contributes to Members' efforts to maintain such stations under the most preferable conditions. Specifically, it is hoped to strengthen NMHSs' role in cases where centennial climate stations are at risk due to resource constraints and/or conflicting societal interests at national or local levels including intended unfavorable changes in the station environment etc. It is acknowledged, however, that such a purpose requires an objective and rigorous designation mechanism.

8.2.3 Accordingly, EC-65 requested CCI to investigate, jointly with GCOS and CIMO, an appropriate WMO mechanism for the designation of centennial observing stations based on a minimum set of objective assessment criteria. Such criteria, which shall be based on existing arrangements and mechanisms, might include aspects of metadata, quality, homogeneity, data gaps, station relocation(s), siting classification, monitoring principles etc.

8.2.4 Two experts, one from climate and one from observation domains, have been invited to visit the Secretariat mid November 2013 to explore the existing site certification mechanisms, network criteria and monitoring principles and discuss potential criteria and mechanisms for a WMO recognition of centennial climate stations.

8.2.5 Based on this work a mechanism for centennial climate station recognition will be proposed to CCI-MG for endorsement and then for submission to CCI-16 and CIMO-16 in July 2014.

9. REVIEW OF ACTION ITEMS

The meeting agreed on the following list of specific actions and identified the persons responsible and the timeframe for the actions to be completed, noting however that there could be other actions emanating out of the discussions outlined in the previous sections:

S. No.	Action	Responsible	Deadline
1.	Take more control of CCI's facebook page. No advocates' posts allowed, on any side of an argument. Link only to official sources which primarily mean WMO or governments. Some universities would be OK, but only some. Climate Central often OK (our communication advisor Heidi Cullen works at Climate Central). No posts in obscure languages. Form a team to address this so that it doesn't all fall on a single individual.	S. Sensoy	15 Oct 2013
2.	Support volunteer networks team with CAgM and CHy. Get our rattaché to bring it up in Korea with other Commissions.	T. Peterson, L. Song	20 Oct 2013
3.	Invite the Intergovernmental Board on Climate Services (GFCS' governing board) to nominate one person to join the TECO organizing science committee. Prepare a letter for the SG to send to IBCS.	A. Delju	31 Oct 2013
4.	Invite WCRP to nominate members to a joint scientific organizing committee to plan the technical conference.	R. Martinez	1 Nov 2013
5.	Lead ad hoc team to draft CCI Facebook Guidelines and submit to MG.	A. Martis	1 Dec 2013
6.	Work with OPACE I to draft language on climate normals for approval at CCI-16.	O. Baddour	31 Dec 2013
7.	Lead the Ad hoc team to plan the technical conference prior to CCI 16. The MG agreed with their initial plans, though suggested a few minor tweaks. The team is authorized to move this forward however they deem best, in consultation and collaboration with the Secretariat. No further approval by the MG needed. Identify peer-reviewed journal for a special issue for the	R. Martinez	31 December 2013 for initial preparation, to continue in due

CCI MG Report 2013

	workshop.		course
8.	Draft document to get CCI-16's approval and perhaps editing of climatologist competencies that the ET-SCBCS has developed.	S. Sensoy, A. Delju	31 Dec 2013
9.	Draft language for CCI-16 for encouraging countries to identify focal point for national climate monitoring products to interact with the team implementing national climate monitoring products. (in consultation with OPACE II co-chairs and John Kenedy, the team lead).	O. Baddour	31 Dec 2013
10.	Make http://wmo.asu.edu a DCPC site.	O. Baddour	1 Jan 2014
11.	Certificates of appreciation will be mailed to CCI team members who have contributed to CCI. Provide their list of people on their teams who should or should not receive certificates.	OPACE Co-Chairs	15 Jan 2014
12.	Prepare certificates for signature by the President in time for the PTC meeting the week of 20th January 2014.	R. Kolli	20 Jan 2014
13.	Contact Mary Power (WMO Secretariat) to seek GFCS funding for CDMS, with a particular focus on sustained funding over the course of a decade or more. Cost out estimated needs by seeking help with this task as appropriate	W. Wright	31 Jan 2014
14.	Contact CBS to inform them that CCI will give thumbs up or down on DCPC applications.	W. Wright	31 Jan 2014
15.	Recommend to MG on process for approval of changes to the Guide to Climatological Practices.	A. Delju	1 Mar 2014
16.	Interact with the concerned members of the CCI MG about relevant EC documents prior to their submission, to make sure the relevant OPACE co-chairs approve of statements which we expect EC to endorse and the OPACEs to accomplish. This will not involve sending the OPACE co-chairs or MG a bunch of mysterious documents to read through. But rather involve sending each pair of OPACE co-chairs their relevant documents with the actions we are expecting the co-chairs to do clearly highlighted so the OPACE co-chairs will not have to read through all the documents to find the key parts.	Secretariat	1 Mar 2014 (one month prior to the date the EC documents are due)
17.	Mail the certificates to the individuals with copy to the PR.	R. Kolli	1 Mar 2014
18.	CCI 16 awards to Pierre Bessemoulin (of France) and Randy Cerveny (USA). Pierre for general long-term contributions especially as President and creating the new version of the Guide to Climatological Practices. Randy for making CCI THE recognized authority on world, hemispheric and continental extreme weather	R. Kolli	2 Apr 2014

	records. Assess support for travel for these individuals which would be preferred by the MG though perhaps not fully required.		
19.	Enlist people to review (and edit if necessary) the sections of the Guide based on the time schedule Amir will provide them.	OPACE Co-Chairs	1 May 2014, if due in 2014
20.	Keep RA chairs of climate working groups informed of CCI activities relevant to their regions.	Secretariat	Ongoing
21.	Create stronger connections with the Secretariat supporting WCRP. Additionally pay attention for possible funding sources for joint WCRP CCI pilot projects.	R. Kolli	Ongoing

10. CLOSURE OF THE MEETING

The meeting closed at 16.00 on Friday, 4 October 2013.

ANNEX 1

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Annex 2

PROVISIONAL ANNOTATED AGENDA

1. OPENING OF THE MEETING

1.1 Welcome and introductions

The third meeting of the Management Group of the Commission for Climatology during its fifteenth intersessional period (CCI-XV) **will open at 0930 Hrs on Tuesday, the 1st October 2013** in the **Press Room (Ground Floor) of WMO Headquarters**, Geneva, Switzerland. For additional information about the venue please visit the WMO web site (<http://www.wmo.int>). The meeting will be chaired by Dr Thomas Peterson, President of CCI, who will give his opening remarks welcoming the members and making a special mention of the presence of the Chairs of WMO Regional Association Working Groups dealing with climate matters. There will be a *tour de table* of self-introductions of meeting participants.

1.2 Address by the Representative of the Secretary-General

The designated representative of the WMO Secretary-General will make a short opening speech to outline the expected outcomes of meeting.

2. ADOPTION OF THE AGENDA AND ORGANIZATION OF THE MEETING

2.1 Adoption of the Agenda

The provisional agenda will be presented to the meeting for approval with the understanding that it can be amended at any time in the course of the session.

2.2 Organization of the Meeting

The meeting will run from 0930 to 1730 Hrs on Tuesday (01 Oct), from 0900 to 1730 Hrs on Wednesday and Thursday (02-03 Oct) and from 0900 to 1600 Hrs on Friday (04 Oct). The entire meeting will be conducted in English, and there is no provision for interpretation.

3. PLANNING FOR THE SIXTEENTH SESSION OF CCL (PART I)

The Sixteenth Session of CCI (CCI-16) is scheduled to be held from 3 to 8 July 2014 at Heidelberg, Germany. CCI-16 will be preceded by a Technical Conference from 30 June to 2 July 2014 including a day's joint session with the World Climate Research Programme (WCRP), at the same venue. In order for the session to be held at this time, the President of CCI promised the Conferences Department of WMO Secretariat that CCI would have all the papers that need to be translated in months ahead of time – which basically means by the end of December. In order to do that we need to agree on the structure we will recommend for CCI, draw up a list of key documents required for CCI-16. We also need to agree on the inputs required from MG members and OPACE teams which need to be consolidated by the Secretariat to prepare the draft documents.

- Theme and concept for the Technical Conference, and its preliminary agenda (*Kumar*)
- Planning of joint session with WCRP (*Rodney*)

4. CCL WORK PROGRAMME: CURRENT STATUS AND FUTURE PLANS

The first step of planning for CCI-16 is reviewing what we have done, what we plan to do before July 2014, what worked out well (so we can repeat similar activities), and what did not work out so well (so we don't repeat mistakes).

4.1 OPACE I - Climate Data Management

(presented by William and Lianchun)

- Expert Team on Climate Database Management Systems
- Task Team on Data Rescue
- Other issues related to Data Management (Climate Normals, World Weather Records, High Quality Data Management Framework for Climate, WMO Information System Data Collection or Production Centres, etc.)
- Joint Rapporteurs on Voluntary Observing Networks
- Communications Advisor
- Review of action items from the 2011 CCI MG meeting
- What worked best
- What worked worst
- Review of OPACE domain: should it be more narrow, wider, altered or remain as it is?

4.2 OPACE II – Climate Monitoring and Assessment

(presented by Manola and Fatima)

- Joint CCI/Clivar/JCOMM Expert Team on Climate Change Detection and Indices
- Rapporteurs on World Records of Weather and Climate Extremes
- Task team on National Climate Monitoring Products
- Task Team on Definitions of Extreme Weather and Climate Events
- Communications Advisor
- Review of action items from the 2011 CCI MG meeting
- What worked best
- What worked worst
- Review of OPACE domain: should it be more narrow, wider, altered or remain as it is?

4.3 OPACE III - Climate Products and Services and their Delivery Mechanisms

(presented by Jean-Pierre with inputs from Takano through Akihiko Shimpo)

- CCI/CBS Expert Team on Regional Climate Centres
- Expert Team on Climate Services Information System
- CBS/CCI Expert Team on Operational Prediction on Sub-seasonal to Longer Scales
- Task Team on Global Seasonal Climate Update
- Communications Advisor
- Review of action items from the 2011 CCI MG meeting
- What worked best

- What worked worst
- Review of OPACE domain: should it be more narrow, wider, altered or remain as it is?

4.4 OPACE IV - Climate Information for Adaptation and Risk Management

(presented by Rodney and Albert)

- Expert Team on Climate Risk and Sector-Specific Climate Indices
- Task Team on User Participation in Climate Outlook Forums
- Task Team on User Interface
- Task Team on Climate Risk Management
- Joint (CCI CAgM CHy) Expert Group on Climate, Food and Water
- Communications Advisor
- Review of action items from the 2011 CCI MG meeting
- What worked best
- What worked worst
- Review of OPACE domain: should it be more narrow, wider, altered or remain as it is?

4.5 Other Focus Groups (possibly to be consolidated as OPACE V in CCI-16)

(presented by Serhat and Tom)

- Task Team on Climatological Normals
- Expert Team on Strategy for Capacity Building for Climate Services (*Serhat*)
- Rapporteurs to review the Guide for Climatological Practices (*Amir*)
- Expert Group on Quality Management for Climatology (*Serhat*)
- Rapporteurs for Volunteer Observing Networks (*Tom*)
- CCI Representatives in other WMO bodies/programmes (e.g., CCI Focal Point on Disaster Risk Reduction)
- Pan-CCI Communications Advisor (*Tom*)
- CCI in social media including Facebook, etc. (*Tom, Serhat*)
- Review of action items from the 2011 CCI MG meeting
- What worked best
- What worked worst
- Review of potential OPACE domain: Should we have a new OPACE to cover this domain? List of pros and cons and additional options. (*Tom*)

5. PLANNING FOR THE SIXTEENTH SESSION OF CCL (PART II)

What is the organizational structure we recommend for CCI-16 going to be? The Management Group will be invited to consider an initial list of papers that will be needed, and identify who will write each one. Further, the Management Group may also review and consider possible improvements to the current process of recruiting volunteer-experts for CCI work, and the formation of Expert/Task Teams, to learn from the experience, and to ensure a wider and more efficient participation of volunteers. In particular, the Management Group may discuss issues related to lack of action or response of some members of the teams, and may propose some procedures for expeditious replacement.

6. ADDITIONAL ASPECTS TO BE CONSIDERED FOR CCL-16 PLANNING

6.1 REPORT FROM THE PRESIDENT OF CCI

The meeting will consider a brief progress report from the President of the Commission on the activities undertaken since the last meeting of the Management Group in October 2011, including his participation in WMO constituent body sessions, meetings of the Presidents of Technical Commission (PTC) and other events.

6.2 BRIEF APPRAISAL OF CCL RELEVANT ASPECTS IN WMO CONSTITUENT BODY SESSIONS SINCE THE LAST MEETING

The meeting will be briefed by the Secretariat on CCI relevant aspects considered by the various WMO Constituent Body sessions since October 2011 (Congress, Executive Council, etc.). The meeting will be invited to consider the implications of the applicable decisions to the work of the Commission.

6.3 IMPLEMENTATION OF THE GLOBAL FRAMEWORK FOR CLIMATE SERVICES: CCL PERSPECTIVES

The meeting will be briefed on the further developments in the implementation of the Global Framework for Climate Services (GFCS), including the relevant outcomes of the Extra-ordinary Session of the World Meteorological Congress (October 2012) and the First Session of the Intergovernmental Board on Climate Services (IBCS-1, July 2013). The meeting will be briefed on the follow-up activities, particularly those concerning the finalized implementation plan of GFCS. The Group will be invited to elaborate the implications of these developments and identify a core set of activities and responsibilities for the Commission. The Group may consider preparing a clear statement on the current and future contributions from CCI to the GFCS.

6.4 REGIONAL CLIMATE ACTIVITIES

The meeting will be briefed by the Chairs of the six Regional Association (RA) Working Groups dealing with climate related matters, and their perspectives on how CCI can be more effectively engaged with the regional initiatives, and contribute to the national level climate activities. The Group will be briefed by the RA Working Group Chairs on the regional activities relevant to the ongoing activities of all the OPACEs. The Group will review the progress in the implementation of RCCs and RCOFs, and the relevant roles of the Regional Working Groups. The Group will be invited to consider potential mechanisms to sustain CCI linkages with the Regional Associations.

6.5 CCL LINKAGES WITH CLIMATE RESEARCH COMMUNITY (Rodney)

The meeting will be briefed by Dr Rodney Martinez, who has been recently nominated to the Joint Scientific Committee (JSC) of the WCRP, on the common areas of work between CCI and WCRP, including proposals on possible ways to improve mutual interactions. The meeting will consider the ongoing projects and activities of the WCRP, and explore effective collaborative mechanisms to pursue research inputs to improve operational climate activities.

7. PLANNING FOR THE SIXTEENTH SESSION OF CCL (PART III)

Final planning and coordination discussion to make sure we incorporated all the insights from this meeting, especially all the insights from the regional representatives who participated.

- CCI-16 agenda and documentation requirements, including the reports and deliverables of OPACES and other entities of the Commission
- Agree on assignment of roles and responsibilities to support CCI-16 preparations, among MG, OPACE teams and the Secretariat

8. ANY OTHER BUSINESS

The meeting will discuss other items of interest not covered by the above agenda items. In particular, the meeting may consider the proposal to present certificates of appreciation to the members of expert/task teams and other groups of CCI during its fifteenth intersessional period. The meeting will also consider the proposal to recognize stations providing long and sustained observations of climate by way of their designation as “Centennial Climate Stations”.

9. REVIEW OF ACTION ITEMS AND ADOPTION OF THE MEETING REPORT

The meeting will review all action items agreed during the meeting and will adopt the draft report of the meeting prepared by the Secretariat. In particular, the Commission will review the arrangements for the updating of the Guide to Climatological Practices (WMO No. 100), and also the ongoing EC Task Team consultations on the international data exchange in support of climate services.

10. CLOSURE OF THE MEETING

The meeting will close no later than 16:00 Hrs on Friday, the 4th October 2013.

