RCOF Review 2017

[Regional Climate Outlook Forum]

Status Report (Survey) on FOCRAII

Annotated Outline

Specific Climate features of concerned region

The salient features of the seasonal climate of the region (rainy season, dry season), indicating the sources of seasonal predictability (ENSO for example); does a baseline study exist on climate variability in the region and its major forces? Include references to important recent peer-reviewed publications on the subject, along with a brief summary outlining the key messages on the current status of scientific knowledge relevant to seasonal forecasting for the region of interest.

- The Asian region is characterized by diversified climate types, with high spatio-temporal variability and significant seasonal differences in precipitation. The Asian summer monsoon starts from the Indo-China Peninsula to the Bay of Bengal in May, then progresses northward where monsoon rainfall becomes particularly abundant from June to September.
- In the summer, precipitation amounts are less than 200 mm in Central Asia, West Asia and Western East Asia and well above 500 mm in South Asia. In the winter, rainfall is less than 100 mm in most of the Asian region, except in coastal areas of East Asia where it can reach over 200 mm.
- The El Niño Southern Oscillation (ENSO), the plateau thermos-dynamical conditions and the Indian Ocean Sea Surface Temperatures Anomalies are the main sources of predictability in the region. Under the influence of the ENSO and the monsoon, the region experiences extreme events such as flash floods, typhoons, droughts or snow storms.
- Faced by a growth in population, the pressure on water resources availability intensifies. Water resources and agriculture are the key sectors in the region that are exposed to the vagaries of climate variability and change.

Highlight specific climate sensitive sectors in the region - like agriculture or water resources - mentioning impacts of seasonal climate variations on their activities, along with a brief outline of potential applications of seasonal forecasting products for decision making.

- Agriculture, water resources, disaster risk reduction, energy, public transportation etc.

The RCOF background

The RCOF details:

- *when/how it started (e.g. preceded by a scoping workshop);*

- During the 13th Session of Regional Association II (Asia) held on December 7-15, 2004, China Meteorological Administration (CMA) proposed to organize the Forum on Regional Climate Monitoring-Assessment -Prediction for Asia (FOCRAII) to response the initiatives of WMO RAII on improving capabilities in seasonal prediction and related fields to transfer the benefit to the Region through RCOF (See the appendix XIII-RA II/Pink 5.3.3 of the 13th Session of WMO RAII).
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- The first session of FOCRAII was held on 7-9 April 2005 in Beijing, hosted by Beijing Climate Center of CMA as a WMO RCOF. The main purposes of FOCRAII are to offer a review of seasonal to inter-annual climate forecasting methodologies and operational systems, and to provide a platform to share the experience and forecasting products for Asia from the climate prediction centers of Asia and around the world as well.
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- Since the 2nd session held on April 6-8 2006, FOCRAII has hosted by BCC/CMA timely every year and combined with the Joint Meeting for Seasonal Prediction of the East Asian Summer Monsoon which started in 1998 and was coordinated alternately among Korea Meteorological Administration (KMA), Japan Meteorological Agency (JMA), and CMA previously.

- *coordinating institution(s) (e.g. RCC/RCC-network, an NMHS, a regional organization)*
  - coordinated by the RCC Beijing

- *sub-region/countries involved;*
  - Countries in RAII are involved,
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- *collaborating partner institutions;*
  - JMA, KMA, ECMWF, Met office, NCEP, IRI, EC, BOM, NEACC, APCC, etc. are involved.
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- *typical frequency, target season(s), tentative dates of the session (physical, or online)*
  - frequency: once a year
  - target season: boreal summer season from June to August
  - tentative dates of the session: usually in the second week of April, sometime around end April to early May (physical meeting)

Note: Information already available in RCOF factsheets[1] published by WMO could be used, unless it needs to be updated.

The RCOF process

The RCOF implementation process, including the capacity development activities, the main forum structure, joint sessions with user involvement, sessions focused on specific sector(s), if any.

