

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

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Commission for Climate(CCI) WMO

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

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Commission for Climate(CCI)

- One of the eight technical commissions of WMO
- CCI has four thematic Open Panels of CCI 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

Coordinator

Dr Kiyoharu TAKANO (Japan)

Theme Leader in Climate Applications and User Liaison

Dr Im-Chul SHIN (republic of Korea)

Theme Leader in CLIPS including RCCs and RCOFs

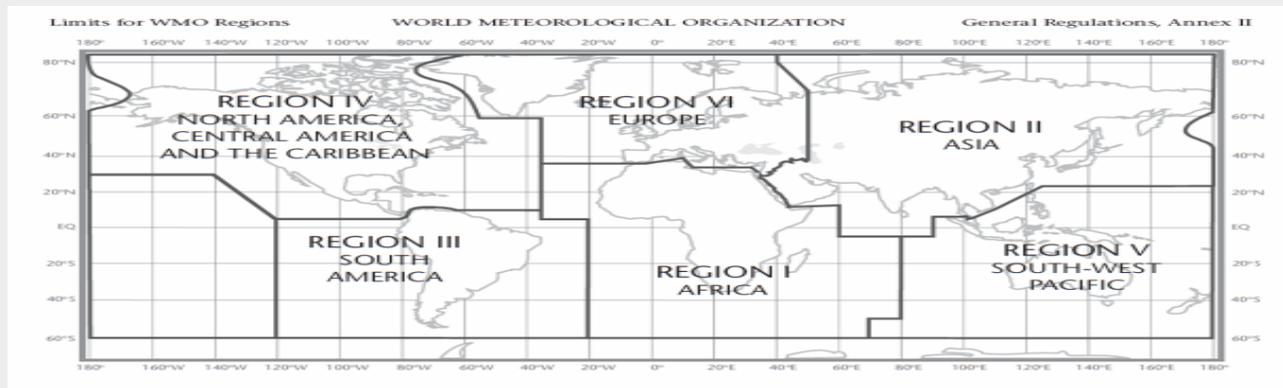
Dr Vladimir KRYZHOV (Russian Federation)

Theme Leader in Climate Monitoring, Climate Watch and Climate Change

Dr Tatyana SPEKTORMAN(Uzbekistan)

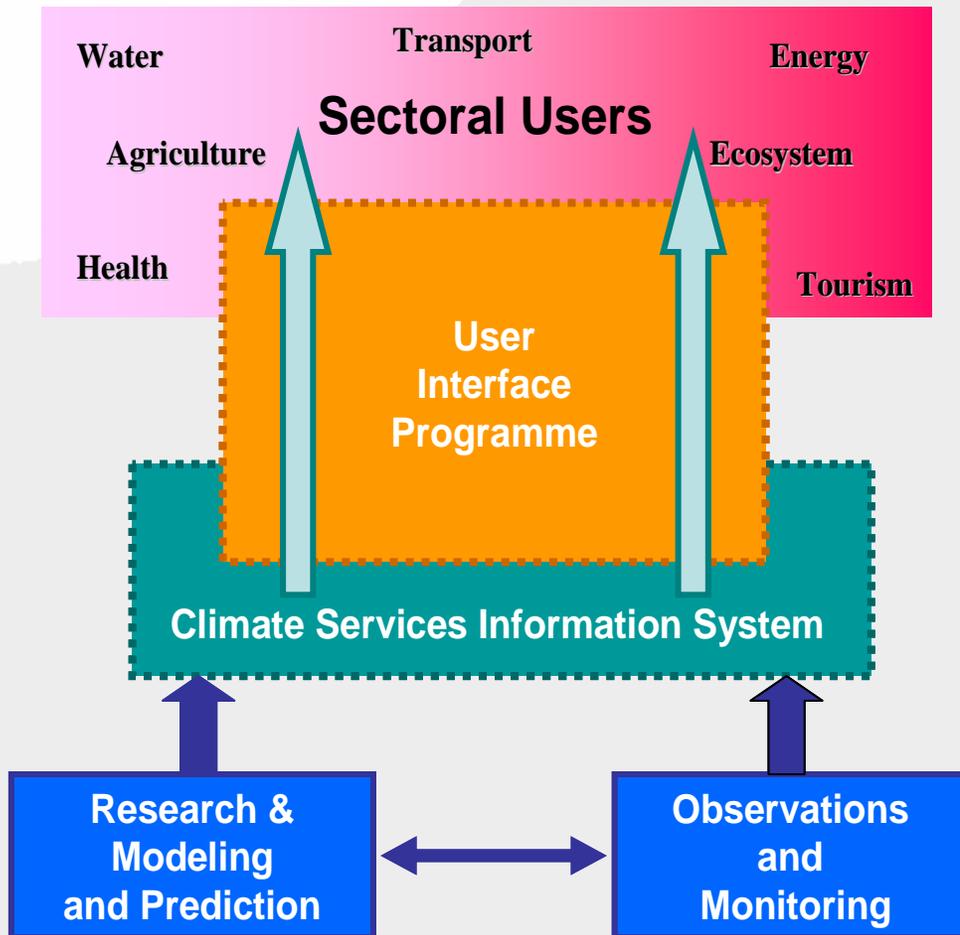
Theme Leader in Climate Research

Dr Majeed HABIBI(Islamic Republic of Iran)



Global Framework for Climate Services

Establishment was decided
in World Climate Conference-3 (WCC-3) (2009)





WMO

WCRP

World Climate Research Programme



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).
CCI-XV (19-24, Feb.)