Annex 3

**Recommendations of the Ad-hoc Group
on Planning for a Technical Conference preceding CCI-16**

1. Proposed Science Committee: Dr. Rodney Martinez, Dr Manola Brunet, Ms Barbara Tapia, Mr William Wright, Mr Jean-Pierre Ceron, and Dr G. Srinivasan.
2. Science Committee to also articulate some key questions for the Panel Discussion sessions.
3. Format: Sessions to be mainly composed of invited talks, but an open call for contributions may be issued for poster presentations, with the possibility of “short-oral” (five-minute “Quick-fire” presentations). Contributed presentations may be selected on the basis of abstracts received in response to the open call.
 - a. Publicity through usual channels/e-mail lists/web-sites/other operational communities
 - b. Invited speakers – funding support
4. Peer-reviewed special issues in a scientific journal – more open/acceptable to applications and operational issues
5. **Day 1: 30 June 2014** – *(CLIPS evolution, achievements and transition to GFCS to be demonstrated – Cycle from CLIPS to GFCS)*
 - Session 3: Climate Data and Monitoring systems (DARE,.., other pertinent topics)**
- Day 2: 1 July 2014** *(Climate Services Toolkit, OPACEs achievements more show cases previously selected from the call for papers. Regional and thematic balance will be considered)*
 - Session 4: Climate Services Toolkit
 - Session 5: Global Climate Information (Including operational prediction aspects)
 - Session 6: Panel Discussion on Enriching Climate information at RCOFs and NCOFs
 - Session 7: Building user interface for effective use of climate information**
 - Session 8: Building user interface for effective use of climate information**
Creating Information Systems for Climate Services
- Day 3: 2nd July 2014** *(Joint CCI/WCRP Session: WCRP Grand Challenges and the Strategic views of CCI for the near future could be considered)*
 - Session 9: Research Contributions to Operational Climate Information & Services
 - Session 10: ENSO, El Niño and century scale climate prediction/projections risk management**
 - Session 11: ENSO, El Niño and century scale climate prediction/projections risk management
 - Session 12: Panel Discussion on Improving COFs with better science and capacities – Regional Aspects and Stakeholder participation
 - Session 13: Conclusions and Recommendations

ANNEX 4

REPORT OF OPACE-I: Climate Data Management

William Wright and Song Lianchun

1. Expert Team on Climate Data Management Systems (ET-CDMS)

ET-CDMS was set up to further international collaboration and standards on Climate Database Management Systems (CDMS), with the driver being that if NMHS cannot adequately store and manage their climate data, they will be unable to efficiently provide climate services to their people, nor contribute to international climate monitoring, research etc. The team met twice during the Intersessional period (Dr Wright attended the second meeting, in April 2012), and in addition a number of Webex teleconferences were held, and the team made good progress against its Terms of Reference (ToR). The highlights are summarised in the following four paragraphs.

1.1 Main achievements

- a) A survey was conducted of all member countries, to gather information on which NMHS had a CDMS capacity, which systems, whether the CDMS were being actively utilised, and if not, why not. Other information sought included the capacity to fulfil WMO standards such as CLIMAT message generation. The survey aims to inform future strategies for improving the ability of NMHS to archive, manage and access their climate data. It took a long time to get an adequate number of responses to the survey, but eventually a response rate of **72%** was achieved, including 68% of developing countries. Results were analysed by co-chair Denis Stuber. For various reasons we decided against publishing the full survey on the Web, but the Secretariat prepared a short summary of the key findings, which is available on the Website at http://www.wmo.int/pages/prog/wcp/wcdmp/CDM_3.php
- b) A CDMS Specifications document was also drafted, and is currently undergoing review. It is a comprehensive document that assesses the required functionality of a CDMS, classified according to whether the feature is Mandatory (or Required), Recommended, or Optional. Required functionality, for instance, would be things like a facility for key entry, some form of quality control, proper governance processes (such as controlled access), simple report- writing functionality, and message generation (e.g., CLIMAT). The target audience for the document is NMHS who may wish to choose a CDMS, and also developers. The next step is to assess the extent to which existing CDMS meet the functionality standards. All ET members contributed something to the document, and two of the team members, Bruce Bannerman and Denis Stuber, were brought to Geneva for a fortnight where they did a great job in merging the various contributions and completing the text.

1.2 Progress in other areas

- a) Progress was made towards a core metadata profile for climate, where “metadata” is defined as both the familiar “stations” metadata describing how observations were made, and so-called “discoverability” (or WIS) metadata which, like a library

catalogue, enables potential users of climate datasets to find and access climate data- and product sets. It is called WIS metadata because the discoverability and exchange of information about products is one of the core goals of WIS. The team based its approach around the existing WMO No 9, Volume A, and how it could be extended to include extra information such as station moves. Collaboration is being sought with WIGOS' TT-WMD (for WIGOS MetaData);

- b) The Team looked at Data Interoperability issues based on the use of Open Spatial Standards. The new CDMS Specifications document includes this functionality as a recommended component. The IPET-MDRD (successor to the IPET-MDI) has developed plans to develop a combined climate observations and stations metadata model as its first extended logical data model and application schema;
- c) We produced a guidance document on best-practice in capacity-building in CDMS. This was a slight re-interpretation of the original ToR (which was to review past experience in CDMS deployment), but should make a useful future contribution to capacity-building in climate data management;
- d) There has been several capacity building workshops with Data Management focus and ET involvement. For example, a training program in East Africa featuring Steve Palmer; Denis Stuber leading Meteo France courses on Climatology as a foundation for climate services.

1.3 *Things that worked well*

- a) The success of the dedicated writing team in Geneva. The specifications document would almost certainly not have achieved the quality and completeness it has without this arrangement. It has provided a model that we are planning to apply to other activities, e.g., progressing planning for an International I-DARE;
- b) Much of the functionality and practices described in the document provides a basis for the emerging High Quality –Global Data Management Framework for Climate (HQ-GDMFC);
- c) The inclusion of capability to provide fundamental report types such as CLIMAT, World Weather Records as Mandatory CDMS features should in future address many of the capacity problems historically experienced in developing and least-developed countries (D & LDC) in particular;
- d) For a time we held two-monthly Webex teleconferences, and thanks go to Omar, Hama and more recently Peer for arranging and running these. These proved very effective at keeping the group focussed and on track.

1.4 *Things that didn't work well*

- a) The CDMS survey took something like three years to achieve a sufficient quorum of responses. By that time, a lot of the information received by earlier respondents was out of date. A more efficient way of gathering the information, and for updating it, is needed;

- b) The GFCS IP reflected the need for Data Rescue as an integral part of successfully executing the GFCS, however this was not the case with CDMS. We believe this to be something of an omission from the IP, as the ability of NMHS to store climate data is a fundamental part of their ability to deliver a range of services. The risk is that, if support for data management is not explicitly identified as a need in the GFCS IP, it will not be resourced, which experience shows in particularly a problem in D & LDC. Therefore we fed some comments to this effect into the IP in the post-July 2013 reviewing period.

2. Task Team on Data Rescue (TT-DARE)

The main purpose of Data Rescue is to secure from loss or damage historical records and data, and digitise them so that they become readily available to the NMHS for climate service delivery, and for participation in international climate monitoring, analysis and research. The Task Team undertook a number of specified tasks, completing or progressing most, while also undertaking broader engagement on data rescue activities in different Regions, and directly linking its activities with OPACE 2's Expert Team on Climate Change Detection Indices (ET-CCDI). Most Task Team members participated in some capacity, although during the Intersessional period two members had to drop out and be replaced.

2.1 Main achievements

- a) Significant progress was made in establishing frameworks for rescuing data in various Regions, among them RA II, IV and VI. A highlight was the establishment of a West African Climate Assessment and Data Rescue (WACA-DARE) Initiative in Africa, and a road map for its implementation, following a meeting in Ghana in November 2012. This structure is being underpinned by ACMAD, and is already addressing an urgent need to accelerate the recovery and digitisation of African microfiche records that were at high risk of being lost. It may also be noted that in the Pacific important digitisation projects were set up in nine Pacific countries under funding by the Australian Government (one of the task team members, Rod Hutchinson, was instrumental in this);
- b) The close collaboration between the TT-DARE and ET-CCDI established a nice model for directly linking data rescue activities with important climate service delivery, in this case of the development of climate change indices. In Ghana, it was recognised that national Governments were far more likely to invest in, and support, in-country data rescue activities if the benefits of the data (e.g., improved analyses and predictions of climate impacts on health, disaster management etc) were demonstrated;
- c) The Task Team collaborated closely with other data rescue-oriented groups, particularly ACRE and IEDRO, most notably at the Workshop on Climate Data Management in Nanjing. This has helped to build a shared sense of purpose among the various DARE initiatives, with broad agreement on the basics of a Data Rescue strategy;

- d) A plan for the establishment of an International Data Rescue Portal (I-DARE) will be developed before the end of the current Intersessional Period. Preliminary discussions among OPACE- and TT-co-chairs about a possible model have been conducted, with general agreement that the central I-DARE portal should link to existing data rescue sites, and contain guidance on best-practice for Data Rescue. It is likely some investment would be required to set up, populate, and maintain the portal.

2.2 *Things that worked well*

- a) The rising visibility of the importance of Data Rescue, through WACA-DARE, through the various workshops within different WMO Regions linking data rescue activities with generating climate change detection indices, and as noted above through the improved collaboration between WMO and other Data Rescue initiatives;
- b) The increasing synergy between CDMS and DARE, with the former providing the means of securing in accessible forms the data recovered from Data Rescue activities and digitisation projects;
- c) The GFCS IP reflected well the priority for Data Rescue for supporting climate services, and reinforcing the Observation and Monitoring Pillar of the GFCS.

2.3 *Things that didn't work well:*

- a) Initial ToR were not specific and tasks were not suited to a defined start-and-finish Task Team (it should have been designated an Expert Team). This was an "In retrospect" one, though we probably could have formally revisited the ToR when it became apparent that they were no longer the most appropriate guide. The fact that both OPACE co-chairs had to miss the first meeting may have contributed to a slower start than needed to be the case. This raises a more general issue about attendance of OPACE chairs at meetings;
- b) The 2012 meeting of the TT-DARE in Ghana, while very successful overall, suffered from the fact that most team members were unavailable. One of the major problems was finding a suitable venue (several TT members were refused permission by their Governments to travel to countries like Niger, where the security risk was high), compounded by the difficulty some task team members faced in achieving visas in a timely fashion. So only 3-4 of the team made it to Ghana.

3. ***Participation in cross program groups on observations***

One of the co-chairs (William Wright) represented CCI on three cross-program groups in the general area of observations systems and planning during the Intersessional Period. The three groups were, GCOS/AOPC, ICG WIGOS and ET-OSDE (formerly ET-EGOS). A brief summary of each of these follows, describing what was required, the benefit of participation and what the outcomes were. Others from the broader pool of experts also undertook representative activities. For instance, Bruce Bannerman (ET-CDMS) was elected as the CCI representative on the IPET-MDRD (formally IPET-MDI).

A general observation is that all involvements were productive, but in future there is a need to spread these activities across a broader group of experts, especially as mutual benefits could additionally be obtained by engaging with, e.g., JCOMM.

3.1 GCOS/AOPC

The CCI representative traditionally provides a report on relevant CCI activities and issues that are relevant to GCOS. As such, CCI both benefits from and contributes to a very useful information exchange. Outcomes relevant to CCI included an increased visibility of, and endorsement of, certain OPACE 1 activities, e.g.:

- CDMS
- Data Rescue
- Climate Normals
- Aspects of climate observation needs, guidelines, etc such as the guidelines on AWS for climate purposes
- Ideas on how OPACE 1 activities can address GCOS needs, e.g automating CLIMAT message generation in CDMS, thereby improving response rates.

3.2 ICG-WIGOS

(WIGOS = WMO Integrated Global Observing System, consisting of co-sponsored observing systems)

As required, a report on CCI activity relevant to key activity areas of the WIGOS IP is provided to the meeting. The meeting offers a good opportunity to provide input from a CCI viewpoint into WIGOS IP.

Outcomes relevant to CCI:

- Better coordination of activities, e.g., SPICE (solid precipitation measurement); metadata activities (ET-CDMS and TT-WMD);
- Visibility, improved understanding, and collaborative agreements around Centennial stations, HQ-GDMFC

3.3 IPET-OSDE (formerly ET-EGOS)

(OSDE = Observing system Design and Evolution)

A report on relevant CCI activities and priorities is provided. In addition a Statement of Guidance on behalf of CCI (collaborating with GCOS) was prepared in 2011. The benefit to CCI is the opportunity to provide an increased visibility and understanding of broad climate data needs to Observation planners.

Outcomes & Recommendations:

- a) Statement of Guidance (SoG) was a solid effort. It was commenced by the former OPAG 1 chair Mr Raino Heino, and updated by Dr Wright working in collaboration with OPACE 4. It may be viewed as a major source of CCI's technical input into the design and evolution of the WIGOS. This was tabled at the 2011 meeting of ET-EGOS;

- b) While GCOS participation in the past identified most climate observation needs, there were some important needs underpinning wider climate service provision that had not been adequately conveyed previously;
- c) IPET-OSDE wants a more quantitative statement of requirements – an issue because it would be a large job to marshal and balance the needs across all climate services;
- d) Better alignment needed in SoG with GFCS, including seasonal prediction;
- e) Workload limitations meant that William Wright handed over his membership to a Fijian woman (Mrs Varanisese Vuniyayawa) - which should have the beneficial outcome of allowing a small island developing state perspective into Observational systems planning.

4. Other OPACE-I related activities

4.1 Climate Normals

- i. In 2010 a small task team led by Dr Wright was established to progress formulation of a much needed change to the model of calculating the Standard Climate Normals. This was in response to the realisation that, in a changing climate, a Normal than can be up to 29 years out of date provided inadequate guidance for most climate functions;
- ii. Much work and consultation was required in formulating a new model. The consultation included circulating a proposal for comment, including to other Technical commissions and GCOS; e-mail exchanges; and a two-hour discussion session as a side-meeting in Nanjing. There were certainly divergent views on the subject, but we eventually arrived at a model that most attendees were happy with. The model, endorsed at EC – 65, comprised:
 - A varying 30 year period updated every 10 years (suitable for most climate services); current 1981-2010;
 - A fixed reference period (1961-90) for long-term climate variability and change assessment. This period to be adopted as a stable WMO reference period, until such time as there is a compelling scientific case for changing it.
- iii. The next steps are to have the new Standard and the amendment of WMO Technical Regulations to be approved by CG-XVI in 2015. A communication strategy will be needed.

4.2 International workshop on climate data and HQ-GDMFC.

The China Meteorological Administration, in collaboration with WMO Commission for Climatology hosted a workshop (4-8 March 2013) in Nanjing on climate data requirements. More detail on this later, but one of the most significant outcome relevant to the Data Management part of the workshop was to launch an initiative to develop a high quality global Data Management Framework for Climate, HQ-GDMFC. The aim of this initiative is to establish an improved regulatory framework for best practice climate data management

within WMO Member countries, based on existing infrastructure, using commonly agreed standards, and developing or updating guidance material and/or new regulations as needed. It was recognised that close collaboration would be required with CBS (WIGOS) and WIS. The proposal was raised at the ICG-WIGOS meeting (also March 2013), who endorsed the idea of establishing a CCI-led Inter-Program Expert Team on Climate Data Management Framework (IPET-CDMF) involving CCI, CBS, WCRP and potentially other relevant bodies to progress the initiative. We believe this should be an important focus during the next Intersessional Period. The next steps would appear to be to scope the requirements of what such a Framework should include, define the Terms of Reference, and establish the IPET-CDMF.

4.3 *Observation standards*

There were a number of disparate activities under this general heading, including: working on Guidelines documents on AWS and QA/QC, the SoG, contributions to various Implementation Plans (EGOS IP, WIGOS IP, GCOS IP), the various representative activities described above, and involvement in initiatives such as ISTI, . We did not establish a Task Team or Expert Team for these activities which in retrospect could have better enhanced engagement with at least the first two of these activities.

4.4 *Communication Advisor*

Thus far in this Intersessional Period OPACE 1 has not made use of its Communications Advisor; however in this document at least one clear area has been identified (Climate Normals) where work should proceed. Some of this should be possible within the current Intersessional Period.

4.5 *Miscellaneous*

(i) World Weather Records

The WWR are an important source of information about historical climate variability, but the preparation of these has become patchy. EC-65 urged Members to work with CCI to update the WWRs for the 10-year period 2001-10, and also the preceding 10 year period 1991-2000. Recognising that more frequent updates are required, WMO has requested Members to update the WWRs annually, commencing in 2011. In order to address the problem of Members having difficulty calculating the WWRs as requested, ET-CDMS has specified that the means to calculate these automatically from data held in CDMS should be a mandatory feature of CDMS.

