

Wintertime meridional teleconnection associated with convective activity over the Maritime Continent

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Anomalous convective activity forced by tropical SST variability associated, for example, with ENSO influences the climate and weather in the extratropics. It has been known that El Niño (La Niña) tends to bring milder (colder) winter to East Asia, providing a statistical basis for wintertime seasonal predictions. However, ENSO variability is found to account only for nearly 60% of the interannual variance of convective activity around the maritime continent, and a significant fraction of the convective variability may therefore be uncorrelated with tropical SST variability. Through analysis of observational data for 1979/80-2011/12, the present study attempts to identify the tropical region where the interannual variability in seasonal-mean activity of SST-uncorrelated convection tend to be strongest and how effectively the variability can force atmospheric teleconnections into the extratropics if compared to ENSO-forced anomalous convection. At each location SST-correlated OLR variability was first identified by regressing seasonal-mean OLR anomalies linearly on the five leading PC time series of tropical SST variability. Defined locally as the residual, seasonal-mean anomalies in SST-uncorrelated OLR variability include no direct contribution from MJO. The leading EOF of the SST-uncorrelated OLR variability in boreal winter over the entire tropics accompanies the largest local variance around the maritime continent, where the variability reaches as much as a third of the ENSO-forced OLR variance. The associated atmospheric anomaly pattern differs considerably from that forced by ENSO, especially in the midlatitude north Pacific. The SST-uncorrelated convective variability around the maritime continent is found to exert remote influence on wintertime East Asian climate, which tends to be even slightly stronger than the ENSO influence. Our analysis thus suggests that the anomalous convective activity around the maritime continent uncorrelated with SST variability significantly limits the wintertime seasonal predictability over East Asia.

Keywords: East Asian winter monsoon, ENSO, seasonal predictability