Geophysical Research Abstracts
Vol. 21, EGU2019-12476, 2019
EGU General Assembly 2019

Impacts of MJO convection over the Maritime Continent on eastern China cold temperatures

Lei Song and Renguang Wu
Institute of Atmospheric Physics, Chinese Academy of Sciences, China

Present study reveals that winter cold events over eastern China may be induced by Madden-Julian Oscillation (MJO)-associated anomalous convection over the Maritime Continent. We conduct composite analysis separately for identified intraseasonal cold events over eastern China that occur following anomalous convection over the Maritime Continent and the tropical Indian Ocean. For cold events related to anomalous convection over the Maritime Continent, the southward intrusion of cold air into eastern China takes an eastward path in association with eastward location of anomalous Siberian high compared to cold events related to anomalous convection over the tropical Indian Ocean. The Maritime Continent convection related cold events tend to occur with negative Arctic Oscillation (AO), whereas the tropical Indian Ocean convection related cold events tend to be accompanied by weak AO. Anomalous convective heating over the Maritime Continent triggers a poleward Rossby wave train, which, together with an AO-related southward wave train from northern Eurasia, contributes to the deepening of the East Asian trough. The poleward wave energy dispersion is similarly trigged by anomalous convective heating over the tropical Indian Ocean. In both types of cold events, anomalous tropical heating induces a meridional vertical circulation, with large-scale air mass convergence in the upper-mid-troposphere and the descending of air on the northern branch of the vertical cell over Siberia. The upper-level mass convergence and the radiative cooling over Siberia work together for the enhancement and southeastward expansion of the Siberian high and the southward intrusion of cold anomalies to eastern China.