(ii) CCI endorsement of WIS Centres

As the relevant Technical commission, CCI has been asked to contribute to the endorsement of candidate Members, or groups, as WIS Centres pertinent to Climate. While CBS reviews compliance with WIS functional requirements (i.e. discovery metadata, communication of data and products etc), CCI's role will be to ensure compatibility with relevant programme-specific technical requirements. In so doing, CCI will contribute to improving the visibility, availability, timeliness, access and quality of climate information worldwide at national, regional and global levels. At the same time it is acknowledged that there is as yet no strictly defined set of criteria which would allow CCI to accept or reject climate-related WIS Centre

applications. Accordingly, it is suggested to use one or more of the existing or evolving CCI mechanisms such as those related to the High Quality Global Data Management Framework for Climate (HQ-GDMFC) and the Climate Services Information System (CSIS) to develop a pragmatic list of criteria for CCI endorsement of DCPCs and NCs pertinent to climate data, products and services. Until such an objective assessment process is in place, ideally by Congress 17, CCI might consider a tacit endorsement of existing well-defined entities, such as WMO RCCs and climate centres that are clearly associated with the NMHS and endorsed by the PR. Other entities wishing CCI endorsement as climate-related WIS Centres should address their request to the President of CCI as an interim solution. Centres being primarily associated with climate research should be considered by WCRP rather than CCI. To this end, it is recommended that CCI liaise with WCRP in the development of endorsement criteria.

(iii) Joint Rapporteurs on Voluntary Observing Networks

P/CCI initiated an email exchange in January 2013 on this issue with the Vice-President, CCI-OPACE-1 co-chairs and the secretariat.

He raised the increasing need for expanding country rain gauge networks as cost effective means for Members to create the data they need for climate monitoring, agricultural planning and research, disaster risk reduction. There is an emerging request for CCI to have a role in encouraging and assisting the creation and maintenance of these networks

He proposed to create a joint position of Rapporteur for Volunteer observation Networks, and suggested two names Nolan Doesken and Henry Reges from Colorado State University, USA who authored a paper on "creating volunteer observing networks, WMO Bulletin Vol. 60, 2011

http://www.wmo.int/pages/publications/bulletin_en/archive/60_1_en/60_1_reges_en.html

Nolan Doesken and Henry Reges have therefore been nominated as joint rapporteurs for Volunteer Observing Networks as part of a separate CCI focus group (not part of an OPACE structure) but having a linkage with OPACE-1. The Rapporteurs' ToR includes:

- Provide guidance to WMO Members on development and deployment of volunteer observing networks;
- Encourage WMO Members to establish cost effective volunteer observing networks;
- Assess the potential usefulness of a WMO Guidance document on volunteer observing networks, and if appropriate, lead the development of such a document;
- Report on activities to both the Chair of the CCI Expert Group on Strategy for Capacity Building for Climate Services and the Co-Chairs of Open Panel of CCI Experts (OPACE I) on Climate Data Management.

(iv) Centennial Climate stations

Consideration was given to a proposal to recognise Centennial Climate Stations. Discussion of this matter at the recent ICG-WIGOS meeting resulted in a recommendation that CCI should lead discussions with GCOS and CIMO about a suitable process and criteria for site certification. A separate document (Doc 8.2) provides more details on ongoing activity on this matter.

5. Review of action items from 2011 CCI MG meeting

This report will not address each item, which may be assumed to have been completed unless otherwise stated. Just a few comments on specific items:

5.1 CCI representation on ET-EGOS (now IPET-OSDE)

As in report, representation has passed to Ms Varanise Vuniyayawa (Fiji). Jay Lawrimore represented CCI at the most recent meeting, but it is important that the needs for non-GCOS observations continue to be conveyed, especially given the tendency worldwide to automate networks.

5.2 Regulatory information for Climate.

We provided some information on regulatory/guidance material at the most recent ICG-WIGOS. There is a need to broaden this guidance, and we see the HQ-GDMFC as the chief means of doing this. The WIGOS TT-WIP was disbanded at the most recent meeting of ICG-WIGOS before Dr Wright (nominated CCI representative) was asked to do anything or attend any meetings.

5.3 ET-CDMS and TT-DARE related action-items

They were covered in the specific reports earlier in this document. The Gap-Opportunity analysis will draw on the contents of the SoG tendered to ET-EGOS in 2011, and a data exchange component being addressed by the ET-CDMS.

5.4 UK workshop on data sets and ISTI

There seems to have been little progress recently in advancing ISTI.

5.5 Strategic documents contributing to ICG-WIGOS and GFCS.

Dr Wright provided input into both the WIGOS and GFCS Implementation Plans. More detailed strategies and documents would follow from proposed activities under the HQ-GDMFC and EG-QMC

5.6 International workshop on climate data requirements

This workshop was co-hosted by the China Meteorological Administration and WMO, and held in Nanjing, China, 4-8 March 2013. The workshop involved some 80 participants from 28 different countries, and consisted of two parts: (1) a series of lectures and presentation on climate data management-related topics; and (2) a hands-on workshop component involving member countries from RA II processing their countries' data using RClindex software. There were also a number of side-meetings. The outcomes included an agreement to establish a HQ-GDMFC, and this was endorsed by EC-65.

5.7 Establishment of a HQ-GDMFC.

As previous point, a decision has been ratified by EC and ICG-WIGOS to establish an IPET-CDMF, and it is likely Drs Coughlan and Bessemoulin would be part of such a Team.

5.8 *OPACE-I co-chairs to delegate some of their work to other Experts*

This is discussed more fully in 6.1 below. An example from this period was to replace Dr Wright on the ET-EGOS with Ms Vuniyayawa.

6. Further comments and suggestions

The following comments relate to the management aspects of OPACE membership, meetings, workplans, resource mobilisation, etc.

6.1 *Identifying experts*

One problem we encountered during the Intersessional Period, which prevented some of the work that needs doing on climate observing standards being done, was insufficient information on recommended experts. The CVs were too short, and not aligned with key OPACE deliverables. Most of the members of the ET-CDMS and TT-DARE were selected from people personally known to the Management Group or secretariat. For a time we considered establishing a Task Team on observational standards, but it was not clear who should be on it. It is recommended that the next call for volunteers asks potential nominees to report on their experience against the main deliverables for each area of work during the next Intersessional Period. We submit that this will provide a more pertinent guide to people's skills, while in principle still allowing for the balance of Regions, gender etc to be met.

Decision: does the MG agree with this approach?

6.2 *RA V representation on Expert Teams*

Is it a problem elsewhere? Better representation is needed from D & LDCs in at least some Regions. As an example, for reasons unknown there were no nominees from Pacific Island countries and few from SE Asia, hence nearly all RA V reps came from Australia. Yet experience suggests there are a number of representatives in Pacific Island Countries who could probably do the job well. It would be helpful to understand better what the problem is here.

6.3 *Meetings*

Our experience suggests that, where possible, each Expert Team should have at least two meetings, one early in the period, interspersed with focussed Webex teleconferences to keep people on track. It is recommended that at least one co-Chair attend at least the first meeting of each Expert Team, to ensure the expectations for the Team are clearly understood by Team members.

6.4 *Timing of meetings*

Getting to meetings was sometimes problematic for the Co-chairs of OPACE 1, as their host countries impose limitations on travel. This points to a need to try to schedule -where

possible- meetings e.g., Expert Teams with other representative meetings. This worked well at times when, for instance, the ET-CDMS meeting immediately preceded the GCOS AOPC meeting in April-May 2012.

6.5 Work plans more structured and accountable

Work plans should be structured and accountable, but flexible where developments suggest benefit would be gained by deviating from the original Terms of Reference (ToR). As an example, the collaboration between OPACE 2 and TT-DARE, which delivered good results, was not well reflected in the original ToR. One thing we would do differently in future is to modify the ToR as needed.

6.6 Resource mobilisation

The sustainability of resourcing for Data Rescue and CDMS is vital to ensure that climate observations are available from the past and in the future, but it is by no means clear how this will be done. An integrated “sustainability strategy” aimed at ensuring ongoing support for these activities is needed which takes into account both sustainable funding and support from Regional structures such as RCCs, groups such as ACMAD etc. It is recommended that CCI assesses whether the funding to be available from GFCS is sufficient for this purpose, and if not, to seek the support of relevant interested partners (such as GCOS) in pursuing a strategy for sustainability.

6.7 Proposal on an OPACE 5

The President CCI requested comment on whether an OPACE 5 on Education should be established. A preliminary response is that it is important that stronger links be established between the CCI and existing programs within WMO such as the Education and training program and the Capacity Building unit, but we are not sure what the best mechanism for this is.

ANNEX 5

OPACE-II: Climate Monitoring and Assessment

Manola Brunet and Fatima Driouech

1. Joint CCI-CLIVAR-JCOMM Expert Team on Climate Change Detection and Indices

The joint CCI/CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ETCCDI) is composed of: Albert Klein-Tank (Co-Lead) - The Netherlands; Xuebin Zhang (Co-Lead) – Canada, Blair Trewin – Australia; Matilde Rusticucci - Argentina; Zhai PanMao – China. The main purpose of ETCCDI is to provide international coordination and help organize collaboration on climate change detection and indices. One main activity area of ETCCDI is the collaboration in, or organization of, regional workshops providing training on the computation and analysis of climate indices. ETCCDI ToR can be found at <http://www.wmo.int/pages/prog/wcp/ccl/opace/opace2/ETCCDI.php>.

A teleconference held on 19/07/2010 provided an opportunity for a first information exchange between the co-chairs of OPACE II and the co-leads of the ETCCDI. OPACE co-chairs provided background information on the CCI Management Group and on the ToR of the ETCCDI. The work plan was established during the 4th Session of the ETCCDI held in Victoria, Canada on 23-25 February 2011 (report cf. <http://eprints.soton.ac.uk/193779/>). The work plan builds on earlier work plans of the team and is essentially summarized by a list of action items.

1.1 Main achievements

- a) The ET has been working with the support of the ClimDEX project to produce global gridded indices of temperature and precipitation extremes. Several global datasets of these indices (including HadEX2; an updated HadEX indices product) have been produced. The analyses based on these datasets improved understanding of past changes in climate extremes, contributing significantly to the AR5 assessment. The data products also form basic datasets for climate model validation and detection and attribution work;
- b) The ET organized the computation of indices based on CMIP5 model simulations. Model indices data are disseminated through a Website hosted at the Canadian Center for Climate Modeling and Analysis (<http://www.cccma.ec.gc.ca/data/climdex/index.shtml>) for the climate research community. An analysis of these model data has been published in the Journal of Geophysics Research and has been highlighted as AGU Research Spotlight. This activity contributes significantly to the IPCC AR5 assessment;
- c) A principal activity of the ET is maintaining a sustained program of regional workshops that drive capacity development in less developed regions where both data availability is scarce and/or data accessibility is difficult, helping regional climate

service. ETCCDI organized or was involved in the organization of the following capacity building workshops:

- The Regional Training Workshop on Statistical Analysis of Climate Extremes for South America (Guayaquil, Ecuador, 2011; cf. Annex 1),
- The Caribbean workshop (Mona, Jamaica, May 2012),
- Pacific Island Countries workshop (New Caledonia, May 2012),
- WMO Region-II of Asia workshop (Nanjing, China, March 2013).
- Casablanca workshop for North African and Arabian countries (May, 2011) (cf. chapter 5 below),

1.2 *Progress in other areas*

- a) The ETCCDI links and collaboration with other CCI expert teams have been facilitated by information exchanges with: (i) TT-NCMP for software calculation and indices definitions, (ii) TT-DEWCE thanks to the common membership in both teams of Blair Trewin and (iii) the OPACE-IV Expert Team on Climate Risk and Sector Specific Climate Indices to enhance knowledge exchange with societal actors (Lisa Alexander is an ETCCDI member and also co-chair of the OPACE-IV Expert Team on Climate Risk and Sector Specific Climate Indices, which ensured maximum exchange between the groups).
- b) ETCCDI is also actively involved in the organization of the WCRP Summer School on Climate Extremes. In fact, WCRP is preparing a jointly sponsored Summer School on Extreme Event Attribution and Prediction in 2014 in collaboration with the ICTP. The Summer School will train the participants on indices, extreme value theory, and event attribution, in each case with the objective of gaining understanding, and tools, for the analysis of the past, and the evolution of the future (in terms of both prediction and projection).
- c) Several members of the ETCCDI have been directly involved in the IPCC AR5 work.

1.3 *Things that worked well*

The ETCCDI links and collaboration with other CCI expert teams have been increasing.

1.4 *Things that didn't work well*

No particular issue to be reported here.

2. *Task Team on National Climate Monitoring Products*

The Task Team on National Climate Monitoring Products (TT-NCMP) is composed of: John Kennedy (Lead) -UK, Ladislaus Chang'a (co-lead) -Tanzania, Deke Arndt -USA, Prithiviraj Booneedy -Mauritius, Olga Bulygina –Russian Federation, Mesut Demircan -Turkey, Mohammad Semawi –Jordan and Andrew Watkins -Australia. The main purpose of the TT-NCMP is to propose a set of national monitoring products to be recommended to WMO to be produced by its Members, and provide guidance on its computation and related software as well as its dissemination. The team's TOR can be found at <http://www.wmo.int/pages/prog/wcp/ccl/opace/opace2/ttncomp.php>.

The roles, responsibilities and expected deliverables of the TT-NCMP were introduced by the co-chairs during a teleconference in 29/06/2010. Two face to face meetings were organized in Geneva (12-14 September 2011, and 12-14th September 2012, documents and reports of TT-NCMP have been made available by John Kennedy on a dedicated Web page hosted by the Met Office at http://www.metoffice.gov.uk/hadobs/opace2_tt_ncmp/.

2.1 *Main achievements*

- a) A list of six national climate monitoring products to be produced by the Members has been defined:
- Monthly area-average means temperature time series (max+min)/2. Anomaly to be defined relative to 1971-2000 (or WMO preferred alternative) with the actual normal temperature for 71-00 included in metadata. Units degC.
 - Monthly area-average of total precipitation anomalies expressed as percentages. Anomalies to be defined relative to 71-00 period (or WMO preferred alternative). Units none
 - Monthly area-average of Standardized Precipitation Index (SPI) calculated for each station. Standardization will be to the 71-00 period (or WMO preferred alternative). Based on proposed ETCCDI index definition. Units none
 - Monthly area-averaged percent of time Tmax > 90th percentile of daily maximum temperature. 71-00 period for standardization (or WMO preferred alternative). Based on ETCCDI definitions. Units none.
 - Monthly area-averaged percent of time Tmin < 10th percentile of daily minimum temperature. 71-00 period for standardization (or WMO preferred alternative). Based on ETCCDI definitions. Units none.
 - Significant climate and weather event relevant to the area or region. This product consists of zero or a number of these events coded from a predefined table: cold snaps, heat waves, snow storms, dust storms, wind storms, sea level or heavy swell events, flooding, heavy rainfall, volcanic ash. Referring to guidance from the WMO Task Team on the Definition of Extreme Weather and Climate Events.
- b) A draft on detailed guidance has been prepared. A standard format for the detailed guidance was developed by the TT. Definition of the NCMPs involved information exchanges between TT NCMP and TT-DEWCE;
- c) The work relative to the ToR 5 has also been done by the TT who highlighted the need of recommended (standardized) software to be used for calculations of NCMPs in order to ensure consistency;
- d) The team recommends adapting the software used by ETCCDI: Rclimdex (R was the preferred language). John Kennedy is working on that software with a view to assess

the feasibility of combining it with gridding software to make a single NCMP software package. This software issue is one of the actions that led to collaboration with ETCCDI;

- e) A skeleton design for training workshops have been prepared (Mesut Demircan and WMO Secretariat) based on the model of ETCCDI and CLIMAT workshops organized by GCOS and CBS for the provision of training in the software; guidance on how to disseminate the NCMPs on a monthly basis; and also to explain the need to provide regular and timely updates;
- f) The TT has also prepared a nice poster which was presented in different occasions and a leaflet which was distributed during the World Meteorological Congress 2011.

