

World Climate Research Programme and Seasonal Prediction

Description

Developing countries are particularly vulnerable to climate change, partly because agriculture, water management and the spread of disease are highly dependent on weather and climate, and partly because of the inadequate adaptive and planning strategies available to properly respond to major climate anomalies.

The WCRP has a long-standing commitment to coordinating international seasonal prediction activities. Recent breakthroughs in seasonal prediction include:

1. the recognition that seasonal forecasts must include quantitative information regarding uncertainty (i.e., probabilistic prediction) and that verification must include probabilistic measures of skill; and
2. that a multi-model ensemble strategy may be the best current approach for adequately resolving forecast uncertainty. Numerical experimentation for seasonal-to-interannual variability and predictability is coordinated by the WCRP/CLIVAR-led Working Group for Seasonal-to-Interannual Prediction (WGSIP), paying special attention to assessing and improving predictions. Seasonal prediction activities cut across all core projects of the WCRP and provide a test bed for evaluating IPCC class models in seasonal prediction mode.



In monsoon India and many other developing regions the seasonal rainfall is critical to society and human livelihood.

*Image source:
International Water Management Institute
Photographed by Mamta Borgoyary.*

Added value

Award winning breakthrough in climate prediction:

The 2006 Norbert Gerbier-Mumm International Award was given to Dr Tim Palmer, co-chair, WCRP CLIVAR, and 24 of his collaborators (from 13 institutions and 7 nations) in recognition of their major contribution to ensemble climate prediction applications that significantly improve early-warning techniques including those for malaria outbreaks. Dr Palmer and colleagues' work was published in 2004 in the Bulletin of the American Meteorological Society (Volume 85). In his acceptance speech (June 2006), Dr Palmer thanked the Norbert Gerbier-Mumm foundation, the European Commission for funding and the WCRP for providing fora for the modelling community, noting that ensemble climate predictions were pioneered through and by WCRP. The Award's prize money was recently invested in a project led by the Tanzania Meteorological Agency, studying the impacts of climate variability on malaria in Tanzania. The main objective of the project was to further develop and apply the DEMETER methodology of integrating seasonal forecasts and malaria statistics into an end-to-end early warning system for malaria outbreaks.

A new database of clinical cases was collected and made available for the wider scientific community, the seasonal and interannual cycle of malaria outbreaks since the year 2000 and beyond determined, and the high risk areas in Tanzania identified.

WCRP assessed state-of-the-art capabilities and skill in seasonal forecasting:

Recognizing the importance of seasonal prediction, WCRP has launched a specific effort led by CLIVAR to determine the extent to which seasonal prediction is possible and useful in all regions of the globe with currently available models and data. For this purpose, a task force on seasonal prediction organized an international seasonal prediction experiment in 2007 and co-ordinated analysis of results at a Seasonal Prediction Workshop in Barcelona, Spain (June 2007, <http://grads.iges.org/ellfb/SMIP2/smip.top.html>). The workshop was designed to assess state-of-the-art capabilities and skill in seasonal forecasting with currently available retrospective forecast data sets made available through the Seasonal Model Intercomparison Project (SMIP) and DEMETER.

WCRP collaborates with WMO/THORPEX to help develop accurate prediction of high-impact weather and environmental events:

The challenge of seamless prediction from days to decades, particularly in terms of bridging the gap between forecasting high impact weather events and seasonal variations naturally brings together the activities of the communities of WCRP Seasonal Prediction and the WMO's weather research programme THORPEX to discuss emerging coordination and collaboration. Both programmes have the obligation to help develop relevant scientific knowledge and a science infrastructure to provide society, in particular policy- and decision-makers 'more accurate, and from a socio-economic perspective more useful, prediction of high-impact weather and environmental events'.

WCRP advances seasonal prediction for agriculture:

Climate experts associated with WCRP have significantly contributed to the advances made in several areas especially in the science of climate forecasting, downscaling large area climate forecasts to local applications, integration of climate forecasts in operational crop models to develop alternative scenarios for operational decision making, and capacity building at the local level in all these areas. The climate forecast community is now capable of providing an end-to-end multi-scale (in space and time) integrated prediction system that provides skilful, useful predictions of variables with socio-economic interest. For agriculture, climate forecasts must be interpreted in terms of production outcomes at the scale of decisions if farmers and other agricultural decision-makers are to benefit. Indeed, there have been several successful attempts to link seasonal climate forecasts from general circulation models with crop models.

WCRP/CLIVAR-scientists participated in the International Workshop on Climate Prediction:

Agriculture and Challenges held in May 2005 at WMO and submitted several review articles to the Climate Research Special Issue (Vol. 33: 1) on Advances in Applying Climate Prediction to Agriculture (available at <http://www.int-res.com/abstracts/cr/v33/n1/>). CLIVAR-scientists were also involved in the WCRP co-sponsored Global Change System for Analysis, Research and Training (START), which continues to equip young professionals from developing countries with expertise in agriculture and food security to apply advances in climate prediction to their home institutions' ongoing efforts to address climate-sensitive aspects of agricultural production, food insecurity and rural poverty. START, together with IRI and WMO, recently published a selection of science articles in a book edited by Drs M. Sivakumar and J. Hansen.

Relevance to GEO

Task CL-07-01. Coordinator: WCRP