

# Summer Season Hindcast Experiments using JMA/MRI-CGCM3

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## ABSTRACT

Japan Meteorological Agency (JMA) is preparing to replace the current 2-tiered long range forecast system with the atmosphere-ocean coupled forecast system named JMA/MRI-CGCM4 in early 2010. Although the previous version (JMA/MRI-CGCM3) has already been in operation as an ENSO forecast system and has been run separately from the seasonal forecast system, it will take over the role of seasonal forecasting after several upgrades. As a preliminary step for the operational use of the coupled system, a set of seasonal hindcast experiments were conducted at the Meteorological Research Institute (MRI) to grasp its forecast performance using JMA/MRI-CGCM3.

Experiment results show that the coupled system has a relatively high capability of forecasting Sea Surface Temperature (SST) in the Indian Ocean and atmospheric circulation in the lower troposphere around the Western North Pacific Monsoon (WNPM) area compared with the current 2-tiered system. Since it is well known that convective activities around WNPM area have huge impacts on climate in East Asia, it is expected that the introduction of the coupled system would further improve our seasonal forecasting services.

Our current understanding of where these predictabilities come from is as follows.

A basin-wide warming/cooling pattern of the Indian Ocean SST is subtracted as a first EOF mode (EOF1) in boreal summer. Since EOF1 interannual time series has a significant correlation with NINO.3 time series of the previous winter, it is speculated that a large part of basin-scale variability in the Indian Ocean can be explained by delayed response to ENSO. On the other hand, summertime atmospheric conditions succeeding El Niño events in East Asia are characterized by a clear low-level anticyclonic circulation anomaly and suppressed convective activity around WNPM area. Xie et al. (2009) suggests a possible mechanism for these prolonged El Niño effect during summer. Since the mechanism partly reproduced on the coupled system, it may be one of the factors of the improvement of the forecast skill on the atmospheric circulation around WNPM.