2.2 *Progress on other aspects*

Although the work relative to ToR 2 and ToR 8 has not been completed so far, the TT carried out relevant actions as follows:

- a) Due to some difficulties encountered in gathering an inventory of existing products (finding suitable contacts within national met services), the TT recommended the creation of an official list of focal points for climate monitoring within each country. Ladislaus Chang'a drafted ToR for NCMP focal points. (*CCI-MG is invited to advise on how to implement this recommendation*).
- b) To assess current climate monitoring capabilities within countries, a short survey has been drafted (Ladislaus Chang'a and Raj Booneedy) for dissemination to national focal points;
- c) Contact World Data Centres about guidelines and feedback to the team (Deck Arndt);
- d) Investigate the mechanisms within CBS for metadata definition and dissemination and report back to the team (Mesut Demircan);
- e) John Kennedy contacted Steve Palmer and Roger Stern and Ian Dale at Reading University to find out more about the provision of e-learning;
- f) A request to the IPET-DRMM (Inter-Programme Expert Team on Data Representation, Maintenance and Monitoring) regarding the creation of NCMP messages within BUFR including a justification of the production of NCMPs has been prepared;
- g) Andrew Watkins attended (remotely) the meeting of the IPET-DRMM. The interest is for the representation of the data in BUFR and XML.

2.3 *Things that worked well*

The team's links to, and collaboration with, other CCI expert teams (ETCCDI, TT- DEWCE) have been increasing. Most of the scheduled activities have been carried out and the remaining actions are considered to be on schedule.

2.4 *Things that didn't work well*

No particular issue to be reported here.

2.5 *Recommendation for the future*

- a) There is need to expand the mandate of the TT in the next intersession period to guide and monitor the regular production and dissemination of the NCMPs by WMO Members;
- b) It is preferable that the future task team includes at least one or two members from the actual one. This should allow continuity and effective progress;
- c) Capacity building should play an important role during the implementation phase. The future team should include persons with good background. Sustainability of these efforts for long time is important (ETCCDI example).

3. *Joint Rapporteurs on World Weather and Climate Extreme Records*

The Joint Rapporteurs on World Weather and Climate Extreme Records are Randall Cerveny (Chair) – USA and José Luis Stella (Co-Chair) – Argentina. The main purpose of the Rapporteurs' work is to create guidelines and an appropriate mechanism for verification of national, regional and global extremes; to work on the creation, verification and documentation of a database of national, regional and global extremes; to take the lead in creating and maintaining a database of extreme records, and to develop guidelines and recommendations for continuing this record of extremes beyond the current intersessional period. The joint Rapporteurs' ToR can be found at <http://www.wmo.int/pages/prog/wcp/ccl/opace/opace2/rapporteur.php>.

3.1 *Main achievements*

- a) Evaluation of world record highest temperature including its publication in BAMS ['WMO assessment of the purported world record 58°C temperature extreme at El Azizia, Libya (13 September 1922)]
- b) Verification and acceptance of:
 - the largest Western Hemispheric hailstone (July 23, 2010 in Vivian, South Dakota: 0.879 kg)
 - the Asian highest temperature (June 21, 1942 54°C, recorded in Tirat Zevi, Israel)
 - The world record highest sea-level pressure above 750m asl (December 19, 2001 in Tosontengel, Mongolia: 1084.8hPa; an article discussing the findings of this evaluation is in preparation).

Additionally, a number of investigations of new records have been undertaken using *Ad hoc* evaluation committees; namely, the global "Highest average annual precipitation" extreme (Puerto Lopez, Colombia: a 30-year average precipitation 1982-2011 of 13023.3 mm per

year) and the global “48-hour (two-day) greatest precipitation” extreme (Cherrapunji, India, June 15–16, 1995: 2493mm), both being currently under evaluation by a new *Ad hoc* evaluation committee.

The Lead Rapporteur is also active in maintaining, enhancing and updating the World Weather and Climate Extreme Archive, which is supported by Arizona University (ASU) and which has reached high international visibility, being quoted as one of the most authorised Website documenting climate and weather records.

3.2 Things that worked well

Most of the scheduled activities have been brilliantly carried out. The Lead Rapporteur’s contribution during this intersessional period can be summarised as successful accomplishments with high scientific and societal impact that has returned an increased international visibility of the work carried out. The Archive of World Weather and Climate Records is considered as *the* authorised voice on the subject.

3.3 Things that didn’t work well:

The above mentioned success is the result of the active lead and inspiration of the Lead Rapporteur only. Accordingly, the new ‘joint-Rapporteurs’ approach set up for this intersessional period (a lead and a co-lead Rapporteur from different RAs) hasn’t been as beneficial as expected.

The World Weather and Climate Extreme Archive has not yet been registered under WIS.

3.4 Recommendation for the future

It is strongly recommended to continue this activity in the future. Prof Cerveny is an excellent candidate for continuation as (Lead) Rapporteur. The concept of two Rapporteurs should only be considered if equally motivated persons can be identified.

4. Task Team on the Definition of Extreme Weather and Climate Events

The Task Team on the Definition of Extreme Weather and Climate Events (TT-DEWCE) is composed of: Ren Fumen (Chair) - China; Pattanaik Dushmenda (Co-Chair) – India, Randall Cerveny – USA; Blair Trewin - Australia; Boris Sherstyukov – Russian Federation; Andreas Walter –Germany and Diallo Aissatou - Guinea. The main purpose of TT-DEWCE is to develop common definitions related to climate extreme events, to provide guidance on respective methodologies and standards and to advise on adequate computational tools. The development of an inter-operable data base for climate extreme events with focus on regional and national levels forms another key topic of the team’s activities. TT-DEWCE TOR can be found at <http://www.wmo.int/pages/prog/wcp/ccl/opace/opace2/ttdewce.php>.

The team met from 23 to 25 November 2011 in Tarragona, Spain to kick-off its joint activities and to agree on a work plan (meeting report cf. http://www.wmo.int/pages/prog/wcp/wcdmp/documents/TT-DEWCE_meeting_report.pdf). A second meeting is envisaged to take place during the current intersessional period (February 2014, tbc).

4.1 *Main achievements*

- a) Draft report of existing work and studies on extreme weather and climate events. The draft has been reviewed by experts within and outside the Task Team and is now subject to finalisation within the team. Activity expected to be finished in time;
- b) Draft report on gaps in, and need for, developing common definitions of extreme weather and climate events. Report is currently under internal review; finalisation of activity expected to be slightly delayed;
- c) Draft document “A guidance on methodologies and standards for defining regional extreme weather and climate events” under review. Accompanying article ‘A research progress review of regional extreme events’ under peer-review by Journal of Applied Meteorology and Climatology. Activity expected to be finished in time;
- d) Draft report “Advice on developing an inter-operable data base for regional extreme weather and climate events”. Report is currently under external review; activity expected to be finished in time;
- e) Draft concept document on a WMO Portal linking national products and reports on extreme weather and climate events. Document under internal review; activity expected to be finished in time;

To terminate its mandate, however, it is still required to ensure that all documents have been reviewed externally and that TT-DEWCE will produce the expected guidance on climate and weather extreme definitions and the tools to analyse extremes identified, gathered and provided before the end of this intersessional period.

4.2 *Things that worked well*

All agreed-upon tasks have been or are being carried out. TT-DEWCE collaborated with the abovementioned expert/task teams.

4.3 *Things that didn't work well*

Some delays were noted in the team's internal communication response times.

The work carried out by the team could be qualified as exploratory and not conclusive, since although they have considered and evaluated most of the existing previous works and studies and examined most of the methodologies and standards used in the field of climate extremes analysis, the team have not yet agreed on common and univocal extreme events definitions nor has arrived to a consensus on the tools for their analysis.

Another weakness that could be addressed prior to the end of the current intersessional period is the extent of collaboration with parent teams. Although some actions have been taken in this direction, as already mentioned, the liaison has not properly materialised in the extent it could have been. In this regard, the commitment to adapt some indices focusing on monsoon areas for monitoring long dry spells leading to drought indices or to focus on indices and metrics for other extreme events (e.g. forest fire index, low and high water levels on rivers, depth of seasonal soil's thaw at permafrost, depth of seasonal soil's freeze) have not been materialised, which could be left for the next intersession period.

4.4 *Recommendations for the future*

A continuation of respective activities beyond this intersessional period should be envisaged with the following main topics: (i) to identify and provide a set of tools and univocal definitions to analyse climate extremes both point-based and of regional extent indices, (ii) to implement an inter-operable Web Portal holding a data base for regional extreme weather and climate events, and (iii) to address the more specific indices mentioned above that couldn't be addressed in this intersessional period.

5. ***Other activities with involvement of the OPACE II Co-Chairs***

Dr Driouech hosted the Regional Workshop on Climate Prediction/Projection and Extreme Events Indices in the Arab Region, Casablanca, Morocco, from 13 to 16 March 2012. This workshop is part of a project within the framework of a Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region, coordinated by the United Nations Economic and Social Commission for Western Asia (ESCWA), League of Arab States (LAS), Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD), Swedish Meteorological and Hydrological Institute (SMHI), World Meteorological Organization (WMO) and United Nations International Strategy for Disaster Risk Reduction (UNISDR), and funded by the Swedish International Development Cooperation Agency (SIDA). Representatives from 17 countries (namely Algeria, Bahrain, Djibouti, Egypt, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Palestine, Saudi Arabia, Somalia, Sudan, Tunisia, United Arab Emirates and Yemen) participated in the training on data quality control, data homogeneity tests and indices calculations using ETCCDI software (RClimdex, RHtest). A publication of a peer-reviewed article in the International Journal of Climatology (Donat et al, 2013) was released on time for consideration within IPCC AR5.

Dr Driouech, as member of the Expert Group on Quality Management for Climatology (EG-QMC), participated in its first meeting held in Geneva, 21- 23 September 2011. She reported on best practices on QMS in RA I and highlighted the difficulties encountered in accessing the information.

Dr Driouech has also been active in carrying out some tasks within TT-NCMP in addition to overall OPACE-2 duties.

Dr Brunet is involved in the WMO/CCI Mediterranean Data REscue (MEDARE) Initiative, a cross-cutting activity also related to OPACE1; in the Task Team on Climatological Normals led by OPACE1 co-chair; in the Expert Team on Climate Services Information System (CSIS), a key pillar for GFCS in connection with OPACE3; in the TT- CRSCI related to OPACE4; in the Expert Team on Strategy for Capacity Building for Climate Services (ET.SCBCS); and in the Expert Group on Quality Management for Climatology (EG-QMC). Another engagement comprised an evaluation mission on DARE and Climate Data Management Systems (CDMS) to Western Balkan National Meteorological and Hydrological Services in Albania, Bosnia and Herzegovina, Republic of Srpska, Macedonia (Former Yugoslav Republic of Macedonia), Kosovo and Republic of Montenegro. A subsequent workshop on historic hydro-meteorological data management under the umbrella of the IPA/2012/290552 multi-beneficiary project "Building Resilience to Disasters in Western Balkans and Turkey" was led by her.

5.1 *Status and progress made in other CCI cross-cutting activities relevant to OPACE 2*

This section provides further details about MEDARE, the Regional Training Workshop on Statistical Analysis of Climate Extremes for South America (Guayaquil, Ecuador, 2011) and the SEE/DRR Regional Workshop on Historic Hydro-Meteorological Data Management for Western Balkan Countries (Skopje, Macedonia, the Former Yugoslav Republic, 2013).

The MEDARE Initiative, set up in 2007 under the auspices of WMO, endorsed by WMO/EC-60 in 2008 and supported by most of the Great Mediterranean Region (GMR) NMHSs along with relevant academic and research institutions, has been particularly aiming at (i) consolidating progress in data rescue (DARE) and high-quality climate dataset developments for the GMR, (ii) linking the MEDARE Community through its Website (<http://www.omm.urv.cat/MEDARE/index.html>), (iii) implementing and populating a climate metadata base on-line infrastructure, (iv) identifying and documenting the longest and key instrumental records over the GMR, (v) organising specific training on its areas of expertise, (vi) linking the Initiative to other CCI (OACE1 TT-DARE) and international (e.g. ACRE, IEDRO, ISTI, I-CA&D) DARE activities, and (vii) promoting DARE activities in connection with national and European funded projects in addition to its active role in raising awareness and promoting the MEDARE goals among stakeholders.

Currently, MEDARE is focusing on the development of the GMR long-term and high-quality climate datasets, for which WMO SG sent a letter to the PRs involved, requesting to grant access to their longer digitised records to facilitate the development of the MEDARE datasets. So far, Libya, Slovenia and Spain have sent their longest digitised records and France and Turkey are on their ways to provide theirs. In addition, and following the MEDARE strategy to include a DARE component in any research project to be funded, MEDARE linked to the EU-funded EURO4M project. It has successfully rescued and digitised about 2.4M of station values and homogenised 38 (32) maximum and minimum temperatures (precipitation) series at the daily scale over North Africa and Middle East countries, one of the data-sparse regions of the world. This successful tale of cooperation with the research community will be continued in the foreseeable future thanks to the recently EU-funded UERRA project.

MEDARE, however, faces long-term sustainability problems, since it has no regular budget allocated and all the work carried out is made on a volunteer basis. This compromises its mandate for consolidating progress on the recovery of the wealthy heritage of historical data. Therefore, MEDARE's support to produce timely and reliable climate services over the GMR in the framework of GFCS is at risk.

Another relevant and successful activity has been the Regional Training Workshop on Statistical Analysis of Climate Extremes for South America (Guayaquil, 2011) in connection with OPACE4, supported by WMO/WIS Data Management Applications Division and based on the ETCCDI approach and scientific support. The weeklong workshop brought together technicians from most of the South American NMHS to assess their data quality and homogenise their time series to produce reliable extreme indices. The workshop was followed by a scientific assessment analysing changes in climate extremes over South America, which was led by a local expert. A respective peer-reviewed article was published by GLOPLACHA, another high impact factor Journal. The article was issued on time for consideration by the IPCC AR5 process.

A remarkable training activity was enabled by the aforementioned IPA/2012/290552 project on disaster risk reduction in Western Balkan countries. The five days training for technicians from the IPA NMHS plus Lebanon and Jordan aimed at transferring knowledge on, and tools for, high-quality climate time-series development including homogenisation and extreme indices calculation and interpretation. This activity was a big success according to the very high scores given by the attendees in the respective feedback questionnaire. In addition, participants agreed to collaborate on a regional peer-reviewed climate assessment. This activity, which is currently in progress, follows the same conceptual approach as used in the South America workshop: leadership by a local expert under supervision of the trainers.

6. *Additional thoughts and general comments on the future structure of OPACE-2 for the next intersession period by Dr Brunet*

- a) This co-chair was involved in following up a recommendation made during the 2nd CCI MG meeting, and laid down in point 7.2.4 of the respective report, to request about the status of the JCOMM position paper on marine indices, variability and extremes and explore the possibility to present this paper at the JCOMM session in 2012. Although this co-chair interacted with the relevant JCOMM members at the ETCCDI, no response have been received so far. Therefore, the issue was handed over to the Secretariat;
- b) On the ETCCDI structure and its future beyond the current intersessional period: It is clear for this Co-Chair that the ETCCDI work need to be continued in the future, not only because of its high scientific profile, but also for its paramount contribution to better understand and document changes in extremes worldwide and on detecting and attributing causes to man-made climate change. Even though, this Co-Chair feels that the ETCCDI has not been so active in this intersessional period compared with previous ones. This is likely related to the deep involvement of the ET's co-chairs in the IPCC AR5 process. For CCI membership in ETCCDI, it is important to ensure a proven high scientific profile to keep the high standards of the team. Another aspect to be considered is the better involvement and integration of the JCOMM members, since they have not been as active as expected;
- c) On the TT-NCMP: My recommendation here is to continue with the team in the next intersessional period with a clear mandate of identifying, gathering and making accessible the tools to calculate operationally the agreed 6 NCMPs in closer coordination with other relevant teams (e.g. ETCCDI, TT-DEWCE, ET-CRSCI) by means of ensuring at least one shared member in each team;
- d) To avoid overloading OPACE Co-Chairs by engaging them in other CCI focus groups, while ensuring coordination among related activities. A number of other CCI focus groups (e.g. Task Team on Climatological Normals, ET-SCBCS, EG-QMC) were set up by mainly incorporating, although not only, OPACEs' Co-Chairs. This has added further tasks to their already overloaded piles, putting at risk the quality and timeliness of contributions to these focus groups. It should be pursued to integrate other volunteers with less workload in these teams to ensure timely contributions, although at the same time it could be kept just one co-chair from the most relevant OPACE in the focus group to ensure coordination. Definitively, it should be avoided to

assign a Co-Chair to several of such groups. And this brings me to a point to provide my input to the discussion on advantages and disadvantages in creating a new OPACE (OPACE 5) on education, which would integrate the ET-SCBCS and EG-QMC. I can't see the benefits that such a new OPACE could bring, although I see the need to have a clear, official and strong voice in the WMO Educational Panel to defend and push ahead the curricula in climatology. Along with the CCI President, I think that each OPACE and its teams would have to look after their educational challenges and should have among their ToRs one on capacity development;

- e) Suggestion on a cross-cutting task team between OPACE 1 and 2 on long-term and high-quality climate data series development in connection to the centennial stations task: Robust and reliable climate data series (e.g. quality controlled and homogenised) are vital to support the delivery of authoritative climate services including e.g. decadal climate predictions. The latter research topic is getting considerable scientific interest nowadays and the "homogenisation" community in response to this is doing remarkable steps ahead to identify the best homogenisation methods and generate new approaches for homogenising even time series at the finest time-scales in connection with other DARE initiatives (e.g. ISTI). I think this is a key CCI area, especially if the Commission wants to lend a good service to GFCS and help NMHSs to adopt these procedures for the development of high-quality longer (centennial scale) climate records. I think a cross-cutting OPACE task team with a mandate to explore the-state-of-the-art regarding time-series quality control and homogenisation at different time scales and to make recommendations to adopt the best identified procedures and tools by other relevant CCI groups and NMHSs is highly desirable. Relevant outputs can greatly facilitate climate services. The ToR can easily be identified upon general agreement for such a team.