A special joint session of technical conference of CCI experts with the JSC was held(18, Feb)

Excerpt from the Statement

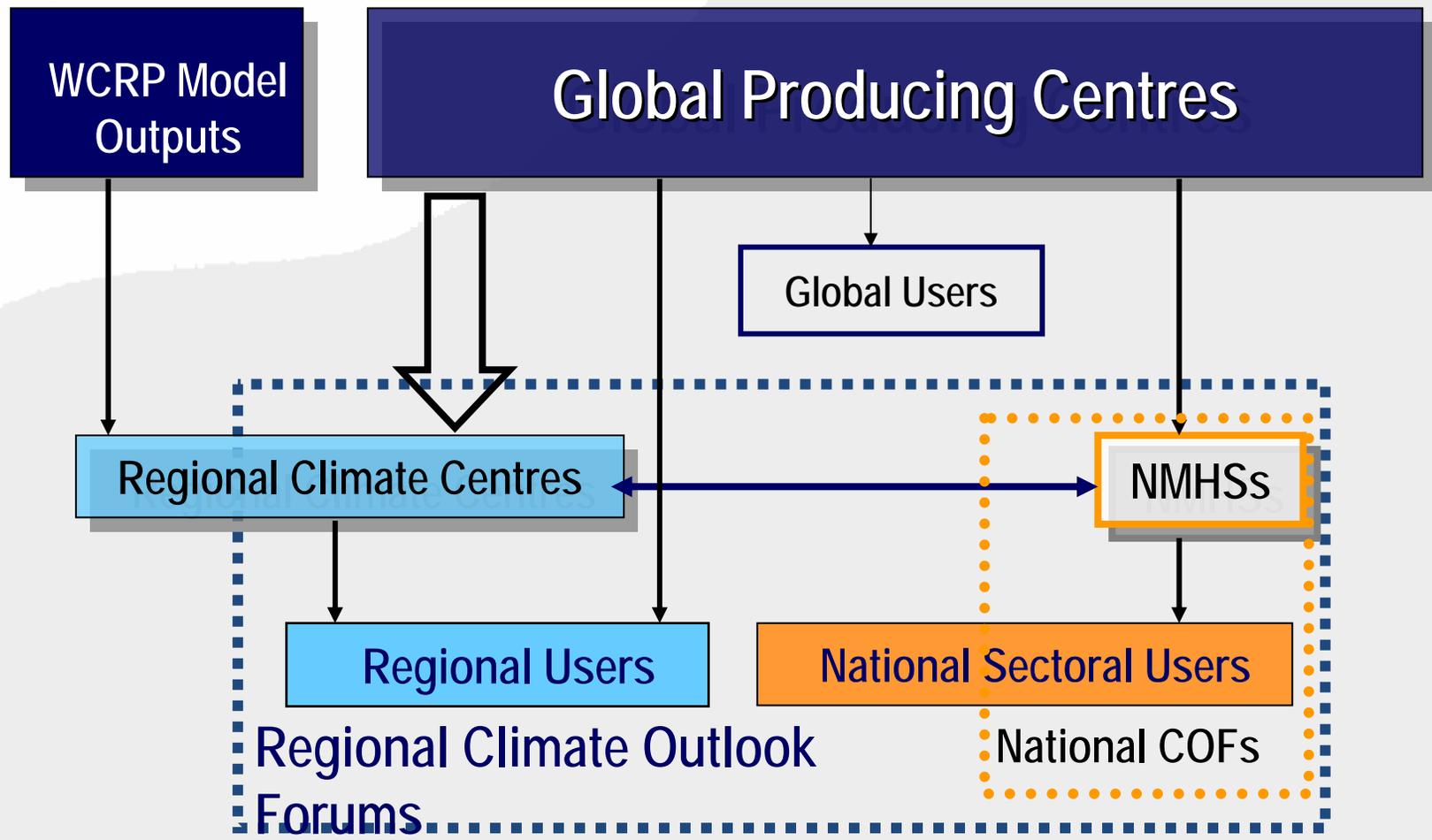
To support the successful implementation of GFCS, WCRP and CCI agree to closely collaborate to address the following topical issues of direct relevance to climate adaptation and risk management in general and the GFCS in particular:

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

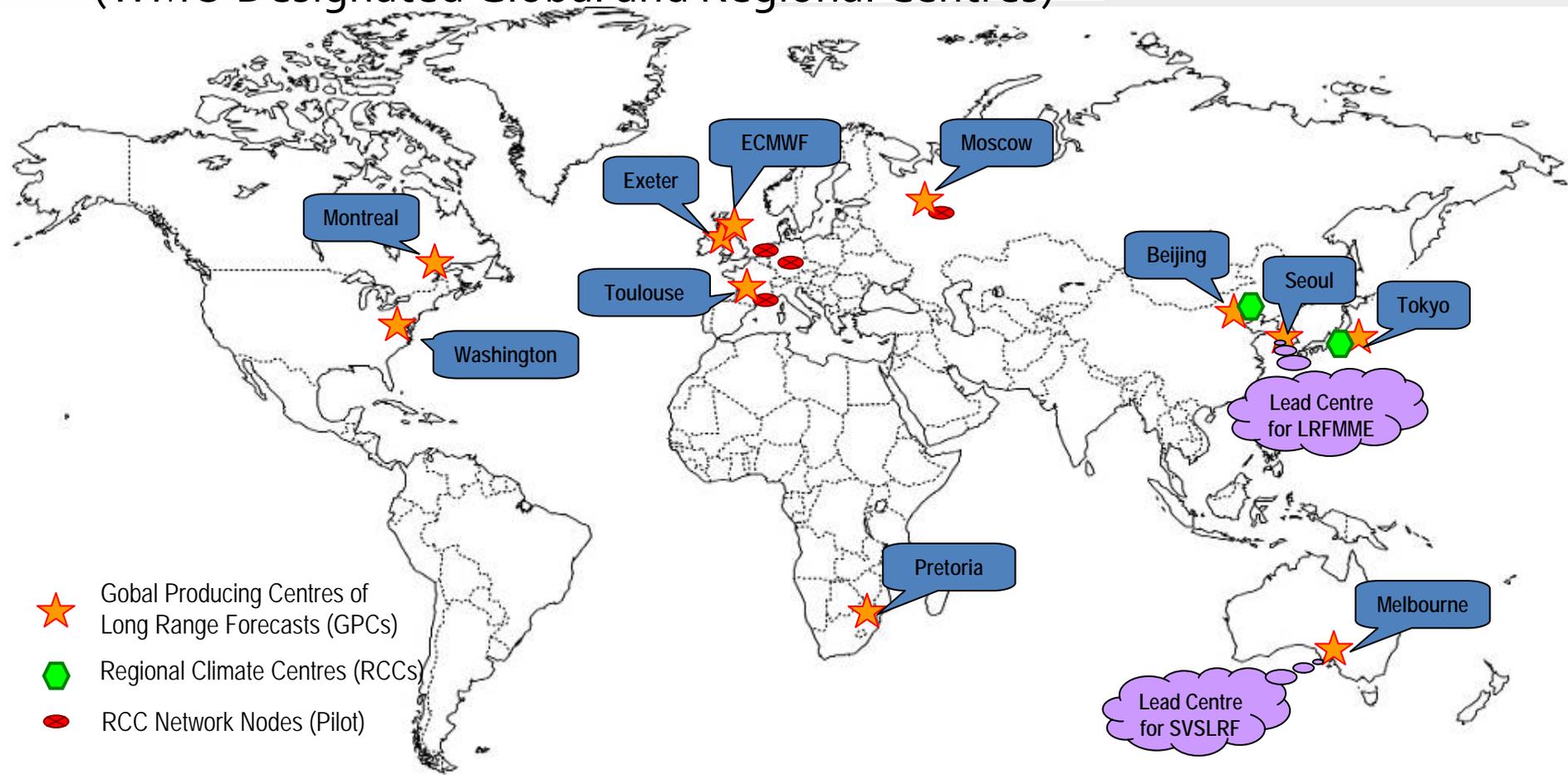
- National Meteorological and Hydrological Service (NMHS)
- Regional Climate Centers
To support NMHSs, WMO is proceeding with establishment of Regional Climate Centers.
Beijing Climate Center and **Tokyo Climate Center** were designated as first two RCCs in 2009.
- **Global Producing Centres for Long 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



Global Network for Climate Information

(WMO Designated Global and Regional Centres)



SVSLRF: Standardized Verification System for Long Range Forecasts
LRFMME: Long Range Forecast Multi-Model Ensemble

RAII RCC Network Homepage

アドレス http://www.rccra2.org/detail/index.htm

移動 リンク

Link to data and products of BCC and TCC

Welcome to Regional Climate Center Network in RA II Homepage

Home Add Favorites

Beijing Climate Center

what's New

Long Range Forecast

Interpretation of GPC Products
Regional Products (station)
Regional Products (gridded) monthly
Regional Products (gridded) seasonal
Verification (forecast)
Verification (hindcast)

Climate Monitoring

Climate Diagnostics
Climate Advisories and Information

Data Service

Climate Database (station)
Climate Database (gridded)

Training

Training Courses

Research & Development

Climate Analysis
Climate Modeling
Climate Scenarios
Downscaling
Climate Information Application

Coordination

ABOUT BCC RA II

Link to NMHSs in RA II

Afghanistan	Bahrain	Bangladesh	Bhutan	Cambodia	China
Democratic People's Republic of Korea	Hong Kong, China	India			
Iran, Islamic Republic of	Iraq	Japan	Kazakhstan	Kuwait	Kyrgyzstan
Lao People's Democratic Republic	Macao, China	Maldives	Mongolia		
Myanmar	Nepal	Oman	Pakistan	Qatar	Republic of Korea
Republic of Yemen	Russian Federation	Saudi Arabia	Sri Lanka	Tajikistan	

Regional Climate Outlook Forums FOCRAII Consensus Statement

Information of Conference, Seminar, Workshop, Training Course, Meeting

- FOCRAII 6-8 April 2009 (Hangzhou, China)
- World Climate Conference-3 (WCC-3) 31 August - 4 September 2009 (Geneva, Switzerland)

WMO Official Website

- WMO TOP
- GCOS Surface Network Monitoring Center (GSNMC)

GPCs Website

Melbourne	Montreal	Beijing	Toulouse	Tokyo
Seoul	Washington	Exeter	ECMWF	

気象庁 Tokyo Climate Center

What's New

Long Range Forecast

Interpretation of GPC Products
Regional Products (station)
Regional Products (gridded)
Verification (forecast)
Verification (hindcast)

Climate Monitoring

Climate Diagnostics
Climatology
Climate Advisories and Information

Data Service

Climate Database (station)
Climate Database (gridded)

Training

Training Courses

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Research & Development

Climate Analysis
Climate Modeling
Climate Scenarios
Downscaling
Climate Information Application

Coordination

Lead Centre for Long Range Forecast Verification System

Information on Regional Meetings and other useful links

- APEC Climate Center

<http://www.rccra2.org/detail/index.htm>

Climate System Monitoring (TCC)

