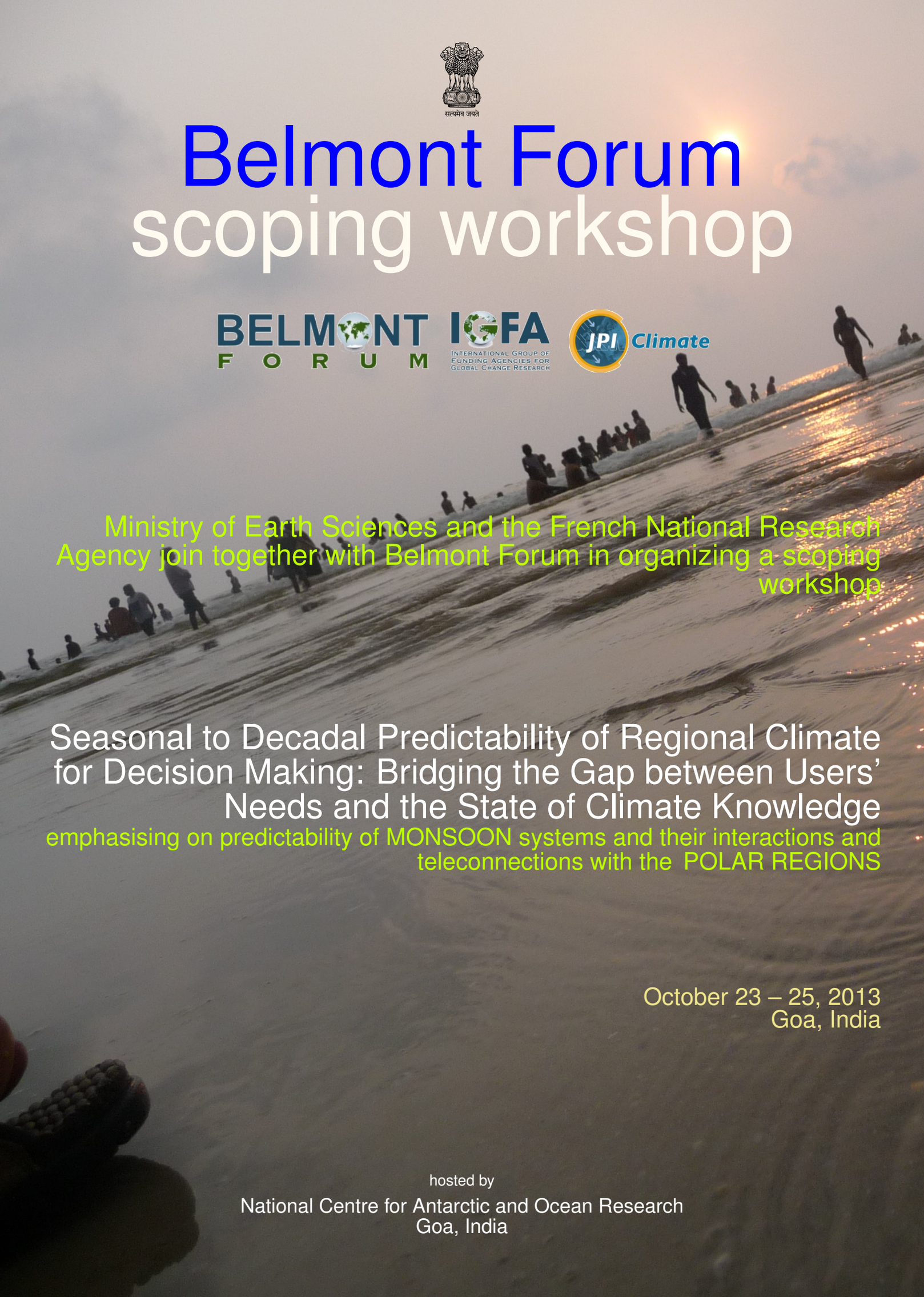

Belmont Forum
scoping workshop

Ministry of Earth Sciences and the French National Research Agency join together with Belmont Forum in organizing a scoping workshop

