

Takemura, K., T. Enomoto, and H. Mukougawa, 2021: Predictability of enhanced monsoon trough related to the meandered Asian jet and consequent Rossby wave breaking in late August 2016. *J. Meteor. Soc. Japan*, **99**, 339-356. <https://doi.org/10.2151/jmsj.2021-016>

Plain Language Summary: Predictability of an enhanced monsoon trough south of Japan seen in late August 2016 is diagnosed. The monsoon trough is found to be enhanced by a meandering of the Asian jet and by a subsequent Rossby wave breaking east of Japan (Fig. 1). Japan Meteorological Agency (JMA)'s operational one-month ensemble forecast from 12 UTC 16 August 2016 fails to predict the enhanced monsoon trough. The main findings obtained from the predictability assessment are summarized as follows.

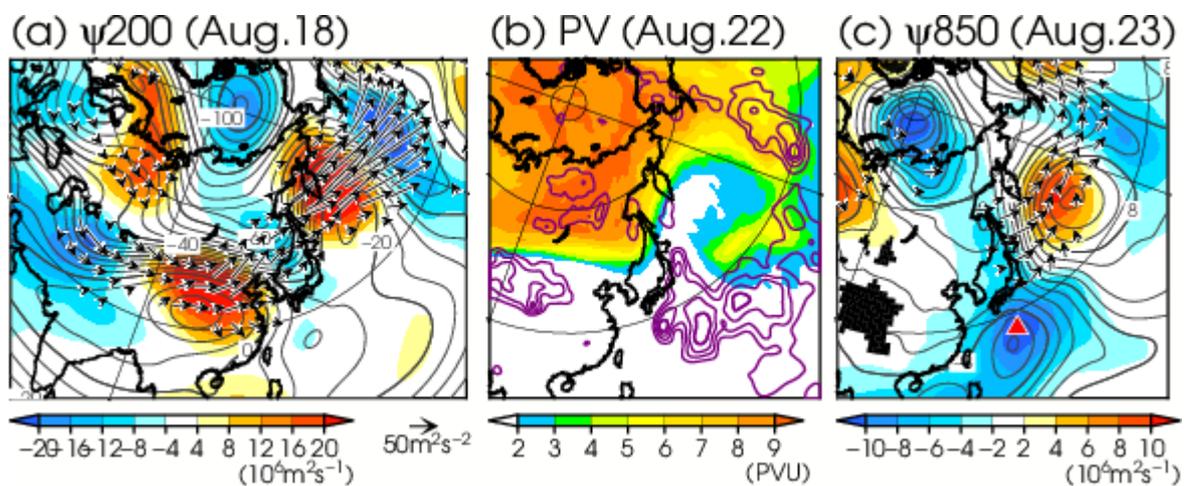


Figure 1. Five-day running mean (a) 200-hPa stream function (contour; unit: $10^6 \text{ m}^2 \text{ s}^{-1}$) and the anomalies (shading) in 18 August, (b) 360-K potential vorticity (shading; unit: PVU) and anomalous negative outgoing longwave radiation (OLR; purple contour) at intervals of 15 W m^{-2} in 22 August, and (c) 850-hPa stream function (contour) and the anomalies (shading) in 23 August 2016. Wave activity fluxes (unit: $\text{m}^2 \text{ s}^{-2}$) are indicated by vectors in (a) and (c). Black shadings in (c) indicate regions with altitudes exceeding 1,600 m. A red triangle in (c) denotes a central position of typhoon at 12 UTC in 23 August 2016 based on JMA's best track data.

- A simple sensitivity analysis based on ensemble singular vectors indicates that initial perturbations over the Bering sea and near the Asian jet entrance region can efficiently grow and propagate toward the region to the south of Japan, affecting the predictability of the enhanced monsoon trough.
- The monsoon trough in perturbed hindcast experiments with the initial perturbations obtained from the simple sensitivity analysis is significantly enhanced compared with that in an unperturbed one, supporting the simple sensitivity analysis.