

Hirahara S., Y. Kubo, T. Yoshida, T. Komori, J. Chiba, T. Takakura, T. Kanehama, R. Sekiguchi, K. Ochi, H. Sugimoto, Y. Adachi, I. Ishikawa and Y. Fujii, 2023: Japan Meteorological Agency/Meteorological Research Institute Coupled Prediction System version 3 (JMA/MRI-CPS3).

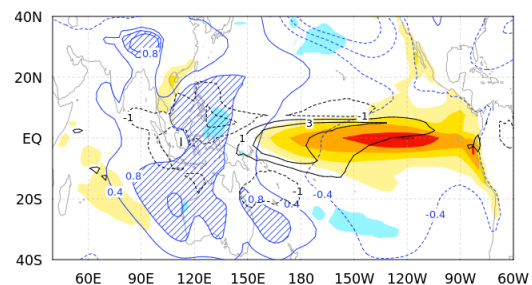
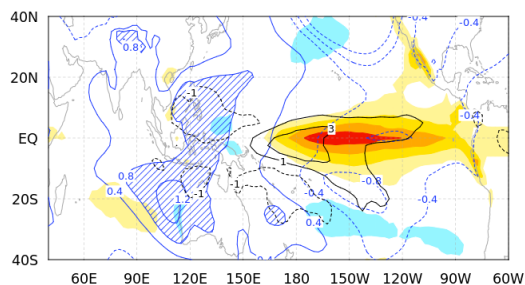
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**Plain Language Summary:** An overview of the newly developed operational seasonal forecasting system JMA/MRI-CPS3 is presented. Improvements in forecast initialization methods, model resolution, and physical processes have resulted in superior forecast performance over the previous system on sub-seasonal to seasonal time scales. To enhance its application to shorter forecast lead times, the operational schedule was modified to update forecasts on a daily basis.

(a) Analysis (MGD SST, GPCP, JRA-3Q)

(b) CPS3



(c) CPS2

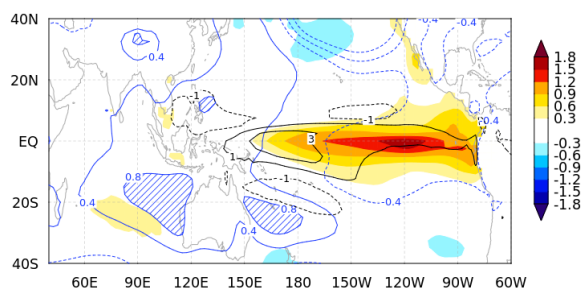


Fig. 12. Regression coefficients between NINO 3.4 area-averaged SST and global SST (shading; K/K), precipitation (black line; mm/day/K), and sea level pressure (blue line with hatching in the areas above 1.2; hPa/K) during boreal winter (December–February).

The regression coefficients are based on the statistics of November initial conditions in 1991–2020.

- Ocean 4D-Var and sea ice 3D-Var data assimilation methods are newly introduced. The errors in the ocean analysis are now represented in the initial perturbations.
- Updated physical processes and increased resolution of the atmospheric model contribute to the improved climate reproducibility of the MJO and North Atlantic blocking highs.
- The introduction of a 0.25-degree-resolution ocean model provides a realistic representation of tropical instability waves and contributes to improved ENSO pattern.