Seasonal to Decadal Predictability of Regional Climate for Decision Making: Bridging the Gap between Users' Needs and the State of Climate Knowledge

emphasising on predictability of MONSOON systems and their interactions and teleconnections with the POLAR REGIONS

October 23 – 25, 2013
Goa, India

hosted by
National Centre for Antarctic and Ocean Research
Goa, India

Workshop objective

Co-define research priorities on societal issues related to seasonal to decadal variability of regional climate, ranging from monsoons to polar areas, with emphasis on two topics (more details in annex):

- Predictability of regional physical climate from season to decades;
- Bridging the gap between climate models and local knowledge, for adaptation decisionmaking

The scoping workshop will involve invited scientists, experts and program officers, supported by IGFA/Belmont Forum or JPI Climate research funders. The scoping workshop will be hosted by Indian Ministry of Earth Science, 23 – 25, October 2013, in Goa, India.

Main output is an International 2014 Call proposition to be submitted, by 15 November 2013, for approval to the IGFA/Belmont Forum and the European JPI Climate at their respective meetings in December 2013.

Workshop structure and expected outcome

A 3 days' workshop[1] is planned with around 40-50 participants with experience on seasonal to decadal variability issues of regional or local climate, ranging from monsoons areas to polar areas. The objective is to have an interdisciplinary group of scientists (from observation to modeling), climate knowledge users (public or sectorial actors) and research funders from different parts of the world, to exchange their knowledge, need, bottleneck and expectation and to co-design research priorities from short to long-term.

The meeting will be divided into plenary sections for key speaker presentations and general discussions, and in small working groups to discuss and co-define the main questions that could be addressed by supporting an international Collaborative Research Action (CRA).

By the end of the meeting a document will be produced highlighting the main results and identified gaps that will allow formatting the 2014 Call proposition to be submitted to members of IGFA/Belmont Forum and/or JPI Climate.

Organizing Committee

Patrick Monfray, co-lead, patrick.monfray@agencerecherche.fr, ANR, IGFA/Belmont Forum & JPI Climate

Parvinder Maini, co-lead, parvinder.maini@moes.gov, MoES, IGFA/Belmont Forum

Satheesan K, satheesan.k@gmail.com, NCAOR, Goa, India

Asuncion St Clair, asun.stclair@cicero.oslo.no, ISSC, IGFA/Belmont Forum

Ghassem Asrar, gasrar@wmo.int, WMO, WCRP& GFCS

Claus Bruening, Claus.Bruning@ec.europa.eu, DG R&I/Environment, IGFA/Belmont Forum & JPI Climate

Sylvie Joussaume, sylvie.joussaume@lsce.ipsl.fr, JPI Climate Management Committee

Philippe Bougeault, philippe.bougeault@meteo.fr, AllEnvi, IGFA

Ned Garnett, nedg@nerc.ac.uk, NERC, IGFA/Belmont Forum & JPI Climate

General Information for Participants

The proposed Belmont Forum Scoping workshop **Seasonal to decadal predictability of regional climate for decision making: bridging the gap between users' needs and the state of climate knowledge** will be held in Goa during **23 – 25 October 2013**. The workshop will be organised by the Earth System Sciences Organisation, Ministry of Earth Sciences (Government of India) and The French National Research Agency (ANR) and will be hosted by National Centre for Antarctic and Ocean Research, Goa, India.

[1] Last half-day will be dedicated to a closed session for funders

Venue

The workshop will be held at Neptune Hall I in the Bogmallo Beach Resort (http://www.bogmallobeachresort.com/) at Bogmallo beach, situated about 4 km from the Goa Airport at Dabolim and 8 km northwest of the port town Vasco da Gama.

