APEC Climate Center for Information Services (APCC)

Description

APCC is a regional climate center aimed at realizing the APEC vision of regional prosperity through the reduction of economic losses due to abnormal climate and the application of climate information for socio-economic benefits. APCC produces real-time operational climate prediction information based on a well-validated multi-model ensemble (MME) system. APCC contributes to enhancing capacity-building in the monitoring and prediction of unusual climate in the Asia-Pacific region by sharing high-cost climate data and information.

Added Value

APCC is one of the modeling and data processing centers of GEOSS. It can be an important contributing component and addition to the inter-governmental action plan of Earth Observations in many ways. The well-validated multi-model ensemble system will utilize the comprehensive observations and produce reliable climate prediction information for disaster reduction, integrated water resource management, air quality monitoring and forecasting, sustainable land use, management, etc. The advanced capability in climate monitoring and forecast tools developed by APCC will contribute to the success of the 10-Year Implementation Plan of Earth Observations.

Relevance to GEO

APCC activities will contribute to the following 6 year and 10 year targets identified in the GEOSS Implementation plan:

- Enhance the collaboration mechanism between observation organisations and research communities with users of climate information to make maximum use of the observations, analyses and products.
- Develop data integration facilities for exchanging data, products and information between climate sectors and socio-economic benefit areas.
- Provide support to the development of a long-term strategy that encompasses progress in observation, data assimilation and modelling
- Contribute to major advances in the monitoring and predictability of climate on seasonal, interannual and decadal time scales, including the occurrence of extreme events.

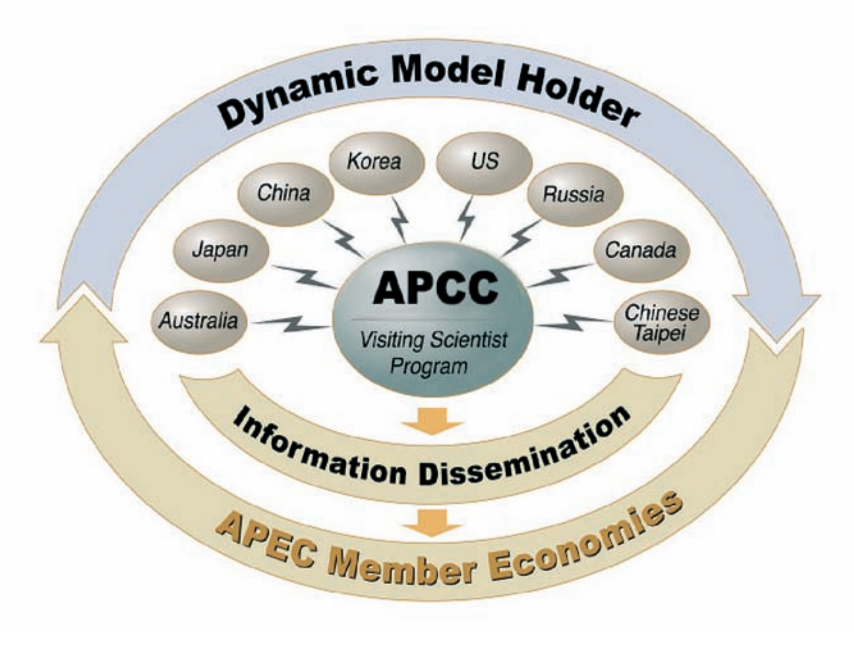
Participants

- 21 economies in Asia Pacific Economic Cooperation (APEC)
- World Climate Research Programme (WCRP)

Current Status and Next Steps

APCC has been providing operational 3-month lead dynamical seasonal predictions to user communities, based on a well-validated multi-model ensemble system (MMES). Currently, APCC-MMES uses outputs from operational-mode global climate models at various institutes from eight APEC member economies (Fig. 1). Organizations and institutes participating in the joint real-time MME operational forecasts are the National Aeronautics and Space Administration (NASA), National Center for Environmental Prediction (NCEP), International Research Institute for Climate and Society (IRI) and Center for Ocean Land Atmosphere Studies (COLA) of USA, Hydrometeorological Center (HMC) and Main Geophysical Observatory (MGO) of Russia, Korean Meteorological Agency (KMA), Meteorological Research Institute (MRI) and Seoul National University (SNU) of Korea, Japan Meteorological Agency (JMA), Central Weather Bureau (CWB) of Chinese Taipei, Institute of Atmospheric Physics (IAP) and Beijing Climate Center (BCC) of China, Canadian Meteorological Center (CMC) and the Australian Bureau of Meteorology (BOM). MME seasonal predictions are distributed through the APCC website (http://www.apcc21.net) four times a year. Currently APCC operates the world's largest and most extensive operational MME dynamical seasonal prediction system.

APCC multi-model ensemble system



APCC seeks to provide useful climate information for disaster preparedness and mitigation efforts for the APEC region. This will be done by innovative use of climate monitoring, prediction techniques, as well as analyses and interpretation of climate data.

For the needs of regional applications, current forecast products from global models are often inadequate; they have too coarse spatial and temporal resolutions. To bridge the gap between model outputs and end-user requirement, a suite of statistical downscaling tools will be implemented which will leverage the end values of MME outputs. The potential of using high-resolution dynamical models to predict extreme climate events from the intraseasonal to interannual timescales, such as the MJO and its associated clusters of high-impact weather, will be vigorously researched and exploited.

Within the next five years, APCC will provide reliable 12-month predictions using a Tier-1 MME system, focusing on information of major climate modes such as ENSO, IOD and the Monsoons. This warrants much research on the coupled climate prediction problem, for instance the impact of initial data, error characteristics and their controlling mechanisms, and predictability limits. In the end, our capacity of predicting local climate variations, including the likelihood of inclement weather and extreme climate, with relatively long lead time, will be vastly expanded.

Combining these prediction technologies with comprehensive monitoring efforts of the climate state using near real-time satellite data, an Early Warning System will be setup. Timely information of climate events and potential climate hazards will be available for sound decision making on the local, national and international level, and for the specific needs of various sectors such as agriculture, energy, water management, health and transport.

APCC will serve as the WCRP Data Center for Seasonal to Interannual Prediction, constructing an easily accessible database for subsets of model data, generated through co-ordinated experiments in participating institutes, to further serve the climate research community.