

# “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) It is required that the technology transfer from the RCCs to NMHSs through trainings and workshops, particularly regarding the new techniques in climate applications.

### List of Abbreviations

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