International and domestic travel

Goa is well connected by various domestic airlines as well as few International airlines. International participants, other than those flying dirtectly to Goa, are advised to fly through two major gateways Mumbai and New Delhi which are very well connected to Goa. While Mumbai would be preferred due to its proximity to Goa, New Delhi airport has a modern integrated terminal with excellent passenger amenities. Mumbai airport is currently undergoing modernization works and the domestic and international terminals are expected to be integrated in October 2013. Till then, there will be a need to transfer between international and domestic terminals if you are landing in Mumbai. There is a courtesy coach service and is the safest and most convenient means of transfer between the international and domestic terminals. Avoid taking any cabs and if you must, then use pre-paid taxi services located inside the airport immediately after the custom clearences.

Local transportation

Dabolim airport in Goa is about 4 km away from the workshop venue, the Bogmallo Beach Resort. The hotel will arrange free Airport pick-up and drop for all guests who choose to stay with them. Please provide your arrival and departure itinerary to the hotel reservations and/or local organisers. In case you miss the transportation facilities provided by the hotel, please approach the prepaid taxi counters just outside the arrival hall of Dabolim Airport. These taxi counters will charge you the government approved rates to your destination. Note that this is a prepaid system, safe, and you do not have to pay any extra amount after you reach your destination.

Accommodation

Organisers have blocked sea-facing rooms for all participants at the workshop venue (Bogmallo Beach Resort) at reduced rates for the workshop as follows: Single occupancy Indian Rupees (INR) 5500 per room per night Double occupancy INR 6500 per room per night The above special rate includes all taxes, breakfast, conference meals, and the airport transfer.

To avail the above, participants should mail the local organizer (satheesan@ncaor.gov.in, satheesan.k@gmail.com) with the names, occupancy and dates. Participants would directly settle the bills before departure. The hotel accepts all major credit cards (VISA, MASTER and AMEX).

Internet facilities

Free wireless Internet connectivity is available at the meeting halls. Internet is available at the rooms on payment basis.

Conferencing facilities

The workshop will be held at Neptune Hall I in the Bogmallo Beach Resort. The hall will be equipped with a pc/laptop, an LCD projector, a screen, and microphones. Participants need not bring any equipment such as a personal laptop from outside. However, participants need to carry own Mac laptops, if needed, to the meeting.

Lunch and Breaks

During conference days lunch will be arranged at Nautilus Restaurant and Tea / coffee at Neptune I Pre function area.

Financial services

The official currency of India is the Indian Rupee. Well known credit cards (Visa, MasterCard, etc.) are accepted in most places. The easiest and safest place to exchange your currency to Indian Rupee is inside the Airport. New Delhi and Mumbai airports have many foreign exchange counters. Dabolim Airport has one money exchange counter. However, there are few ATMs located enroute to the hotel as well as within 1 km distance from hotel premises. It is advised that participant may carry some Indian currencies as the smaller shops do not accept credit cards.

Things to see and do

Goa is Indias smallest state in terms of area and is located on the west coast of India. With its magnificent beaches, rich cultural heritage, delectable cuisine, and laidback vibe, Goa will provide an ideal location for a productive yet enjoyable conference. For more details, please explore at: Lonely Planet, Goa Department of Tourism, Wikitravel

Weather

October marks the beginning of tourism in Goa as the weather dries up considerably after monsoons. Although the temperatures in October are lower than they are during the summer months, the weather is still warm and sunny, with theaverage daily temperaturearound27C. More details on the climate of Goa is available at ¡http://www.imd.gov.in/section/climate/extreme/goa2.htm¿

Local Contact

For further information on logistic arrangements, please contact:

Dr. K. Satheesan, National Centre for Antarctic and Ocean Research, Earth System Sciences Organisation, Ministry of Earth Sciences, Government of India Headland Sada, Vasco da Gama, Goa – 403 804, Tel: +91 832 2525 530 E-mail: satheesan@ncaor.gov.in; satheesan.k@gmail.com

Annexure

Overarching framework for a CRA on seasonal to decadal predictability of regional climate