ANNEX 6

OPACE III: Climate Products and Services and their Delivery Mechanisms

Jean-Pierre Ceron and Kiyoharu Takano

1. *General comment*

A strong effort had been made in strengthening the CBS and CCI liaison, which is critical for putting in place the appropriate delivery mechanisms for climate products and services. Especially two Expert Teams (ETs) were turned into joint CBS/CCI ETs, with endorsement from WMO Executive Council. The Task Team on CLIPS Evolution has completed its work, and therefore has been disbanded.

2. *CCI/CBS Expert Team on Regional Climate Centres (ET-RCCs)*

2.1 *Activity:*

- Support to CCI President for RCC designation
- Developing a draft guidance document for the establishment and operation of RCCs, expected to be completed during the current intersessional period.

2.2 *Status of the Implementation of RCCs in WMO Regions*

This information may be supplemented with additional details by the representatives of Regional Associations at the meeting.

RA I (Africa)

- RCC implementation initiated by identifying six RCCs, viz., African RCC at ACMAD, IGADRCC at ICPAC, SADC RCC at SADC CSC, ECOWAS RCC-Network by ACMAD and AGRHYMET, North African RCC-Network to be implemented by five North African countries and CEMACRCC for Central Africa;
- Demonstration phases have been formally initiated for African RCC by ACMAD and IGAD RCC by ICPAC.

RA II (Asia)

- Beijing and Tokyo designated as WMO RCCs in June 2009 and North Eurasian Climate Centre (Russia) designated as WMO RCC in May 2013;
- India began a demonstration phase as a candidate RCC in May 2013;
- Iran, Saudi Arabia and Kazakhstan expressed interest to host an RCC.

RA III (South America)

- RCC implementation initiated by identifying three RCC arrangements, viz., CIIFEN for western coast of South America, Northern South America RCC-Network by Brazil and French Guyana and Southern South America RCC-Network by Argentina and Brazil;
- All three RCC proponents formally expressed, through RA III president, intent to start a demonstration phase;
- CIIFEN has commenced its demonstration phase.

RA IV (North America, Central America and the Caribbean)

- CIMH has commenced a demonstration phase in May 2013;
- Proposals for two more RCC-Networks, for Northern America and Central America, under discussion.

RA V (Southwest Pacific)

- RA V Working Group on Climate Services is in the process of assessing the current RCC related functions being performed in the Region vis à vis the mandatory and highly recommended functions for WMO RCCs;
- Two RCC-Networks, for (i) Southeast Asia and (ii) Pacific Island countries, under active consideration.

RA VI (Europe)

- RCC-Network, with nodes in Germany, Netherlands, France and Russian Federation, has been formally designated in May 2013.

2.3 *What worked well*

- Many establishment activities are on-going.

2.4 *What did not work so well*

- Interaction and Information sharing among Regional Associations, ETs, and CCI as a whole is insufficient;
- Very little working cooperation between CCI and Regional Association climate groups.

3. *CCI Expert Team on Climate Services Information System (ET-CSIS)*

3.1 *Activity*

- ET constituted (but the Chair left at the beginning of this year, and a new Chair nominated), still some adjustments needed in terms of membership;
- First ET meeting held (12/2012 – Australia) : Meeting report available;
- Contributed to the CSIS Annex within the GFCS Implementation Plan.

3.2 *Main Outcomes*

- Establishment of the expected main mandatory CSIS functions (more details in the meeting report) for:
 - data services
 - monitoring services
 - climate prediction services
 - climate projection services
 - products, dissemination, quality management and capacity building services
- Identification of potential toolkit candidates to fulfil the different mandatory functions

3.3 *What worked well*

- Very efficient ET, very good prospects;

3.4 *What did not work so well*

- Some concern with meeting organisation;
- A Co-Chair yet to be identified.

4. ***CBS/CCI Expert Team on Operational Prediction from Sub-seasonal to Long-time Scales (ET-OPSLs) (Previously CBS/CCI ET on Extended and Long Range Forecasting, ET-ELRF)***

4.1 *Activity*

- Meeting held in March 2012 – report available;
- Support to Global Seasonal Climate Update (GSCU) development;
- Planned meeting for March 2014;
- Draft document disseminated on possible Climates Indices and products to be used in seasonal monitoring and forecasting.
- Preparation of a GPCs/RCCs/RCOFs/NMHSs workshop on operational seasonal prediction planned at the end of November (in close liaison with CCI)

4.2 *Main outcomes/recommendations*

- Review of WMO (CBS/CCI) decisions and other initiatives relating to ET-ELRF Terms of Reference, including new applications for GPC status
- Progress with the GFCS and CSIS in particular, and implications for GPCs
- New developments in systems and products: including seasonal, extended, multiannual/decadal;
- Interactions with RCCs
- Use of GPC products by RCCs/RCOFs
- Observational requirements for GPCs
- LC-LRFMME: future directions and products: including implications for additional data exchange
- LC-SVSLRF: Future directions: including verification of multimodel; revisit of potential for centralized verification; new scores.
- Revised Manual on the GDPFS and implications for the ET and GPCs
- Progress with the GSCU, implications for GPCs and Lead Centres
- Liaison with the WWRP/THORPEX/WCRP research initiative on seasonal to sub-seasonal prediction
- Promotion and outreach of GPCs

4.3 *What worked well*

- Very efficient ET.

4.4 *What did not work so well*

- This ET is becoming too large (in terms of the topic spectrum).

5. Task Team on Global Seasonal Climate Update (TT-GSCU)

5.1 Activity

- Development and improvement of the first version
- Second TT meeting (in June 2012 – Busan) : Meeting report available
- Provision of a Guidance document (for operational implementation)
- External review to be done
- Operational implementation awaiting completion of peer review

5.2 Comments on the progress made

Progress has been slower than first anticipated. Some of the reasons for this are changes in the format we made that were designed to improve the quality. For example, the move to a common hindcast reference period and inclusion of verification information in the appendix. We now have a good team producing the forecast images and text in a reasonably timely fashion. Thus, with one caveat, we have a product ready for trialing with considering the realistic time schedule for operation and carrying out wider review. The caveat is that we currently have no one to produce the observational component, since Ahira Sanchez of NCDC had (after doing a splendid job) to pull out because of personal reasons. Extension of prediction period until six months ahead for the GPVs from GPCs may help GSCU creation to get more time to work (maybe ET-OPSL's issue).

5.3 Main Outcomes

- GSCU new version (to be externally reviewed)
- Update of the operational guidance

5.4 What worked well

- Enthusiastic investment of time and effort by some people, including external experts.

5.5 What did not work so well

- Some difficulties with the LC-LRFMME work (and competencies), presently still too much dependent of a few people for operations, the relatively limited availability of the Lead of the TT fortunately compensated by the work of the Co-Lead.

6. Communication Advisor

6.1 Activity

- OPACE III Newsletter
- Participation in the GSCU TT meeting for guidance in terms of communication

- Starting the work on vocabulary issues (work in progress)
- Convening and coordinating a session at the ECAM conference about communication of uncertainty in seasonal predictions and climate projections (CE 3 – report available soon)
- Convening and coordinating a Media and Communication session (CE1 – short report available).
- Joint event with WMO – Communication workshop for NMHS (during the EMS/ECAM conference)

6.2 *Main Outcomes*

- A DVD with all the contributions at the CE3 (also CE1) will be compiled, so that the information could be spread among community.
- Preliminary document on vocabulary issues.

6.3 *Comments on the progress made :*

- With limited resources we had to join our forces with other organizations in this case mainly with EMS, but also with WMO communication unit and PWS. So both of the ECAM sessions took place under the umbrella of EMS. They addressed the issue of uncertainty and how to communicate it, beside other general issues concerning information retention, understanding of message and users needs.
- For the vocabulary issues, the work started and a first draft document should be available by the end of this year.

6.4 *What worked well*

- Enthusiastic investment of time and engagement of other interested people, interesting outcomes

6.5 *What did not work so well*

- Some difficulties to schedule real dedicated meetings, limited resources.

7. ***Additional work***

- Promotion of RCOFs in new regions (CARICOF 02/2012; SWIOCOF implemented 10/2012, could be merged with ACMAD initiative in 2014)
- Promotion and preparation of a scoping meeting on a Mediterranean COF (first session should be held in November 2013) and participation to the Interim Management Team.
- Technical Guide on downscaling/tailoring methodology available in English and French (preliminary version)
- RCOF Position Papers (*Six RCOF position papers developed following Arusha review to be published online as living documents*)
- Participation in the WWRP/THORPEX/WWCRP planning group on the sub-seasonal to Seasonal Prediction Project
- Participation in the International Conference on Climate Services

- Contribution to the review of the Research annex for the draft implementation plan for GFCS (under WCRP coordination).
- Participation in the review of the draft implementation plan for GFCS (chapter 2,3 and 4 + CSIS annex).
- Review of the WMO/CCI guidance on verification
- Review of the WMO/CCI Guidance on establishment and operation of WMO Regional Climate Centres (still in progress).
- Participation to the Climate Services Dialogue on the occasion of IBCS-1
- Support to CCI President
- Participation to the organizing committee of the GPC/RCC workshop (in November)

8. OPACE-III Prospects for CCI-16

8.1 Domain of Opac III

It is proposed to retain the same domain, but with a strong focus on CSIS and related topics (like RCCs, LRF, etc.) and likely in close liaison with the UIP, so some explicit linkages with OPACE IV may be developed.

8.2 Proposed Teams

It is proposed to retain the following teams :

- CCI ET-CSIS (Considering the overarching nature of CSIS cutting across all the OPACEs, the MG may also consider setting up an Implementation Coordination Team (ICT) focused on the CSIS, with membership spanning all the OPACEs)
- CCI/CBS ET-RCCs
- CBS/CCI ET-OPSLs
- TT-GSCU until GSCU becomes operational (A possible alternate approach also could be to make it an internal task team of the ET-OPSLs).
- Communication advisor (It is suggested to keep one communications advisor, chairing a small task team on vocabulary issues (one annual review to follow up and update the started work) and associated communication concerns (e.g. GSCU)

A mechanism/structure facilitating more regular exchanges with OPACE IV may be adopted (especially on user targeted COFs, UIP and CD).

8.3 Additional Challenges / Prospects

Capacity Development: Capacity development activities should be addressed in a better way and somewhere in our Opac III (review, update, follow-up of existing material, etc.). Also, specification and preparation of training involving users and providers may be encouraged to build the shared knowledge necessary to the GFCS implementation. But we should adapt to the CCI structure which could be proposed for CD activities.

Verification: The verification beyond the products (e.g. verification of the quality of decision making processes using climate information, weight/importance of the climate information in decision making).

Uncertainty: The uncertainty topics (including the ensembles of ensembles) and the best way to convey this information up to the stakeholders (including some topics at the border like the tolerability of the uncertainty in the decision making processes).

Seamless Use of Climate Information: It is important (in an OPACE III perspective) to convey that from the seamless modelling concept itself it is important that the climate models used on all the range of climate forecasts/projections could be as close as possible one to each other. So that all experience gained from one side (CC, Decadal, seasonal and even monthly) could be of benefit to the other time scales (e.g. knowledge of the climate trend which is present into the seasonal forecast). More importantly, there is the concept of the seamless use of the climate forecasts, whereby we have to learn and train our users to optimize all the available information across all time scales in order to get the greatest benefit of using the climate information. And so it is very important that some common approaches and diagnostics could be shared over all time scales (and even including the monitoring aspects so that we get the best consistency across the different time scales). In this viewpoint, the set up of the climate change scenarios in the CSIS will certainly be one of the greatest challenges to face in the coming years. In addition, the implementation of "Climate Watch" using monitoring and sub-seasonal/medium range forecasts is also important as a shorter time scale activity.

Products relevant to the GFCS: In the perspective of Climate Services delivery, the products themselves should evolve from "basic" products like temperature or rainfall to better tailored products able to represent the impact onto the stakeholders activity. Among a large spectrum of possibility and with respect of priority sectors, we will likely have to develop forecasts of hydrological characteristics, forecast of energy production and/or consumption, more EWS relevant to the Health domain, better products for agriculture and crop production, etc. These emerging needs will become more and more prominent and the CSIS will have to propose relevant interface for the impact models and/or relevant integrated climate indices in order to make the decision making processes more efficient and more beneficial to the stakeholders and the societies.

8.4 *Where do we go*

At this stage OPACE III co-chairs would like to recall the earlier discussions with the President of CCI, and suggest that we should retain the following main proposed directions and project them on to OPACE III:

- increasing partnership;
- increasing openness of data;
- increasing diversity of data and tools;
- increasing demands for tailored information (especially for impact forecasts);
- increasing visibility and appreciation of climate information;
- increasing demand for near real-time climate information;
- increasing scientist citizen participation.

ANNEX 7

OPACE-IV: Climate Information for Adaptation and Risk Management

Rodney Martinez and Albert Martis

1. *Expert Team on Climate Risk and Sector Specific Indices (ET-CRSCI)*

1.1 *Deliverables*

- Collection and analysis of existing climate indices with particular specific sectors (Agriculture, water, health and DRR)
- Technical publication on climate indices for sectoral applications
- Standardized software and associated training materials for systematic assessment of sector-specific climate indices
- Proof of concept workshop (one region) on development and application of the indices
- Workshop Report/Publication

1.2 *Achievements*

Development of indices, Development of *ClimPACT* software, Associated software manual, Pilot workshop – Guayaquil, Ecuador June 2013, Assessing sector-relevant climate indices

1.3 *Action Plan timeline*

- Adjust *ClimPACT* code based on feedback 31st July 2013 – delayed due to programmer leaving
- Analysis of indices and sectoral information in areas of each country where designated stations are located 28th Feb 2014
- Report of National Group members through NMHSs representative on the relevance and sector application of indices 30th Mar 2014
- Technical Report/Paper/Article on regional application of sectoral indices developed through *ClimPACT*, 30th May 2014
- Preparation of a concept document for implementation of a regional drought monitoring system, 15th Dec 2013 (depending on WCSACOF date)
- Scientific Publication of drought variability in Western South America 30th Jun 2014
- Application of the indices for national climate monitoring products for sectors 31st Aug 2014
- Integration of ET CRSCI work into the regional or national implementation plans for GFCS 30th Nov 2013

- Scientific publication on ET CRSCI concept with some concrete examples from the region 31st Mar 2014 – in preparation

1.4 *Key challenges*

- Definitions of the new indices may require research and testing of concept with adjustments in according to different sectors and regions.
- The integration of data sets from different sectors to design more complex and multidisciplinary nature indices.
- Training in different regions and sectors will be required.

1.5 *Recommended Actions*

- Review existing ET-CRSCI membership
 - some members have made little contribution, others a lot
 - consider inviting new members
- Continue to seek the expert guidance from external sector and climate experts
- Consider either having a pilot workshop in another region or continuing the workshop format in the Western S. America region
- Develop *ClimPACT* to include indices derived from other climate variables that are relevant for sector impacts

1.6 *Request for CCI-MG*

It is proposed that CCI-MG may keep this EXPERT TEAM with updated TORs and Membership until it accomplishes its tasks.

