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REPORT OF THE MEETING OF THE WORKING GROUP ON CLIMATE-RELATED MATTERS FOR REGIONAL ASSOCIATION II (RA II WGCRM)

(Beijing, China, 7 – 8 April 2007)

WCASP - No. 73

WMO-TD No. 1382

WORLD METEOROLOGICAL ORGANIZATION
April 2007

The **World Climate Programme (WCP)** implemented by WMO in conjunction with other international organizations consists of the following major components:

- World Climate Data and Monitoring Programme (WCDMP)
- World Climate Applications and Services Programme (WCASP)
- World Climate Impact Assessment and Response Strategies Programme (WCIRP)
- Coordination activities within the Climate Agenda (CCA)
- World Climate Research Programme (WCRP)
- Intergovernmental Panel on Climate Change (IPCC)
- Global Climate Observing System (GCOS)

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SUMMARY

An ad-hoc meeting of the Regional Association II Working Group on Climate-Related Matters (RA II WGCRM) was held from 7 to 8 April 2007 at Beijing Climate Center (BCC), China Meteorological Administration (CMA) Headquarters, Beijing, China. The participants included selected members of the RA II WGCRM, who were nominated during the thirteenth session of RA II. The meeting reviewed the work done by RA II WGCRM since its establishment, and examined the eligibility of proposals for designation as Regional Climate Centres (RCCs). The meeting also discussed the implementation aspects of the RCC Network in RA II, including the detailed products and services, website and its hosting responsibilities, the expected final structure of the RCC Network and further steps needed for implementation. The meeting also considered the progress reports by the WG members. The meeting was pleased to note the climate-related academic exchange and training activities carried out within the RA II Region.

The meeting examined the eligibility of NMHSs for the RCC network for recommendation to the president of RA II regarding their designation as RCCs, based on the applications received so far, after the Designation Procedures for Establishment of RCCs (see Annex IXc) and the Guidelines on the Eligibility of RCCs (see Annex IXb) had been agreed by the members of WGCRM, and approved and distributed by the President of RA II. The meeting noted that CMA (BCC) and JMA (TCC) had applied to serve as RCCs in RA II Region. The meeting took cognizance of the fact that the Islamic Republic of Iran Meteorological Organization (IRIMO) and India Meteorological Department (IMD) had also shown interest in the RCC status, but had not yet formally applied. Furthermore, the meeting noted that the North Eurasian Climate Centre (NEACC) established by the NMHSs of the Commonwealth of Independent States (CIS) has recently approved their joining of the RA II RCC Network and is planning to formally apply to participate in the network. The meeting agreed that WGCRM should consider the applications by the other Members of RA II, if submitted in the future.

The meeting considered the presentations made by CMA (BCC) and JMA (TCC), two candidate centres for RCCs, on their status and future plans for the implementation of RCC network. The meeting agreed to recommend to the President of RA II that both BCC and TCC be designated as RCCs. The meeting requested the President of RA II to submit a report on the above recommendation to the Fifteenth Congress of WMO. The President was also requested to urge CCl and CBS to take action, as appropriate, to agree to the designation of RCCs in RA II.

The meeting deliberated on the issues related with the further implementation of the RCC Network in RA II, including: the detailed products and services to be provided by the RCC network, users' requirement in RA II, structure of RCC Network and role of the host for homepage, etc. The meeting emphasized that further coordination was important among the participating institutions in the implementation of RCC network in RA II. The meeting endorsed an implementation plan for RCC Network in RA II. The meeting agreed to have the RCC Network home page hosted by both BCC and TCC in such a manner as mirror sites. The meeting also discussed the schedule for establishing RCC network, and agreed that it should be established and start its operation as early as possible but not later than 1 June 2007. The meeting underlined the importance of cooperation and coordination among the participating institutions and homepage host in establishing and starting its earlier operation.

The meeting noted with appreciation the progress made by members of WGCRM on their assigned roles and work in the group. The meeting encouraged each member of the group to continue and expand their contribution to promoting the WGCRM's activities on climate-related matters of importance to this region.

1. Introduction

An ad-hoc meeting of the Regional Association II Working Group on Climate-Related Matters (RA II WGCRM) was held from 7 to 8 April 2007 at Beijing Climate Center (BCC), China Meteorological Administration (CMA) Headquarters, Beijing, China. The meeting was chaired by Dr Zheng. The participants included selected members of the RA II WGCRM, who were nominated during the thirteenth session of RA II, (Annex II).

2. Opening Remarks

Dr Zheng Guoguang, Administrator of CMA and Chair, RA II WGCRM, welcomed the participants on behalf of CMA, and thanked Mr A.M.H. Isa, president of RA II, and WMO through Dr T. Toya, Director, Regional Office, Asia-Pacific (RAP), and Dr Nyenzi, Director, World Climate Programme (WCP) for the active support to the organization of the present meeting. He highlighted the fact that the climate change issue has now secured worldwide attention, and is now high on social, political and economic agenda at global, regional and national levels. In this context, he mentioned that he was just back from attending the IPCC WG2 meeting at Brussels, Belgium, where the Summary for Policy Makers (SPM) of the Fourth Assessment Report of IPCC WG2 was approved and released. He said that, while it was a tough meeting involving intense debate on various aspects covered in the report, finally all sides agreed to adopt the report, which was an encouraging development. Dr Zheng said that CMA was honoured to be given the responsibility of holding the present meeting of RA II WGCRM, to discuss the progress achieved so far and to decide on the issues to be placed before the forthcoming Fifteenth Session of the World Meteorological Congress (Cg-XV). He also recalled the proceedings of the previous meeting of RA II WGCRM, the report of which elicited excellent response from WMO and thanked WMO Secretariat and RA II president for their full support to the work and activities of the WG. He expressed confidence that, with the active support of all the members of RA II, the RA II WGCRM will achieve greater success during the current intersessional period. He offered the hospitality of the CMA to the participants, and encouraged them to visit Beijing during their free time.

The Chair invited other participants to give their opening remarks.

Dr Nyenzi offered warm congratulations and felicitations to Dr Zheng for his appointment as the Administrator of CMA and the Permanent Representative of China with WMO. On behalf of the Secretary-General and other staff members of WMO Secretariat, Dr Nyenzi conveyed greetings to the WG and expressed deep appreciation of the work being done by the members. In particular, he expressed his sincere gratitude to the WG for their leading role in Regional Climate Centre (RCC) matters from as far back as 2004. He acknowledged the fact that RA II has always been on the forefront in this matter, paving the way for other regions to follow. The route taken by RA II in this regard has shown encouraging results, and two centres have already expressed willingness to take up the role of RCCs. He expressed satisfaction that the procedures adopted by the Region, with active encouragement of a multi-functional distributed approach, ensures that others willing to join at later stages also can be accommodated. He said that RA II is a vast region with diverse climatic conditions and socio-economic impacts, and that just one centre may not be able to adequately address all the related needs. He affirmed that WMO is always ready to support the Region, and that Dr R Kolli, Chief, World Climate Applications and CLIPS Division under the World Climate Programme, is responsible for supporting RA II in climate-related matters. The WG is welcome to also contact Dr Nyenzi, in case the situation demands.

Dr Kurihara conveyed his warm congratulations to Dr Zheng for taking up the leadership of CMA, and expressed the hope that he will continue to lead the RA II WGCRM despite his vastly increased responsibilities as the Administrator of CMA. He thanked the Chair for keenly pursuing the organization of the present meeting and facilitating its hosting by CMA. He gave special thanks to all the local staff members of CMA who worked very hard to make all the necessary arrangements for the meeting and to WMO Secretariat for providing all required support. He expressed his happiness that the RA II RCC Network was on the forefront and emphasized that it was important to make further progress within the WG on this issue.

Dr Kryzhov said that, though this was the first time for him to attend the WG meeting, he was happy to see several familiar faces. Introducing himself, he informed the members that he worked in Asia-Pacific Climate Centre (APCC) for three years, and that he has just returned back to Moscow in December 2006. He thanked CMA and WMO for enabling his participation and said that this would be an important milestone in the Region's progress in climate-related matters. He assured the WG that Russia will contribute its best to ensure rapid progress.

Later, Mr Liu, Dr Chen and Dr Luo of CMA were introduced by the Chair. Dr Kolli thanked the Chair for his efforts to organize and host this meeting and assured full support of WMO Secretariat in the WG's work during the remaining part of the intersessional period.

Concluding the opening session, the Chair invited all participants to take time to visit the CMA premises and facilities.

3. Organizational Matters

The Chair informed the WG that two invited members, from India and Iran, could not attend the meeting due to unavoidable circumstances. However, the member from India, Dr G. Srinivasan, Rapporteur on Regional Climate Data Management including Data Rescue, sent in his inputs through email for consideration by the WG. The Chair then placed the proposed Meeting Agenda before the WG, which was approved without any changes (Annex I). The designation of the Rapporteur for this meeting was then discussed and it was unanimously agreed that Dr Kolli will act as the rapporteur for the meeting and prepare the draft report.

4. Examination of the Eligibility of Candidate RCCs

This session, chaired by Dr Zheng, commenced with a review of the work done after the present WGCRM was established.

4.1 Report by the Chair of WGCRM

The Chair provided the essential background for this agenda item, and invited members to consider his detailed report (Annex IV) for discussion. Regional Association II (Asia), at its Thirteenth Session, (Hong Kong, China, 7–15 December 2004), agreed with the recommendation of the erstwhile WGCRM to initiate a process on the establishment of an RCC network in RA II during the next intersessional period. Accordingly, Resolution 9 (XIII-RA II) was adopted (Annex III). The draft guidelines on the eligibility criteria of RCCs have been distributed to all Members of RA II. The Chair informed the members that the RA II president sought proposals from the Members for recognition as RCCs, for which December 2005 was set as the deadline. In response to this initiative, CMA and JMA have so far formally applied for RCC status.

The Chair noted that both CMA and JMA have already initiated a number of relevant activities even before applying for RCC status. BCC commenced the series of "Forum on Regional Climate Monitoring, Assessment and Prediction for Asia", widely known as FOCRA II and sustained them for the past three years, and also organized summer schools on climate change. Both CMA and JMA set up home pages and made excellent progress in RCC-related activities. The Chair expressed confidence that the Members of RA II will greatly benefit from these activities, due to the easy access to the regional climate products and services. India, Iran and Russia are also interested in joining the RCC network, but have so far not submitted formal applications. The Chair informed the members that he has recently met the Permanent Representative (PR) of Russia and discussed these issues. He mentioned that there have been some later developments in Russia which he expected Dr Kryzhov to cover in his presentation later. He stressed that the process for RCC establishment in the Region has just begun and that the other Members of RA II would get further opportunity to join the RCC network in due course. He said that the present meeting will consider the two formal applications received so far. The Chair pointed out that there is as yet no clear definition and scope for the long-range forecasting (LRF) and requested the WMO Secretariat to clarify and provide guidance. He informed the members that two "Monsoon Activity Centres" have been approved by the Commission for Atmospheric Sciences (CAS), to be hosted by India and China, but that their functions have not yet been clearly defined. The Chair stressed the importance of the visibility for the RA II RCC Network, which is best achieved by an appropriately designed web site. He suggested that a unified home page, with appropriate links to other RCCs, is the most desirable approach. The Chair then opened the topic for discussion.

Dr Kurihara and Dr Nyenzi supported the idea of a unified home page, and stressed the importance of adopting a common format for this purpose. Dr Kryzhov provided some preliminary indications of the Russian Federation's intended role in the RCC network, though it has not yet formally applied. He requested that its expression of interest be included in the report. He informed the members that it has been decided to establish a climate centre covering the Commonwealth of Independent States (CIS). However, he said that Roshydromet does not have the intention to host the RA II Network home page. Dr Nyenzi clarified that the present meeting could take note of Russian Federation's interest, but that the Chairman's report might contain only the progress made earlier. Dr Kurihara pointed out that both BCC and TCC had submitted their activity reports, which should be mentioned in the RA II WGCRM report.

4.2 Present Status and Future Plans of Beijing Climate Center (BCC)

Dr Yong Luo, Deputy Director-General, BCC, made a presentation on this agenda item (see Annex V for details). He brought the attention of the members to the annual report of BCC, and provided additional details and implementation plan. He highlighted that the BCC activities are being strongly supported by CMA, and that the BCC has staff strength of 122 and also supports a large number of postgraduate students including postdocs and several visiting scientists. BCC has six divisions and its functions involve operational, research, coordination and training activities. On the operational level, BCC has dynamical prediction systems involving global as well as regional models, and it is involved in Global Producing Centre (GPC) activities. BCC plans to undertake monthly runs of the models for the next year. The web site of BCC contains menu-driven information easily accessible to the users, and the monthly prediction is updated every five days for the next 30 days. BCC is also actively involved in drought monitoring and ENSO monitoring. Dr Luo provided details of many parameters with examples, including extremes and East Asian Monsoon Monitoring. BCC products are also disseminated as hard copy publications, which are regularly sent to WMO

and other NMHSs in Asia. BCC has a special initiative on "Drought Watch". BCC has been organizing FOCRA II every year on the first week of April, which has attracted more than 100 participants from 28 countries. The 2006 predictions made by FOCRA II were quite successful. Dr Luo expressed satisfaction that BCC is recognized as one of the most advanced centres, and is sustaining its activities with 2007 predictions already in place. There have been several other international seminars/workshops organized by BCC. BCC is also actively promoting capacity building, and has supported nine international visiting scholarships so far. BCC has made valuable contributions to IPCC WG1 assessment and is also active in web-based dissemination of regional climate information, and is quite enthusiastic in working with TCC to develop a common home page for the RA II RCC network based on the trial website (http://www.rccra2.org) developed by BCC. Dr Luo cited the compliments received by BCC from Mr Y.S. Boodhoo, former President of CCl and Dr B. Nyenzi, which he said were a great source of inspiration. On behalf of BCC, he thanked all the senior officials from WMO Secretariat and RA II countries and other global experts for their kind support and cooperation. The ongoing activities and the 2008 plans at BCC include development of downscaling methodologies, probabilistic forecasts, multi-model ensembles, new seasonal to interannual (SI) forecast products; and a new fully coupled modeling system for climate change research. BCC's future plans include expansion of SI prediction network, heat wave early warning system, socio-economic impacts, capacity building, GPC-LRF, FOCRA II, China-Japan-Korea joint meeting on seasonal prediction, two sessions of visiting scholar programme, post-doctoral programme, etc. He invited the members to visit BCC web site (http://bcc.cma.gov.cn), which he said has been visited more than 100,000 times in English and more than 1,700,000 in Chinese.

