Takemura, K., and H. Mukougawa, 2021: Relaxation experiments for predictability assessment of enhanced monsoon trough in late August 2016. *J. Meteor. Soc. Japan*, **99**, https://doi.org/10.2151/jmsj.2021-023.

Plain Language Summary: Predictability of an enhanced monsoon trough south of Japan seen in late August 2016 is diagnosed using an atmospheric general circulation model. The trough is found to be enhanced by a Rossby wave propagation over Eurasia and the subsequent Rossby wave breaking east of Japan. Three types of relaxation experiments are conducted, with nudging the model forecast toward reanalysis, for regions of the Rossby wave breaking, Rossby wave propagation, and both the regions. The main findings obtained from the experiments are summarized as follows.

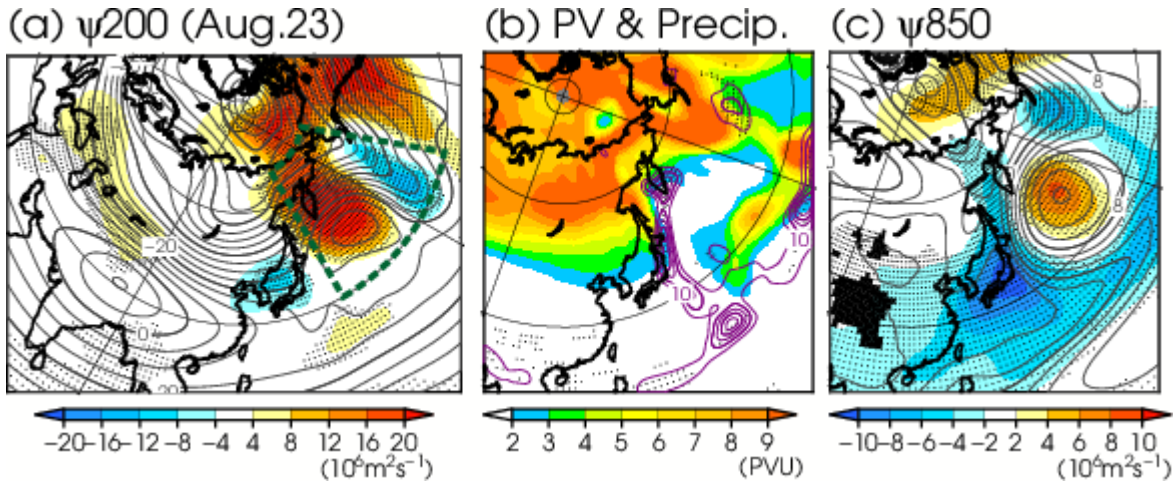

Figure 1. Results of the relaxation experiment for the region of the Rossby wave breaking east of Japan. (a) Five-day running mean 200-hPa stream function (contour; unit: 10^6 m^2 s^{-1}) and the responses (shading), (b) 360-K potential vorticity (shading; unit: PVU) and responses of positive daily precipitation (purple contour) with intervals of 5 mm, and (c) five-day running mean 850-hPa stream function (contour) and the responses (shading) in a lead time of +7 day (23 August) from 12 UTC 16 August 2016. The responses are defined by differences in the ensemble mean between the relaxation experiment and a non-relaxation experiment. Dots denote the significant responses of (left, right) stream function and (middle) positive precipitation with a confidence level of 99 %. Area surrounded by green dashed lines in (a) denote the region of the Rossby wave breaking.

- Compared to a non-relaxation experiment, the relaxation experiments show enhancements of the Rossby wave propagation and Rossby wave breaking, as seen in the reanalysis. The upper-level wave amplification contributes to the improved reproducibility of the enhanced monsoon trough, through the well reproduced southwestward intrusion of upper-level high potential vorticity airmass.
- The relaxation experiments show that the Rossby wave breaking plays a primary role in predicting the monsoon trough, while the Rossby wave propagation plays a secondary role.