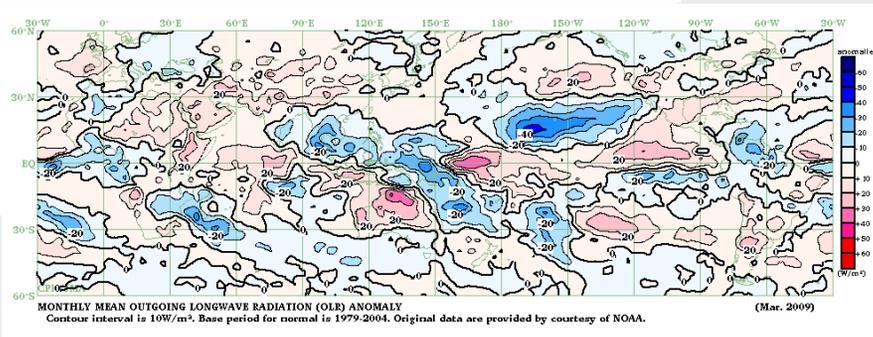
Atmospheric Circulation: Global Objective Analysis Data and Reanalysis Data by JMA

Tropical Convective Activity: Satellites Observations (NOAA/NESDIS)

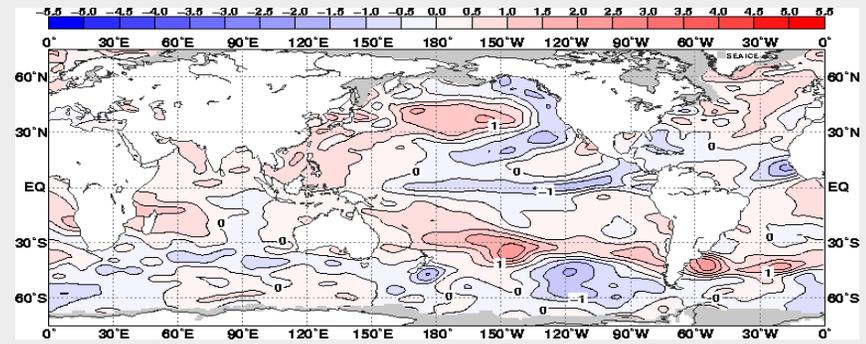
Sea Surface Temperature: Global SST Analysis Data by JMA

Snow and Sea Ice: CLIMAT Reports & Satellite Observations (SSM/I)

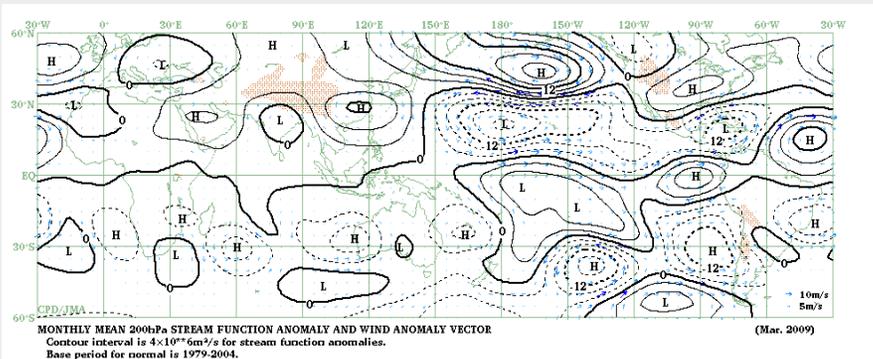
Monthly Highlights on Climate System



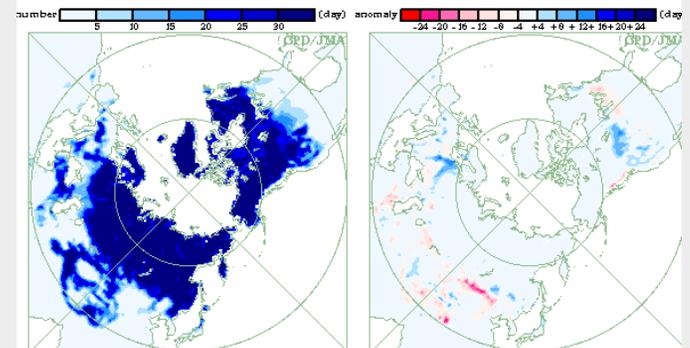
OLR Anomaly (March 2009)



SST Anomaly (March 2009)



200hPa Stream Function & Wind Anomalies
(March 2009)



Number of days covered with snow observed by
SSM/I (left) and its anomaly (right) (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**

Bbackground 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).
- Gained momentum as a regional response to the major 1997–1998 El Niño event.
- 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.