4.3 Present Status and Future Plans of Tokyo Climate Center (TCC)

Dr Kurihara made this presentation on behalf of TCC and JMA (see Annex VI for details). He thanked the Chair for the opportunity, and mentioned that he was representing JMA as well as contributing as a member of WGCRM. He clarified that his presentation on this agenda item was on behalf of JMA. He has been serving as the Director of Climate Prediction Division of JMA with staff strength of around 50. Introducing the activities of TCC, he informed the members that the TCC was established in 2002, and has established a web site http://ds.data.jma.go.jp/tcc/tcc. He showed some examples of TCC products, including monthly/seasonal reports, Asian monsoon monitoring, TCC News, significant climate events (summary reports), El Niño outlook, etc. Among the major operational functions at TCC is generation of GPC products at present, but more interpretative products are planned for the future. TCC is among the nine GPCs expected to be nominated by the World Meteorological Congress with effect from July 2007. TCC participates in the WMO Standardized Verification System for LRF, and is actively producing operational seasonal prediction products (e.g., 7-day means up to four weeks; monthly mean up to three months). TCC is also engaged in statistically calibrating products in probabilistic form, and Dr Kurihara showed some examples. These products are basically provided on 2.5 degree grids. TCC is bringing out a new online bulletin, "Monthly Highlights on Climate System" from April 2007. The coordination functions at TCC include an international workshop including an open seminar on climate applications held in February 2007, sub-regional Climate Outlook Forums being considered to be taken up from 2008, etc. He remarked that FOCRA II was an excellent initiative of CMA, but since it covers a very wide area encompassing vastly varying climatic conditions, it becomes essential to develop sub-regional RCOFs that can provide more specific and targeted information. He stressed that close cooperation between CMA, JMA, KMA and WMO will be required for such activities. The data service functions at TCC include GSN Monitoring Centres, etc. He informed that surface monthly climate data from 1982 will be made available on TCC web site through ClimView, a man-machine interface software, and provided some examples; the

service is expected to commence from summer 2007. TCC is carrying out its training and capacity building function through training workshops and country-specific training courses. The research and development functions at TCC include the development of the JMA Climate Data Assimilation System (JCDAS), high-resolution AOGCM, the reanalysis project JRA-25, next generation JRA project likely to span 50 years, etc. JRA-25 was the first in Asia and third in the world, and has been providing data free of charge for research. However, the users need to be registered to access the data and so far more than 300 users are already registered. The 3rd WCRP Reanalysis Conference is being organized in January 2008 in Tokyo, Japan (http://jra.kishou.go.jp/3rac_en.html), and the NMHSs are encouraged to attend this conference. TCC has developed statistical downscaling methods and the downscaled prediction products will be available in real-time from 2007 summer onwards. The practical utility of such products is planned to be examined in collaboration with the Thai Meteorological Department (TMD) and Malaysian Meteorological Service (MMS). TCC is also planning operational provision of probabilistic prediction products at some Southeast Asian locations.

Dr Kurihara referred to the new TCC web site, and informed that GPC data are available only for NMHS users with a password control. Twenty out of 34 Members in RA II are already registered for this service. He demonstrated a prototype RCC Network home page developed by JMA. TCC web site is currently being accessed 10,000 times per week, and its demand has been increasing. Indeed, FOCRA II participants used data from TCC web site for their country studies. Dr Kurihara presented the self-checked scores of TCC for RCC functions defined by the Guidelines (Annex IXb), which totaled to 60 out of 78.

The Chair opened the two presentations for discussion.

In response to a query from Mr Liu, Dr Kurihara clarified that the scores for TCC were based on the present status, and future plans (Annex VI). He further said that both BCC and TCC are providing all the RCC functions and significant number of users is accessing the home pages of both centres, but we need to evaluate the number of access to individual RCC functions to survey users' needs.

Commenting as a member of the WGCRM, Dr Kurihara concluded that both BCC and TCC are eligible for RCC status, which was also echoed by Dr Kryzhov. The Chair pointed out that the member from India has supported the CMA and JMA proposals in writing. Both BCC and TCC have applied for RCC status to the RA II president. In response to a query from the Chair, Dr Luo explained that BCC also made a self- evaluation and that the score was 70 out of 78. He agreed with TCC evaluation, and Dr Kurihara responded that TCC also agreed with BCC evaluation. Dr Nyenzi explained that the two RCCs need not be identical in their functions and either of them could be a master in one or two functions, as per the concept of distributed functions. The Chair added that each center may set its own priorities and declare them openly. Dr Kryzhov said that, since this is just the beginning, the centres may like to get involved in everything. Over a period of time, the priorities would become self-evident from the inherent strengths of the individual centres. He suggested that BCC and TCC may evaluate each other. Dr Kurihara said that JMA has a higher focus on the eastern and southeastern parts of RA II; similarly, it might be better to associate each of the main sub-regions of RA II with specific RCCs as their main focus.

The Chair wrapped up the discussion with a summary. After considering the presentations of BCC and TCC and the discussion that followed, the RA II WGCRM endorsed the proposals of BCC and TCC and decided to communicate a recommendation to that effect to the president of RA II. The WGCRM also noted that the Russian Federation and India have shown interest in participating in the RCC network.

5. Implementation of the RCC Network in RA II

This session was chaired by Dr Kurihara.

5.1 Products and Services to be included in the RCC Network

Initiating the discussion, Dr Kurihara said that it would be necessary to identify which functions BCC and TCC are going to focus and that the detailed contents of the products to be delivered by BCC and TCC need to be discussed. Dr Chen said that operational forecasts are of prime importance and that sub-regional issues need to be considered. Dr Nyenzi said that this might not be a major issue at this stage, as things are still at the initial stages. Mr Liu suggested that the functions as listed in the guidelines might be considered in a systematic way for this discussion. Dr Kryzhov pointed out that, since different centres are using different models, the forecasts could be substantially different; therefore, some strategies to combine the forecasts need to be considered.

Dr Kolli suggested that, without going to the individual responsibilities, we may prepare a list of products that are required for the Region, which should be delivered by the RCC network. Dr Kolli suggested that a questionnaire might be issued to the NMHSs to get their inputs. Dr Kurihara agreed and said that BCC and TCC could jointly provide a list of the products already available, and should request the NMHSs to provide feedback on their requirements. Dr Chen added that a staff member each from BCC and TCC could be identified to undertake this task. Dr Nyenzi recalled that similar questionnaire might have been done earlier and that WMO could check this. It might be better if president of RA II disseminates the questionnaire. Dr Kurihara also emphasized that it was important to convey to the NMHSs what the RCCs were doing. Dr Nyenzi agreed and said it was indeed useful to inform the NMHSs on this. This may be distributed along with the report of the WG meeting report to all the Members. Dr Kurihara said that NMHSs might also be requested to review the user requirements and that even if indeed a questionnaire was issued earlier, it was important to update it.

Dr Kolli brought up the subject of downscaling of climate change scenarios, which he said was a major requirement at the national level for most Members. He suggested that the RCCs could assist the developing and least developed countries to generate and disseminate the data pertaining to high-resolution regional climate change scenarios. Dr Chen cautioned that the downscaling process has resource implications on operational scale, but that it might be possible to generate some limited climate change scenarios. There was some discussion on the available downscaling strategies. Dynamical downscaling has constraints, such as the availability of data on lateral boundary conditions, and lack of multi-model projections. Statistical downscaling may provide a practically easier approach to generate regional climate change scenarios. Dr Kurihara pointed out that it is important to consider downscaling of a variety of climate products. Dr Chen suggested the use of weather generators to provide local information within the seasonal forecasting framework. He said that all the numerical models have an inevitable bias, which can be addressed effectively by statistical downscaling approaches. Dr Kryzhov pointed out that there could be geographic differences in the optimal downscaling strategies. To implement locally oriented downscaling in the centres, manpower can be a limiting factor. The RCCs' role may be limited to provide some general guidance and tools to be used by the NHMSs at their level, with the main RCC efforts being focused on local training. Dr Kurihara informed the members that JMA is already doing some downscaling studies with TMD and MMS, which may be handled in country-specific manner. Summarizing the discussions, Dr Kurihara concluded that downscaling is important for climate change projections, as well as for shorter timescale climate predictions such as one-month to seasonal

forecast, and that RCCs and NMHSs need to work together to develop and implement such strategies.

Among other topics, extremes such as heat waves and cold waves were also considered by the WG, agreed that it is necessary to consider sub-regional priorities to address the related climate services. Dr Nyenzi pointed out that RA VI is very advanced in dealing with such issues and that RA II may benefit from their experiences. Dr Kurihara said that early warning is a major requirement for climate-related hazards, but it may not be feasible at this stage to take up such tasks in a comprehensive manner.

5.2 Designation of the Host Institution of RCC Network Homepage

The members felt that it is important to clarify the role of the host institution for the RCC network homepage. Dr Chen proposed that it is convenient and useful to operate mirror sites hosted by multiple institutions, which was agreed by the members. Commenting on the role of the RCC partners that may subsequently join the RCC network such as the Russian Federation and India, Dr Kryzhov said that it would not be efficient to have too many co-hosts for the web site. Some of the RCCs may have their own sites, with mutual links. Dr Chen suggested that the homepage may be managed by a suitable rotation of responsibilities. Dr Kolli added that it is important to physically identify an individual person for this task. Dr Nyenzi suggested that each of the RCCs may provide such a person by rotation. However, Dr Kurihara remarked that other RCCs may not materialize in the near future and therefore this may not be a major issue at the present time. Dr Kryzhov mentioned that, even if the Russian Federation joins the RCC network, it has no intention to host the home page. Dr Kolli suggested that the homepage development might be taken up jointly in the initial stages and the rotation aspects can be decided in due course depending on the work load. Dr Kryzhov said that web-counter should be jointly operated, even if mirror sites are separately hosted. Mr Liu suggested to set up a unified home page under the same frame and link to different languages in order to promote their access in different countries, but the members felt that there was no need to make specific recommendations on this issue. There was some discussion on the possible contents of the home page, (e.g., announcements and links, FOCRA II information, etc.).

Dr Chen emphasized that the structure of the web site should be carefully planned and held constant. The members agreed that the web site should be elegantly and professionally designed, and Dr Chen mentioned that CMA might be able to provide some assistance in this regard. Dr Kurihara suggested that efforts should be concentrated first to establish the home page and then work towards these enhancements. He said that achieving excellence in design is a time-consuming process, and it is essential to give priority to expedite the web site rather than to make it very attractive. The WG requested BCC and TCC to nominate a contact person on each side to work together on the web site.

As per the timing for launching the web site, the members felt that it was feasible to do something by the forthcoming Cg-XV Session. Dr Kurihara said that the site could be very simple at this stage. Dr Kolli said that WMO Secretariat may be involved in the discussions for possible suggestions.

5.3 Final structure of RCC Network and Implementation of the RCC Network in RA II

This part of the session considered the schedule of establishment and implementation of RCC network, the role of WGCRM to advise on RCC activities and coordination with other components such as GPC and CLIPS, etc. Dr Kolli suggested that the meeting might consider the overall schedule of the RCC network establishment, and not just the current status.

Dr Kryzhov informed that the Russian Federation may formally apply in the near future in accordance with recent decisions made by Inter-governmental Council for Hydrometeorology of the Commonwealth of Independent States. Dr Kurihara pointed out that there are only two formally proposed RCCs in the network as of now, and that we may proceed with the implementation process by identifying the Focal Points. Based on the inputs provided by the members representing BCC and TCC, it has been agreed that Dr Wenjie Dong and Ms Kumi Hayashi will act as the RCC Network Focal Points for BCC and TCC, respectively.

Dr Kurihara said that the annual evaluation of RCCs also needs to be considered. Based on detailed discussions, it has been decided that, at the end of December every year, RA II president shall collect reports of evaluation from all Members, providing their feedback on the RCC Network services. WGCRM shall synthesize these reports and prepare a consolidated evaluation report in the first quarter of the following year. The feedback can also be obtained by the RCCs directly from the Members, possibly through RCC-related information in the respective annual reports.

The members noted that the main role of the GPCs was to produce dynamical seasonal forecasts. The WG agreed that the role of RCCs is to collect products from several GPCs and appropriately package them for use in RA II. In this context, Dr Nyenzi said that WCP and CCl need to consult with CBS on the specific roles of GPCs and RCCs as well as their linkages, and that WCP and WWW need to work together in the WMO Secretariat on this. Dr Kolli offered to discuss the matter with Dr Peter Chen of the WMO World Weather Watch Department (WWW), and determine a common description.

The members also desired that the RCCs need to be in touch with CLIPS Focal Points to promote wider utilization of the RCC products and services. Dr Kolli informed the members that the CLIPS Focal Point database is being updated, and offered to share it with the RCCs. He also suggested that the RCCs should involve CLIPS in training activities, user liaison, user sector partnerships, etc., and help with the development of CLIPS Curriculum on topics of relevance to RA II. The RCCs may also provide resource persons and demonstration material for CLIPS training sessions. Dr Nyenzi pointed out that the CLIPS Training sessions are taken up in a cyclical fashion covering all the WMO Regions, and it could take more than seven years to revisit a Region. RCCs may therefore pursue their own CLIPS training sessions to supplement the training cycle. The members also expressed the need for the RCCs to be active in publications and scientific reports, which could be made available on the RCC Network home page. Such publications may undergo an informal peer review process, possibly assisted by the WGCRM. There was also a suggestion to bring out the reports on topical issues in a numbered series (e.g., RA II RCC Network Publication Series).

Dr Kurihara summed up the discussions, saying that the final structure of RCC Network will be clear only after CCl and CBS finalize the formal designation of RCCs. At this juncture, it has been agreed that the WGCRM recommend to the president of RA II to take steps to formally recognize the RCC Network in the present form.

6. Progress Reports of WG Members on Climate-Related Matters

This session was chaired by Dr R. Kolli.

6.1 Progress Report of North Eurasia Climate Centre (NEACC)

Dr Kryzhov made the presentation on behalf of Dr Roman Vilfand, Rapporteur on CLIPS and Predictive Capability, RA II WGCRM with presentation having been prepared by Dr Vilfand and Dr Dmitry Kiktev from Roshydromet. The presentation mainly dealt with the recently established North Eurasia Climate Centre (NEACC).

Dr Kryzhov highlighted that North Eurasia has an enormous territory, mostly contained in RA-II, but having considerable part in RA-VI. It has great diversity of weather and climate conditions: from continental to near-maritime, from subtropics to polar permafrost areas. The territory is marked by quite non-uniform observational network and data exchange facilities. There is relatively low predictability on seasonal time scale for the most part of the territory, with relatively low ENSO influence on climate variability. He said that there have been concerted efforts and all-round support for the integration of former USSR countries in dealing with the natural environment, which is further facilitated by the absence of linguistic barriers. NEACC was established by the initiative of the Intergovernmental Council for Hydrometeorology comprising the NMHSs of Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. NEACC is a multi-institutional centre with eight institutions from the Russian Federation already participating now and the list is kept open for further expansion.