Climate Services are generally considered as the provision of best available science-based information to decision makers to facilitate decisions on adaptation, mitigation and management of risks associated with climate variability and change. These should comprise information on the current and future climate conditions, for time horizons ranging from few weeks to seasons and decades, and longer time. Information needs include the average climate distribution, the frequency and intensity of extreme events, a clear description of the associated uncertainty, and an assessment of the impacts and consequences of climate variability and change on all sectors of the economy, the human health, and the Earths natural environment and the benefits derived from them. Because of the complex non-linear interactions and feedback mechanisms between the Earths atmosphere, land, ocean and cryosphere components, climate variability and change needs to be addressed across a wide spectrum of temporal and spatial scales, processes and regions where these are relevant and occurring.

In October 2012, 129 countries assembled in the first Extraordinary World Meteorological Congress recognized the need for improved Climate Services and decided to create a Global Framework for Climate Services (GFCS[2] and to establish an Intergovernmental Board on Climate Services (IBCS[3]). The GFCS consists of five main components (or pillars):

- Observation and Monitoring
- Research, Modeling and Prediction
- Climate Service Information System
- Users Interface Platform
- Capacity Building component

Some of these pillars have existed for several decades, as a result of international cooperation [4] among the nations around the world, and some pillars need to be further developed (e.g. Climate Service Information and Users Interface), however the most unique feature of GFCS is the integration and coordination of activities of all five pillars with the ultimate objective of developing and delivering the most reliable climate information for decision making. This proposed international Collaborative Research Action (CRA) is to solicit and support innovative research, modeling and analysis proposals, as a contribution of the IGFA/Belmont Forum and/or European JPI Climate partners to the implementation of GFCS, as well as to Future Earth[5]

One emphasis will be on predictability of monsoon systems in Asia, Australia, Africa, and the Americas, an important requirement for provision of climate and other hydro-meteorological services for approximately one third of the world population. While the basic understanding of the monsoon is well established and is well simulated in some climate models, the understanding of the monsoon teleconnections with the polar regions is still in its infacy. We also do not have an adequate understanding of some of the interactions, especially the interactions with the land surface and the interactions across time and space with extra-tropical areas up to the poles. Two main topics are proposed for the scoping workshop and the eventual call.

Topic 1: Predictability of regional physical climate from season to decades

Physical climate is understood here as anomalies of temperature, humidity, rainfall, wind, etc, defined both by their mean, distribution and extreme values. The most promising methods to predict physical climate fluctuations at these space and time scales are global coupled models of the Earth system, including atmosphere, ocean, land surfaces, and cryosphere, with the best possible natural and anthropic forcing. Such models are already in use for seasonal predictions in tropics and should be further developed to address decadal variability and

[2] http://www.gfcs-climate.org/

[3] http://ibcs-1.wmo.int/

[4] As World Climate Research Program (WCRP), Earth System Science Partnership (ESSP) and Global Earth Observations (GEO) that provide knowledge to the Intergovernmental Panel on Climate Change (IPCC) and the UN Scientific Assessment of Ozone Depletion.

[5] Future Earth, international research initiativefor global sustainability, www.icsu.org/future-earth.

predictions. Further there is a need to understand the processes that influence the variability in polar climate and their influence on monsoons.

The phenomena that provide predictability at these temporal scales are various oscillations and teleconnections frequently observed in the climate system. Classic examples of climate oscillations that can provide predictability beyond few weeks are the Madden Julian Oscillation (MJO[6]), the North Atlantic Oscillation (NAO), the El Nino Southern Oscillation (ENSO[7]), the QuasiBiennal Oscillation (QBO), the Pacific Decadal Oscillation (PDO) and the Atlantic Multi-decadal Oscillations (AMO).

Other teleconnections may include interactions between tropical and extra-tropical regions of the planet, including polar regions and oceans[8], including ice features. Also, the stratosphere is increasingly considered as a medium that can carry information on climate anomalies on long time scales from pole to pole.

