Science and Technology Infusion Climate Bulletin
NOAA's National Weather Service
39th NOAA Annual Climate Diagnostics and Prediction Workshop
St. Louis, MO, 20-23 October 2014

Predictability of Eastern Pacific Intrasesonal Variability

J. M. Neena[1], Xianan Jiang[1], Duane Waliser[1, 2], June-Yi Lee[3, 4], and Bin Wang[3]

[1] *Joint Institute for Regional Earth System Science and Engineering, University of California*

[2] *Jet Propulsion Laboratory, California Institute of Technology, California*

[3] *International Pacific Research Center and Department of Meteorology, University of Hawaii*

[4] *Institute of Environmental Studies, Pusan National University, Busan*

ABSTRACT

The Eastern Pacific (EPAC) warm pool is a region of strong intraseasonal variability (ISV) during boreal summer. While the EPAC ISV is known to have large-scale impacts that shape the weather and climate in the region (*e.g.* tropical cyclones and local monsoon), simulating EPAC ISV is still a great challenge for the present day global weather and climate models. In the present study, the predictive skill and predictability of the EPAC ISV are explored in eight coupled model hindcasts from the Intraseasonal Variability Hindcast Experiment (ISVHE). Relative to the prediction skill for the boreal winter Madden-Julian Oscillation (MJO) in the ISVHE (~15-25 days), the skill for the EPAC ISV is considerably lower in most models with an average skill around 10 days. On the other hand, while the MJO exhibits a predictability of 35-45 days, the estimate of predictability for the EPAC ISV gives a 20-30 day range (Figure 1). The prediction skill was found to be higher when the hindcasts were initialized from the convective phase of the EPAC ISV as opposed to the subsidence phase. Higher prediction skill was also found to be associated with active MJO initial conditions over the Western Pacific (Figure 2, evident in 4 out of 8 models), signaling the importance of exploring the dynamic link between the MJO and the EPAC ISV. The results illustrate the possibility and need for improving our dynamical prediction systems to facilitate more accurate and longer-lead predictions of the EPAC ISV and associated weather and short-term climate variability.

This work was published in Journal of Climate in 2014.

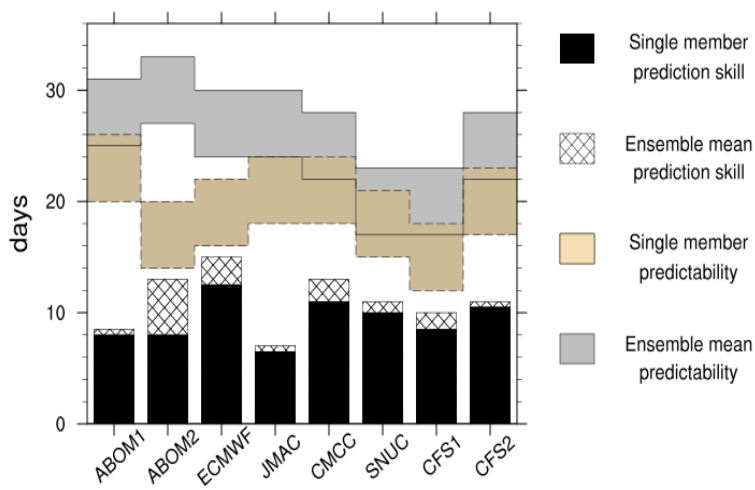

Fig. 1 Signal to noise ratio based estimates of prediction skill and predictability for EPAC ISV PC1 in the eight models (x-axis). Average individual hindcast prediction skill estimates are shown as black bars and ensemble mean prediction skill estimates are shown as hatched bars. A +/-3 day range for single member and ensemble mean estimates of predictability are represented by the tan and grey shaded areas respectively.

References

Neena, J.M., X. Jiang, D. Waliser, J. Lee, and B. Wang, 2014: Eastern Pacific intraseasonal variability: A predictability perspective. *J. Climate*. doi:10.1175/JCLI-D-14-00336.1, in press.

Wheeler, M. C. and H. H. Hendon, 2004: An all-season real-time multivariate MJO index: development of an index for monitoring and prediction. *Mon. Wea. Rev.*, **132**,1917–1932.

Correspondence to: J. M. Neena, Joint Institute for Regional Earth System Science and Engineering, University of California; Email: njmani@jifresse.ucla.edu

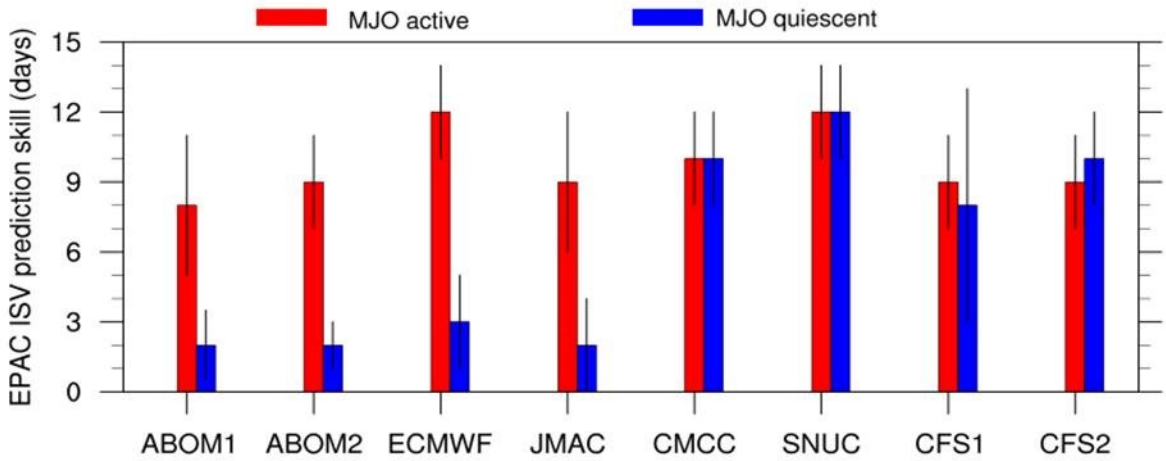

Fig. 2 Average prediction skill for EPAC ISV PC1 in the eight models for hindcasts initiated from active MJO conditions (RMM (Real-time Multivariate MJO indices, Wheeler and Hendon 2004) amplitude > 1.2) (red bars) and quiescent MJO conditions (RMM amplitude <0.8) (blue bars).