Dr Kryzhov informed the members that NEACC has a strong operational function, and that though the products are not yet posted to the web site, it will be done in due course. Its coordination functions are mostly planned into the future. The data services include the World Data Centre (http://www.meteo.ru), etc. The training and capacity-building functions include WMO Training Centre, which is currently focused on short-term weather forecasting and the seasonal to interannual prediction aspects yet to be fully established in the training activities. The research and development functions mainly deal with statistical studies, but numerical studies have also commenced. The web site http://neacc.meteoinfo.ru has started about a week ago in Russian as well as English, but with only limited information in English. Monthly weather reviews are posted on the web site. More details and the current status and future plans for NEACC are provided in Annex VIII. Dr Kryzhov expressed the confidence that the NEACC is ready to play a role of one of multifunctional regional climate centres within the RCC Network in RA II with focus on provision of climate information service for North Eurasia counties. NEACC is currently located in Hydrometeorological Research Centre of the Russian Federation (HMC), Moscow. A formal application from NEACC for recognition as RCC is yet to be submitted.

Participating in the discussion that followed the presentation, Dr Kurihara remarked that NEACC may be requested to provide information to other centres on their climate issues. However, Dr Kryzhov said that the material in English might be very limited. Dr Zheng informed the members that CMA has bilateral agreements with many NEA countries, with annual meetings on climate prediction, and exchange of climate monitoring and prediction products. He said that such bilateral exchange of information must be continued, but the mechanism for integrating this into the NEACC activities needs to be further explored. Dr Kryzhov appreciated the suggestion, and said that it would be taken up on high priority. Dr Zheng added that there are good channels of communication at the higher levels, which should be fully exploited. Dr Nyenzi commented that the formation of NEACC is a very good development and an excellent initiative for coordination in climate matters. Dr Kurihara said that an organization like NEACC recommended by an NMHS is eligible to participate in the RCC network in RA II, and that the procedure for formal application needs to be worked out as

per the regulations in this regard. Dr Nyenzi clarified that this issue can be discussed in WMO, possibly in consultation with the WMO President.

6.2 Report on the Activities for the Implementation of the RA II RCC Network

Dr Kurihara brought the attention of the members to the Summary Report on the activities for the implementation of the RA II RCC Network provided by him (see Annex IXd). He summarized the results of the International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region held at TCC in February 2007 and its conclusions (see Annex VIIIb). He has particularly highlighted the conclusions of the workshop related to the importance of sub-regional COFs and cross-Regional collaboration (e.g., RA II and RAV). He also emphasized the potential role of the RCCs on climate change matters and application-specific climate products. The workshop called for the development of web-based application tools for the use of NMHSs. Technology transfer from RCCs to NMHSs is also a major requirement, particularly on new techniques in climate applications.

There was some discussion on the seasonal to interannual forecasts routinely issued by NMHSs and how to reconcile them with RCC forecasts. Dr Nyenzi said that the RCOFs are the best ways to facilitate such reconciliation and suggested that countries with common climatic characteristics should be encouraged to prepare the forecasts using consensus approach. It was also noted that there are many subjective ways of operational use of seasonal forecasts generated by the RCCs. Dr Zheng noted that most NMHSs extensively use statistical methods for seasonal to interannual prediction. They need to be provided additional strategies to generate prediction products.

6.3 Report on Regional Climate Observing Networks

Mr Liu presented this report, dealing with relevant aspects of GCOS, CBS, and the present status of RA II Climate Observing Systems (RA II COS). He also provided information on the salient features of China Climate Observing System (CCOS). He referred to the new initiatives of GCOS, including the ClimDev project and the GCOS Implementation Plan, cooperation with GOOS and GTOS, CBS notes on GCOS Implementation Plan, etc. He briefly described the present status of RA II COS including the existing, new and international plans. The GCOS Network in RA II consists of 206 surface stations and 30 upper-air stations. He provided details of the China Climate Observing System (CCOS), which is expected to be launched by CMA and five other agencies soon. It will enhance the connection of the overall design scheme of the China Climate System Monitoring Network with the Global Climate Observing System (GCOS). CCOS involves 16 Key observation areas for multi-department observing systems, and a CCOS Data Sharing Platform will be set up in future. The datasets include climate, agriculture, environment, water resources, land use, forestry, etc. CMA is also setting up a National Climate Observatory network according to CCOS Plan. Considering the continual change of networks and instruments in the past, Mr Liu also brought up data homogeneity issues (change of instruments etc.), quality control, etc. He stressed on the importance of the generation of application-specific climate change information, and exchange between different climate-related databases. He suggested the setting up of a questionnaire to assess the progress in regional climate observing networks in RA II.

Initiating discussion on this topic, Dr Zheng noted that data continuity and addressing gaps is a major challenge and stressed the importance of reconstruction/expansion of observatory network including innovative ways of climate monitoring (e.g., biological characteristics, air quality, etc.). He also referred to the WMO GOS Calibration Centre and said that resources remained a major constraint to such activities. Members noted that, while there are 206

stations in RA II surface network, there are still large data gaps, which are at alarming levels in some countries. Dr Zheng noted that it was difficult to even communicate with some of the countries in this regard and all possible channels of communication should be explored to address this issue. The members agreed that the WGCRM would recommend to the president of RA II to organize a meeting of the PRs of the Region during the Congress to deliberate on this issue.

7. Concluding Session

The members noted that the next RA II session is likely to be held towards end of 2008 or early 2009. Members agreed that RA II WGCRM should meet in early 2008 to prepare the final report. The meeting decided that RA II president should be requested to brief the PRs about the progress of WGCRM and then highlight on the issues requiring attention. The members requested WMO Secretariat to make arrangements for budgetary provisions for the next meeting. The agenda for the next meeting of the WGCRM may include TCC/BCC Progress, observing system status in RA II and other proposals for RCCs. In this context, Dr Kurihara suggested that FOCRA II-2008 may consist of TCC/BCC presentations, which Dr Zheng requested Dr Chen to note.

Based on the presentations and discussions held so far, the members agreed that significant progress has been achieved by the WGCRM. The members agreed that the written inputs provided by Dr G. Srinivasan of India, Rapporteur on Regional Climate Data Management including Data Rescue, may be included as an annex to this report (Annex X). The members unanimously concluded that both BCC and TCC qualify for recognition as RCCs and that a web site for the RA II RCC network be jointly set up by them, and endorsed the web site focal points chosen by BCC (Dr Yuping Yan) and TCC (Ms Kumi Hayashi). The members appreciated the sustained COF activities in the region and CMA's support to FOCRA II series. The members welcomed the formation of NEACC. The members expressed concern over inadequate observational network in some countries. The members highlighted the importance of climate change issues and the role of climate information for adaptation strategies.

The members agreed that the WGCRM should request the president to take further steps for RCC recognition, and make concerted efforts to formally establish the RA II RCC Network during the current intersessional period. The WGCRM also encourages other proposals to participate in the RCC Network (e.g., NEACC). The members requested the Chair, RA II WGCRM to pursue with all the members to maintain contact through email, and prepare a work plan with specifically assigned work to each of the members. The meeting supported the holding of sub-regional COFs. The members also agreed that the WGCRM should request RA II president to convene an informal meeting, possibly during the forthcoming Cg-XV, to address the issue of observational coverage. The members encourage NMHSs to actively participate in the RCC network and support their activities, utilize the products, and facilitate data exchange. The members agreed that RCCs should contribute to provide more authentic climate change information, capacity building and address the needs of developing countries, especially the least developed countries.

The members adopted the following major conclusions and recommendations, based on the proceedings of the meeting.

7.1 Conclusions and Recommendations

a) The meeting of RA II Working Group on Climate-Related Matters (WGCRM) noted with appreciation the report (see Annex IV) presented by Dr Zheng Guoguang, Chair of

WGCRM, on the activities of the group as per its terms of reference decided by Resolution 9 (XIII-RA II) (Hong Kong, China, December 2004), (see Annex III).

b) The meeting was pleased to note the climate-related academic exchange and training activities carried out within RA II region, including forums on Regional Climate Monitoring, Assessment and Prediction for Asia by BCC, International Seminar on Climate System and Climate Change by CMA and International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region by JMA (TCC).

c) The meeting noted that WGCRM was requested by Resolution 9 (XIII-RA II) to examine the eligibility of NMHSs for the RCC network and recommend to the president of RA II qualified NMHSs to be designated as RCCs. By the same resolution, WGCRM was authorized to receive and consider applications of, and identify participating institutions.

d) The meeting was pleased to note that CMA (BCC) and JMA (TCC) had applied to serve as RCCs in RA II region after the Designation Procedures for Establishment of RCCs (see Annex IXc) and the Guidelines on the Eligibility of RCCs (see Annex IXb) had been agreed by the members of WGCRM, and approved and distributed by the President of RA II. The meeting was also informed that the Islamic Republic of Iran Meteorological Organization (IRIMO) and India Meteorological Department (IMD) had also shown interest in the RCC status, but had not yet formally applied. Furthermore, the meeting noted that the North Eurasian Climate Centre (NEACC) established by the NMHSs of the Commonwealth of Independent States (CIS) has recently approved their joining of the RA II RCC Network and is planning to formally apply to participate in the network. The meeting agreed that WGCRM should consider the applications by the other Members of RA II, if submitted in the future.

e) The meeting considered the presentations (see annex V and VI) made by CMA (BCC) and JMA (TCC), two candidate centres for RCCs, on their status and future plans for the implementation of RCC network. The meeting agreed to recommend to the President of RA II that both BCC and TCC be designated as RCCs.

f) The meeting requested the President of RA II to submit a report on the above recommendation to the Fifteenth Congress of WMO. The President was also requested to urge CCl and CBS to take action, as appropriate, to agree to the designation of RCCs in RA II.

g) The meeting deliberated on the issues related with the further implementation of the RCC Network in RA II, including: the detailed products and services to be provided by the RCC network, users' requirement in RA II, structure of RCC Network and role of the host for homepage, etc. The meeting emphasized that further coordination was important among the participating institutions in the implementation of RCC network in RA II. The meeting agreed on the future implementation plan proposed by the Chair and Vice-chair of WGCRM (See Annex IXa).

h) The meeting discussed the role of the host institution(s) of RCC network homepage. The meeting considered the contents of homepage suggested by BCC and TCC, and agreed to have the RCC Network home page hosted by both BCC and TCC in such a manner as mirror sites.

i) The meeting also discussed the schedule for establishing RCC network, and agreed that it should be established and start its operation as early as possible but not later than 1 June

2007. The meeting underlined the importance of cooperation and coordination among the participating institutions and homepage host in establishing and starting its earlier operation.

j) The meeting encouraged all of the websites of the participating institutions of RCC network to link with the RCC Network homepage, in order to ensure the integration of the whole structure of the system and their activities.

k) The meeting noted with appreciation the progress made by members of WGCRM on their assigned roles and work in the group. The meeting encouraged each member of the group to continue and expand their contribution to promoting the WGCRM's activities on climate-related matters of importance to this Region.

8. Closure of Meeting

Dr Zheng thanked all the members for their active participation in the meeting that resulted in extremely important and useful recommendations for the Region. He thanked all the staff of BCC and CMA who worked very hard behind the screen for the success of the meeting. He thanked the president, RA II for his leadership and support, and the WMO Secretariat for support with the organization of the meeting. He then announced closure of the meeting.

Annex I

AGENDA

Saturday, 7 April 2007

09:00-09:30 Registration of Participants

09:30-09:40 Opening Remarks

- Dr Zheng Guoguang, Chair, WGCRM of RA II and Administrator of CMA
- Dr Nyenzi, Director, World Climate Programme Department, World Meteorological Organization (WMO)

09:40-09:50 Organizational Matters

- Approval of the Meeting Agenda
- Designation of the Rapporteur for the meeting

09:50-12:00 Session 1: Examining of the eligibility of the candidate RCCs

Chair: Dr Zheng Guoguang

09:50-10:10 Reviewing the work of WGCRM since its establishment
- Report by the Chair of WGCRM

10:10-10:40 BCC's present status and future plans
- Presenters from Beijing Climate Center/CMA

10:40-11:00 *Tea Break*

11:00-11:30 TCC's present status and future plans
- Presenters from Tokyo Climate Center/JMA

11:30-12:00 Discussion and Summary of the session (Dr Zheng Guoguang)

12:00-13:30 *Lunch Break*

13:30-17:30 Session 2: Implementation of the RCC Network in RA II

Chair: Dr Koichi Kurihara (Vice Chair, WGCRM of RA II)

13:30-14:30 **Topic 1:** *What are the detailed products and services to be included in the RCC network?*

- RCC Network services, identified by Annex to Resolution 9 (XIII-RA II), including not only operational function but also other functions such as coordination, data services, trainings, research and development functions.
- Identification of what RCC Network can and cannot provide as a result of Session 1.

- Review of Users' requirements in RA II

14:30-15:30 **Topic 2:** *Designation of the host institution of RCC Network homepage.*

- Role of the of host for homepage
- Identification of host institution

15:30-15:50 *Tea Break*

15:50-17:00 **Topic 3:** *Final structure of RCC Network and further implementation of the RCC Network in RA II.*

- Schedule of establishment and implementation of RCC network
- Roles of WGCRM to advise on RCC activities
- Coordination with other sectors such as GPC and CLIPS, etc.

17:00-17:30 Summary of this session (Dr Koichi Kurihara)

18:00 **Reception**

Sunday, 8 April 2007

09:00-12:00 **Session 3: Progress report of WG members on climate related matters**

Chair: Dr Rupa Kumar Kolli (WMO)

09:00-10:20 Presentations of WG members on the progress of their assigned role and work

10:20-10:40 *Tea Break*

10:40-13:00 Preparation of drafts by the WG members on their comments and suggestions on the topics discussed in this meeting to be used by the WG Rapporteur for preparing the report of this meeting

13:00-13:30 Discussion on the draft report of RA II WGCRM meeting.