In addition to research devoted to improve our understanding of the above phenomena and their role on predictability of the climate system, Topic 1 would support work on key aspects of modeling for long-range predictions, such as initialization, forcing and verification, as well as all possible sources of information on past climate anomalies.

Key questions concerning initialization are (i) the assessment of the potential of the most recent global reanalyses of the atmosphere and the ocean to describe the climate trends and serve as initial data for seasonal and decadal forecasts; (ii) the comparison of initialization techniques based on full field or departure from the mean state of the climate; and (iii) assessment of the role of other components of the climate system, such as land-surface moisture, snow cover, sea-ice or aerosols amount and distribution.

Key questions concerning forcing are the preparation and impact on predictability of the best dated natural and anthropic forcing for climate simulations, i.e. solar variability at various time scales, history of volcanic emissions, VOC emissions, anthropic GHG and aerosols emissions, and landuse. The preparation of optimal datasets by sharing information available in the various international research centers is strongly encouraged.

Key questions concerning model verification are the identification, attribution and reduction of biases, the definition of optimal model metrics to measure how well the models reproduce the various climate oscillations, with due account to observation uncertainty. Key questions regarding the observational basis for climate prediction include sharing past data to provide optimal coverage of the climate decadal variability over the last two millennia, and better interpretation methods for proxy data.

Global approach should be complemented by regional studies of monsoon systems in Asia, Australia, Africa, and the Americas, taking the specific role of diverse and steep orography (as Himalayas, African rift areas, Andes). It is important to avoid over-emphasis on the long-range forecasts, and move towards a range of user-targeted monsoon information products based on modern scientific approaches encompassing climatological monitoring as well as prediction aspects. Multi-week to seasonal forecasts of monsoon rainfall and active and break cycles at the local to regional scale would be very useful for farmers, especially forecasts of extreme years, but effort also needs to be invested in how best to use the forecast skill that is apparent only over larger areas, including impact of volcanic events.

Topic 2: Bridging the gap between climate models and local knowledge and decision-making processes for adaptation

This topic emerges from the substantive gap between the production of scientific information and the actual suitability and saliency, credibility and often lack of legitimacy of that information for users in decision making processes for adaptation. Also of central importance is the role that local knowledge has in decision making by

[6]The MaddenJulian oscillation (MJO) is the largest element of the intra-seasonal (3090 days) variability in the tropical atmosphere. It is a large-scale coupling between atmospheric circulation and tropical deep convection. The MJO is characterized by an eastward progression of large regions of both enhanced and suppressed tropical rainfall, observed mainly over the Indian Ocean and Pacific Ocean.

[7]El NioSouthern Oscillation (ENSO) is a quasi-periodic climate pattern that occurs across the tropical Pacific Ocean roughly every 2-7 years. The Southern Oscillation refers to variations in the temperature of the surface of the tropical eastern Pacific Ocean (warming and cooling known as El Nio and La Nia respectively) and in air surface pressure in the tropical western Pacific. The two variations are coupled: the warm oceanic phase, El Nio, accompanies high air surface pressure in the western Pacific, while the cold phase, La Nia, accompanies low air surface pressure in the western Pacific. The extremes of this climate pattern's oscillations, El Nio and La Nia, cause extreme weather (such as floods and droughts) in many regions of the world.

[8]Recent research using proxy records points to the role of polar region on monsoons (Kemp et al., 2010; Wang et al., 2012). Some studies correlated Atlantic Multidecadal Oscillation with the multidecadal variability of Indian monsoon rainfall (Burns et al., 2003; Chang et al., 2001; Rajeevan et al., 2002; Goswami et al., 2006).

communities, industries, or policy makers. Whereas traditional knowledge about environmental change plays a central role in defining the adaptation needs of many communities and agents across the globe, climate change impacts are likely to bring unprecedented change and thus local knowledge is insufficient and misguiding for appropriate decision making.

