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Oceanic impacts on 50–80-day intraseasonal oscillation in the eastern tropical Indian Ocean

Yun Liang and Yan Du

South China Sea Institute of Oceanology, State Key Laboratory of Tropical Oceanography, China (liangyun@scsio.ac.cn)

In this study, daily outgoing longwave radiation (OLR) product is used to detect the atmospheric intraseasonal oscillation (ISO) in the eastern tropical Indian Ocean (TIO). A 50–80-day ISO is identified south of the equator, peaking in boreal winter and propagating eastward. The mechanisms underneath are investigated using observational data and reanalysis products.

The results suggest that the 50–80-day atmospheric ISO is enhanced by ocean dynamic processes during December–January.

Monsoon transition in October–November causes large wind variability along the equator. Equatorial sea surface height/

thermocline anomalies appear of Sumatra due to the accumulative effects of the wind variability, leading the atmospheric

50–80-day ISO by ~5–6 weeks. The wind-driven ocean equatorial dynamics are reflected from the Sumatra coast as downwelling oceanic Rossby waves, which deepen the thermocline and contribute to the SST warming in the southeastern TIO,

affecting local atmospheric conditions. It offers insights into the role of ocean dynamics in the intensification of 50–80-day

atmospheric ISOs over the eastern TIO and explains the seasonal peak of the eastward-propagating ISO during boreal winter.

These results have implications for intraseasonal predictability.