13:30-14:00 Summary of the workshop and Closing Remarks

Dr Zheng Guoguang

14:00 Closure of Meeting

Annex II

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Annex III

RESOLUTION 9 (XIII-RA II)
ESTABLISHMENT OF A REGIONAL CLIMATE CENTRES NETWORK IN RA II (RCC-RA II)

REGIONAL ASSOCIATION II (ASIA),

NOTING:

(1) Resolution 7 (XI-RA II) — Working Group on Climate-Related Matters,
(2) Proceedings of the Meeting on Organization and Implementation of Regional Climate Centres (WMO/TD-No. 1198),

RECOGNIZING:

(1) That EC-LVI (2004) had urged regional associations interested in Regional Climate Centres (RCCs) to proceed quickly towards implementation,
(2) The RA II president's request to conduct a survey on requirements for the establishment of RCCs in RA II and report the result to XIIIRA II,
(3) The urgent needs in Region II, identified by the survey, to establish a system of RCCs in order to enhance the climate information services of NMHSs,
(4) The capacity in Region II, identified by the survey, to perform a broad range of RCC functions for the Region,
(5) That designation procedures for RCCs are subject to agreement between CBS and CCl,

DECIDES:

(1) To take immediate steps to implement a network of multiple multifunctional centres and/or specialized centres on a pilot basis as the structure for implementing RCC activities in Region II, in order to determine optimal composition of the RA II RCC network which would best comply with the functions of RCCs as described below:

Functions of RCCs

(a) RCC functions should be composed of "operational function", "coordination function", "data services function", "training and capacity-building function" and "research and development function". The functions and activities are listed in the annex to this resolution;
(b) In order to maintain the flexibility of RCCs, network climate products and services provided by each participating institution may be subject to change over the course of the evaluation process;

Eligibility and overall structure

(a) An NMHS, or an organization recommended by an NMHS, responsible for climate-related services which intends to provide RCC services on its own initiative and on a voluntary basis (participating institution) is eligible to participate in the RCC network, subject to being qualified by the RA II Working Group on Climate-Related Matters (WGCRM) as being capable of carrying out the functions of an RCC as defined in Guidelines on the Eligibility of RCCs. A participating institution should have at least some of the listed functions, preferably including several operational activities for all, or a part, of the Region, and must adhere to WMO Technical Regulations and resolutions involving data policy (Resolutions 40 (Cg-XII) and 25 (Cg-XIII));
(b) In the RCC network, each participating institution should establish and manage its web site on its own initiative. All of the web sites are integrated by linking up to the RCC network home page, to ensure the visibility of the whole structure of the system and their activities;

(c) Each participating institution should develop its implementation plan and submit it to the Region II WGCRM in advance. In addition, participating institutions should submit activity reports on an annual basis to WGCRM;

(2) To request WGCRM to examine the eligibility of NMHSs for the RCC network and recommend to the president of RA II qualified NMHSs to be designated as RCCs;

(3) To authorize WGCRM to be responsible for the RCCs overall coordination, including:
(a) To identify an NMHS to host the RCC network home page;
(b) To receive and consider applications of, and identify, participating institutions;
(c) To review NMHSs' requirements for RCC activities;
(d) To propose remedial measures for outstanding RCC activities;
(e) To deal with other issues related to RCC activities;
(f) To review and consider the adequacy of eligibility and overall structure of the RCC network through reviewing the network;
(g) To monitor and review the current status of RCC activities;

REQUESTS:

(1) The chairperson of the WGCRM to submit Guidelines on the Eligibility of RCCs to the president of Regional Association II;
(2) The president of RA II to endorse the Guidelines on the Eligibility of RCCs and designate a procedure for the establishment of an RCC network in Region II, both of which are to be developed by the WGCRM.
(3) The president of RA II to distribute the Guidelines to the Members of Region II and to invite interested NMHSs to apply for RCC status.

ANNEX TO RESOLUTION 9 (XIII-RA II)
REGIONAL CLIMATE CENTRES NETWORK IN RA II (RCC-RA II)

List of functions and activities of the RCC Network in RA II (RCC-RA II)

1. Operational function

Activities:
(a) To provide interpretation and assessment of relevant output products from global prediction centres;
(b) To generate and distribute tailored products to meet NMHSs' needs, including seasonal outlooks etc.;
(c) To undertake product verification, including hindcast verification of the tools, and the necessary exchange of basic data;
(d) To provide climate analysis and monitoring;
(e) To provide climate advisories in coordination with NMHSs;
(f) To undertake climate database management.

2. Coordination function

Activities:
(a) To develop systems to facilitate harmonization and assistance in the use of seasonal and interannual forecast products;
(b) To assist coordination with end-users, including the organization of workshops and other forums on users' needs (regional climate outlook forums);
(c) To assist the introduction of climate information and predictions into early warning and disaster prevention systems.

3. Data services function

Activities:
(a) To assist in the rescue of climate data sets;
(b) To provide climate database and archiving services;
(c) To provide advice on data quality management.

4. Training and capacity-building function

Activities:
(a) To train NMHS staff in seasonal and interannual forecasting methods and characteristics to assist NMHSs to strengthen their services;
(b) To assist the training of end-users on the application and impact of seasonal and interannual forecast products;
(c) To assist the introduction of appropriate decision models for end-users, especially as regards probability forecasts;
(d) To assist technical capacity-building at NMHS level.

5. Research and development function

Activities:
(a) To study climate variability, predictability and impact in the Region;
(b) To develop tools for objective climate analysis and prediction;
(c) To develop and/or validate regional models and methods of downscaling of global output products;
(d) To undertake application research, and assist in the specification and development of sector-specific products;
(e) To promote studies of the economic value of climate information.

Annex IV

REPORT OF THE CHAIR OF THE RA II WORKING GROUP ON CLIMATE RELATED MATTERS (Dr Zheng Guoguang)

After the Hong Kong meeting in 2004, according to the meeting resolution, the chair of RA II WGCRM developed the first draft of "Guidelines on the Eligibility of RCCs" (hereafter "Guidelines") and "Designation procedures for the establishment of the RCC network in RA II (hereafter "Designation Procedures"). The chair distributed the drafts to the members of WGCRM, and got feedbacks from vice-chair Koichi Kurihara (Japan) and R.Vilfand (Russia), Liu Wenquan (China) and Mohammad Rahimi (Iran). With discussion to the members of WGCRM and modification on the Guidelines and Designation Procedures, these two documents were submitted by Chairperson to the President of RA II in the middle of November, 2005. The President of RA II endorsed the "Designation procedures" and "Guidelines" and distributed the "Guidelines" to the members in RA II and invited interested institutions to apply for RCC. As of December 2006, two Members, CMA (BCC) and JMA (TCC) had applied to serve as the RCC in RA II region. Both of them had already submitted their present status and implementation plan for RCC functions. The Working Group monitors and reviews the status of the candidate RCCs and proposes remedial measures. At the same time, BCC and TCC have expressed their intentions to serve as the host of the RCC Network homepage. BCC also established a trial RCC network homepage, which is www.rccra2.org. The Iran Meteorological Organization and India Meteorological Department also showed interest in the RCC status, but have not yet formally applied. The Working Group would consider the applications by the other Members of RA II in the future.

The Working Group actively promotes academic exchange and training activities within RA II region, including forums on Regional Climate Monitoring, Assessment and Prediction for Asia by BCC, International Seminar on Climate System and Climate Change by CMA and International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region by TCC. In addition, the training courses, such as "BCC Climate Products Interpretation and Application", "Wind and Solar Energy Resources Measure and Assessment", "Regional climate model training" to name a few. BCC is also implementing their visiting scholarship program.

CBS, at its extraordinary session in 2006, recommended that WMO Global Producing Centers for Long Range Forecasts (BCC, TCC and KMA) be designated with effect from 1 July 2007, and WMO East Asian Monsoon Activity Center (BCC) was approved by CAS.

With regard to the RCC Designation Procedures, each participating institution should submit activity reports on an annual basis to WGCRM. BCC, a candidate for RCC, distributed the "2005 BCC Annual Report", but didn't submit the report to WGCRM. The Chairperson was informed that "2006 BCC Annual Report" was ready and would be submitted and distributed during the WG meeting in Beijing. JMA, another candidate for RCC, has submitted "Activity Report at Tokyo Climate Center in 2006" to the Chair of WGCRM in RA II.

Although WG makes great efforts on implementation of RCC network in RA II, further coordination, discussion and examinations are necessary among the host and the participating institutions, which are to be identified at this WGCRM meeting.

The RA II WGCRM encourages all of the websites of the participating institutions to be integrated by linking to the RCC Network homepage, in order to ensure the visibility of the whole structure of the system and their activities.

Annex V

Present Status and Future Plans of the Beijing Climate Center (BCC)

1. Operational function

(a) *Provide interpretation and assessment of relevant output products from global prediction centres*

Present status

BCC routinely provides basic interpretation and assessment of CMA's seasonal (or three-month running mean) forecast output products with lead time of 0-4 month and the interpretation and assessment are updated monthly。The super ensemble prediction model system has been developed by BCC since 2004.

Future plan

It is planed to provide informative interpretation and assessment based on ensemble prediction products of BCC, as well as other GPC model products by early 2008.

(b) *Generate and distribute tailored products to meet NMHS needs including seasonal outlooks etc.*

One-month Forecast:

Present status

BCC routinely generates and distributes a variety of figures for ensemble means and most probable tercile categories of a number of variables which are derived from output of the CMA's one-month ensemble prediction system. These variables include geopotential height at 500 hPa, mean surface air temperature, and total precipitation on a 2.5x2.5 degree grid system over the global. The figures are updated every 5 days.

Future plan

Through the development and application of BCC's downscaling technology, BCC is going to generate and distribute detailed probabilistic forecast by multi-model outputs for some major points as required in Asia by early 2008.

Three-month Forecast:

Present status

The same is done as with the one-month forecast, except the updating is on the monthly basis.

Future plan

Through the development and application of BCC's downscaling technology, BCC is going to generate and distribute detailed probabilistic forecast by multi-model outputs for some major points as required in Asia by early 2008.

(c) *Undertake product verification, including hind cast verification of the tools, and the necessary exchange of basic data*

Verification results according to WMO LRF_SVS:

Present status

BCC provides the verification results of 20-year (1983-2002) hind cast of CMA's three-month ensemble forecast of mean surface air temperature and total precipitation according to WMO LRF_SVS.

Future plan

It is planed to provide the verification results of 22-year (1981-2002) hind cast of CMA's three-month ensemble forecast according to the WMO LRF_SVS by early 2007.

Provide the necessary data, including both hind cast and observation for verification:

Present status

BCC provides the data for model verification in response to requests from WMO members.

Future plan

It is planed to provide the 22-year hind cast data for verification by early 2007.

(d) Provide climate analysis, monitoring

The analysis and monitoring products of maximum/mean/minimum temperature and precipitation in Asia:

Present status

BCC routinely provides climate analysis and monitoring products of the maximum/mean/minimum temperature and precipitation for 1, 10, 20, and 30 day means. The products are updated daily. BCC also provides the preliminary monitoring products on global weather/climate extreme events

Future plan

It is planed to improve the monitoring and analysis products related to anomaly and extreme events of global climate and to provide new generation products by early 2008.

The special climate analysis and monitoring products focused on ENSO, Eurasian snow cover, Asian monsoon, drought, and other severe weather and climate events:

Present status

BCC routinely provides a series of special reports such as “ENSO report”, “Eastasian monsoon report”, “Snow cover report” and “Climate System Monitoring Bulletin”, both in printed form and on Website of BCC. Also Asian and global drought monitoring and the global climate extremes monitoring are provided daily and monthly respectively through BCC website.

Future plan

It is planed to improve the products further in accuracy and more frequently updating.

(e) Provide climate advisories in coordination with NMHS

Present status

BCC provides climate advisories and coordination with the NMHS of other countries in RAII and climate centers such as Hadley Center, CPC, IRI by organizing international workshops and products dissemination.

Future plan

It is planed to improve climate information explanation during providing climate advisories and strengthen coordination and cooperation with the NMHSs in the Asian region.

(f) Undertake climate Database Management

Present status

BCC routinely provides the public with the climate monitoring, analysis, and prediction data as well as BCC model product data through BCC’s Website

Future plan

It is planed to improve the capability of database service on managing and providing climate monitoring and prediction data.

2. Coordination function

(a) Develop systems to facilitate harmonization and assistance in the use of Seasonal and Interannual (SI) Forecast products

Present status

Network for using SI forecast products is set up between BCC and the provincial meteorological agencies in China, Korea, Pakistan and Nepal in Asian region and CIIFEN in South America. Training courses on SI forecast methods and products have been given to the RAII NMHS staffs by BCC routinely since 2005.

Future plan

It is planed to expand the network to the countries of Asian region, set up feedback information system in order to better use SI forecast products.

(b) Assist coordination with end users, including the organization of workshops and other forums on users' needs (Regional Climate Outlook Forum)

Present status

International Climate Outlook Forum for WMO Regional Association (RAII) (FORCRAII) has been organized annually by BCC since 2005, the participants included member of WMO

RAII and other international climate centers (such as Hadley Center, CPC, IRI, CIIFEN, SADC–DMC in south Africa, CPAC in east Africa). Meeting with end users were also included in the Forums. BCC also provides training courses to the users for improving their capacities for climate service and application of climate products. In addition, the questionnaires of climate application products are distributed through the website and emails in order to get feedbacks from the end-users and improve more tailored climate products.

Future plan

It is planed to organize other workshops to meet users' needs.

(c) *Assist the introduction of climate information and predictions into early warning and disaster prevention systems*

Present status

Various drought and flood indices using different type of observation data including satellite data have been introduced into the drought and flood early warning and disaster prevention systems established by BCC. The systems provide the media and policy makers with relevant information on a routine basis. In addition, since 2001, BCC has provided climate prediction and meteorological condition analysis on bush/forest fires to the relevant forest protection department during spring and autumn with higher probability of forest fire. At present, climate information on fire danger has been rolling updated monthly and early warning been given about the more dangerous period and region.

Future plan

It is planed to introduce climate information into heat wave early warning system and cyclones (typhoons) early warning and disaster prevention systems.

3. Data services function

(a) *Assist the rescue of climate data sets*

Present status

Climate database of surface and upper air on different time scales over China and different regions in China were set up. The grid-point drought and flood data were derived from historical documentary records in eastern part of China and China climate historical data for 3000 years were achieved and published. In addition, BCC provides technical assistance in rescuing climate data from ice cores, tree rings and historical climate documentary records.

Future plan

To continue with the assistance on the rescue of climate data sets

(b) *Provide climate database and archiving services*

Present status

BCC provides archiving services for monthly mean surface air temperature, precipitation data over China and advises on data quality management.

Future plan

BCC is going to provide monthly mean air pressure data over China and the monthly mean surface air temperature, precipitation as well as air pressure data in Asian area.

(c) *Provide advice on data quality management*

Present status

BCC are involved in some of quality management projects of National Meteorological Information Center, CMA, which ensures the continuous discussion on and provision of scientific advices of data quality control issues.

Future plan

BCC will continue to provide advice on data quality management.

4. Training and capacity building function

(a) *Train NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen their services*

Have access to basic training facilities:

Present status

BCC has been engaged in providing group training courses in meteorology and climatology in collaboration with the CMA's Training Center and Nanjing University of information Science and Technology (former named Nanjing Institute of Meteorology, also designated by WMO as East-Asian Regional Training Center) for training NMHS staff in SI forecasting methods and characteristics. In addition, BCC provided training courses on interpretation and application of dynamical climate model products and numerical simulation technology on wind energy resource assessment. Since 2004, BCC has held International Seminar on Climate System and Climate Change every summer, focusing training on regional climate model and ocean data system assimilation. BCC has basic training facilities, including a group of experienced experts on climate prediction.

Future plan

It is planed to continue and strengthen the group training course

Training NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen their services

Present status

Besides basic training, BCC has organized "Training workshop on application on SI forecast by downscaling dynamical climate model output" and provided training with experimental operation by BCC-models products during the Forums on Regional Climate Monitoring, Assessment and Prediction for Asia (FOCRAII) since 2005. BCC also provides visitor scholarship for staff of Asian NMHSs for special assistance on cooperation and exchange of SI forecast methods between NMHSs since 2005.

Future plan

It is planed to continue and strengthen the special training such as model products downscaling and SI forecast methods to assist NMHSs staff in Asia.

(b) Assist the training of end-users on the application and impact of SI Forecast products

Present status

BCC organized meeting with end-users during the FOCRAII 2006 to better understanding their requirement for the climate information products, including SI forecast products. The experts of BCC educated and trained on the application and effects of SI forecast products through different media, including newspapers, TV and internet.