The provision and quality of climate services for adaptation is not a given. Not only there needs to be a bi-directional relation between the production of climate knowledge and the users. It is also central to understand decision making processes and their actors, the social and political working of policies and local institutions, as well as the realities of many poor communities and countries and their lack of institutional capabilities to produce, absorb, access, demand and use climate knowledge. There is a substantive lack of scientific knowledge on the barriers, limits and opportunities for improving the flow of knowledge and the integration across sectors of relevant climate information.

Bridging the gap between climate models and local knowledge and decision making processes for adaptation requires co-production and co-design, ongoing flows of information and trust, and detailed and thorough understanding of the contexts and multiplicity of issues with which climate decision making converges and competes in particular localities. These are the tasks of social sciences and the humanities in close collaborations with the natural sciences. Key objectives of this topic are to:

- Ensure a double way exchange of knowledge:
  - Improve climate scientists' understanding of users existing knowledge and needs[9]
  - Use of climate knowledge by stakeholders[10]
  - Monitor and evaluate bidirectional knowledge production and use, between users and scientists;
  - Identify limits, barriers and opportunities in both directions[11]
- Understand processes of decision making and policy making, about seasonal and decadal predictability knowledge:
  - How climate extreme indicators enter in decision processes;
  - Comparative approaches of misused and well-used knowledge;
  - Perception and acceptability of risks;
  - Coherence of various policies across sectors and/or across countries;
  - Better understanding of policy processes for climate related decision making at various scales and by multiple sectors (community, private sector, government, civil society).
- Enable capacity for developing, demanding, understanding and using salient climate services, as identify needed institutional, organizational and technological arrangements.

This proposed CRA would particularly focus on regional cross-sector case studies, as along the lines the themes developed by the Future Africa-Climate Services Adaptation Program, and seek to expand South-South research interaction and knowledge transfer.

[9] Improve climate scientists' understanding of the information needs of different user groups and thus able to produce more usable and salient climate information. Improve climate scientists understanding of how people cope with climate variability and uncertainty and their knowledge of trends and expected changes. Improve climate scientists understanding on what type of information and in which format is most salient for diverse users. Tools for identifying end-users needs, their access to knowledge, and their understanding of climate models.

[10] Assess and understanding by users. Identify access and best use of climate knowledge including case of misused. Map and role of institutions in the production and flow of knowledge. Identify specific knowledge needs for concrete sectors of central relevance locally (e.g. food security, health; flooding; disaster prevention, infrastructure etc.)

[11] Optimal use of knowledge.Identification of opportunities and barriers for cross-sector sharing of climate information. Identify limits, barriers and opportunities for adequate institutional capacities (including to demand and deliver relevant knowledge). Better understanding of information sharing and barriers to use climate information. Identify cultural, political and socio-economic factors affecting access to and use of climate information for decision making.

Agenda
Belmont Forum Scoping Workshop
Seasonal to Decadal Predictability of Regional Climate for Decision Making: Bridging the Gap between Users' Needs and the State of Climate Knowledge
Day 1: Wednesday 23 October 2013

0900 – 1100	Inauguration & Overarching	
Moderator:	Parvinder Maini	
0900 – 0910	Introduction and Opening Remarks	Shailesh Nayak
0910 – 0930	The polar regions and Indian monsoon: MoES initiatives	S Rajan
0930 – 0950	Belmont Forum CRA & Future Earth	P. Monfray
0950 – 1010	JPI Climate (incl. feedback from WG1/KNMI meeting)	S. Joussaume
1010 – 1040	Future Earth & Global Framework for Climate Services	G. Asrar
1040 – 1110	Discussions & Break	
1110 – 1330	THEME 1a: Highlights on variability of regional physical climate	
Chair: S Naqvi	Rapporteur: Mxolisi Excellent Shongwe	
1110 – 1130	Additional Predictability of the South Asian Monsoon arising from Extra-Tropical SST	B N Goswami
1130 – 1150	West African Monsoon	Amadou Gaye [1]
1150 – 1210	Importance of teleconnections for predictability	Tercio Ambrizzi[1]
1210 – 1230	Sea-ice variability and its impact on extreme events	L. C. Shaffrey[1]
1230 – 1250	Climate Reconstruction using multiple proxies	R Ramesh [1]
1250 – 1330	Discussion on key bottlenecks	
1330 – 1500	Lunch Break	
1500 – 1730	THEME 1b: Challenges on predictability of regional physical climate	
Chair: B N Goswami	Rapporteur:A. Bamzai	
1500 – 1530	New frontiers in climate predictions	S K Behera [1]
1530 – 1600	Climate prediction for climate services: sources of predictability and forecast quality	Francisco J. Doblas-Reyes[1]
1600 – 1630	Southern Hemisphere Teleconnections and Climate predictability	Carolina Susana Vera [1]
1630 – 1730	*Discussion on progress in 5 yrs, in 20yrs*	

