Cooperation between research and operational communities in climate services in Asia Pacific Region

Kiyoharu TAKANO
A member of Management Group, Commission for Climate (CCI) WMO

Coordinator
Sub-group on Climate applications and services for WMO Regional Association II

Climate Prediction Division
Japan Meteorological Agency
Commission for Climate (CCl)

- One of the eight technical commissions of WMO

- CCl has four thematic Open Panels of CCl Experts (OPACEs)
  
  OPACE 1: Climate Data Management
  OPACE 2: Climate Monitoring and Assessment
  **OPACE 3: Climate Products and Services**
  OPACE 4: Climate Information for Adaptation and Risk Management
**REGIONAL ASSOCIATION II (ASIA)**

**Sub-group on Climate Applications and Services**

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<th>Position</th>
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<tr>
<td>Coordinator</td>
<td>Dr Kiyoharu TAKANO</td>
<td>Japan</td>
</tr>
<tr>
<td>Theme Leader in Climate Applications and User Liaison</td>
<td>Dr Im-Chul SHIN</td>
<td>Republic of Korea</td>
</tr>
<tr>
<td>Theme Leader in CLIPS including RCCs and RCOFs</td>
<td>Dr Vladimir KRYZHOV</td>
<td>Russian Federation</td>
</tr>
<tr>
<td>Theme Leader in Climate Monitoring, Climate Watch and Climate Change</td>
<td>Dr Tatyana SPEKTORMAN</td>
<td>Uzbekistan</td>
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<td>Theme Leader in Climate Research</td>
<td>Dr Majeed HABIBI</td>
<td>Islamic Republic of Iran</td>
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Global Framework for Climate Services

Establishment was decided in World Climate Conference-3 (WCC-3) (2009)
Working together towards strengthened Research and Operations Linkages for Enhancing the use of Climate Information

Joint Session of
WMO Commission for Climatology and
Joint Scientific Committee for the WCRP

STATEMENT
Antalya, Turkey, 18 February 2010

JSC-31 for WCRP(15-19, Feb).
CCl-XV (19-24, Feb.)

A special joint session of technical conference of CCl experts with the JSC was held(18, Feb)
Excerpt from the Statement

To support the successful implementation of GFCS, WCRP and CCI agree to closely collaborate to address the following topical issues of direct relevance to climate adaptation and risk management in general and the GFCS in particular:

1. Strengthen and mainstream research observations to serve as prototypes for future climate observing systems, in cooperation with GCOS and WIS;
2. develop climate prediction systems with lead times from seasons to centuries;
3. ensure development of reliable high-resolution products needed for climate adaptation and risk management;
4. promote interdisciplinary research to develop sector applications, tools and tailored information;
5. facilitate flow of user requirements to the research community and climate services producers through user feedback;

6. support the RCCs, NCSs and the Climate Outlook Forums (COFs) mechanism as well as consensus assessments (Annual State of the Global Climate);
7. foster links between WMO Regional Associations (RAs), NMHSs, WCP, CCI and WCRP, for regional and national activities
8. improve the availability of highly-skilled talent to undertake climate research, operational prediction, and communication, particularly in the developing countries;
Operational Climate Services

- National Meteorological and Hydrological Service (NMHS)

- Regional Climate Centers
  To support NMHSs, WMO is proceeding with establishment of Regional Climate Centers. **Beijing Climate Center** and **Tokyo Climate Center** were designated as the first two RCCs in 2009.

- Global Producing Centres for Long Range Forecasts
  12 centers
  - WMO Lead Center for Standard Verification System of Long Range Forecasts (LC-SVSLRF)
  - WMO Lead Center for Long Range Forecast Multi-Model Ensemble (LC-LRFMME)
Elements of Climate Services Information System

- WCRP Model Outputs
- Global Producing Centres
- Regional Climate Centres
- Regional Users
- Regional Climate Outlook Forums
- National Sectoral Users
- NMHSs
- Global Users
Global Network for Climate Information
(WMO Designated Global and Regional Centres)

- Global Producing Centres of Long Range Forecasts (GPCs)
- Regional Climate Centres (RCCs)
- RCC Network Nodes (Pilot)

SVSLRF: Standardized Verification System for Long Range Forecasts
LRFMME: Long Range Forecast Multi-Model Ensemble
RAII RCC Network Homepage

Link to data and products of BCC and TCC

Information on Regional Meetings and other useful links

http://www.rccra2.org/detail/index.htm
Climate System Monitoring (TCC)

Atmospheric Circulation: Global Objective Analysis Data and Reanalysis Data by JMA
Tropical Convective Activity: Satellites Observations (NOAA/NESDIS)
Sea Surface Temperature: Global SST Analysis Data by JMA
Snow and Sea Ice: CLIMAT Reports & Satellite Observations (SSM/I)