Future plan

More workshops or seminars will be organized by BCC to put forward the application of SI forecast products to assist the training the end-users on the application of SI forecasts products and impact assessments.

(c) Assist the introduction of appropriate decision models for end-users, especially as related to probability forecasts

Future plan

It is planed to develop decision-making models related to probabilistic forecasts.

(d) Assist technical capacity building on NMHS level

Present status

A number of national and international conferences and seminars were organized by or collaborated with BCC successfully, including the 14th session of WMO CCl and Joint meetings of the seasonal prediction of East Asian Summer Monsoon as well as international seminars on climate system and climate change. BCC also provides visitor scholarship for staff of Asian NMHSs since 2005 to strengthen the technical capacity building. BCC has international academic exchanges and collaboration with institutions in around 30 countries.

Future plan

BCC will continue to assist in technical capacity building through collaborative research activities.

5. Research and development function

(a) Study climate variability, predictability and impact in the Region

Present status

BCC has extensive activities on using statistical methods and Climate System Models to study climate variability and predictability for monthly, seasonal to inter-annual forecast over Asia and other regions. It also provides ENSO prediction. Assessments of climate change Impacts on socio-economic and ecological systems in the Region.

Future plan

BCC intends to further develop its research tools to study impacts on socio-economical system and ecological system.

(b) Develop tools for objective climate analysis and prediction

Develop tools for objective climate analysis for Asia:

Present status

BCC has been developing and validating statistical methods and Climate System Models for objective climate analysis in Asia

Future plan

It is planed to develop new Reliability Ensemble Averaging (REA) method for climate analysis in Asia

Develop climate modeling system for Asia:

Present status

BCC has developed Dynamical Climate Model Prediction System (DCMPS) for monthly, seasonal to inter-annual forecast which was launched into routinely operation on the new platform of HPC since Jan 2005. Continuous efforts are made to improve and validate the monthly, seasonal to inter-annual forecast from DCMPS.

Future plan

A new fully Coupled Climate System Models for SI forecast and climate change research is under development and will be launched into experimental operation by later 2008 as the upgraded of the current DCMPS.

(c) Develop and/or validate regional models and methods of downscaling of global output products

Present status

BCC has been developing and validating statistical and hybrid statistical/ dynamical downscaling methods for monthly and seasonal forecast.

Future plan

It is planed to strengthen research for developing downscaling techniques in collaboration with domestic universities and institute as well as international experts.

(d) Undertake application research, and assist in the specification and development of sector specific products

Present status

RCC have provided assessment information for the national key construction projects, such as Three-Gorges Reservoir, South to North Diversion Project and Tibetan Railway. A number of sector specific products such as impact of climate/weather conditions on human health and China weather Generator have been developed,

Future plan

It is planed to strengthen research in specification and development of sector specific products, for example, agriculture, water resources, and climate resources, to name a few.

(e) Promote studies of the economic value of climate information

Present status

Several studies have been carried out to assess the economical value of climate information under historic climate.

Future plan

BCC will enhance the studies on the subject by extending the studies into the climate change area.

Annex VI

Present Status and Future Plans of the Tokyo Climate Center (TCC)

1. Operational function

(a) *Provide interpretation and assessment of relevant output products from global prediction centres*

Present status

TCC is providing brief interpretation and assessment of JMA's three-month and six-month ensemble prediction output products experimentally.

Future plan

It is planned to provide interpretation and assessment of JMA's one-month ensemble prediction output products focusing on the tropics in the Asia-Pacific region and its relationship with extra-tropical circulations in the middle of 2007.

(b) *Generate and distribute tailored products to meet NMHS needs including seasonal outlooks etc.*

(One-month Forecast)

Present status

TCC routinely generates and distributes a variety of charts, as referential materials, derived from JMA's one-month ensemble forecast model outputs, such as 500 hPa height forecast charts.

Future plan

It is planned to provide statistically downscaled (point-wise) probabilistic prediction products, for both precipitation and temperature, at some major points in Southeast Asia in the middle of 2007. A kind of tercile probabilistic prediction products on 2.5x2.5 degree grids will be developed in the near future.

(Three-month Forecast)

Present status

TCC routinely generates and distributes a variety of charts as referential materials derived from JMA's three-month ensemble forecast model outputs, such as 500 hPa height forecast charts. TCC is also providing the tercile probabilistic forecast of mean temperature and total precipitation issued monthly for 2.5x2.5 degree grid points over the globe.

Future plan

It is planned to introduce perturbation in prescribed SST and increase the number of ensemble members from 31 to 50 in order to improve the accuracy of the estimation of probability distribution in the middle of 2007. Long-term hindcast experiments using the new ensemble prediction system (EPS) will be executed before its implementation.

(c) *Undertake product verification, including hindcast verification of the tools, and the necessary exchange of basic data*

(Verification results according to WMO LRF_SVS)

Present status

TCC provided the verification results of 21-year (1983-2003) hindcast of JMA's three-month ensemble forecast of mean temperature and total precipitation, in accordance with the WMO LRF_SVS.

Future plan

It is planned to update the verification results of 21-year hindcast using the new version of the JMA's three-month EPS. It is also planned to start providing the verification results of 20-year (1982-2001) hindcast of JMA's one-month EPS, in accordance with the WMO LRF_SVS.

(Provide the necessary data, including both hindcast and observation data for verification)

Present status

TCC has provided the hindcast data by the JMA's three-month EPS and the Japanese 25-year reanalysis (JRA-25) data for the verification.

Future plan
It is planned to provide updated hindcast data for developing tailored products and their verification.

(d) *Provide climate analysis, monitoring*
(The analysis and monitoring products of maximum/mean/minimum temperature and precipitation in Asia)
Present status
TCC routinely provides the analysis and monitoring products of mean temperature and total precipitation amounts for a week and a month, issued weekly and monthly respectively.
Future plan
In addition to the mean temperature and total precipitation amounts, it is planned to routinely provide the analysis and monitoring products of maximum and minimum temperature in the middle of 2007.
(The special climate analysis and monitoring products focused on ENSO, Eurasian snow cover, Asian monsoon, drought, and other severe weather and climate events)
Present status
TCC is routinely providing those specialized products in the booklet of "Monthly Report on Climate System", and also issuing the "El Nino Monitoring and Outlook" on a monthly basis through the TCC website.
Future plan
It is planned to start issuing the new series of "Monthly Highlights on Climate System" as online files (PDF), which contains a lot of useful links, instead of the printed documents. Various kinds of climate data (atmospheric and oceanic) will be provided as a CD-ROM named the "Annual Report on Climate System" on an annual basis. Special reports on unusual climatic anomalies will be issued through the TCC website on a timely basis.

(e) *Provide climate advisories in coordination with NMHS*
Present status
TCC began to cooperate with Thai Meteorological Department and Malaysia Meteorological Department in developing site specific climate information.
Future plan
It is planned to strengthen cooperation and collaboration with the NMHSs in the Asia-Pacific region in 2007 toward provisions of climate advisories.

(f) *Undertake climate Database Management*
Present status
TCC is routinely providing the monthly climate data including mean temperature and precipitation, and objective analysis data of the atmosphere as GPV through the TCC website. The JRA-25 data has been provided to the NMHS users since the middle of 2006.
Future plan
Monthly climate data, which was exchanged through GTS as CLIMAT reports, has been archived at JMA since 1982. They are planned to be compiled into a database and provided with web-based accessing tools at the TCC website in the latter half of 2007. It is planned to derive historical daily surface climate database in Southeast Asia from some existing data sets and to make it open to the NMHSs; re-dissemination policy of each original data sets apply to the database.

2. Coordination function

(a) *Develop systems to facilitate harmonization and assistance in the use of Seasonal and Interannual (SI) Forecast products*
Future plan
Under consideration.

(b) *Assist coordination with end users, including the organization of workshops and other forums on users' needs (Regional Climate Outlook Forum)*

Present status

TCC organized the “International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific region” in Tokyo, Japan, from 20 to 22 February 2007. It was fruitful to exchange the best practices in the application of climate information in various sectors, such as agriculture, water resource and business. International cooperation to promote the application of climate information and useful technologies behind that were discussed.

Future plan

JMA is thinking of convening a sub-regional climate outlook forum in the Southeastern Asia and Western Pacific region to promote the international and inter-sectoral cooperation in the application of climate information in 2008.

(c) *Assist the introduction of climate information and predictions into early warning and disaster prevention systems*

Future plan

Climate monitoring and assessment from the space, which is being executed in the GEOSS framework, is valuable for developing early warning and disaster prevention system. JMA is thinking of developing some kinds of climate monitoring and assessment indices using earth observation satellites data in the future.

3. Data services function

(a) *Assist the rescue of climate data sets*

Present status

JMA gave technical assistance in managing data quality and archiving data under the project of “ASEAN Compendium of Climate Statistics” conducted during January 2001 through March 2004.

Future plan

It is planned to conduct technical supports and consultations for the data rescue activity in the “Monsoon Asia Hydro-Atmosphere Science Research and prediction Initiative (MAHASRI)”, one of the continental scale experiments under the WCRP/GEWEX.

(b) *Provide climate database and archiving services*

Present status

JMA, as a GSN Monitoring Center, routinely manages monthly surface climate data based on the CLIMAT reports. The climate data of monthly mean surface temperature, precipitation and air pressure etc. since 2000 are open to the public through the GSN Monitoring Center website (http://www.gsnmc.dwd.de.GSNMC.htm).

Future plan

It is planned to compile the monthly surface climate data archived at JMA since 1982 into a relational database and to provide them through web-base data accessing tools.

(c) *Provide advice on data quality management*

Present status

JMA routinely conducts a consultation for the quality control management of the incoming CLIMAT reports as a CBS Lead Center for GCOS data.

Future plan

JMA is ready to give technical advice on quality management when required.

4. Training and capacity building function

(a) *Train NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen of SI forecast products*

(Have access to basic training facilities)

Present status

JMA in collaboration with the Japan International Cooperation Agency (JICA) has been providing group training courses in meteorology, including climatology, for more than 30 years.

Future plan

The group training course on meteorology is planned to be carried out in autumn 2007. JMA considers restructuring a curriculum of the training course after 2008.

A training course, on a country basis, which deals with statistical downscaling techniques, will be set up in 2008.

(Train NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen their services)

Present status

In addition to the above-mentioned group training course for NMHSs' staff, TCC organized the "Training Workshop on Climate System Monitoring, Diagnosis and Prediction in the Asia-Pacific Region" in 2003.

Future plan

In the course of the cooperative development activity with Thai Meteorological Department and Malaysia Meteorological Department, some training and/or technology transfer on the statistical /dynamical downscaling techniques and probabilistic forecasting methods are planned.

(b) *Assist the training of end-users on the application and impact of SI Forecast products*

Future plan

In the sub-regional climate outlook forum mentioned above (see section 2.(2)), it is planned to communicate with users of climate outlooks and to have some kind of training session.

(c) *Assist the introduction of appropriate decision models for end-users, especially as related to probability forecasts*

Future plan

It is planned to strengthen the relationship with both domestic and overseas researchers to develop decision-making models related to probabilistic forecasts. The MAHASRI project mentioned above (see section 3.(1)) is one of the inter-disciplinary research projects,

(d) *Assist technical capacity building on NMHS level*

Future plan

It is planned to assist in technical capacity building through collaborative research activities.

5. Research and development function

(a) *Study climate variability, predictability and impact in the Region*

Present status

TCC is conducting the study on climate variability by using COBE-SST and JRA-25. The regression maps between the NINO.3 SST and the global circulation (height, temperature and stream function) were calculated to see the potential predictability owing to ENSO (El Nino /Southern Oscillation).

Future plan

It is planned to conduct the study on climate predictability by using long-term hindcast results in collaboration with universities and research institutes in the framework of the MAHASRI.

(b) *Develop tools for objective climate analysis and prediction*

(Develop tools for objective climate analysis for Asia)

Present status

JMA developed Climate Data Assimilation System (JCDAS) with 3-D variational method and finalized the JRA-25 project in early 2006. The new climatological normals based on the JRA-25 data took the place of the old normals made from different kinds of analyses in January 2007.

Future plan

In order to make plans for next generation reanalysis project, JMA is going to hold an international conference on Re-Analysis in Tokyo in January 2008 under the auspices of WCRP. It is planned to use a new JCDAS with 4-D variational method in the next generation reanalysis project.

(Develop climate modeling system for Asia)

Present status

JMA developed dynamical ensemble prediction systems for one-month, three-month and six-month forecasts which are routinely operated, and has been improving the systems in many aspects such as physical processes of related numerical models, especially for ENSO and Asian monsoon prediction.

Future plan

A high-resolution coupled ocean-atmosphere model and variational ocean data assimilation system has been developed at the Ocean Research Department in Meteorological Research Institute to improve the ENSO prediction. In 2007, it is planned to conduct a thorough hindcast experiment to verify its prediction skill as a seasonal prediction model, including Asian monsoon. Preliminary results suggest that it's better than that of the operational one. It is supposed to be put into operation in early 2008.

(c) *Develop and/or validate regional models and methods of downscaling of global output products*

Present status

TCC has been developing and evaluating statistical downscaling techniques for one-month forecast. By the end of 2006, a prototype of downscaled (point-wise) probabilistic prediction products, for both precipitation and temperature, at some major points in Southeast Asia was developed using the JMA's 10-year one-month hindcast experiment and daily surface observations in Southeastern Asia. Those products were proved to have significant skill in above median probability of 2-15 day precipitation amount and above/below one standard deviation probability of 9-15 day mean temperature, although there is considerable variation of skill from region to region.

Future plan

In order to make the best use of the downscaled probabilistic prediction products, it is planned to start providing the products operationally and to initiate a collaborative evaluation and development with Thai Meteorological Department and Malaysia Meteorological Department of this statistical products. As for the dynamical downscaling techniques with regional models, it is expected to promote collaborative research with university scientists under the framework of MAHASRI (see section 3.(a)).

(d) *Undertake application research, and assist in the specification and development of sector specific products*

Present status

JMA started experimentally issuing an early warning for extreme temperature with a lead time of around one week in March 2007. In the experimental phase, the warning is communicated to the domestic users in agricultural and/or energy sector, who are expected to understand the use of probabilistic information.

Future plan

After examining the usefulness of such kind of early warning, it will be disseminated to the public. Early warning techniques on weather elements other than temperature, such as precipitation and sunshine duration, will be developed in the future. Through the experimental provision of early warning and its evaluation by users, it is expected to clarify what kind of climate information is the most useful in practical use and to give a hint to develop tailored products which meet the users' needs.

(e) *Promote studies of the economic value of climate information*

Future plan

Through the experimental provision of early warning and its evaluation by users, it is expected to clarify what kind of climate information is the most useful in practical use and to give a hint to develop tailored products which meet the users' needs.