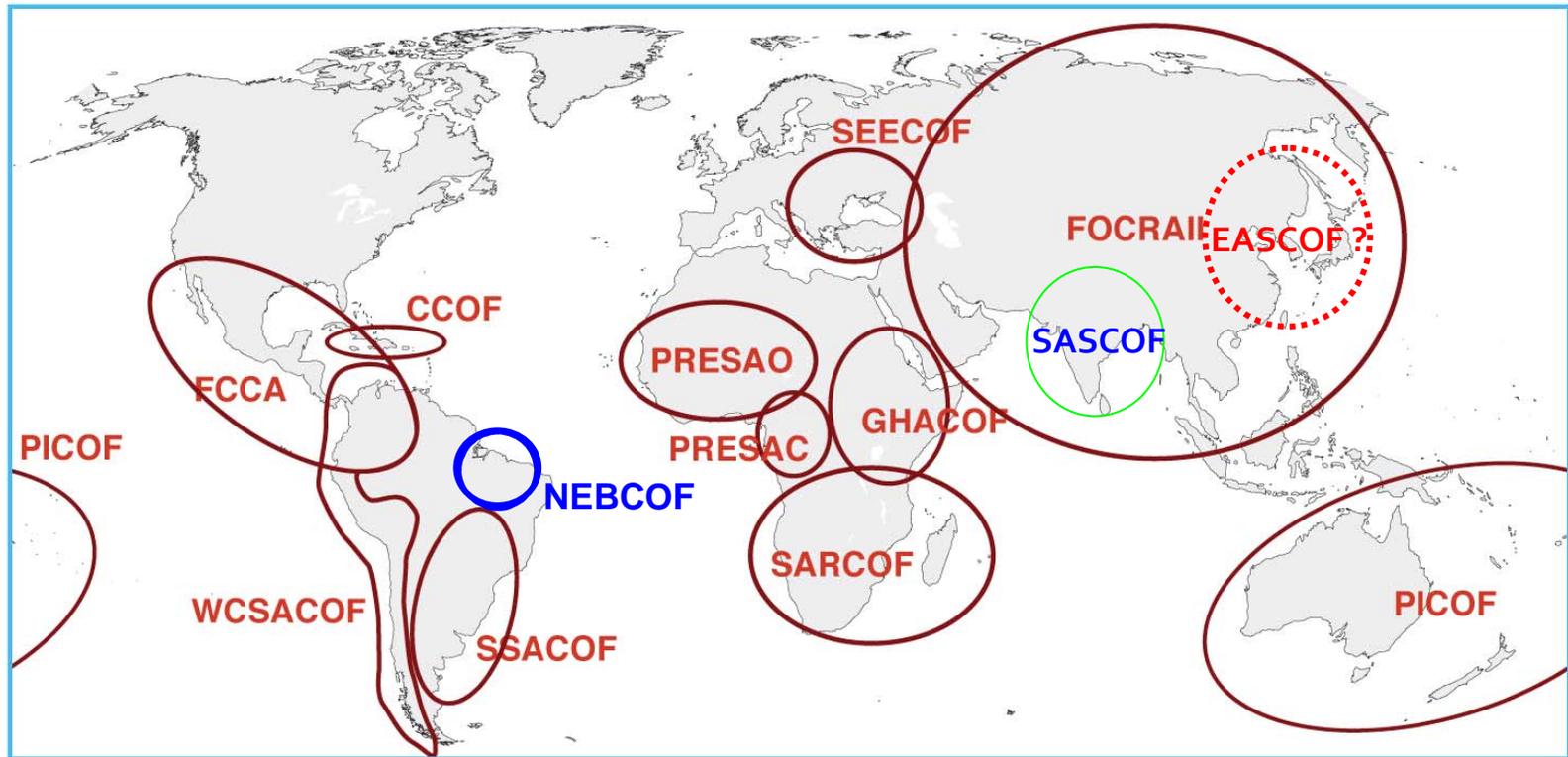
RCOF Concept (1/2)

- 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 RAI region +Pacific Region
 GPCs(ECMWF, UK)
 Researcher s (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)
 User 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))
 Researcher (METRI, IAP)

Regional Climate Outlook Forum (RCOF) in RA II

Two events held annually in RAI; 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

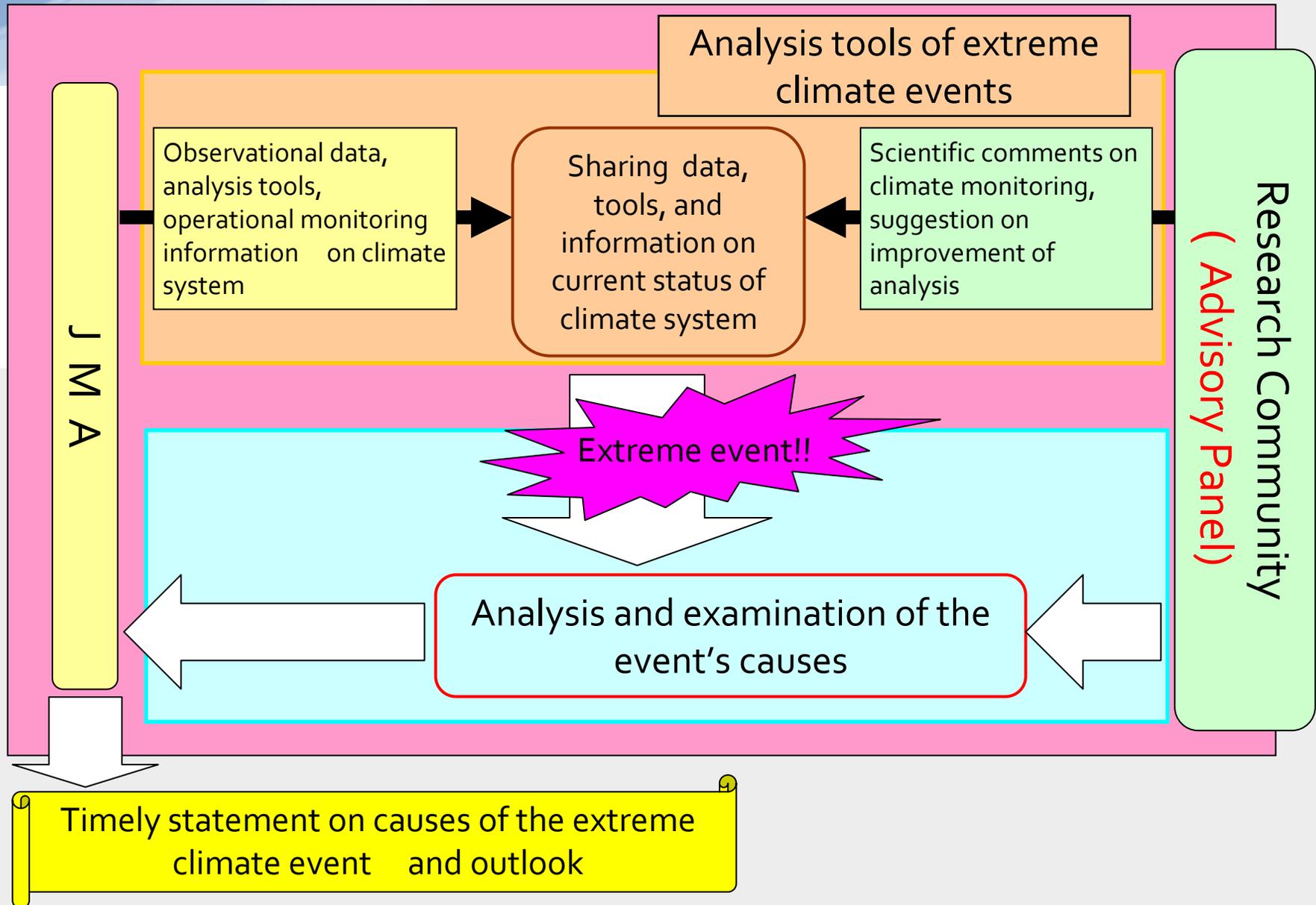
- Improvement of Monsoon Prediction
(Summer, Winter) Activity, Onset, Withdrawal
→ Comment at RCOF including uncertainty.
- Improvement of Intra-Seasonal Oscillation Prediction
One of the most important forecast
- (Dynamical) down scale