Monthly Highlights on Climate System

- SST Anomaly (March 2009)
- Number of days covered with snow observed by SSM/I (left) and its anomaly (right) (March 2009)
- OLR Anomaly (March 2009)
- 200hPa Stream Function & Wind Anomalies (March 2009)

Regional Climate Outlook Forums (RCOFs)(1)

- Participants
  - Experts from NMHSs in the region
  - Experts from GPC
  - Other experts
    - Large scale prediction specialists,
    - Regional and local climate applications and prediction/downscaling specialists,
  - Climate information Users
Regional Climate Outlook Forums (RCOFs)(2)

1 Discussion of Present Climate Status

2 Introduction and exchange of new-technology on climate prediction

3 Discussion of the climate outlook in next season in the region and production of consensus climate outlook
   (The persons from NMHSs utilize the regional outlook to produce national climate outlook)

4 Dialogue with users
Background of Regional Climate Outlook Forums (RCOFs)

- A key component of WMO Climate Information and Prediction Services (CLIPS) project activities.
- First established in October 1996 at the Workshop on Reducing Climate-Related Vulnerability in Southern Africa (Victoria Falls, Zimbabwe).
- RCOF Concept was pioneered in Africa and spread worldwide.
- WMO and a number of national, regional and international organizations (e.g., NOAA, IRI, Meteo France, World Bank, etc.) have supported their growth and expansion.
RCOF Concept (1/2)

- Climate information including predictions/outlooks could be of substantial benefit to many parts of the world in adapting to and mitigating the impacts of climate variability and change.
- RCOFs have the responsibility to produce and disseminate a regional assessment (using a consensus-based approach) of regional climate for the upcoming season.
- Built into the RCOF process is a regional networking of the climate service providers and user-sector representatives.
RCOF Concept (2/2)

- RCOFs bring together national, regional and international climate experts, on an operational basis, to produce regional climate outlooks based on input from NMHSs, regional institutions, Regional Climate Centres (RCCs) and Global Producing Centres of long range forecasts (GPCs) and other climate prediction centres.
- Through interaction with sectoral users, extension agencies and policy makers, RCOFs assess the likely implications of the outlooks on the core socio-economic sectors in the region and explore potential applications of these outlooks.
- RCOF sessions feed into national forums to develop detailed national-scale climate outlooks and risk information including warnings for communication to decision-makers and the public.
Climate Outlook Forums
RCOFs in Asian Region

1. Forum on Regional Climate Monitoring, Assessment and Prediction for Asia (FOCRAII) (Summer Outlook, held in April)
   Since 2005-
   Participants
   NMHSs  RAll region +Pacific Region
   GPCs(ECMWF, UK)
   Researchers (China, Korea, USA)
   Users

2. South Asia Climate Out-Look Forum (SASCOF) (Summer Outlook, held in April)
   Since 2010-
   Participants
   NMHSs (India, Pakistan, Afghanistan, Sri Lanka, Nepal, Bhutan, Maldives)
   GPCs(Korea, Japan, UK)
   Research Institutes (IRI, APCC, SMRC,ADPC)
   Users Agriculture, Journalist

3. Joint Meeting for the Seasonal Prediction of the East Asian Winter Monsoon (EASCOF?) (Winter Outlook, held in November)
   Since 2000(1998)- (Started by KMA’s Call)
   Participants
   NMHSs (China, Japan, Korea,(Mongolia))
   Researchers (METRI, IAP)
RCOF for RA II (Asia): FOCRAII

Precipitation Outlook, JJA 2009

Temperature Outlook, JJA 2009
Regional Climate Outlook Forum (RCOF) in RA II

Two events held annually in RAII; FOCRA II for summer and Joint Meeting for winter

Forum on Regional Climate Monitoring, Assessment and Prediction for Asia (FOCRA II)

Fifth Session
Beijing, April 2009

Joint Meeting of Seasonal Prediction on the East Asian Winter Monsoon

Ninth Session
Tokyo, November 2008
Personal opinion on RCOF

While there are many roles in RCOF, the most important role is to organize and strengthen regional climate community including users and cooperate with each other.

We hope regional research community is involved RCOFs in an organized way.
Research Needs of Key Importance to Operational Activities in Asia-Pacific Region

• Improvement of Monsoon Prediction (Summer, Winter) Activity, Onset, Withdrawal Comment at RCOF including uncertainty.

• Improvement of Intra-Seasonal Oscillation Prediction One of the most important forecast

• (Dynamical) down scale
Possible Cooperation in Asian Region

- Researcher’s participation in RCOF
  Advice at RCOF
  Communication between research and operational community
  Dialogue with users

  FOCRAII, SASCOF

- Utilization of RCC products such as climate monitoring in research community
  Comments on those products by research community are helpful to develop new products

- Capacity building of NMHSs
An example of cooperation (Japan’s case)

- Observational data, analysis tools, operational monitoring information on climate system
- Analysis tools of extreme climate events
- Sharing data, tools, and information on current status of climate system
- Scientific comments on climate monitoring, suggestion on improvement of analysis
- Extreme event!!
- Analysis and examination of the event’s causes
- Timely statement on causes of the extreme climate event and outlook
Schematic chart showing the factors behind the unusually wet and cloudy summer weather over Japan in July 2009
Conclusion

- To provide better climate services to users, CCI or operational climate service institutes would like to request cooperation of research community.