Day 2: Thursday 24 October 2013

1500 – 1730	THEME 2: Bridging the gap between climate models and local knowledge	
Chair: Jost von Hardenberg	Rapporteur: Helen Cleugh	
0900 – 0930	Linking with social needs and social sciences	Asun St. Claire [1]
0930 – 1000	Seasonal prediction of Indian Summer Monsoon rainfall for decision making in agriculture	Sulochana Gadgil[1]
1000 – 1030	Water resources and regional climate	Izabella Koziel [1]
1030 – 1100	*Break*	
1100 – 1130	CORDEX: an unprecedented opportunity for regional climate information	Bruce Hewitson [1]
1130 – 1200	Climate-culture relationship during mid-Holocene	Vandana Prasad[1]
1200 – 1230	Climate research priorities in the light of services and stakeholder needs	Chris Hewitt[1]
1230 – 1330	*Discussion on key bottlenecks*	
1330 – 1430	*Lunch Break*	
1430 – 1500	Towards a Collaborative Research Action in 2014	Patrick Monfray
1500 – 1800	Two Theme Groups: in-depth debate on the overall plan and to identify key issues to promote at international level	

Day 3: Friday 25 October 2013

Moderators: S Rajan and Patrick Monfray	Rapporteurs: K Satheesan & J. Muller
0900 – 1030	Report from the two Theme Groups and plenary discussion agreement on Topics
1030 – 1230	**Two Theme groups**: refine the plan, identify next steps and persons in charge for the proposal due by November 15, 2013
1230 – 1325	Reports and Final Plenary Session
1325 – 1330	Vote of Thanks:K Satheesan
1330 – 1500	Lunch Break
1500 – 1700	**Meeting of the fund managers (closed session)**

[11] ***Visionary talks 13'+7' discussion) beyond state of the art about research gaps and research challenges for the next 5-10yrs, plus indentification where international cooperation and/or science/society exchange is required.***

Two main topics are proposed for the scoping workshop

Predictability of regional physical climate from season to decades

Predictability of MONSOON systems is an important requirement for provision of climate and other hydro-meteorological services for approximately one third of the world population. While the basic understanding of the MONSOON is well established and is well simulated in some climate models, the understanding of it's teleconnections with the POLAR REGIONS is still in its infacy. We also do not have an adequate understanding of some of the interactions, especially the interactions with the land surface and the interactions across time and space with extra-tropical areas up to the poles.

Bridging the gap between users' needs and the state of climate knowledge

There are substantive gaps between the production of scientific information and the actual suitability and saliency, credibility and often lack of legitimacy of that information for users in decision making processes for adaptation. Also of central importance is the role that local knowledge has in decision making by communities, industries, or policy makers. Whereas traditional knowledge about environmental change plays a central role in defining the adaptation needs of many communities and agents across the globe, climate change impacts are likely to bring unprecedented change and thus local knowledge is insufficient and misguiding for appropriate decision making.

For details, contact

satheesan@ncaor.gov.in
National Centre for Antarctic and Ocean Research
Headland Sada, Vasco da Gama
Goa – 403 804, INDIA