Possible Cooperation in Asian Region

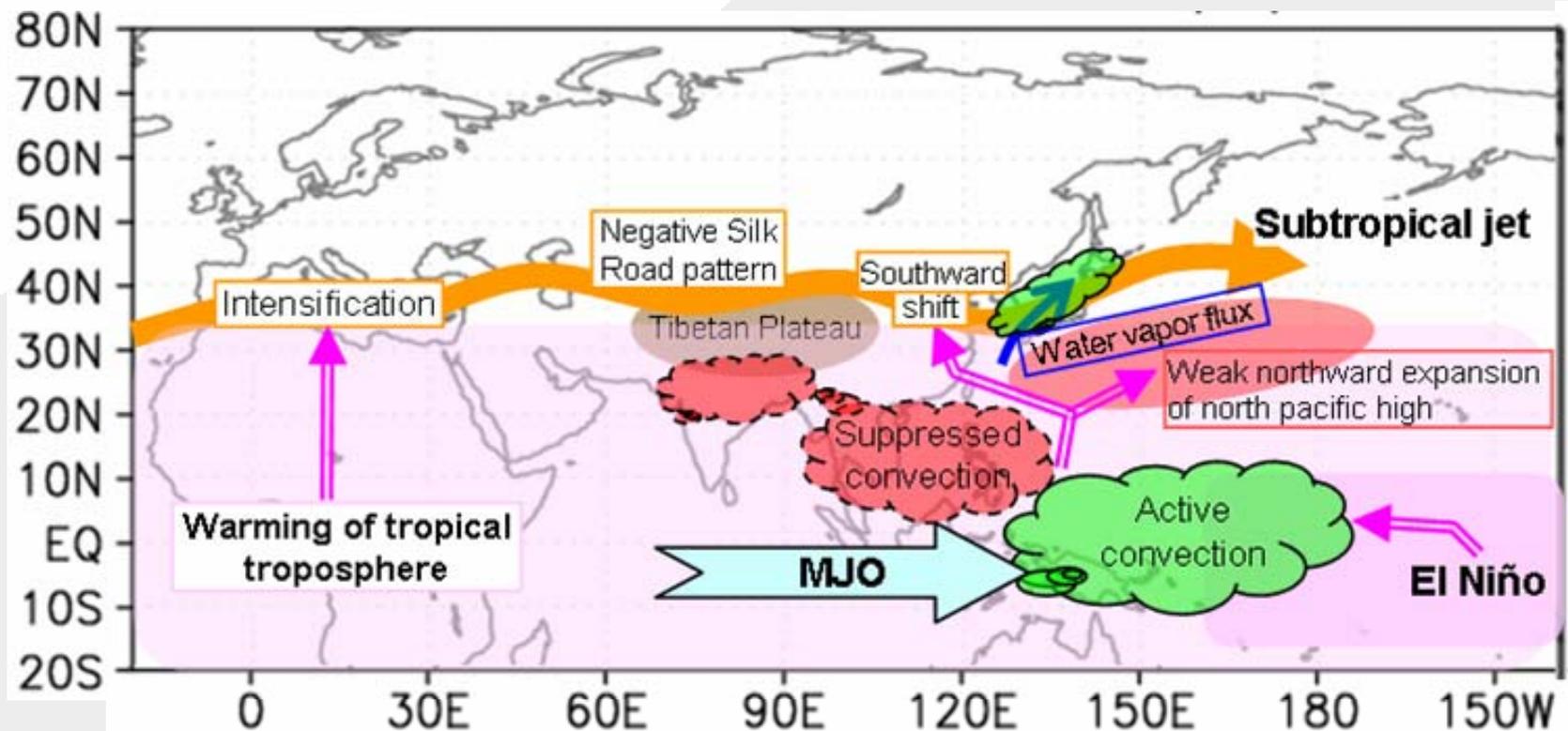
- Researcher's participation in RCOF
Advice at RCOF
Communication between research and operational community
Dialogue with users