Annex VII

Implementation Plan of the RCC Network in RA II

1. As agreed at the meeting of the WMO RA II WGCRM, the President of RA II will be requested to approve the qualified institutions to be designated as RCCs on a pilot basis and prepare a report to the WMO Cg-XV.

2. The President of RA II is requested to urge CBS and CCl to take actions as appropriate to agree on the designation of Regional Climate Centres in RA II.

3. The WGCRM will monitor and review the implementation of the RCC network structure and the RCC homepage as agreed at this meeting. Each participating institution should submit activity report on annual basis to the Chair of WGCRM, which should be distributed to all members of WGCRM, the Presidents of RA II, CCl and CBS, and the Secretariat of WMO.

4. The RCC Network will promote the climate products interpretation and application, as well as climate information application and services. The president of RA II will be requested to seek funding to organize relevant training events for the staff from NMHSs of developing countries, especially the least developed countries in RA II.

5. The participating agencies in RCC Network should work to promote the downscaling of climate products and their application in the NMHSs of developing countries, especially the least developed countries in RA II.

6. The NMHSs should work to enhance climate advisories and services by providing data archiving services in RA II.

7. The RCCs should promote the development of research tools to study the impacts of climate change on socio-economic sectors and the ecological system, as well as tools for objective climate analysis. Studies on the quantification of economic value of climate information should also be encouraged.

Annex VIII

PROGRESS REPORT OF THE NORTH EURASIA CLIMATE CENTRE

North Eurasia Climate Centre (NEACC) is an initiative of the Intergovernmental Council for Hydrometeorology of the Commonwealth of Independent States (CIS) aimed at provision of regional climate related services to its national economies. CIS Intergovernmental Council for Hydrometeorology for was established on 8 February 1992 by Intergovernmental agreement between Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan and Ukraine. CIS Intergovernmental Council for Hydrometeorology is a recognized by the WMO structure providing a framework to organise co-operative programmes between its Members in the various fields of basic hydrometeorological activities such as observing systems, data processing and forecasting, training, research and development. Through these programmes the Members develop their collective capability to provide hydrometeorological services for the region. CIS Intergovernmental Council for Hydrometeorology works on the basis of its own long-term Program of development of hydrometeorological activity for the period from 2006 to 2010.

The recent XVIII Session of the CIS Intergovernmental Council for Hydrometeorology (2007) decided to establish the North Eurasia Climate Centre. In the near future the relevant information on this fact is planned to be sent to Presidents of RA-II and RA-VI and to the CCl and CBS.

At the current stage the North Eurasia Climate Centre (NEACC) is a virtual multi-institutional centre comprising several institutions from Roshydromet:

1. Hydrometeorological Research Centre of the Russian Federation (HMC),
2. Institute of Global Climate and Ecology (IGCE),
3. All Russian Research Institute for Hydrometeorological Information – World Data Centre (RHMI-WDC),
4. Voeikov Main Geophysical Observatory (MGO),
5. All Russia Research Institute for Agricultural Meteorology
6. Centre for Drought Monitoring of Intergovernmental Council for Hydrometeorology
7. Main Computational Centre of Roshydromet
8. Main Radiometeorological Centre of Roshydromet.

This structure opened for other interested NMHSs from CIS and its neighborhood.

The centre is focused on the provision of climate information products and services for the area of North Eurasia, with coverage comprising Asian Russia, Kazakhstan, Uzbekistan, Tajikistan, Turkmenistan, Kyrgyzstan within RA II (Asia) Region.

Summary of the NEACC current status and future plans.

The NEACC has established and currently develops a website http://neacc.meteoinfo.ru in Russian taking into account that Russian language is convenient for majority of the end-users of the North Eurasia Region; mirror site in English is under construction. Nowadays, the NEACC operates as a regional climate centre de facto and produces a large number of the products and services assigned to the RCCs. Particularly, seasonal and monthly probabilistic forecasts of temperature and precipitation based on the WMC Moscow (HMC RF) model global outputs are issued operationally and posted on the web-site, with all forecasts being supported by hindcast based verification results; various monitoring products are also available via the centre's web-site; the works on data rescue, collection and archiving are conducted; research on climate variability, climate model predictability and development of multi-model ensemble predictive tools are conducted. In 2006, the International Conference on the Problems of Hydrometeorological Security was held.

In the near future, the NEACC intends to adjust the scope of products and services provided to the requirements of the RCCs. Particularly, to extend the web-site, extend the list of the forecasts and monitoring products provided via the web-site; to implement multi-model ensemble postprocessing predictive tools including those for the forecast of climate extremes; etc. Special attention will be paid to coordination and organization of the training and capacity building activity focused on end-users within NHMSs-members of Interstate Hydrometeorological Council.

Thus, the NEACC is ready to play a role of one of multifunctional regional climate centres within the RCC Network in RA II.

NEACC CURRENT STATUS AND FUTURE PLANS

1. Operational function

(a) Provide interpretation and assessment of relevant output products from global prediction centres.

Current Status:

Output from EPS WMC Moscow (HMC RF) is available routinely. Centre provides interpretation and real time assessment of the forecast fields.

Element: mean temperature, total precipitation, Z500, T850, wind components at Z850 and Z200

Forecast period: three month

Update frequency: monthly

Future plan:

In the nearest future EPS will be extended by inclusion of EPS MGO.

(b) Generate and distribute tailored products to meet NMHS needs including seasonal outlooks etc.

One month Forecast

Current Status:

On the basis of output from EPS WMC Moscow 1-month probabilistic forecasts for tercile categories (Global and North Eurasia) are issued.

Element: mean temperature, total precipitation

Forecast period: one month

Update frequency: one month

Future Plan:

The same forecast will be issued each 10 days

Multi-model ensemble forecasts will be implemented. In the nearest future: 2 model ensemble (EPS WMC Moscow and EPS MGO).

Three Month Forecast:

Current Status:

On the basis of outputs from EPS WMC Moscow 3-month probabilistic forecasts for tercile categories (Global and North Eurasia) are issued.

Element: mean temperature, total precipitation

Forecast period: three month

Update frequency: one month

Future Plan:

Multi-model ensemble forecasts will be implemented. The nearest future 2 model ensemble (EPS WMC Moscow and EPS MGO).

(c) Undertake product verification, including hind cast verification of the tools, and the necessary exchange of basic data

Hindcast verification:

Current Status:

Verification (both deterministic and probabilistic versions) is carried out according to WMO LRF_SVS for 1979 – 2003 (25 years) hindcasts computed according to protocol SMIP-2/HFP (same as the real time prediction).

Element: mean temperature, total precipitation

Forecast period: one month and three months

Future Plan:
Verification of two-model ensemble.
Development of region specified verification procedures in addition to WMO LRF_SVS.
Hindcast and observation data provision for verification:
Current Status:
Results of SMIP-2 historical seasonal forecasts of the EPS WMC Moscow and EPS MGO were provided to APEC Climate Center.
Results of SMIP-2 historical seasonal forecasts of the EPS WMC Moscow were forwarded to the Livermor National Laboratory (USA) and available at the address http://iridl.ldeo.columbia.edu/expert/SOURCES/.WCRP/.SMIP-2.
Future Plan:
Verifications of global seasonal forecasts of the EPS WMC Moscow will be sent to the Lead Centre of SVSLRF located in Melburn.

(d) Provide climate analysis, monitoring

The analysis and monitoring of the maximum/mean/minimum temperature and precipitation:
Current Status:
For the Northern Hemisphere and North Eurasia both analysis and monitoring are conducted routinely and results are posted on the web-site.
Update frequency: monthly
Future Plan:
It is planned to extend the list of characteristics monitored, particularly, with a set of characteristics of climate extremes.
Special climate analysis and monitoring products focused on ENSO, Eurasian snow cover, Asian monsoon, drought, and other severe weather and climate events
Current Status:
Specialized analysis and monitoring of droughts, floods, snow melt conditions, river ice melt is routinely conducted for Russia.
Update frequency: monthly
Future Plans:
To extend geographical coverage on (at least) whole North Eurasia.

(e) Provide climate advisories in coordination with NMHS

Current Status:
Analysis and advisories of impacts of observed, predicted and projected climate anomalies on water resource, agriculture, human health and energy industry is provided for Roshydromet (NHMS of Russia)
Update: monthly and more frequently
Future Plans:
It is planned to provide advisories for other North Eurasia NHMSs as well.

(f) Undertake climate Database Management

Current Status:
Surface weather observation of maximum/mean/minimum temperature, precipitation, humidity and wind for Hydrometeorological stations of the North Eirasia as well as a wide list of other environmental variables and characteristics on air pollution, agrometeorological conditions, oceanic state, etc. are collected on the daily basis by the ARRIHMI-WDC.
Future Plan:
Participation in the WMO Information System Pilot Project.

2. Coordination function

(a) Develop systems to facilitate harmonization and assistance in the use of Seasonal and Interannual (SI) Forecast products

Current Status:
Subjective harmonization of the 1-3 month statistical (basic) forecast and probabilistic forecast derived on the basis of EPS WMC Moscow output.
Future Plan:
Development and implementation of the statistical postprocessing methods (including probabilistic methods based on the Bayes Theorem) for harmonization of MME dynamical and dynamical-statistical forecast products from different sources.

(b) *Assist coordination with end users, including the organization of workshops and other forums on users' needs (Regional Climate Outlook Forum)*
Current Status:
Future Plan:
The program will be developed.

(c) *Assist the introduction of climate information and predictions into early warning and disaster prevention systems*
Current Status:
In 2006, the International Conference on the Problems of Hydrometeorological Security was held.
Future Plans:
Development of the forecast methods of extreme events (probabilistic), compatible with decision supporting systems (see R&D).

3. Data services function

(a) *Assist the rescue of climate data sets*
Current Status:
Rescue of data is performed by ARRIHMI-WDC, a member of NEACC.
Future Plans:
To continue the work.

(b) *Provide climate database and archiving services*
Current Status:
Database and archiving services (including supporting metadata) are performed by ARRIHMI-WDC and HMC, members of NEACC.
Future Plans:
Participate in the WIS data management regulations development. Migration of data processing and archiving system towards the requirements of WIS.
Upgrade of data processing and archiving facilities in 2008 will result in more efficient and convenient data management.

(c) *Provide advise on data quality management*
Current Status:
Homogenization and quality control of long series are performed by ARRIHMI-WDC and HMC, members of NEACC.
Future Plans:
To increase the number of series, update the series, post on the web-site (www.meteo.ru).

4. Training and capacity building function

(a) *Train NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen their services*
Have access to basic training facilities
Current Status:
WMO Training Centre for RA II/IV hosted by Roshydromet. On the basis of the center, a system of permanent training operates. This system is intent to meet the requirements of all North Eurasia NHMSs.

Future plan:
To develop a program of training on climate related matters and to implement it in the Training Centre.
Train NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen their services
Current Status:
There are irregular trainings for operational specialists on the basis of the centre.
Future plan:
To develop a program of training on climate related matters and to implement it in the Training Centre.

(b) Assist the training of end-users on the application and impact of SI Forecast products
Assist the introduction of appropriate decision models for end-users, especially as related to probability forecasts
Current Status:
Future Plan:
The specialized training program focused on the end-users will be developed.

(c) Assist technical capacity building on NMHS level
Current Status:
Future Plan:
In 2008: upgrade of computer and telecommunication system in the framework of WB Roshydromet Modernization Project.

5. Research and development function

(a) Study climate variability, predictability and impact in the Region
Current Status:
Studies on climate variability and impacts in the North Eurasia were carried out, particularly, variability of circulation, temperature and precipitation, impacts of AO, NAO and other modes of atmospheric variability were carried out. ENSO impacts on extratropical modes, etc.
Future Plan:
To continue the studies on variability, variations, trends, impacts, etc.
In the nearest future: Study on predictability by EPSs of the dominant modes of the Northern Hemisphere circulation variability such as AO, NAO, PNA; study of the influence of background state of tropical ocean (ENSO, IOD, Atlantic) on the predictability over North Eurasia.

(b) Develop tools for objective climate analysis and prediction
Develop tools for objective climate analysis for Asia
Current Status:
NEACC has various statistical tools developed for climate variability studies and climate prediction.
Future Plan:
To continue the work.
Develop climate modeling system for Asia
Current Status:
Two atmospheric models: EPS WMC Moscow, EPS MGO
Future Plan:
Coupled model on the basis of EPS WMC Moscow.

(c) Develop and/or validate regional models and methods of downscaling of global output products
Current Status:
Statistical methods of downscaling appropriate for deterministic approach.
Future plan:
To develop probabilistic methods of downscaling based on the Bayes Theorem.

(d) Undertake application research, and assist in the specification and development of sector specific products

Current Status:

Various statistical methods linking atmospheric characteristics with needs of agricultural, energetic, etc. sectors

Future Plan:

Development of decision supporting systems focused on different sector needs in collaboration with end-users representing different economic sectors.

(e) Promote studies of the economic value of climate information

Current Status:

Qualitative studies. The program complex for quantitative estimate economic value of the forecasts is written.

Future Plan:

To conduct a study on regionalisation of the North Eurasia in accordance with economic value of climate information in the versions of perfect forecast and real forecast.

ANNEX IXa

Summary Report on the Activities for the Implementation of the RA II RCC Network

By Koichi Kurihara
Vice-chair and the rapporteur on implementation of Regional Climate Center in RA-II
of the Working Group on Climate-Related Matters in RA-II

1 The background and current status of the establishment of the RCC Network in RA-II

1.1 The thirteenth session of the WMO Regional Association II (Hong Kong, December 2004) decided to take immediate steps to implement a Regional Climate Centre (RCC) Network in RA-II on a pilot basis (XIII-RA II Resolution 9; see Annex III). The session also decided to establish a Working Group on Climate-Related Matters (WGCRM) in RA-II (XIII-RA II Resolution 7), one of whose terms of reference is to advise the President of RA-II on all matters concerning the implementation of RCC activities in RA-II.

1.2 Following the above Resolutions, the WGCRM (Dr. Zheng Guoguang, chairperson of the WGCRM) developed the "Guidelines on the Eligibility of RCCs" (Annex IXb) and the "Designation procedures for the establishment of the RCC Network" (Annex IXc), and submitted them to the President of RA-II in November 2005. The President of RA-II sent the letter to RA-II Members to invite their applications for RCC status.

1.3 By the end of January 2007, the China Meteorological Administration (CMA) and the Japan Meteorological Agency (JMA) have formally applied for RCC status. CMA and JMA have also expressed their intentions to serve as the host of the RCC Network homepage.

2 The procedure and perspectives of the establishment of the RCC Network in RA-II

2.1 "Guidelines on the Eligibility of RCCs" defines five functions to be performed by the RCCs; operational function, coordination function, data service function, training and capacity building function, and research and development function. Each function and associated activities of the RCCs are evaluated by criteria in four categories 0-3 in order for WGCRM to examine and identify RCCs.

2.2 "Designation procedures for the establishment of the RCC Network" states that 1) an NMHS or an organization recommended by a NMHS, which intends to participate in the RCC Network in RA-II, should submit an implementation plan with its activity report on an annual basis to WGCRM, 2) WGCRM identifies an NMHS that hosts the RCC Network homepage and each participating institution should establish and manage its website on its own initiative, 3) WGCRM monitors and reviews the current status of the activities and considers the adequacy of eligibility and overall structure of the RCC Network.

