A Experimental Dynamical Forecast System for Predicting Asian-Pacific Monsoon Variability

Cheng-Ta Chen, Jung-Lien Chu and Chun-Hsien Wu

Department of Earth Sciences, National Taiwan Normal University, Taipei, Taiwan

Seasonal prediction of climate has shown promise in recent years, in particular for the tropics (ENSO), but also for extratropical and Asian-Pacific region, with potential important socio-economic benefits. There is a need to develop such capacity in Taiwan. The simplest way to build a seasonal forecast system is to run the AGCM with AMIP II experimental protocol and update the integration monthly. Due to sensitivity of model to the initial conditions, ensemble simulations should be performed. The integration should start from 1950s in order to provide a more complete model statistics. These statistics can be used to correct model bias and find the characteristics of model response to different phase and amplitude of SST forcing. The updated runs are the sources for the initial conditions used in the seasonal forecast system. The SST forecasts from other statistical and/or dynamical coupled model are used for the lower boundary forcing. It is basically a two-tier system.

The past ENSO-related circulation and rainfall variability over the East Asian Monsoon region can be reasonably captured by the ECHAM4 AMIP II simulations. However, the prominent high pressure anomaly over the subtropical western Pacific in the ENSO maturing stage is over estimated. Nevertheless, the present forecast system has the skill to predict the above-normal precipitation over the south-eastern China following the mature phase of ENSO when the perfect SST condition is provided.