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)



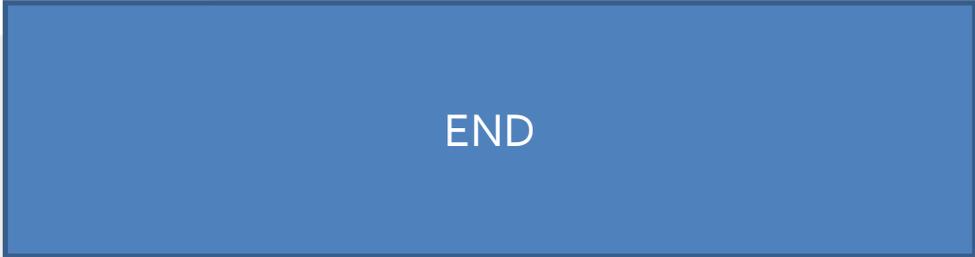
Example of provided figure after the discussion



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.



END

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 warning 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.

The Advisory Panel on Extreme Climate Events

An example of **Research and operational Cooperation in Japan**

- 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.

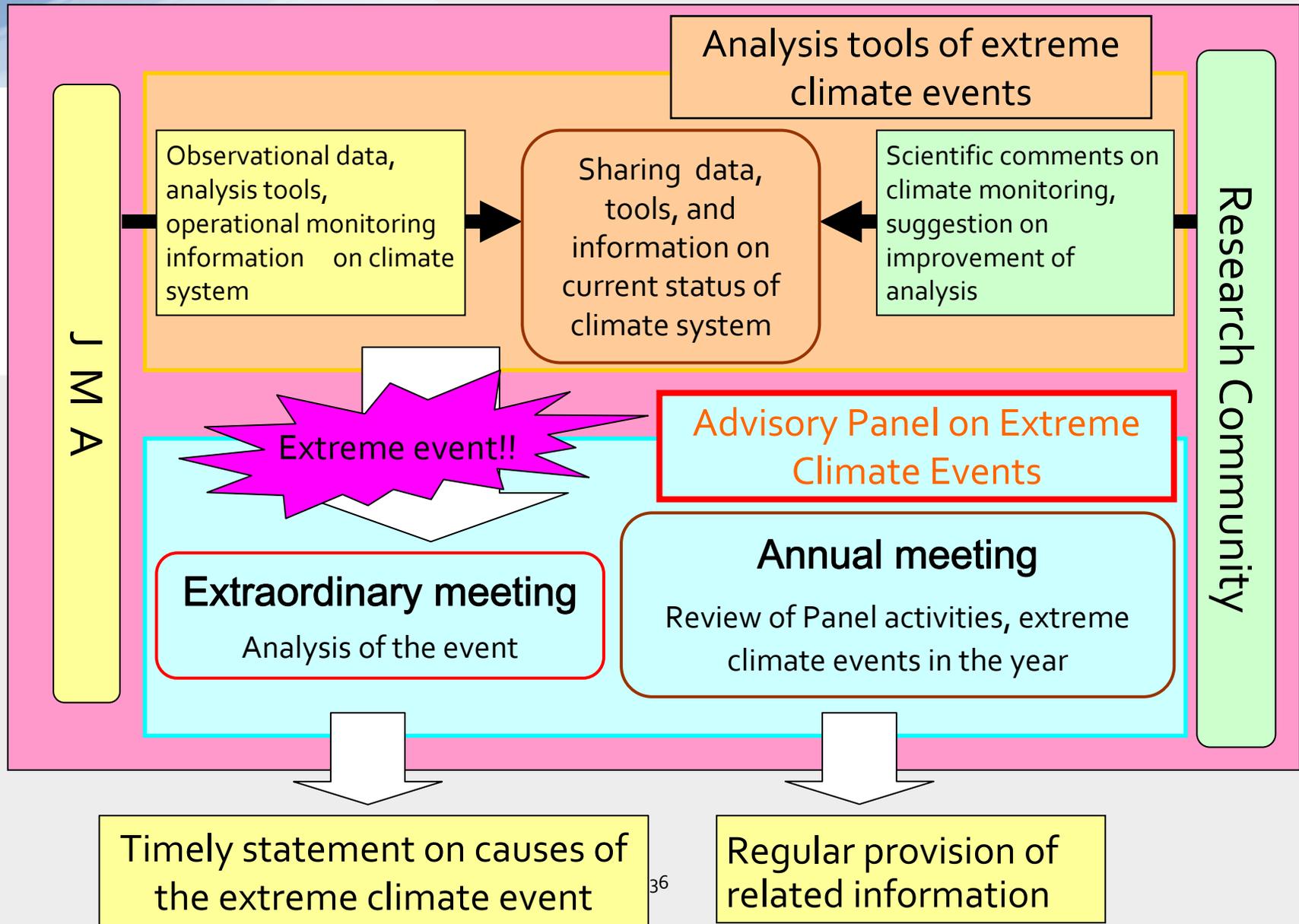
Missions of the Advisory Panel on Extreme Climatic Events

- 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)



Global Temperature & Precipitation

Monitoring (by BCC)