2.3 Following the application of CMA and JMA to RCC status, WGCRM plans to hold a WG meeting in Beijing in April 2007, to discuss, among others, the establishment and implementation of the RCC Network in RA-II, i.e. identifying the participating institutions to the RCC Network and the host institution of the RCC Network homepage. WGCRM will prepare a report on the implementation of the RCC Network in RA-II and submit it to the President of RA-II.

2.4 It should be noted, however, that the above procedure does not mean to exclude institutions other than CMA and JMA from applying for RCC status in the future. It is preferable that institutions which intend to serve as RCCs, submit their implementation plans to the President of RA-II well before the WGCRM meeting.

2.5 Both CMA and JMA have applied for the host institution of the RCC Network homepage. The two institutions noted that they are ready, under the agreement by WGCRM, to operate their own RCC Network websites with unified RCC homepage design through exchanging and sharing relevant technical information. WGCRM will review and identify the host(s) of the RCC Network homepage. Thus the RCC Network in RA-II is expected to be in operation shortly after the WGCRM meeting.

3 Brief summary of the activity reports of the candidate institutions for the RCC Network in RA-II

3.1 Summary of the relevant activities by CMA (BCC)

Climate application and services are one of the most important tasks of Beijing Climate Center (BCC). For the time being, BCC is capable to produce both regional and global products of monthly, seasonal and inter-annual climate system monitoring, prediction and assessment, as well as decadal and century-scale projections of climate change, and to provide climate services for disaster preparedness and reduction and for the socio-economic development of China and other Asian countries. Based on the China Dynamic Climate Prediction Modeling System (DCMPS), monthly to inter-annual predictions on temperature and precipitation, droughts and floods in summer, as well as sand/dust weather patterns has been generated (http://bcc.cma.gov.cn). According to the monitoring and diagnosis of global climate system, BCC disseminates globally such products as Climate System Monitoring Bulletins on monthly, seasonal and inter-annual scales, Drought Watch, ENSO Report, East Asian Monsoon Monitoring Report and BCC Climate Model Products. BCC undertakes the climate database management, assists rescuing the climate data sets and provides climate data services, as well as advises on data quality control. In addition, BCC has organized a couple of workshops for training and capacity building for NMHSs' experts, for example, two sessions of FOCRAII and International Visiting Scholarship Program. BCC was also act as the WMO East Asian Monsoon Activity Center (EAMAC) and the WMO Global Producing Center for Long-Range Forecast (GPC-LRF).

On the other hand, RCC network homepage (http://www.rccra2.org) had already been established by BCC, all of BCC's products can be accessed.

As for the activities that BCC has not conducted, BCC is preparing for implementation in the near future and is ready to play a major role as one of the multifunctional RCCs in RA-II.

3.2 Summary of the relevant activities by JMA (TCC):

The Tokyo Climate Center (TCC) of JMA, established in April 2002, has already been promoting many activities related to major functions of the RCC Network in RA-II. In particular, a variety of climate monitoring and prediction products are operationally provided through the TCC website (http://cpd2.kishou.go.jp/tcc/), for example, seasonal forecast, climate system monitoring, El Nino monitoring and prediction, and the global warming projection products.

In Addition, TCC has organized some workshops for training and capacity building for NMHS's experts and coordinated research and development activities, for example, development of statistical downscaling techniques for deriving detailed probabilistic prediction for observation stations.

As for the activities that TCC has not conducted, TCC is preparing for implementation in the near future.

Thus, TCC is expected to play a major role as one of the multifunctional RCCs in RA-II.

4 International training and coordination activities in RA-II

There were several international training workshops related to climate matters held in RA-II. Major workshops are summarized as follows.

- FOCRAII (Forum on Regional Climate Monitoring, Assessment and Prediction for Asia: April 2005 & April 2006 in Beijing, China) Two sessions of Forum on Climate Monitoring, Assessment and Prediction in RAII (Asia) were held in Beijing in conjunction with the comprehensive consultations on seasonal to inter-annual (SI) scale climate tendency predictions for the RAII region. This forum was a useful experience in gathering world climatologists together to jointly make climate forecasts and to discuss climate application with end-users. Summary reports of the workshop were submitted to WMO as the requirements for RCCs.

- China-Japan-Korea joint-meeting on the seasonal prediction of East Asian Monsoon has been held biannually since 1998. The spring 2006 session was held as one of the sessions of the FOCRAII in Beijing, China. The autumn 2006 session was held from 2 to 3 November 2006 in Beijing, China.
- CLIPS training workshop in RA-II (eastern part) was held from 15 to 27 January 2007 in Bangkok, Thailand, co-organized by WMO and the Thai Meteorological Department. CLIPS focal points from 10 countries participated in the workshop.
- "International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region" was held in Tokyo, Japan from 20 to 22 February 2007. Main purposes of the workshop are to promote the practical applications of climate information in various fields through better understanding of its utility and characteristics, and to promote the international cooperation for operating relevant climate information services in the Asia-Pacific region. One of the objectives of the workshop was to review the requirements for RCCs as included in the workshop report (see Annex IXd).

Annex IXb

Regional Climate Centre (RCC) in RA II
Guidelines on the Eligibility of RCCs
（The total score is 78）

Functions	Activities	Criteria	score
Operational function	Provide interpretation and assessment of relevant output products from global prediction centres	Product: reliability of EPS products and its reasoning Element: mean temperature, total precipitation Forecast period: three month Update frequency: monthly	0~3
	Generate and distribute tailored products to meet NMHS needs including seasonal outlooks etc	Product: probabilities for tercile categories in Asia Element: mean temperature, total precipitation Forecast period: one month Update frequency: 10 days	0~3
		Product: probabilities for tercile categories in Asia Element: mean temperature, total precipitation Forecast period: three month Update frequency: monthly	0~3
	Undertake product verification, including hind cast verification of the tools, and the necessary exchange of basic data	Products: verification results according to WMO LRF_SVS of at least 20-year hindcasts (same as the real time prediction) Element: mean temperature, total precipitation Forecast period: one month and three months	0~3
		Provide the necessary data, including both hindcast and observation data for verification	0~3
	Provide climate analysis, monitoring	Products: the analysis and monitoring products of the maximum/mean/minimum temperature and precipitation in Asia Update frequency: monthly	0~3
		Products: the special climate analysis and monitoring products focused on ENSO, Eurasian snow cover, Asian monsoon, drought, and other severe weather and climate events Update frequency: monthly	0~3

	Provide climate advisories in coordination with NMHS	Products: impacts of observed or projected climate anomalies on water resource, agriculture, human health and energy industry Update: monthly	0~3
	Undertake climate Database Management	Elements: surface weather observation of maximum/mean/minimum temperature, precipitation, humidity and wind Period: daily , pentadly, monthly Update frequency: everyday	0~3
Coordination function	Develop systems to facilitate harmonization and assistance in the use of Seasonal and Interannual (SI) Forecast products	Possesses an objectively harmonizing system, such as: harmonizing various model products provided by GPCs, harmonizing dynamical and statistical forecast products	0~3
	Assist coordination with end users, including the organization of workshops and other forums on users' needs (Regional Climate Outlook Forum)	Assist coordination with end users, including the organization of workshops and other forums on users' needs (Regional Climate Outlook Forum)	0~3
	Assist the introduction of climate information and predictions into early warning and disaster prevention systems	Assist the introduction of climate information and predictions into early warning and disaster prevention system of drought, flood, typhoon, and heat wave	0~3
Data services function	Assist the rescue of climate data sets	Assist the rescue of climate data sets	0~3
	Provide climate database and archiving services	Provide monthly mean climate data: surface temperature, precipitation and air pressure	0~3
	Provide advise on data quality management	Provide advise on data quality management	0~3
Training and capacity building function	Train NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen their services	Have access to basic training facilities	0~3
		Train NMHS staff in SI forecasting methods and characteristics to assist NMHSs to strengthen their services	0~3
	Assist the training of end-users on the application and impact of SI Forecast products	Assist the training of end-users on the application and impact of SI Forecast products and/or climate analysis on one of the following sectors: water resource, agriculture, human health or energy management	0~3
	Assist the introduction of appropriate decision models for end-users, especially as related to probability forecasts	Assist the introduction of appropriate decision models for end-users, especially as related to probability forecasts	0~3

	Assist technical capacity building on NMHS level	Assist technical capacity building at NMHS level by providing dedicated fund and/or sending some experts to the NMHS	0~3
Research and development function	Study climate variability, predictability and impact in the Region	Undertake studies such as: climate variability using historical data, climate predictability using hindcasts and climate impact using historical disaster database	0~3
	Develop tools for objective climate analysis and prediction	Develop tools for objective climate analysis for Asia	0~3
		Develop climate modeling system for Asia	0~3
	Develop and/or validate regional models and methods of downscaling of global output products	Develop and/or validate regional climate models and statistical downscaling methods of global output products	0~3
	Undertake application research, and assist in the specification and development of sector specific products	Undertake application research, and assist in the specification and development of sector specific products	0~3
	Promote studies of the economic value of climate information	Promote studies of the economic value of climate information	0~3

* Each items scored on four category basis as follows
0-----any activities have not been executed nor are planned;
1-----any activities have not been executed yet but nor are planned in the near future;
2-----some of the requested activities have been executed
3-----all of the requested activities have been executed

Annex IXc

Regional Climate Centre (RCC) Network in RA II (Asia)
Designation Procedures for the Establishment of the RCC Network

Time	Procedures
January-May, 2005	The Chairperson of the RA II Working Group on Climate Related Matters (WGCRM) develops the first draft of "Guidelines on the Eligibility of RCCs" (hereafter called "Guidelines") and "Designation procedures for the establishment of the RCC network in RA II (hereafter called "Designation procedures").
June 2005	The Chairperson of the WGCRM distributes the draft to the members of WGCRM, who submit their feedback on the draft to the Chairperson by the end of June.
July-November2005	The Chairperson of the WGCRM modifies the draft according to the feedbacks from the members of the WGCRM, and distributes it again to the members with the comments from the members for further comments. The Chairperson submits the "Designation procedures" and "Guidelines" to the President of RA II (Asia) in the middle of November.
November 2005	The President of RA II (Asia) endorses the "Designation procedures" and "Guidelines" submitted by the WGCRM chairperson. The President of RA II distributes the "Guidelines" to the members in RA II and invites interested institutions to apply for RCC status.
December2005	An NMHS or an organization recommended by an NMHS, responsible for climate-related services, which intends to provide services of RCC on its own initiative and on a voluntary basis should make an application to the President of RA II by submitting its implementation plan for RCC functions by the end of December.
January2006	The WGCRM receives the applications, examines them and identifies participating institutions to the RCC Network based on the "Guidelines". The WGCRM also identifies an NMHS that hosts the RCC Network homepage. The WGCRM reports the results to the President of RA II.
February-April 2006 Establishment of the RCC Network	Each participating institution should establish and manage its web site on its own initiative. All of the web sites of the participating institutions are integrated by linking to the RCC Network homepage, to ensure the visibility of the whole structure of the system and their activities. Full operation of the RCC Network starts for reviews by the end of April 2006.
May-December 2006 Operation of the RCC Network (on pilot basis)	Each participating institution should submit activity reports on an annual basis (in Jan. 2006 and in Jan. 2007) to WGCRM. The WGCRM monitors and reviews the current status of the activities; proposes remedial measures for outstanding RCC activities; deals with other issues related to RCC activities; and considers the adequacy of eligibility and overall structure of the RCC Network through reviewing the network. Coordination and minor modifications are constantly made by the host and the participating institutions, if necessary.
January-February 2007	The WGCRM determines the final structure of the RCC network, and recommends to the President of RA II qualified institutions to be designated as RCCs by the end of February 2007.
March-April 2007	The RA II (Asia) makes the decision for RCC in RA II (Asia) and reports the result to WMO by the end of April 2007.

Annex IXd

International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region

(20 - 22 February 2007, Tokyo, Japan)

1. Purposes of the workshop

We, all participants in the workshop, recognize the rising risks of climate-related hazards due to global warming, such as floods, droughts and heat waves, and the increasing importance of applying climate information to the decision-making process in various socio-economic sectors for climate risk management. This workshop aims 1) to summarize the prerequisite for climate-related products suitable for practical use in various socio-economic sectors, such as agriculture, water resource, and energy, through the presentations on good practice in climate prediction applications, 2) to delineate the direction of research and development of tailored climate information products leading to mitigation of climate-related hazards in the Asia-Pacific countries, and 3) to summarize the requirements of regional cooperation schemes, including the Regional Climate Center (RCC), so as to assist the National Meteorological and Hydrological Services (NMHSs) in the region in providing advanced climate information suitable for socio-economic application.

2. Outlines of the workshop

On the first day of the workshop (February 20), the "Open seminar on the applications of climate information in various socio-economic sectors" was held with the following four invited lectures, provided with English-Japanese consecutive interpretation. About 150 participants in total, including 65 from users' sectors, joined the seminar. Dr Kolli (WMO), in his keynote lecture, introduced the World Meteorological Organization's (WMO) initiatives on the application of climate information. He stressed the importance of regional activities to promote communications between providers and users of climate information, giving an example of Regional Climate Outlook Forums (RCOF).

Dr Stone (Australia) introduced best practices of climate information application in agricultural sectors. In some of the tropical countries, including Australia, precipitation variations associated with El Niño/La Niña events are clearly observed. Interdisciplinary researches of developing integrated climate-agricultural-economic models enables climate information to be used effectively in agricultural decision-making process. Furthermore, a commitment to participative research and development involving users is a high priority.

Dr Ward (U.S.A.) introduced best practices of climate information application in water resource management. Since the water resource management involves a lot of stakeholders and societal factors, it is hard to change the conventional way of practice. It is important to develop an integrated model of water usage, including climate factors, and to simulate the best practice using the climate information. Mr. Yamamoto (Japan) introduced the concept of risk management in the business sectors. When the relationship between costs/sales of the products and weather/ climate variables are estimated, it could be incorporated in the risk management system. Probabilistic information derived from the ensemble prediction is shown to be useful in estimating climate-related risks quantitatively and to take measures to hedge the risks.

On the second and third day of the workshop (February 21, 22), the "Workshop on the application of advanced climate information in the Asia-Pacific region" was held with 14 presentations in the following three sessions.

Session 1: Reports on the status and future plans of climate information and its application for

domestic users in the Asia-Pacific region Delegates from seven National Meteorological and Hydrological Services in the Asia-Pacific regions (Vietnam, Thailand, Malaysia, Indonesia, Korea, China and Japan), presented the current status of the climate information services in their countries and the future plans to advance the utility of their information collaborating with the users.

Session 2: Recent developments for the advanced climate information and its application in the Asia-Pacific region Some of the useful data and prediction techniques for the climate application were introduced, such as Japanese Re-Analysis (JRA-25) data by JMA, Multi-Model Ensemble (MME) technique by APCC and statistical downscaling technique by TCC. Subsequently, scientists from agriculture and water resource sectors showed some examples of the potential utility of climate information.

