

Nirasawa, Y., T. Miyakawa, D. Takasuka, T. Kawasaki, and R. Masunaga, 2025: What is the role of air-sea interaction in the intra-seasonal fluctuation of the monsoon trough over the Western North Pacific? *J. Meteor. Soc. Japan*, **103**, <http://doi.org/10.2151/jmsj.2025-035>

Plain Language Summary: The present study investigated the role of air-sea interaction in the intra-seasonal fluctuation of the monsoon trough over the Western North Pacific using a global high-resolution atmospheric numerical model and its ocean coupled model. The coupled model successfully simulated the fluctuation, which was linked to sea surface temperature variations driven by air-sea interaction. In contrast, the northward propagation speed of the fluctuation was underestimated when the effect of the atmosphere on the ocean was not considered.

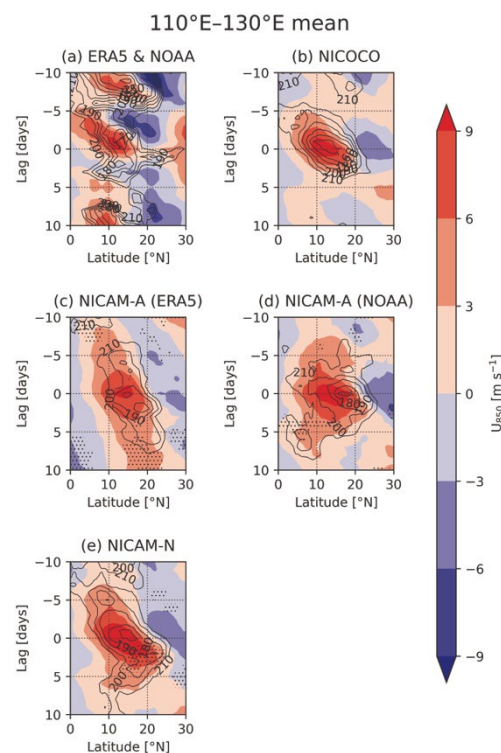


Figure 1. Zonal winds at 850 hPa (shaded) and OLR (contour) averaged over 110°–130°E during the active monsoon trough for (a) ERA5 and NOAA data. (b) NICOCO, (c) NICAM-A (ERA5), (d) NICAM-A (NOAA), and (e) NICAM-N.

- The role of air-sea interaction in the intra-seasonal fluctuation of the monsoon trough over the Western North Pacific was investigated using a global non-hydrostatic atmosphere-ocean coupled model.
- Air-sea coupling improves the representation of the monsoon trough through a meridionally asymmetric structure of sea surface temperature anomaly around active convection.
- Without the effect of the atmosphere on the ocean, sea surface temperature variations are suppressed and the northward propagation speed of the monsoon trough is underestimated.