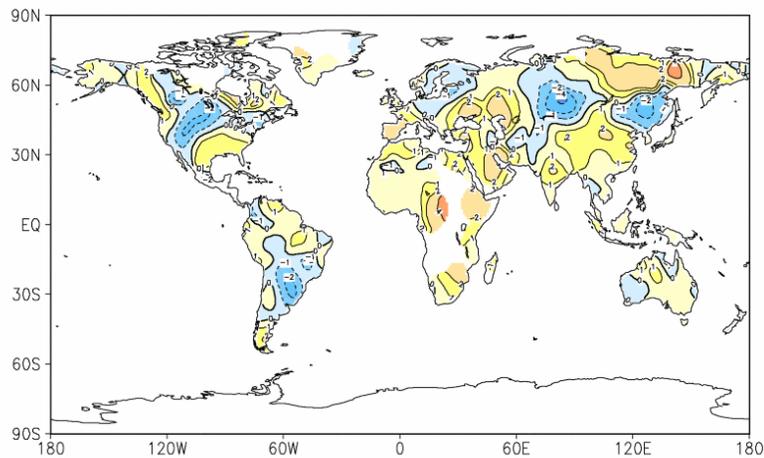
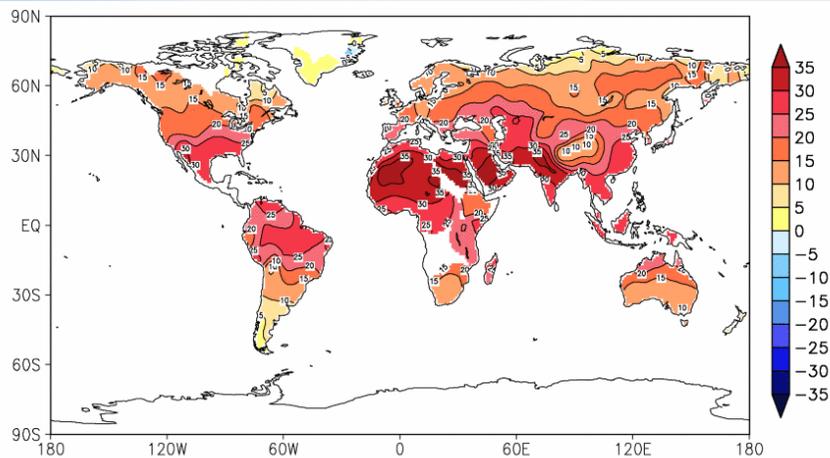


图 2.1 全球月平均气温(上)及距平(下) (°C) 2009.06
Global Monthly Mean Temperatures(top) and Anomalies(bottom)

Climate Diagnostics and Prediction Division /NCC/CMA

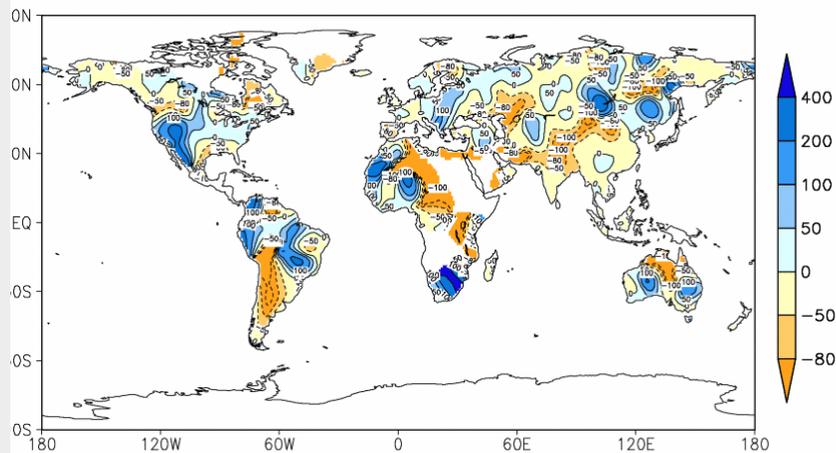
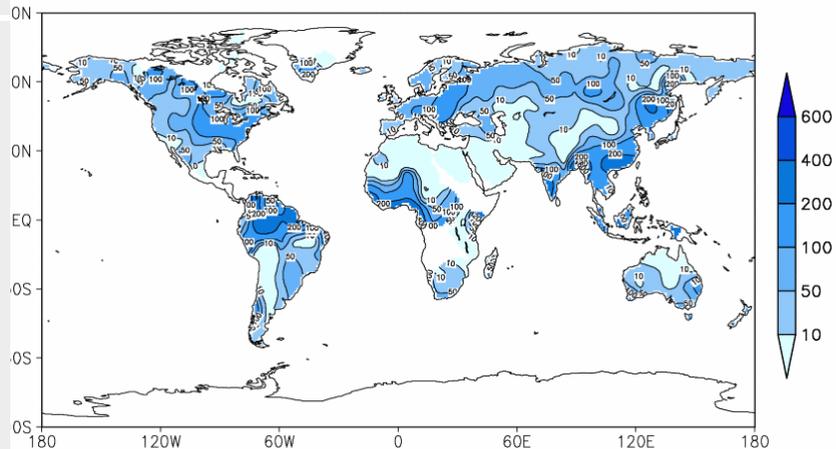
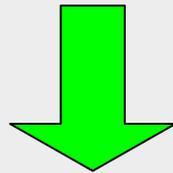


图 2.2 全球月降水量 (mm)(上) 及距平百分率(%) (下) 2009.06
Global Monthly Precipitation Totals(top) and Percentage Anomalies(bottom)

Climate Diagnostics and Prediction Division /NCC/CMA

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