- In Asia-Pacific Region, we hope to begin the dialogue with AMMP on regional cooperation.
RCOFs and Public Health

- Many diseases are indirectly or directly associated with climate. Vector-borne diseases are sensitive to changes in meteorological parameters such as rainfall, temperature, wind, and humidity. These include malaria, dengue, and Rift Valley Fever (RVF). Extreme climate events can trigger rampant outbreaks of waterborne diseases such as cholera and typhoid in areas where they are not common.
- Some efforts are now being made to provide warnings of changes in epidemic risk by integrating rainfall, temperature, and other non-climate information.
- For example, Malaria Outlook Forums (MALOFs) are now regularly held in association with RCOFs in southern Africa and the Greater Horn of Africa.
- The information developed jointly by climate and health experts in these sessions, together with information on population vulnerability, food security, immuno-suppression, and adequacy of control coverage, gives the health community a longer lead-time over which to optimize the allocation of the resources available to combat malaria.
RCOF Process (1/3)

- Meetings of the regional and international climate experts to develop a consensus for the regional climate outlook, typically in a probabilistic form;
- The Forum proper, that involves both climate scientists and representatives from the user sectors, for identification of impacts and implications, and the formulation of response strategies;
- Training programmes on seasonal climate prediction to strengthen the capacity of the national and regional climate scientists;
- Special outreach sessions involving sector specialists as well as media experts to develop effective communications strategies.
RCOF Process (2/3)

- Determine the critical time for development of climate prediction for the region in question;
- Assemble a group of experts:
  - Large scale prediction specialists,
  - regional and local climate applications and prediction/downscaling specialists,
  - stakeholders representative of climate-sensitive sectors;
- Review current large scale (global and regional) climate anomalies and the most recent predictions for their evolution;
- Review current climate conditions and their impacts at local, national and regional levels, and national-scale predictions;
RCOF Process (3/3)

• Considering all factors, produce a climate outlook with related output (e.g. maps of temperature and precipitation anomalies) that will be applied and fine-tuned by NMHSs in the region to meet national needs;
• Discuss applications of the outlook and related climate information to climate-sensitive sectors in the region; consider practical products for development by NMHSs;
• Develop strategies to effectively communicate the information to decision-makers in all affected sectors;
• Critique the session and its results:
  – document achieved improvements to the process and any challenges encountered,
  – Establish steps required to further improve the process for subsequent sessions.
• When extreme event occurs, the public wants to know the causes or background of the event. To provide information on extreme climate events based on latest research outcome, the advisory panel of scientist was established in 2007 in Japan.
Missions of the Advisory Panel on Extreme Climatic Events

- Climatological analysis and research on extreme climate events
- Advice on information that JMA prepares in regard to extreme climate events, including their causes and mechanisms
- Recommendations on the application of results from climatological research on extreme event to JMA’s climatic services and activities
Members of the Advisory Panel on Extreme Climatic Events

- YAMAZAKI, Koji: Hokkaido University
- IWASAKI, Toshiki: Tohoku University
- KIMOTO, Masahide Professor (Chairperson): CCSR University of Tokyo
- NAKAMURA, Hisashi (Vice-Chairperson): University of Tokyo
- MASUMOTO, Yukio: University of Tokyo
- YASUNARI, Tetsuzo: Nagoya University
- MUKOUGAWA, Hitoshi: Kyoto University
- HIROOKA, Toshihiko: Kyushu University
- FUJIBE, Fumiaki: Meteorological Research Institute
- OSE, Tomoaki: Meteorological Research Institute

Former members
- YAMAGATA, Toshio: University of Tokyo
- KITOH, Akio Meteorological Research Institute
An example of cooperation between reaserch and operational community (Japan’s case)

- **JMA**
  - Observational data, analysis tools, operational monitoring information on climate system
  - Extreme event!!
  - Extraordinary meeting
    - Analysis of the event
  - Timely statement on causes of the extreme climate event

- **Research Community**
  - Advisory Panel on Extreme Climate Events
  - Analysis tools of extreme climate events
  - Sharing data, tools, and information on current status of climate system
  - Scientific comments on climate monitoring, suggestion on improvement of analysis
  - Annual meeting
    - Review of Panel activities, extreme climate events in the year
  - Regular provision of related information
Global Temperature & Precipitation Monitoring (by BCC)
Development for Climate information

- The climate information should be based on the latest science outcome as much as possible.
- The climatic science is developing rapidly (ex. Coupled Model)

The development in an operational climate center needs the cooperation with the research community.