2. *Task Team on User Participation in Climate Outlook Fora (TT-UPCOF)*

2.1 *Expected Deliverables*

- Guidance and promotional material to enhance user participation in Regional Climate Outlook Forums (RCOFs) and in post-COF user interaction
- Review and assessment of the approaches in the existing and ongoing user outlook forums (e.g. MALOF, HYDROF)
- 3.Guidance and promotional materials, for the use of sectoral agencies, on the establishment and operation of sector-focused, sector-driven outlook forums in conjunction with Climate Outlook Forums (COFs), particularly the water resources management and agriculture/food security sectors (to be done in collaboration with relevant agencies, organizations and WMO Technical Commissions, particularly CHy and CAgM)-Specific proposals to establish a number of sector-driven user outlook

forums with clear linkages to RCOFs, to take climate outlooks into account – Agriculture and Food Security Outlook Forums, Health Outlook Forums

- Guidance for RCOFs to more efficiently communicate climate outlooks to the users, along with uncertainty aspects-

2.2 *Summary Progress Report*

Task	Task Progress	Responsible	Review Status	Final Status
1. Develop User Outlook forums for water and agriculture	Proposal development for Agriculture/Food Security led by FEWSNET	Luganda, FEWSNET, TT, Secretariat	Ongoing Proposal development for Agriculture & Food Security; Water later	Expected proposal completion February 2014
2. Guide RCOFs to efficiently communicate COFs to users	Develop brochures, video, posters, charts on user participation	Luganda, TT	TT-UPCOF Poster WCRP OSC, Denver completed in October 2011	Expected materials completion February 2014
3. Review user participation in the past RCOFs held globally	Review historical user participation in RCOFs	Luganda, TT	Literature review and collection of materials is ongoing	Expected completion January 2014
4. Enhance RCOF user participation & post-COF interaction	Guidelines to NMHSs – for sustained user participation	Luganda, TT	Collecting materials for review started	Expected completion January 2014
5. Review user outlook forums (e.g., MALOF, HYDROF)	Review and assessment of existing user outlook forums	Luganda, TT	Work expected to take off in November 2013	Expected completion March 2014

2.3 *Constraints*

- Internal cohesion of the Task Team has not been easy as team members have moved from their former institutions and some are unable to participate.
- The task team members have been joined by Gideon Galu of FEWSNET who will take a lead on food security and agriculture issues.

2.4 *Next steps*

Few volunteers have started to contribute actively to the task on hand and the assignment should be accomplished within the stipulated schedule.

3. ***Task Team on User Interface (TT-UI)***

3.1 *Aim of TT-UI*

The Task Team on User Interface will:

- Collect and assess existing case studies relevant to quantifying the social and economic benefits of using climate information, products and services,
- Develop a guideline for users on integrating climate predictions and information into climate risk management, and adaptation strategies and planning, to include user-friendly terminology,
- Collect and develop information on the susceptibility of various sectors to climate variations and change and on the use of climate information in climate risk management and adaptation by specific sectors, and publish these in the form of an online catalogue,
- In collaboration with CBS/CCI/CHy ET on Meteorological, Hydrological and Climate Services for Improved Humanitarian Planning and Response, develop an implementation plan to facilitate the provision of meteorological, Hydrological and Climate Services to the international humanitarian agencies from National Meteorological and Hydrological Services (NMHSs), RSMCs, Global and Regional Climate Centres (RCCs),
- Inform the CCI Management Group on completion of the tasks (within a period of three years from the date of formation of the Task Team) and that the team can be dissolved.

3.2 *Deliverables:*

- A guideline for users on integrating climate predictions and information into climate risk management, and adaptation strategies and planning, to include a user-friendly terminology;
- A collection of existing case studies relevant to quantifying the social and economic benefits of using climate information, products and services;
- Information on the susceptibility of various sectors to climate variations and change and the use of climate information in climate risk management and adaptation by specific sectors, in the form of an online catalogue.
- Overall recommended systematic approach agreed to at the Meeting of the Commission for Climatology (CCI) Task Team on User Interface (TT-UI) Geneva, Switzerland, March 2011 as a guideline for users in integrating climate predictions into climate risk management.
- Understand the target system (eg agriculture, water resources, etc) and its management: it is essential to understand the system dynamics and opportunities for management intervention i.e. *identify those decisions* that could influence desired systems behaviour or performance;
- Understand the impact of climate variability/climate change: it is important to understand *where in the target system climate risk is an issue*;
- Determine the opportunities for tactical/strategic management in response to the forecasts. If forecasts are now available, what possible options are there at relevant decision-points? How might decisions (eg in agriculture, water resources, health) be

changed in response to forecasts? What nature of forecast would be most useful? and - what lead-time is required for management responses?

- Evaluate the worth of tactical or strategic decision options: the quantification and clear communication of the likely *outcomes* (e.g. economic or environmental), *and associated risks of a changing a management practice (eg in agriculture, water resources, etc)* are key to achieving adoption of the technology.
- Implement *participative* implementation and evaluation: working with industry managers/decision- makers generates valuable insights and learning throughout the entire process: i.e. identifying relevant questions/problems and devising suitable technologies and tools.
- Provide feedback to climate forecasting research in the NMHS/university/etc: rather than just accepting a given climate forecast, consider what specific improvements would be of greatest value in the target system. This can provide some direction for the style of delivery of forecasts and for climate research of value for particular sectors.
- “Climate information doesn’t have to be perfect to be useful; it just needs to support a decision” (Approach concepts after Hammer, 2000; also refer to Hammer *et al.*, 2001; Stone and Meinke, 2007; Rodriguez, 2010; Stone, 2012).

WMO and NMHSs, to succeed in the overall aim of improving users’ benefits from the advances being made in climate science and research and in use of integrating systems of value to users core needs, may consider the following:

- Adopt systematic approaches for integrating climate predictions into climate risk management, such as those recommended by the TT-UI including the associated guidelines for users.
- There is a core need by developers of seasonal climate and climate change forecast models and systems to work more closely with the likely developers of tactical and strategic management systems in selected industries (e.g., agriculture, hydrology, energy, insurance, etc).
- There is an urgent need to provide more modelled or actual case studies of detailed quantified economic benefits of the value of seasonal climate and climate change forecasts for specific industries in order to demonstrate to industry/users, scientists, and policy makers where critical opportunities and value would or does exist in the application of climate science outputs.
- There is a need to establish more systems modelling research and operational centres where interdisciplinary systems models and approaches can be developed that will effectively integrate climate forecast modelling systems with comprehensive industry decision systems.
- There is a need to increase interaction with user groups in addition to agriculture where it appears the greatest amount of user interaction in regards to climate forecasts has so far taken place.

TT-UI will provide useful elements for UI design within the GFCS. However, it is time to move from the concept to the design of tools that support UIP development.

3.3 Request for CCI-MG

It is proposed that CCI-MG may upgrade this Task Team to an Expert Team, update the TORs and review the members.

4. Task Team on Climate Risk Management (TT-CRM)

The TT-CRM has recommended the following guidelines to help NMHSs work with relevant organisations to improve CRM at local level:

- a) Focus on users, and enhance collaborations with CRM communities in order to assess their needs and address these through provision of high quality and opportune climate services, including through organizing or participating in both face-to-face and on-line Regional and National Climate Outlook Forums which offer direct interaction with users including sectors and the media.
- b) Tailor climate products for CRM (esp. capacity building, outreach, user training in climate matters and adaptation) end users, inc. planning departments, local authorities, government agencies involved in environment and risk management.
- c) Monitor the climate and its evolution, conduct Climate Watch programmes, develop regular information for users on the past and current states of the climate, and couple these with reliable, user-friendly predictions for upcoming seasons, as part of a climate services culture. Build and sustain observing networks to provide the data needed for a range of climate services for CRM; conduct data rescue exercises to enhance digital climate databases. Promote training and development of their meteorological staff in diverse aspects of climatology and climate services and in CRM.
- d) Enhance climate research, development of climate indexes and other analysis, within their operational activities.
- e) Combine climate products with other geospatial information related to vulnerability derived from other institutions for development of more decision-ready, actionable products (this will require strategic alliances, in “win-win” relationships with co-benefits).
- f) Enhance the liaison with local communities, communitarian networks and local media for efficient dissemination of tailored products applicable for CRM.
- g) Seek and act on user’s feedback for product evolution and improvement.

4.1 Planned actions during remaining time

Planned actions during remaining time	Constraints on delivery of outputs
Develop checklist to help NMHSs improve their capability to support CRM	None
Design CRM workshop template that can be reused for any sector or region to take forward the TT-CRM recommendations for CRM at local level	In progress, constraint on future continuity of TT-CRM to enable initial template to be updated with lessons learned from subsequent workshops
Organise joint workshop (WMO/ACRE) focussed on Agriculture and Water Resource risks in Meso America - demonstrating application of the CRM workshop template	In progress, workshop planned for Feb 2014 at CATIE, Costa Rica. Main constraint is funding to cover workshop expenses

4.1 Request for CCI-MG

- Consider upgrading TT to Expert Team on Climate Risk Management
- Define future activities for the TT/ET-CRM with existing membership and in collaboration with other TT and ET's
- Review existing TT-CRM members and consider inviting new members to help support the future activities

5. Joint Expert Group on Climate Food and Water (JEG-CFW)

This CCI/CAgM/CHy Joint Expert Group on Climate Food and Water (JEG-CFW) was established by EC-LXIII, in 2011. JEG-CFW met for the first time from 7-8 November 2011, Casablanca, Morocco. The second meeting of JEG-CFW is planned in early November, in Korea.

5.1 Request for CCI-MG

To designate a CCI-MG member to attend to the next meeting.

ANNEX 8

CCL EXPERT GROUP ON QUALITY MANAGEMENT FOR CLIMATOLOGY (EG-QMC)

S. Sensoy

1. The first meeting of CCI Expert Group on Quality Management for Climatology (EG-QMC) was held in Geneva from 27 to 29 September 2011, and a preliminary report was provided to the Management Group in October 2011. The meeting had reviewed the terms of reference, set priorities and developed an outline for a strategy for the implementation of Quality Management for climatology including at global, regional and national levels as well as for the work of the Commission itself.
2. Actions recommended by EG-QMC included collecting information on current practices for QMS at NMHSs in six WMO Regional Associations, prospect the possibility of hosting a dedicated web site on QM for climatology and work on the development of QM strategy based on the outline which the group developed at the meeting. The meeting identified reference documents or practices as potential candidates for a joint WMO/ISO standardization.
3. EG-QMC reviewed its Terms of Reference (TORs) and proposed amendments taking into account Cg-XVI and EC-LXIII decisions by which ICTT on QMF was replaced by an EC focal point on QMF. The Management Group approved the amendments, and considered the request of the EG-QMC for an additional member to represent RA V, and its proposal to invite Mr William Wright, Co-Chair of OPACE-I for this purpose.
4. The Management Group recalled the priority actions identified by the EG-QMC reported at its meeting in October 2011, and considered additional elements that could be added.
5. In terms of capacity development, the Management Group considered the draft top level competencies created by the Expert Team on Strategy for Capacity Building for Climate Services (ET-SCBCS) but agreed that it is not necessary that each person has the full set of competencies.
6. The Chair of EG-QMC had requested assistance from the Secretariat with engaging rapporteurs on WMO technical regulations (WMO No. 49), WMO International Meteorological Vocabulary (WMO No. 182) and on the methodology for calculating mean daily temperature.
7. A web page has been created by the EG-QMC at: <http://qmc.mgm.gov.tr/>. The web page will be updated in due course, based on feedback.
8. EG-QMC is keen to sustain its efforts to develop information on best practices in QMS, and has requested members for help in this regard, concerning their respective Regional Associations.
9. EG-QMC proposed the following CCI reference documents and practices as candidates for developing new common ISO/WMO technical standards:
 - *CCI Reference Documents*: WMO No. 100 (Guide to Climatological Practices); WCDMP No. 53 (Guidelines On Climate Metadata And Homogenization); WCDMP No. 55 (Guidelines On Climate Data Rescue); WMO/TD No 1530, GCOS-143 (Guideline for the Generation of Datasets and Products Meeting GCOS Requirements); RClimDex User Manual
 - *CCI Practices*: National Climate Monitoring Products; ETCCDI Core Climate Indices; etc.

ANNEX 9

EXPERT TEAM ON STRATEGY FOR CAPACITY BUILDING FOR CLIMATE SERVICES

S. Sensoy

1. The first meeting of the CCI Expert Team on Strategy for Capacity Building for Climate Services (ET-SCBCS) was held in Geneva from 5 to 7 August 2013. It considered key issues relevant to capacity development in climate services, ranging from climate observation, data management, data rescue, climate prediction and packaging climate products for different user groups. Furthermore, the Expert Team addressed the existing gaps and competencies in the context of WMO mechanisms and procedures for capacity development.
2. The Team decided on the following actions to be completed by mid-November 2013.
 - (a) Refine a draft paper for top level climate experts;
 - (b) Prepare a draft document on the Strategy for Capacity Development needs for the minimum set of climate products, as defined by CCI ET-CSIS;
 - (c) Review the Annex to Res. 7 (CCI-XV) on Strategy for capacity building in climate services;
 - (d) Review the activities of Expert/Task Teams in the composition of CCI and other Technical Commissions and provide a synthesis of their roles and responsibilities in contributing to the different aspects of Capacity Development for climate services;
 - (e) To consider organizing a curriculum development workshop in 2014, subject to the availability of resources, on climate related training and education. Details will be discussed during MG meeting in October 2013 and among the relevant departments of WMO Secretariat.
3. The meeting further agreed on the following set of recommendations:
 - (a) The Commission to pursue prioritization of the training activities using e-learning methods across all the OPACEs, mainly through Regional Training Centers (RTCs), and to advise on the necessary technical guidance. Based on the CCI prioritization and guidance, the Secretariat to assess the resource requirements and explore budgetary resources, including those available within the current financial period as well as extra-budgetary resources.
 - (b) Regional mechanisms to be considered as an integral part of capacity development including strengthened operations of WMO Regional Climate Centres (RCCs), networking, user communities etc. to help each other.
 - (c) The Climate Services Toolkit (CST), envisaged to be developed as part of the implementation of the CSIS, is considered as an important contribution to standardization of training as well as operations in terms of sustainability. The capacity development initiatives of the Commission should be anchored to the CST, to the extent possible.
 - (d) Informal learning activities provide a comprehensive opportunity which complements formal education and training strategy. A complete education and training strategy will include:
 - Formal training events (classroom and online courses)
 - Online learning resources
 - Documentation and tutorials for tools

- Fellowships and secondments
 - Community of practice activities (social networking opportunities)
- (e) A blended approach involving both conventional and distance-learning approaches is needed to address learning needs. Online resources will be very useful for some but not all needs.
- (f) There is a need for assessment of climate information and services, review of ongoing capacity development initiatives including on-line courses, proposed components for training packages and post training sustenance and other relevant issues, which may be taken up for an open discussion during the proposed Technical Conference preceding the forthcoming CCI-16.
- (g) Considering the emerging requirement of a large number of competent climate services personnel through the implementation of GFCS, Universities/Academic Institutions need to be encouraged, through appropriate mechanisms, to consider developing new departments/programmes/curricula in climate related areas to fill the gaps in skilled personnel.

ANNEX 10

CCL ACTIVITIES RELATED TO WMO DRR WORK PLAN

G. Srinivasan

1. The DRR Programme of WMO is engaging research and operational networks, WMO Technical Commissions and partners to address five strategic priorities derived from Hyogo Framework for Action 2005-2015 (HFA) and approved by WMO Congress XV in 2011, including:

- i. Development, improvement and sustainability of early warning systems in particular related to scientific and technical infrastructures, systems and capabilities for research, observing, detecting, forecasting and warnings of weather-, water- and climate-related hazards;
- ii. Development, improvement and sustainability of standardized hazard databases and metadata, systems, methods, tools and applications of modern technologies such as geographical information systems for recording, analyzing and providing hazard information for risk assessment, sectoral planning, risk transfer and other informed decision-making.
- iii. Development and delivery of warnings, specialized forecasts and other products and services that are timely, understandable to those at risk and driven by requirements of disaster risk reduction decision processes and operations engaging socio-economic sectors;
- iv. Stimulate a culture of resilience and prevention through strengthening of capacities for better integration of meteorological, hydrological and climate products and services in disaster risk reduction across all socio economic sectors, such as land use planning and infrastructure design and continued public education and outreach campaigns; and
- v. Strengthening cooperation and partnerships of WMO and NMHSs in national, regional and international user forums, mechanisms and structures for implementation of disaster risk reduction.