Session 3: International cooperation for advancing the climate information and its application in the Asia-Pacific region Delegates of Beijing Climate Center (BCC)/CMA and Tokyo Climate Center (TCC)/JMA presented their activities as the RCCs in Asia. Following those presentations, a general discussion was made by the participants on ways to promote the international cooperation activities for advanced application of climate information in the Asia-Pacific region. Finally, a summary of the workshop was drafted and approved by all the participants.

3. Conclusions of the workshop

Through the presentations and discussions, all the participants of the workshop reached to share the following recognition required to enhance the socio-economic value of the climate information in the Asia-Pacific region.

(1) Communication with the potential users of climate information is essential. Climate information should be developed in a user-oriented manner. In order for the users of climate information to understand the uncertainty/reliability/utility of climate predictions and for the providers of it to understand the real needs for climate prediction, climate outlook forum/workshop involving users' community on regular basis could be effective.
(2) We should recognize that the climate information is merely one of the various factors which may affect decision-making processes. We need to realize the decision-making processes and which parts of them are affected by climate variability and change. Intermediary companies/institutions and/or social scientists are expected to significantly contribute to relevant researches.
(3) Partly due to the progress of global climate change, awareness of climate-related risks is greatly enhanced in many sectors. It has been apparent that not only average temperature and precipitation but also other weather elements, such as maximum/minimum temperature, humidity and wind speed, have possibly significant impacts to the socio-economic activities. NMHSs should provide users with relevant indices, such as Heating/Cooling Degree Days, number of precipitation days and temperature-humidity combined index, and evaluate the prediction skill of each element.
(4) Southeast Asian countries have increasing societal needs for the advanced climate information, including prediction and its application. NMHSs in these countries are in need of regional climate prediction products and/or technology transfer by the RCCs in RA-II. For the East Asian countries, such as China, Korea and Japan, it would be beneficial to exchange their experiences on the application of climate information and the development of tailored climate information, including downscaling techniques.
(5) The JRA-25 data is the first re-analysis data in Asia and is suitable for the researches in variability of Asian monsoon activity, tropical cyclones and Meiyu-Changma- Baiu frontal system. It is expected and recommended to conduct researches using the JRA-25 data in each country.
(6) It has been indicated that MME method is useful for effective use of climate prediction model outputs produced by the Global Prediction Centers (GPCs), including CMA, KMA and JMA. It is necessary to promote international cooperation for applying MME method to operational seasonal forecasting.

(7) International exchange of data, especially meteorological and hydrological observation data which are provided only to domestic users, is quite important to develop and verify downscaling techniques and their applications. High-resolution daily gridded analysis of rainfall would be suitable for the purpose.

(8) BCC/CMA and TCC/JMA showed their activities and future plans as the RCCs in Asia to promote international cooperation about the development to prediction products suitable for application use and capacity building. The requirements of Southeast Asian countries to the RCCs are summarized as follows:

(a) RCC Network in RA-II is based on the infrastructure of the Internet. It is essential to exchange huge amount of climate data, both observations and predictions, for advanced application of climate information, a faster- and larger-capacity communication network should be established.

(b) Since the climate in RA-II is quite different from a sub-region to the other, it is desirable to hold a Climate Outlook Forum in each of the sub-regions, such as South Asia, Southeast Asia and East Asia. Some ASEAN countries, such as Malaysia and Indonesia, are the members of RA-V, so that cross-regional collaboration between RA-II and RA-V should be considered.

(c) Climate change is one of the common issues to tackle in the region. The role of the RCCs in this matter should be stressed and clarified. Regional climate change scenarios provided by RCCs would be useful.

(d) It was shown that there exist some predictable signals in the forecast with lead-time ranging from a week to four weeks, although the predictability differs between sub-regions. It is useful that RCCs develop some application products derived from the forecast targeting within one month ahead, and provide the monitoring results of current situation.

(e) The web-based application tool, which was developed by the Australian Bureau of Meteorology, however whose operation is not active now, was very helpful to understand the uncertainty of seasonal predictions and to develop application products. It is useful that RCCs continually provide such kind of web-based and easy-operating application tools for the use of NMHSs.

(f) The technology transfer from the RCCs to NMHSs through trainings and workshops, particularly regarding the new techniques in climate applications is required.

List of Abbreviations

APCC	APEC Climate Center
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BCC	Beijing Climate Center
CMA	China Meteorological Administration
JMA	Japan Meteorological Agency
JRA	Japanese Re-Analysis
KMA	Korea Meteorological Administration
NMHS	National Meteorological and Hydrological Service
MME	Multi-Model Ensemble
RA	Regional Association
RCC	Regional Climate Centre
RCOF	Regional Climate Outlook Forum
TCC	Tokyo Climate Center
WMO	World Meteorological Organization

Annex X

Inputs for the RA II WGCRM Meeting
(Beijing, China, 7 – 8 April 2007

Dr G. Srinivasan, India
Rapporteur on Regional Climate Data Management including Data Rescue

First, I would like to convey my apologies for not being able to make it the meeting because of some other official commitment. I appreciate the comprehensive documents prepared and circulated for the meeting. It is a good idea to have a meeting before the next WMO Congress and to take the opportunity of the Congress to intimate RA II Members about the progress we have made in establishing the Regional Climate Centres (RCCs).

I have put down some views/observations on the report circulated for your consideration.

Establishment of RCC's

China Meteorological Administration (CMA) and the Japan Meteorological Agency (JMA) have offered to act as RCCs for RAII. This is very welcome and highly appreciated. I would like to convey my support to this proposal, so that they can be established as component of the RA II RCC. Res. 9 (XIII-RA-II) clearly states the concept of the RCCs that we agreed to - "as a Network of, multi-functional centers and /or specialized centers on a pilot basis as the structure for implementing RCC activities in RA II" In accordance with this concept

While considering the proposals from CMA and JMA, it may be useful to identify some specialized roles for each of them, in addition to the regular operational activities proposed by them. This could be some specific research issues of relevance to the region, or development of specific sectoral climate applications of interest to RA II Member countries.

I am happy to note that the summary document circulated recognizes the networked concept of the RA II RCC and in paragraph 2.4 mentions that "procedure does not mean to exclude institutions other than CMA and JMA from applying for RCC status in the future". I think it is very important to leave the participation open-ended, and allow as many members to participate as multi-functional or specialized centers – as when they apply and fulfill the guide-lines laid out.

I would also like to mention that the India Meteorological Service is undergoing a major reorganization and modernization. A formal application for RCC status shall be submitted after the modernization plans are implemented.

Other aspects for consideration

The recently concluded WMO Conference held at Madrid has come up with a set of important actions which are of relevance to Climate services being provided by NMHS. RAII WGCRM may like to consider this Madrid Action Plan and follow-up required at RA II level.

International Events of Importance to be reported

International Workshop on Agricultural Risk Management, 25-27 October 2006 at New Delhi

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WCAP - 8 REPORT OF THE FIRST SESSION OF THE CCl WORKING GROUP ON CLIMATE AND URBAN AREAS INCLUDING BUILDING AND OTHER ASPECTS AND SOME RELATED PAPERS by Professors E. Jauregui and Shen Jianzhu, Members of the Working Group. WMO/TD-No. 287

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WCAP - 16 REPORT OF THE WORKSHOP ON A CLICOM-HOMS INTERFACE, University of Reading, U.K., 6-15 March 1990). WMO/TD-No. 409

Note: ***Following the change of the name of the World Climate Applications Programme (WCAP) to World Climate Applications and Services Programme (WCASP) by the Eleventh WMO Congress (May 1991), the subsequent reports in this series will be published as WCASP reports, the numbering being continued from No. 16 (the last "WCAP" report).***

WCASP - 17 A NONPARAMETRIC FRAMEWORK FOR LONG-RANGE STREAMFLOW FORECASTING by J.A. Smith, G.N. Day and M.D. Kane, Hydrologic Research Laboratory, National Weather Service, U.S.A. WMO/TD-No. 428

WCASP - 18 REPORT OF THE FIRST SESSION OF THE ADVISORY COMMITTEE ON CLIMATE APPLICATIONS AND DATA (ACCAD), Geneva, 19-20 November 1991 (also appears as WCDMP-17). WMO/TD-No. 475 *(out of print)*

WCASP - 19 URBAN CLIMATOLOGY IN AFRICA (Special issue of the journal "African Urban Quarterly"), Yinka R. Adebayo, guest editor, August 1992. WMO/TD-No. 509 *(out of print)*

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WCASP - 21 CLIMATE APPLICATIONS: ON USER REQUIREMENTS AND CLICOM APPLICATIONS. Reports to the eleventh session of the Commission for Climatology, Havana, February 1993 by the CCl rapporteurs on User Requirements (O. Moch) and CLICOM Applications (P. David and S. Roy). WMO/TD-No. 536

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WCASP - 23 A SURVEY OF CURRENT APPROACHES TO MODELLING OF HYDROLOGICAL TIME-SERIES WITH RESPECT TO CLIMATE VARIABILITY AND CHANGE. Prepared for the World Climate Programme - Water, Project A2, by George S. Cavadias, November 1992. WMO/TD-No. 534 *(out of print)*

WCASP - 24 TECHNICAL CONFERENCE ON TROPICAL URBAN CLIMATES - EXTENDED ABSTRACTS (Dhaka, Bangladesh, 28 March - 2 April 1993). WMO/TD-No. 538 *(out of print)*

WCASP - 25 BIBLIOGRAPHY OF URBAN CLIMATE IN TROPICAL/SUBTROPICAL AREAS 1981-1991. Prepared by Dr. E. Jauregui, CCl Rapporteur on Urban Climatology, May 1993. WMO/TD-No. 552 *(out of print)*

WCASP - 26 HYDROLOGICAL DESIGN DATA ESTIMATION TECHNIQUES. Prepared by Old⊆ich Novický, Ladislav Kašpárek, Sv□tlana Kolá⊆ová, Czech Hydrometeorological Institute. Report of the WCP-Water Project C.5 - Re-analysis of Hydrological Observations in Czechoslovakia. May 1993. WMO/TD-No. 554 *(out of print)*

WCASP - 27 REPORT OF THE WORKSHOP ON USER NEEDS AND REQUIREMENTS (Norrköping, Sweden, 4-8 October 1993). WMO/TD-No. 586 *(out of print)*

WCASP - 28 DROUGHT AND DESERTIFICATION. Reports to the Eleventh session of the Commission for Climatology (Havana, February 1993) by Kerang Li and A. Makarau, CCl Rapporteurs on Drought. WMO/TD-No. 605 *(out of print)*

WCASP - 29 SIXTH PLANNING MEETING ON WORLD CLIMATE PROGRAMME - WATER (Wallingford, 1-5 March 1993). WMO/TD-No. 609 *(out of print)*

WCASP - 30 REPORT OF THE TECHNICAL CONFERENCE ON TROPICAL URBAN CLIMATES (TeCTUC) (Dhaka, Bangladesh, 28 March - 2 April 1993). WMO/TD-No. 647

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WCASP - 32 REPORT FROM THE MEETING OF EXPERTS ON CLIMATE INFORMATION & PREDICTION SERVICES, CLIPS (Melbourne, Australia, 28 to 31 March 1995). WMO/TD-No. 680 *(out of print)*

WCASP - 33 REPORT FROM THE MEETING OF EXPERTS ON CLIMATE, TOURISM AND HUMAN HEALTH (Topes de Collantes, Cuba, 22-29 January 1995). WMO/TD-No. 682 *(out of print)*

WCASP - 34 REPORT OF THE TENTH SESSION OF THE ADVISORY WORKING GROUP OF THE COMMISSION FOR CLIMATOLOGY (Geneva, 20-22 September 1995) (also appears as WCDMP-24). WMO/TD-No. 711 *(out of print)*

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WCASP - 36 BIBLIOGRAPHY OF URBAN CLIMATOLOGY FOR THE PERIOD 1992-1995. Prepared by Professor E. Jáuregui, CCl Rapporteur on Urban Climatology, May 1996. WMO/TD-No. 759

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REPORT OF THE MEETING OF EXPERTS ON CLIPS (Geneva, 22-24 May 1996). WMO/TD-No. 774

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WCASP - 40 REPORT OF THE MEETING OF THE TASKFORCE ON TRUCE (Geneva, 14-16 October 1996) WMO/TD-No. 789

WCASP - 41 REGULATORY APPLICATIONS OF THE RELATIONSHIPS BETWEEN NATURAL GAS USAGE AND WEATHER, prepared by J.A. Gray, D.L. Patterson, M.S. Proctor and H.E. Warren (USA) and CLIMATE INFORMATION FOR THE APPLICATION OF SOLAR ENERGY / INFORMACIÓN CLIMATOLÓGICA PARA EL USO DE LA ENERGÍA SOLAR, prepared by/ preparado por/ Sandra Robles-Gil (Mexico), May 1997. WMO/TD-No. 816

WCASP - 42 REPORTS TO THE TWELFTH SESSION OF THE COMMISSION FOR CLIMATOLOGY, GENEVA, AUGUST 1997, by the CCl rapporteurs on Financial, Insurance and Legal Sectors (J. Hopkins), Agriculture and Food (H. Bhalme), Tourism and Recreation (L. Lecha Estela), and Report of Meeting of Experts on Climate and Human Health (Freiburg, Germany, 28-29 January 1997), June 1997. WMO/TD-No. 822

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WCASP - 44 BIBLIOGRAPHY OF BUILDING CLIMATOLOGY FOR THE PERIOD 1988-1995 (in English and Russian). Prepared by Emil Moralijski, CCl Rapporteur on Building Climatology, June 1997. WMO/TD-No. 825

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WCASP - 51 REPORT OF THE FIRST STEERING COMMITTEE MEETING ON WORLD CLIMATE PROGRAMME - WATER (Geneva, 23-25 October 2000). WMO/TD-No. 1048

WCASP - 52 GENERAL SUMMARY OF THE SESSION OF THE INTERCOMMISSION TASK TEAM ON REGIONAL CLIMATE CENTRES (Geneva, 30 April - 3 May 2001). WMO/TD-No. 1070

WCASP - 53 GENERAL SUMMARY OF THE CLIPS WORKING GROUP MEETING (Toulouse, France, 26-29 March 2001). WMO/TD-No. 1087

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WCASP - 60 PROCEEDINGS OF THE RA VI TASK TEAM ON THE PROVISION OF SEASONAL TO INTER-ANNUAL FORECASTS AND REGIONAL CLIMATE CENTRE SERVICES (RA VI-TT/SIRCC) (Reading, United Kingdom, 14 – 16 April 2003). WMO/TD-No. 1163

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WCASP - 69 PROCEEDINGS OF THE MEETING OF THE RA II WORKING GROUP ON CLIMATE-RELATED MATTERS AND CLIPS (Tokyo, Japan, 25 - 27 October 2004). WMO/TD-No. 1261

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