- FOCRAII consists of sessions for Invited Lectures, Impact and Physical Mechanism of Key External Factors for Climate Anomalies, Overview of Recent Climate and Climate Change, Seasonal Climate Prediction, Development of Model and System, Discussion and Summary. A training course is usually involved in FOCRAII jointly organized by RCC-Beijing and CMA Training Center (also is WMO Regional Training Center).
- Since 2010, a session for climate services, named *Technology and Management of Climate Services* or *User Interface Program — Opportunity, Challenge and Implementation,* has been established. This session is not for any specific sector but focus on the user's requirement, engagement and experience sharing.

[1] RCOF Factsheets published by WMO available at : https://library.wmo.int/opac/doc_num.php?explnum_id=3191.

The current methodology/approach adopted for preparing the seasonal predictions and consensus outlook, including the global/regional/national technical inputs for the process. Indicate whether real-time products from GPC-LRFs are routinely accessed and used.

- During FOCRAII, BCC collects all dynamical model products from participants (including GPCs') and relevant statistical model products developed by participants and prepares the drafts of consensus outlook for precipitation and temperature over Asia as the first step (usually through a survey). And then, the consensus outlook is summarized based on the draft and feedback of seasonal forecasts from all NMHSs of participated FOCRAII. This step is fulfilled in the session of discussion among forecasters and experts from participating countries and institutes.
- All the participants of NMHSs routinely access and use the real-time products from GPC-LRFs.

Evaluation of the previous season's consensus outlook:

- *how is outlook skill evaluated, with which skill measures (verification metrics if any), and for what period, with what resulting skill score(s);*
- Just qualitatively evaluation by comparing consensus outlook with observations of summer season. No quantitate evaluation for the consensus outlook.

- *how (or whether) is outlook skill communicated to users*
- The outlook skill is communicated to users through the website, email or meeting.

Further value addition and dissemination of outlooks to stakeholders at national scale, e.g., through National Climate Outlook Forums (NCOFs), or similar activities

- Material and products in terms of climate outlook of ENSO, Monsoon, Precipitation, etc., produced from FOCRAII will be domestically disseminated to underpin the seasonal forecast of national purposes, such as drought and flood prevention during summer season.

Information updates between RCOF events, e.g., through a Climate Watch, monthly updates of forecasts etc., including through the operations of Regional Climate Centres (RCCs) and its dissemination to stakeholders

- No updates for the consensus outlook.

Provision of climatological information together with the outlook (for context and information)

- The consensus outlook also consists of status of external forcing, such as ENSO, Tibetan Plateau, and activities of monsoon and tropical cyclone.

Capacity needs

What are the main capacity needs of the major stakeholders observed to date, of the NMHSs? RCC? Users?

It is required by the major stakeholders and users more forecasts on the subseasonal processes, such as the course of rainy seasons of the Asian Monsoon, like setup and retreat of monsoon of BOB, Indian and Meiyu-Baiyu-Changma, etc. For the NMHSs and RCC, the data exchanging and sharing of observation and climate model forecasts/hindcasts among NHMSs and RCC is major capacity needs to carry out evaluation of model performance and interpretation of models products for a specific region or country in the timescale of season and sub-season.

How are these needs being addressed through the RCOF process? How could they be further addressed?

It could be addressed in a session of RCOF and coordinated by WMO and RAII to discuss and communicate.

User involvement

How user needs are reflected in the forum, and after the forum,

The users of FOCRAII mainly are the NHMSs, and through them, related to the government and other stakeholders. During the process of climate services, NHMSs understand and grasp the major part of user needs and are encouraged to share and discuss in a session of RCOF. It could be collected before and after RCOF by some kinds of survey which would be better to be designed or guided by a specific expert team.