2. These priorities were adopted as WMO DRR Work Plan 2012-2015 by the 15th WMO Congress in 2011, followed by the 64th session of its Executive Council. A key deliverable of this DRR Work Plan is (ii) above on “development of guidelines and standards for hazard definition, monitoring and detection, databases and metadata and hazard analysis and forecasting tools, for weather, climate and hydrological hazards” building on the extensive work of the WMO Technical Commissions, Members and key partners.

3. It is proposed to constitute DRR User-Interface Expert Advisory Groups (UI-EAGs) on Hazard/Risk Analysis to provide user input and guidance towards the implementation of these guidelines and standards by the WMO Technical Commissions. The first meeting of this UI-EAG will be held in 2014. As part of the preparatory work to undertake this initiative, the “First Technical Workshop on Standards for Hazard Monitoring, Databases, Metadata and Analysis Techniques to Support Risk Assessment,” was held in WMO Headquarters, Geneva, Switzerland from 10 to 14 June 2013. CCI-DRR focal point Dr. G. Srinivasan prepared a draft document outlining the activities of CCI linked to DRR in general, and Standards, Database management, Metadata, climate applications and user oriented activities of CCL in particular as compiled briefly in Annex 1.

4. During the discussions on CCI activities there was a particular interest expressed on the work of the “OPACE 2 Task Team on Definition of Extreme Climate & Weather events”. The main recommendations were:

- To establish hazard definitions and a hazard classification scheme, with attention to the spatial and temporal interrelationships of the hazards, which meet the needs of the risk assessment community, response agencies and other key sectors.

- To establish good practice principles for hazard monitoring and mapping in support of risk assessment.
- Establish common format and methodologies for development and interoperability of relevant databases and metadata in linkage to the definitions:
- Need for enhanced cooperation and data exchanges intra-country, trans-boundary, regional and international on hazard data/metadata
- Design, assess human and financial resources needed and propose a pilot to demonstrate the above concepts (building on capacities and activities of WMO TC and other partners engaged in relevant projects in these areas) Subject to on-going consultation with Technical Commissions)
 - a. Identify specific cross-commission cross-agency demo project, activities, databases, etc) (based on best practices and lesson learned from cross-commission cross-agency projects) relevant to
 - b. Loss and damage
 - c. Risk assessment and analysis that is needed
- Need for education and training and systematic capacity development projects to build these capacities.

Details of the recommendations and road-map for implementation are stated in a message at Annex 2.

5. A Coordination Meeting of the DRR Focal Points of the WMO Technical Commissions and Technical Programmes is being organized in the WMO HQ in Geneva on 14 -16 October 2013. The main objectives of this first meeting of DRR Focal points would be to discuss the outcomes of the Hazard Standardization technical Workshop outcomes and develop concrete recommendations for activities, deliverables and timelines for consideration of the TCs' Management Groups and the 2014 meeting of Presidents of Technical Commissions (PTC), pertaining intra- and inter-commission and programme activities for the development of guidelines, manuals and standards for monitoring, detecting, maintaining databases as well as analysis and forecasting techniques for hazards analysis as input to risk assessment. Furthermore, the group will review the DRR Programme Work plan for consideration of other deliverables over time.

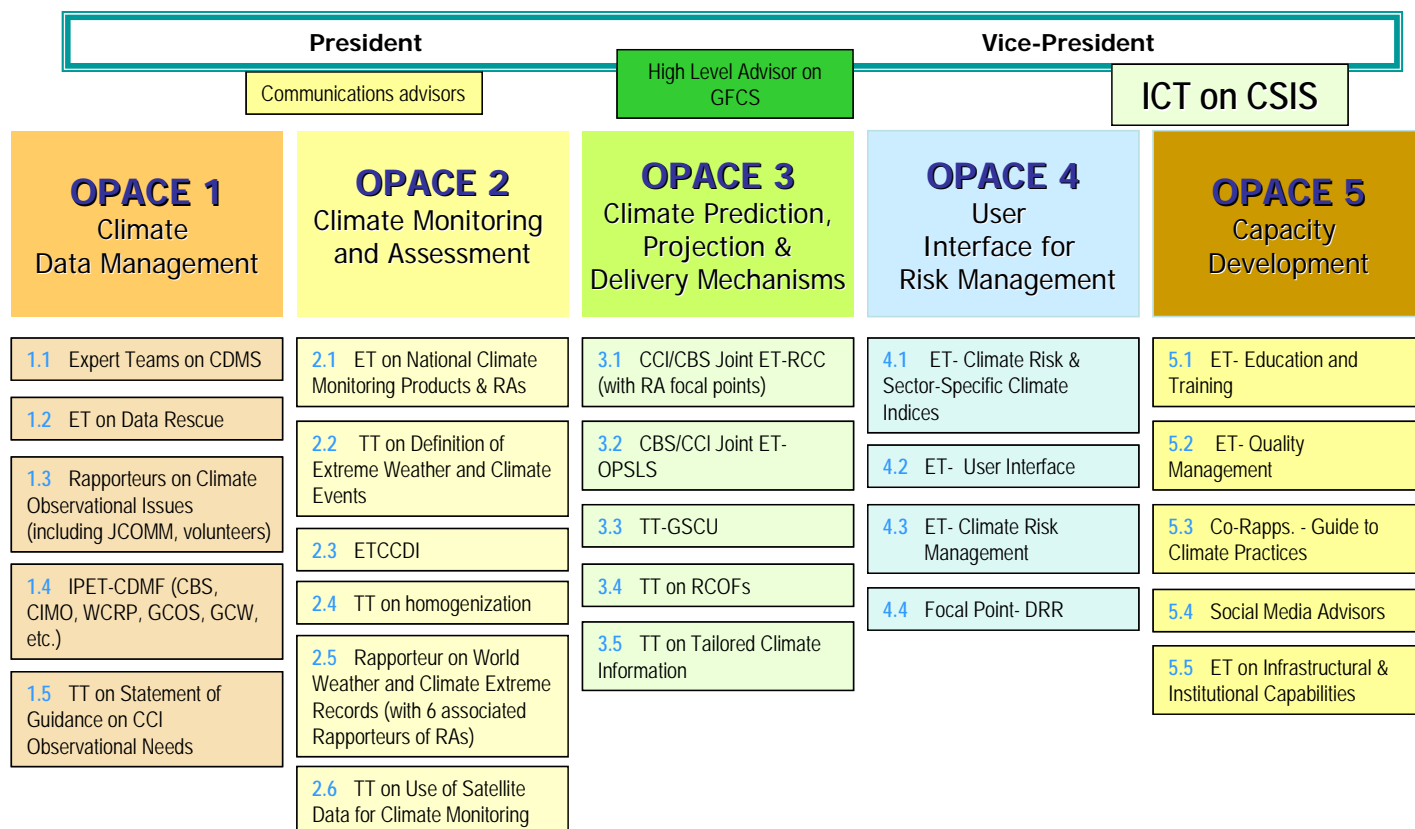
6. The final version of the CCL activities document has been requested to be submitted through the President of the Commission.

7. Meeting of the Commission for Basic Systems (CBS/DPFS-PWS) Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies" was held at WMO Headquarters, in Geneva, Switzerland, from 15 to 17 July 2013. The main recommendation of this task team was that the Global Seasonal Climate Update (GSCU) would be a good contribution to the Early Warning Early Action (EWEA) report, with regular conference calls to support updates of the EWEA report. The EWEA is widely used by humanitarian agencies for preparedness. The team also recognized the need for coordinating and liaising with the Commission for Climatology (CCI), Commission for Hydrology (CHy), and the Commission for Agricultural Meteorology (CAgM), for a seamless Early Warning System (EWS).

ANNEX 11

PROPOSED STRUCTURE OF CCI IN THE 16TH INTERSESSIONAL PERIOD

WMO CCI Structure (MG Proposal)
16th Intersessional Period 2014-2018



ANNEX 12

CLIMATE RELATED ACTIVITIES IN THE WMO REGIONAL ASSOCIATIONS

1. RA I (Africa) by Tesfaye Gissila

1.1 *Salient Points*

The Working Group on Climate Matters and Applications (RA I WGCMA) was established by XV Session of RA I in 2010. A concept paper was prepared and was sent to the members of the Working Group and was discussed. There was a fruitful exchange of views. A questionnaire was prepared and was sent to the Group members so as to make a general review of climate applications over the continent. The WG has so far not held a meeting, and has been somewhat constrained by lack of adequate communication. Efforts are underway to improve the situation.

1.2 *Concept Paper*

The concept paper circulated among the members addressed four major tasks to be accomplished by the Working Group:

- Survey on regional needs for, and capacity and identification of user tailored products and Regional Climate Outlook Forums (RCOFs) to be delivered by the WMO RCC services and the WMO Regional Climate Centre Networks in RA I.
- Develop modalities to work closely with the WMO and RA I for the implementation of the RCCS for the region.
- Work actively in coordination with the RA I in the implementation, demonstration and consolidation of the RCC-related products and services in RA I.
- Develops strategies for enhancing the networking between the NMHSs and the RCCs by identifying the existing opportunities for networking and pooling the capacities of NMHSs for Climate Services at the National level.

Moreover, the concept paper also addressed a road map for the realization of the four major tasks:

- Develop and finalize draft concept notes on the above four tasks.
- Develop draft action plan for the implementation of the GFCS through the RCCS, the NMS and the RCC Networks.
- Identify best practices among the RCCs, NMSs and the RCC Network and use these materials for the workshop/working group meeting.

There were various inputs by some of the members of the working Group. A questionnaire was also sent to the WG members, to assess the state of the level of the implementation of climate applications in the RCCs and identify best practices. It is expected that the response from the WG members on the questionnaire can be used as an input for planning further activities.

1.3 *Conclusions and Way Forward*

The level of the activity of the WG can be enhanced if there is a workshop that can address the following main agenda items on aspects relevant to RA I:

- Climate Data Management system
- Implementation of the RCCs
- Enhancement of the RCOFs
- Enhancement of climate applications

The way forward therefore involves:

- Planning for a workshop on climate matter and applications;
- Identify the major outcomes, objectives, themes, agenda etc and participants and resource persons for the workshop/working group meeting;
- Finalize the preparation of the workshop and also the materials that should be prepared for the workshop/WG meeting;
- Undertake the workshop; and
- Finalize and disseminate action plans, strategies, and recommendations and if possible also adapted technical notes for the implementation process.

2. RA II (Asia) by Ryuji Yamada

2.1 New Working Structure

The Regional Association II, at its fifteenth session (Doha, Qatar, 3 - 9 December 2012), decided to establish the Working Group on Climate Services (WG-CS) consisting of two Expert Groups (for Climate Services and Agrometeorology). The Expert Group for Climate Services (EG-CS) is comprised of two co-ordinators and five theme leaders and the Group is developing a work plan for the inter-sessional period.

2.2 Climate data management and monitoring

CMA hosted International Workshop on Climate Data Requirements and Applications - Progressing on Data Management Tools, Data Rescue in support of Climate Change Assessment and the Global Framework for Climate Services - held in Nanjing, China in March 2013 with the participation of experts around the world.

Japan and Iran have served as CBS Lead Centre for GCOS, which is responsible for monitoring performance of GCOS networks, in particular of the GCOS Surface and Upper Air Networks (GSN and GUAN), and to support any follow-up action in RA II.

2.3 Implementation and Development of RCCs

The Beijing Climate Center (BCC) of the China Meteorological Administration (CMA) and the Tokyo Climate Center (TCC) of the Japan Meteorological Agency (JMA) formally designated as WMO Regional Climate Centers (RCCs) in RA II in 2009, have conducted a variety of RCC-related activities, including the dissemination of climate data/products and the organization of training workshops for capacity development in accordance with RCC mandatory functions.

In addition, the North Eurasia Climate Centre (NEACC) coordinated by ROSHYDROMET, Russian Federation was also formally designated as a new RCC at EC-65 in June 2013. In response, BCC and TCC have introduced a new design on the website (<http://www.rccra2.org/>) to add links to climate products provided by NEACC.

India began a demonstration phase as a candidate RCC in May 2013. Iran and Saudi Arabia have expressed interest in hosting WMO RCCs.

2.4 Progress in the implementation of RCOFs

In RA II, Regional Climate Outlook Forums (RCOFs) are convened regularly. These include the Forum on Regional Climate Monitoring, Assessment and Prediction for Regional Association II (FOCRA II) coordinated by China since 2005, the South Asian Climate Outlook Forum (SASCOF) coordinated by India since 2010, the North Eurasian Climate Outlook Forum (NEACOF) coordinated by NEACC since 2011. In addition, a new RCOF, the East Asia winter Climate Outlook Forum (EASCOF), which replaces the Joint Meeting for the Seasonal Prediction of the East Asian Winter Monsoon held 13 times so far, was established after coordination among four participating countries (China, Japan, Mongolia and Republic of Korea) and its first session will take place on 4-6 November 2013 in Ulaanbaatar, Mongolia. The establishment of another new RCOF in Southeast Asia (including some RA V Members) is being considered.

2.5 User interface for climate services

There is a recognized need to encourage the exchange of good practices and the sharing of experiences in the application of climate information among NMHSs and to strengthen user-provider interaction. Some RCOFs including FOCRA II and SASCOF provide such opportunities by inviting experts from user sectors, such as agriculture and health, to the meeting and by listening to their needs for climate information.

2.6 Pilot Project on Information Sharing on Climate Services

For the successful implementation of GFCS, it is important to share good practices and lessons learned, including experienced project management capabilities, to develop projects and improve climate services by NMHSs as well as to avoid duplication and minimize the risk of failure. The WMO RA II's fifteenth session decided to establish a pilot project on information sharing on climate services. The project aims at sharing information on climate services and best practices of climate information among NMHSs in the region for the successful implementation of GFCS. TCC has been designated as Lead for the project to establish and maintain a dedicated website. To collect relevant information from NMHSs, TCC has developed and distributed a questionnaire for the project to nominated focal points. The submitted questionnaire will be organized on the pilot project website, which is expected to be useful for considering future actions required to facilitate the utilization of climate information.

2.7 Research-operations linkages

The coordinator of WGCAA-CAS (predecessor of EG-CS) attended the WCRP Climate Variability and Predictability (CLIVAR) Project's Asian-Australian Monsoon Panel (AAMP)

Workshop held in conjunction with FOCRA II in Beijing, China, in 2011. This provided an excellent opportunity to consider a possible mechanism for collaboration between operational climate service providers and research sectors.

2.8 Capacity development activities for climate services

A number of training events have been conducted in the region organized by WMO Regional Training Centres, RCCs (BCC, NEACC and TCC) and some NMHSs. Such events have also taken place in conjunction with RCOFs including FOCRA II, SASCOF and NEACOF. Many of these events have been conducted on a practical basis so that trainees could apply what they learnt to their operational climate services soon after returning to home countries.

3. RA III (South America) by Barbara Tapia

3.1 Introduction

The Working Group on Climate Services (WGCS) was established in the XV Session of RA-III in Bogota, Colombia (September 2010). The new structure of the WGCS includes the Sub-group on Climate and Data Management, Sub-group on Forecasting and Application Services and the Sub-group on Agricultural Meteorology.

During the first meeting of WGCS (Ecuador, October - 2011) a work plan was established and during this period the following activities have been performed:

- 2 questionnaires were elaborated to evaluate which Climate/Agricultural products and services are delivered in the RAIII;
- official applications was sent to CCI and CBS to begin the pilot phase of 3 RCCs within the region;
- a Pilot Project for the Global Framework for Agricultural Meteorology was developed; and
- the first South American Regional Climate Forum was held as an opportunity to exchange of experiences, knowledge and the review of good practices.

3.2 Activities related with OPACEs

- OPACE 1: So far no activity has been developed in the RA III, and there is no record that somebody for the region had participated in any meeting or workshop.
- OPACE 2: Regional Training Workshop on Statistical Analysis of Climate Extremes for South America took place in Ecuador, January – 2011; which was organized by WMO and CIIFEN. Most of the countries of the RAIII participated in the training workshop.
- OPACE 3: (i) CLIPS Training Workshop on Operational Climate Prediction (Mexico, April 2011), in which all the Spanish-speaking countries of RAIII and RAIV were represented; (ii) Consultation Meeting on Implementation of RCCs in South America (Brazil, April 2011); (iii) Some members of the WGCS have participated in some of the Expert and Tasks Teams, specially those related with RCC and CSIS.
- OPACE 4: (i) Meeting of Experts (Ecuador, January 2013) workshop (June, 2013) on Enhancing Climate Indices for Sector-Specific Applications, which included the agro,

water and health sector and had the participation of all the countries of the Western Coast of South America (WCSA); (ii) Some members of the WGCS have participated in some of the Expert and Tasks Teams, specially those related with Climate Risks Management and Climate Indices.

