

Forecast of Tropical Pacific SST using an intermediate ocean and a statistical atmosphere model

contributed by In-Sik Kang¹, Chung-Kyu Park², Jong-Seong Kug¹, and Yoo-Geun Ham¹

¹*Climate Environment System Research Center, Seoul National University, Seoul, Korea*

²*APEC Climate Center, Busan, Korea*

El Nino prediction has made using the KMA/SNU ENSO prediction system (Kang and Kug, 2000). The system is based on the intermediate ocean and statistical atmosphere model. The ocean model differs from the Cane and Zebiak (1987) model in the parameterization of subsurface temperature and the basic state. The statistical atmosphere model is developed based on the singular value decomposition (SVD) of wind stress and SST. In order to improve the western Pacific SST prediction, we introduced heat flux formula and vertical mixing parameterization to the ocean model. The initialization of the model is done by combining observed SST and wind stress. Wind stress is calculated by using 925hPa wind of NCEP/NCAR reanalysis data. Using calculated wind stress for initialization has a better forecast skill than the case of FSU wind stress in recent prediction. (Kug et al., 2001). In addition, the present prediction is attended with random noise to consider weather noise and to generate many sets of prediction. Our approach for random noise is similar to Kirtman and Schopf (1998).

Figure 1 shows the Nino3 SST forecast with 12-month lead, with random noise (thin solid lines) and their ensemble mean (thick solid line) of 20 forecasts. Figure 2 shows seasonal SST forecast in tropical Pacific basin. The forecasts indicate that new El Nino evolves from Summer 2009.

3713

Kirtman, B. P. and P. S. Schopf, 1998: Decadal variability in ENSO predictability an prediction, *J. Climate*, **11**, 2804-2822.

References

- Cane, M. A., S. E. Zebiak, 1987: Prediction of El Nino events using a physical model, In *Atmospheric and Oceanic Variability, H. Cattle, Ed., Royal Meteorological Society press*, 153-182
- Kang, I.-S. and J.-S. Kug, 2000: An El-Nino prediction system with an intermediate ocean and statistical atmosphere model, *Geophys. Res. Lett.*, **27**, 1167-1170.
- Kug, J.-S., I.-S. Kang and S. E. Zebiak 2001: Impacts of model assimilated wind stress data in the initialization of an intermediate ocean model and the ENSO predictability, *Geophys. Res. Lett.*, **28**,