Indicate the main (regional) users involved in RCOF

How is the forum used as a mechanism to collect user feedback? What are the main messages from feedback to date? What changes/plans have been made to address these (e.g., development of tailored products, forecasts of sector-specific variables)?
It could be added a session for user feedback related to the major areas of climate services to address the user needs and gaps between providers and users of climate services.

How are seasonal outlooks evaluated from user perspectives, and challenges met by them in the process of applying the information into decision making process identified, and how is this input addressed through the RCOF process?

SWOT analysis

Describe the main Strengths (indicate key benefits realized, with some examples of success stories based on user feedback), Weaknesses, Opportunities and Threats (SWOT) pertinent to the RCOF, both on regional and national scales.

Strength: the first goal of RCOF is to improve the accuracy of climate prediction and minimize the uncertainties of the forecast. That likes a kind of ensemble forecast in term of expertise. FOCRAII involves as many as possible of participants, from GPCs, RCCs, NHMSs to institutes, with kinds of knowledge on specific climate phenomenon and model performance over Asian region, especially the interpretation of model output. Secondly, it is the platform of communication and exchange among providers of climate information and users.

Weakness: The Asia is a large region characterized by diversified climate types with high spatio-temporal variability of climate elements like precipitation. The knowledge and realization of the local climate and its impact factors are different. Data, parameters, indices, tools and approaches related to climate prediction are not unified or standardized which induce more uncertainty and make discussion difficult.

Sustainability of RCOF

Role of a Regional Climate Centre (RCC)/RCC-Network functioning in the concerned region in the RCOF process

RCC play a key role in organizing and supporting the RCOF, especially by:

Providing the certainly model products and its interpretation for consensus outlook;

Communicating the progress of climate monitoring, prediction of assessment methods;

Coordinating joint development or determination on a certainly index, approach or product interested commonly with RCOF.

Recognition of the role of RCOF by the countries in the region

Most countries in RAII

Coordination mechanisms established (such as, a network of focal points, management group) to plan, organize the sessions, discuss challenges and find solutions (such as on-line sessions)

Existing funding mechanisms, need for mobilizing resources to sustain the RCOF; List some of the major projects implemented with support to the RCOF sessions. Suggest approaches for long-term sustainability with minimal dependence on external resources.

FOCRAII is hosted by BCC/CMA funded by China government. Suggesting RCOF applying for funding from more approaches of regional funding such as Asian Bank through supporting of WMO and RA.

Way forward

The future efforts in science (including key research questions and needs), operation, user engagement, sustainability.

- Science
  - improvement of forecast skill on sub-seasonal variability as well as seasonal anomalies by interpretation of the products of GPCs and LRFMME over regions of participating NMHSs
  - improvement of forecast skill on the Asian monsoon activities and key elements of its process such as setup and retreat.
  - Improvement of forecast skill on main phenomenon related to Asian climate anomalies such ENSO, IOD, MJO.
- Operation
  - Sharing the key information of monitoring and model output
  - Standardizing the key indices related to the monsoon activities
  - Establishing the coordinating expert team on technics and management to enhance harmony among RCOFs in organizing and guidance on consistency of products from RCOFs.
- User engagement
  - Enhancing the impacts of RCOF in users, especially high level user and stakeholders.
  - sharing experience of understanding and service to the needs of representative users

Use of objective regional seasonal forecasts in preparing the outlook, and suggestions for the development of global standards for RCOF operational practices

- Adopting or developing standard indices of climate variability representing regional features such as monsoon index for monitoring, prediction and evaluation.
- Based on the quantitative products of climate models or MME, developing objective products of consensus outlook.

Possibility to expand the RCOF product portfolio (such as monitoring information for the recent and current seasons, sub-seasonal information including onset date, rainfall distribution, etc., variables other than rainfall and temperature, impact-based outlooks, etc.)

- Technically, it is possible to expand the RCOF product portfolio for some participants have already developed operational basis and issued relevant products. The problem is the affirmation of product portfolio by RCOF participants and users. It need an expert team to coordinate and guide.