3.3 *Regional Climate Centres*

In February 2012, through the President of the RA III official letters were sent to the CCI and CBS to formalize the future operation of an RCC and two RCC-Networks in the region.

- RCC for Western South America: in March 2013 formally begins the pilot phase of the RCC. Website: <http://ac.ciifen-int.org/rcc/>. At the moment, all the mandatory functions remain operational, and work is underway to finalize some issues related to verification. Also during October it is expected to implement servers and a new infrastructure that will automate the generation of products and services.
- RCC-Network for Southern South America: They are working in the implementation of a regional database and the definition of a list of products. Also, they have ready some products of regional climate watch and there is a test website where some products are being proved. It is estimated that the web site should be operational in late 2013.
- RCC-Network for Northern South America: Throughout the period 2011 - 2013 has not been known any advances of a possible implementation. However, this process has being delayed by institutional and political coordination.

3.4 *Regional Climate Outlook Fora*

Two RCOFs are active, one for the West Coast of South America and the other for Southeast of South America. Monthly updates are made of their tri-monthly forecasts and at least once a year each RCOF has a meeting/workshop where it is possible to review new tools and exchange experiences.

In October 2012 the first South American Regional Climate Forum was held, where the participants had the opportunity to exchange of experiences, knowledge and the review of good practices.

3.5 *WIGOS*

In November 2012, a joint meeting was held between the RAIII Subgroup on Integrated Observing Systems, the RA IV Task Team on Regional WIGOS Implementation and the RAIII Working Group on Climate Services was invited to participate in the meeting. In the opportunity, a Regional WIGOS Implementation Plan for RAIII was developed, and it is expected that the implementation activities will cover the period 2012-2015.

3.6 *Future activities and priorities*

Support of CCI is required in the implementation phase of the RCC of Western and Southern South America, in order to review the progress and difficulties detected, also to have the support of regional authorities and look for guidance of other technical commissions. The priorities for the region include:

- Promote the activities associated with the implementation of the GFCS, not only at regional level but also at national level, and focused on sectors such as agriculture, disaster reduction, water resources and health.
- Promotion and guidance for the implementation of Climate Watch System at regional and at national level, considering the inclusion of hydrological and agrometeorological aspects.
- Assistance in tailoring agrometeorological services and products at local scale, taking into account climate change impacts on the whole agricultural production chain, including related education and training.
- Assistance in the application of climate and hydrological data operations and management, including the development of data collection networks and data rescue.

4. RA IV (North America, Central America and the Caribbean) by Albert Martis

RA IV has not constituted any working group explicitly focused on climate, and all the relevant activities are being directly coordinated by their Management group. The President of RA IV has nominated Mr Albert Martis, Vice-President of RA IV, to brief the MG on climate activities in RA IV. In RA IV, there are two RCOFs, for the Central America and the Caribbean. The Caribbean Institute of Meteorology and Hydrology (CIMH), located in Barbados, has commenced the demonstration phase to seek designation as a WMO RCC. RA IV has also constituted a Task Team on GFCS to advise the Management Group on related implementation aspects.

5. RA V (Southwest Pacific) by Erwin Makmur

The meeting of the RA V Working Group on Climate Services was held from 2-4 November 2011, at Honiara, Solomon Islands, in conjunction with the RA V Regional Seminar on Climate Services. Based on the discussions held during its meeting as well as during the RA V Regional Seminar, the Working Group concluded on five specific activities during the current inter-sessional period (2010-2014):

- Development of a document 'Best practices and resource guide for data management and data rescue';
- Facilitation of a first Southeast Asian Climate Outlook Forum (SEACOF) in 2012;
- Facilitation of a RA V RClmDex training workshop including a report/peer-reviewed journal paper on RA V climate indices analyses;
- Assessment of current RCC-related functions being performed in RA V vis-à-vis the mandatory and highly-recommended RCC functions and subsequent gap analysis;
- Development of a review document on the current use of climate information for agriculture in RA V.

6. RA VI (Europe) by Anahit Hovsepyan

6.1 Introduction

The Working Group on Climate and Hydrology (WG-CH) has been established by the XV Session of RA-VI, in Brussels, September 2009, through its [Resolution 4 \(XV-RA VI\)](#). The proposed new structure of the Group with flexible task teams was aligned with WMO and RA VI strategies, and it allowed stronger integration between different disciplines and activities. Initially the level of integration between climate and hydrology activities remained rather low, since the contents of the work programme 2009 – 2013 were mainly fixed before the decision of the new RA VI structure in September 2009. However, both communities have been able to learn a lot from each other during the past years and support various joint activities in many ways. Based on better starting points for the new work programme, the proposed plan for 2014 - 2018 implies much higher level of integration.

Acknowledging the success of the WG-CH during the period from 2010 to 2013, the RA VI XVI session (11-17 September 2013) maintained the main structure of subsidiary bodies and re-established the WG-CH, which is composed of two Expert Groups, i.e. climate and hydrology, led by the WG's co-chairs A.Hovsepyan (Armenia) for EG climate and Dominique Berod (Switzerland) for EG hydrology.

6.2 *Main events and outcomes*

The Working Group organised or co-organised several events, e.g. the WMO Workshop on Climate Monitoring including the implementation of climate watch systems in RA VI, Offenbach, Germany, 25-28 October, 2010, WMO RA VI (Pilot) RCC-Network coordination meeting, Offenbach, Germany, 28 October, 2010, Side event WMO RAVI RCC-Network workshop, European Conference for Applied Meteorology, 12-16 September, 2011, Berlin, Germany, Water Scarcity and Drought Seminar, Venice, Italy, 13 – 14 October 2011, RA VI Hydrology Forum, Koblenz, Germany, 8 – 10 May 2012, Side event on the implementation of Climate Watch System (CWS) in WMO-RA-VI. European Conference for Applied Climatology, 10-14 September 2012, Lodz, Poland, RA VI side meeting at the 14th Commission of Hydrology session, Geneva, 7 November 2012

6.3 *Regional Climate Centres*

The Task Team RCC coordinated the RAVI RCC-Network related activities. After the evaluation of the performance of the Pilot RCC-Network by CBS and CCI the presidents of CCI and CBS nominated the WMO RA VI Pilot RCC-Network to become a new RSMC in the WMO system. In September 2012 the WMO CBS in its 15th session approved the nomination. A WMO RA VI RCC-Network Website was developed and accessible via www.rccra6.org. A catalogue of available products and services is provided via RAVI RCC-Network Nodes web-portal. The TT RCC coordinated the implementation of Climate Watch System in RAVI, conducting a Workshop and a side event during the EMS/ECAC 2012.

6.4 *Data Rescue*

The Task Team DARE developed a web page (common with CCI ET-DARE (OPACE1)), available at <http://www.climatol.eu/DARE/>, which includes an inventory of known Data Rescue projects and Data Repositories, Guidance on the method for climate series homogenization with the summary of the main characteristics of the available computer packages, and the results of a benchmarking exercise which compares the performance of those able to be run in a completely automatic way. TT-DARE members through their active participation or even

leadership in projects such as HISTALPS, ACRE, MEDARE promoted development of high-quality and homogenized long climate records and mobilizing resources for undertaking integrated DARE projects.

6.5 *Regional Climate Outlook Fora*

The Task Team RCOF worked extensively coordinating RCOF activities in the WMO RAVI. A Concept paper on development of RCOFs in RA-VI including their liaison with the RA VI (Pilot) RCC-Network was prepared by the Team leader as a valuable input to RCOF activities. Potential sources of predictability for Europe in general, and furthermore the predictability of winter and summer seasons over SE Europe have been analyzed and reflected in a research paper. It is worth noting the essential expansion of the RCOFs geographical coverage over the RA-VI region. By 2013, the existing RCOFs cover more than a half of the RA-VI. Particularly, SE Europe is covered by SEECOF (held since 2008), North-eastern Europe is covered by NEACOF initiated since 2011. Nowadays, a third RCOF – inter-regional Mediterranean COF (RAVI-RAI) covering Southern Europe and North Africa is being established.

6.6 *Agrometeorology*

The Task Team AgM played an important role in the promotion, coordination and implementation of Agrometeorology related services and activities in the RAVI. The TT AgM examined the economic impacts of agrometeorological information in Europe based on the specific case studies, explored the ways of improving the active collaboration between farming community and agrometeorological services in Europe. The efficiency of long range forecasts for agrometeorological purposes was studied on the examples of best practices, the strengths and limitations were revealed. New challenges have been identified for agrometeorological services and products related to ongoing climate change impacts and the high-quality agricultural production chain and a number of recommendations has been propose to overcome these challenges. All the outcomes and findings have been reflected in a comprehensive report.

6.7 *Drought Management*

The Task Teams Drought Management and Water Scarcity and Drought activities were closely liaised, as these teams worked on crosscutting issues related to drought. The TT DM reviewed and evaluated drought monitoring capacities in RA VI at national and regional level. The scope for integrated drought monitoring approach in RA VI countries with respect to water resources and agriculture was explored and key recommendations have been made. TT WSD has formed an important link between the European Union Water Framework Directive implementation and RA VI hydrological services. This collaboration has clearly promoted RA VI input to the EU process, and it has also enhanced the development of main TT products – review of European drought observatories, drought forecasting tools, WS&D indicators, and integration of research and services in the region. A joint seminar with the European Union task force has promoted the distribution of results and information. The TT has also developed the concept of environmental flow. The main results are reported jointly with EU bodies at www.circa.europa.eu and <http://edo.jrc.ec.europa.eu>.

6.8 *Priorities for the next intersession period (2014-2018)*

The re-established WG-CH will focus on the following activities:

- (a) Promotion of further supplementing WMO RAVI RCC products and services, based on the analysis of requirements and feedback on effectiveness, gaps for improvement of RCC and RCOF services, and assisting in further strengthening of RCOF mechanisms in RA VI, (relevant to the OPACE III activities)
- (b) Promotion and guidance for the implementation of Climate Watch System at national level, considering inclusion of hydrological and agrometeorological aspects (relevant to the OPACE II activities)
- (c) Assistance in tailoring agrometeorological services and products at local scale, taking into account climate change impacts on the whole agricultural production chain, including related education and training (relevant to the OPACE IV activities)
- (d) Contribution to the research, services and monitoring systems related to water scarcity and drought, considering existing mechanisms as well as deficits in drought information services (jointly with EGH); (relevant to the OPACE IV activities)
- (e) Assistance in the application of climate and hydrological data operations and management, including the development of data collection networks and data rescue procedures (jointly with EGH), (relevant to the OPACE I activities)
- (f) Promotion of closer collaboration between climate, weather and hydrology experts and services within regional meteorological and hydrological services,
- (g) Coordination of regional activities with WMO Technical Commissions and other WMO and UN programmes, and
- (h) Liaison with the European Union bodies and other relevant regional actors to promote the above objectives.

ANNEX 13

PROVISIONAL LIST OF DOCUMENTS FOR CCI-16

(with notes)

No.	Agenda item	Documents	Responsible
	Material arrangements for the session	INF. 1	Secretariat
	Provisional list of documents	INF. 2	Secretariat
	Tentative work plan for the session	INF. 3	Secretariat, President
	Provisional list of participants	INF. 4	Secretariat
1.	OPENING OF THE SESSION	None	
2.	ORGANIZATION OF THE SESSION	-	-
2.1	Report on Credentials	In-session	-
2.2	Provisional Agenda	Doc. 2.2(1)	Secretariat, President
	Explanatory memorandum relating to the provisional agenda	Doc. 2.2(2)	Secretariat, President
2.3	Establishment of Committees	In-session	-
2.4	Other organizational matters	In-session	-
3.	REPORT OF THE SECRETARY-GENERAL ON THE WORLD CLIMATE SERVICES PROGRAMME	Doc. 3	Secretariat
3.1	Report of CCI-XV Activities	INF. 5	Secretariat
3.2	Global Framework for Climate Services	INF. 6	Secretariat
3.3	Regional activities related to WCSP	INF. 7	Secretariat, RA WGs
3.4	Technical Conference on "Climate Services – Building on CLIPS Legacy"	INF. 8	Secretariat
3.5	Coordination of climate activities	INF. 9	Secretariat
3.6	WMO Strategic Planning and RBM	INF. 10	Secretariat
3.7	WMO Quality Management Framework	INF.11	Secretariat
<i>(The above infs may need to be docs so they get captured in the main report. The Secretariat can decide later.)</i>			
4.	REPORT OF THE PRESIDENT OF THE COMMISSION	Doc. 4	P/CCI
4.1	Activities of the president	Appendix C	P/CCI, Sec.
4.2	Activities of the 4 OPACes and Vice President <i>(backward looking on last intersessional period approximately 2 pages per OPACE, accomplishments focused)</i>	Appendix C	OPACes, VP/CCI, Sec.

5.	DECISIONS OF CONGRESS AND THE EXECUTIVE COUNCIL OF RELEVANCE TO THE WORLD CLIMATE PROGRAMME	Doc. 5	Secretariat
6.	REVIEW OF ONGOING ACTIVITIES <i>(about activities started in the current intersessional period and continuing into the next one and when we expect them to finish)</i>	Doc. 6	OPACEs, Secretariat
7.	CCI STRATEGIC PLANNING and how it fits into WMO's strategic planning	Doc. 7	Secretariat, Pres.
8.	PRIORITIES FOR THE FUTURE WORK OF THE COMMISSION	Doc. 8	Secretariat
8.1	Climate Data Management <i>(with resolution on calculating new normals every 10 years, etc.)</i>	Doc. 8.1	OPACE 1/ Omar
8.2	Climate Monitoring and Assessment <i>(including a resolution on focal points for national climate monitoring products implementation)</i>	Doc. 8.2	OPACE 2/ Omar
8.3	Climate Predictions/Projections and their Delivery Mechanisms	Doc. 8.3	OPACE 3/ Kumar
8.4	User Interface for Climate Adaptation and Risk Management	Doc. 8.4	OPACE 4/ Kumar
8.5	Capacity Development	Doc. 8.5	VP/CCI, Pres.
8.6	Climate Services Information System (CSIS) <i>(importance of ICT tying together the all the OPACEs)</i>	Doc. 8.6	OPACEs/ Kumar & Omar
<i>Mainly Appendix A for the above, to the point, describing what we want to do but not how as that is in the TOR later on. Explain scientific and/or strategic basis. No mention of what teams to have to do this.</i>			
9	CCI COMMUNICATIONS <i>(why communication is important, communication advisors justification)</i>	Doc. 9	P/CCI
10.	OTHER KEY INITIATIVES <i>(mainly an open slot but including Centennial stations)</i>	Doc.10	Secretariat, OPACE 1
11.	ELECTION OF OFFICERS	Doc. 11	Secretariat
12.	CCI WORK PLAN AND FUTURE STRUCTURE (2014-2018). <i>(TORs and descriptions of OPACES, list of each OPACEs teams, but not the TOR for each team)</i>	Doc. 12	Secretariat/ MG
13.	REVIEW OF PREVIOUS RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION AND OF RELEVANT EXECUTIVE COUNCIL RESOLUTIONS <i>(and what resolutions are no longer going to be in effect)</i>	Doc. 13	Secretariat
14.	ANY OTHER MATTERS	Doc. 14	Secretariat
15.	DATE AND PLACE OF THE SEVENTEENTH SESSION	Doc. 15	Secretariat
16.	CLOSURE OF THE SESSION	Doc. 16	Secretariat

Note:

All documents will consist of

- *Cover page*
 - *Appendix A which is discussed and edited by CCI 16 in the plenary. This should be short, to the point. pithy. forward looking. This will constitute the main CCI-16 meeting report.*
 - *Appendix B which are resolutions. Anything we especially want CCI-16 to support should be highlighted in a resolution. CCI-16 will edit these. Resolution can have annexes.*
 - *Appendix C which will **not** be edited by CCI-16. This should only be background material. But it can be extensive background and explanatory material. All these documents will be translated into 6 languages so there is a cost to Appendix C, ergo say what needs to be said but no more.*
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