12-Month Forecast of Nino3 SST Anomalies

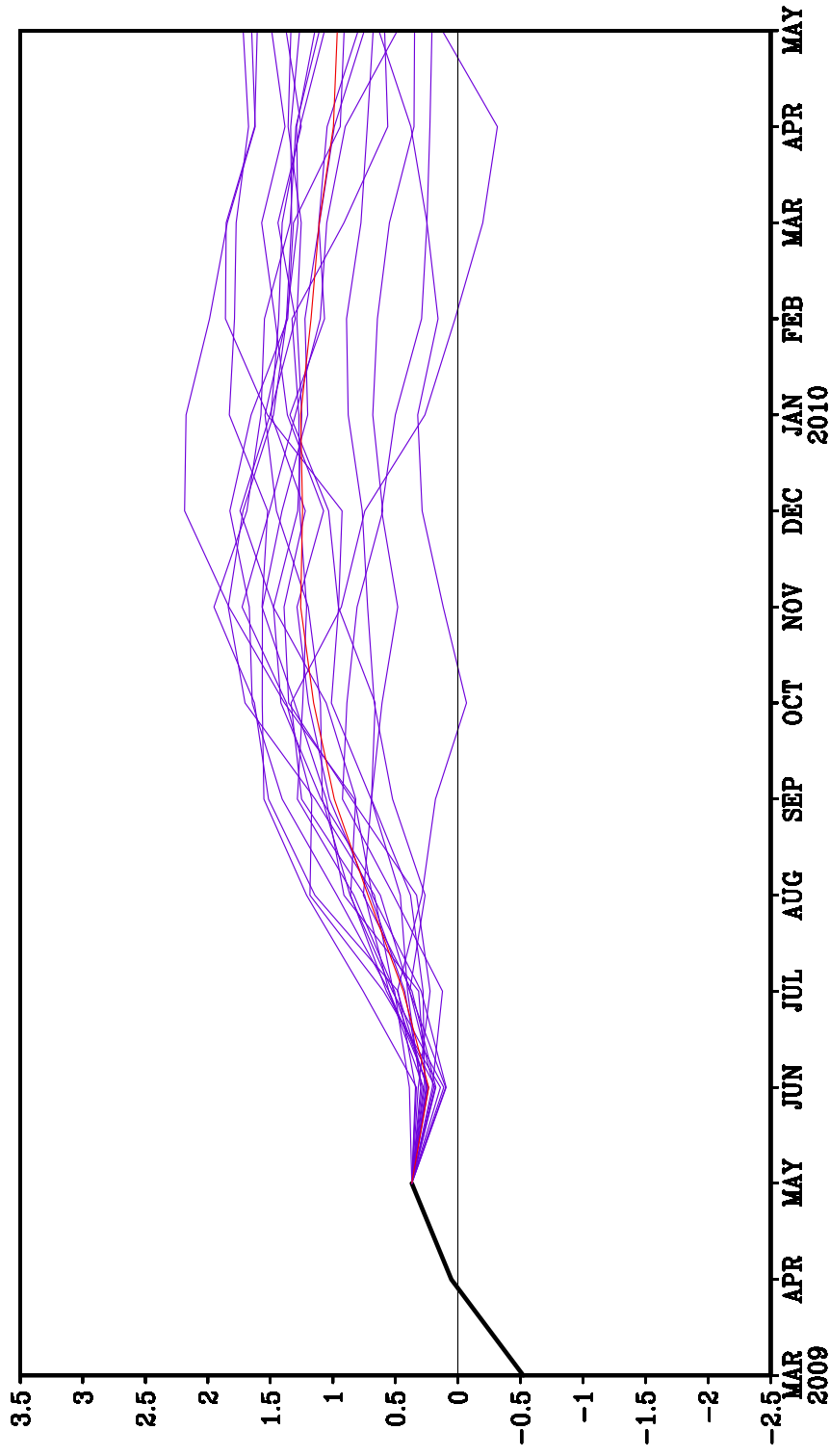


Figure 1. 12-month lead forecast of NINO3 SST with random noise (thin lines) and ensemble mean (thick line)

Seasonal SST Forecast

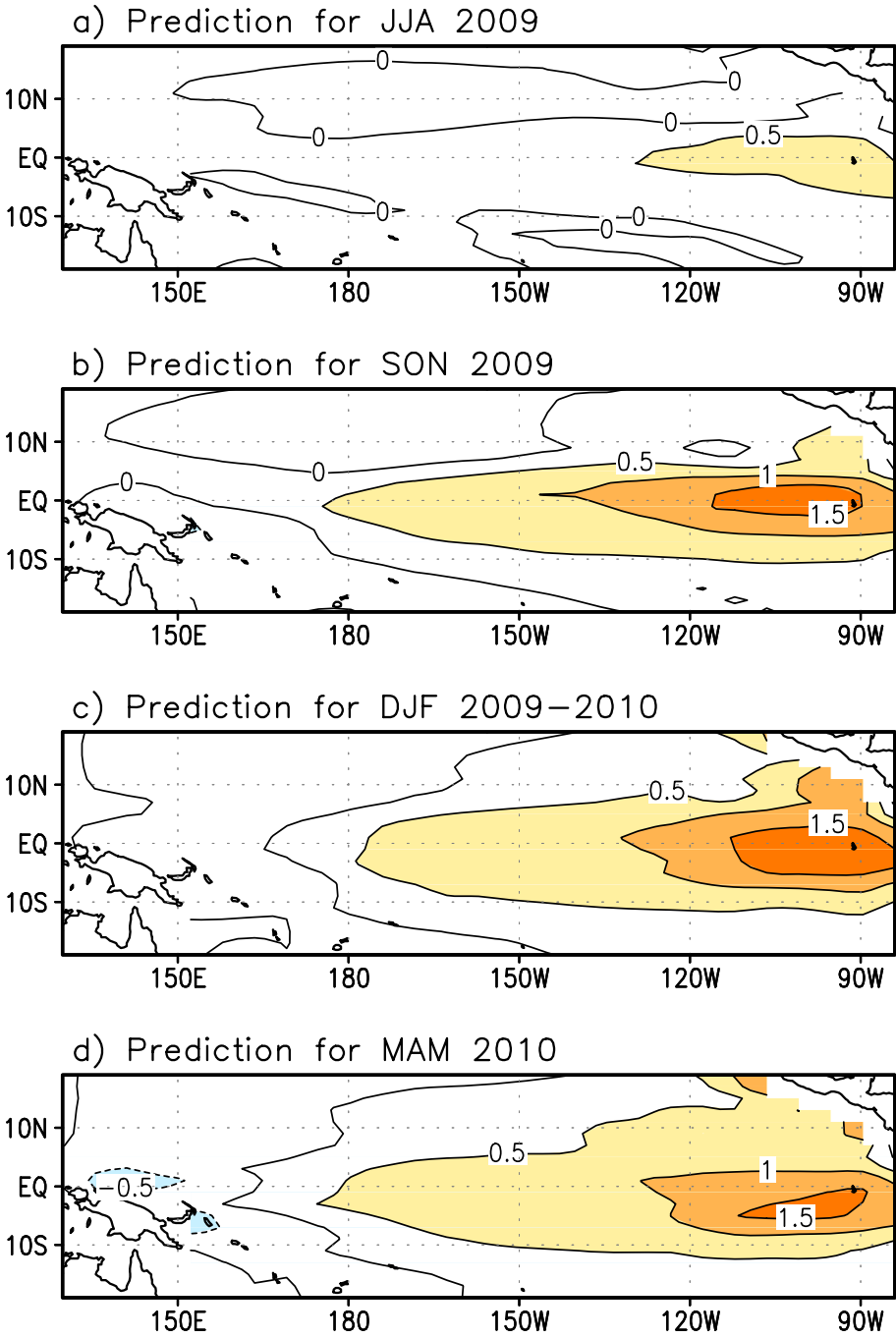


Figure 2. Forecast of Seasonal Mean SST anomaly in the the tropical basin