

Nishii, K., B. Taguchi, and H. Nakamura, 2020: An atmospheric general circulation model assessment of oceanic impacts on extreme climate events over Japan in July 2018. *J. Meteor. Soc. Japan*, **98**, 801-820. Special Edition on Extreme Rainfall Events in 2017 and 2018, <https://doi.org/10.2151/jmsj.2020-041>

**Plain Language Summary:** Oceanic impacts on anomalous atmospheric circulation that caused the heavy rain event and heat wave observed in July 2018 over Japan are investigated. While a pair of anticyclonic and cyclonic anomalies during the heavy rain was unlikely forced by the sea surface temperature anomaly (SSTa), a warm anticyclonic anomaly over Japan during the heat wave was partly forced by the SSTa in the midlatitude North Pacific Ocean as well as in the Tropics.

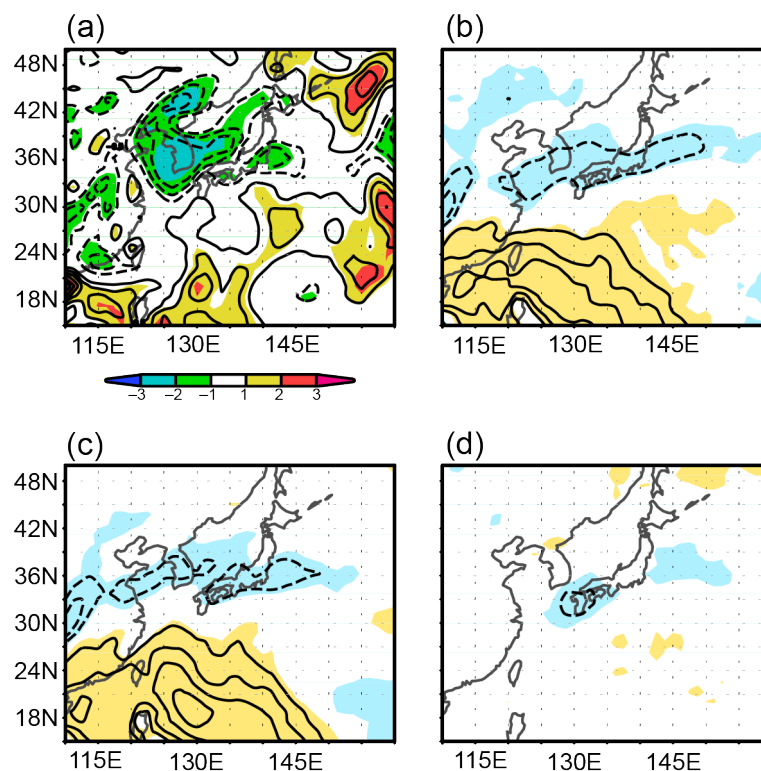


Figure 1. (a) Observed vorticity anomalies in the lower troposphere (850-hPa pressure level) in mid and late July 2018. Blue and yellow shadings are for anticyclonic and cyclonic anomalies, respectively. (b-d) As in (a), but for vorticity responses to SSTa over (b) the global ocean, (c) the Tropics, and (d) the midlatitude North Pacific.

- Impacts of midlatitude and tropical oceans on the circulation anomalies that induced the two extreme events are assessed separately with an atmospheric general circulation model (AGCM).
- The circulation anomaly that induced the heavy rain cannot be reproduced in the model, suggesting that the anomaly was unlikely forced by SSTa but likely due to internal variability.
- The circulation anomaly that induced the heat wave is reproduced in the model, which suggests an active role of both the tropical and midlatitude SSTa in forcing the circulation anomaly.