



A connection between the tropical Pacific Ocean and the winter climate in the Asian-Pacific region

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The impact of the tropical Pacific sea surface temperature (SST) anomaly on the winter mean surface air temperature (SAT) in the Asian-Pacific region is investigated during the period from 1948 to 2008 using both observations and a linear baroclinic model (LBM). A singular value decomposition (SVD) analysis is conducted between the 500-hPa geopotential height (Z500) over the Northern Hemisphere and the SST over the tropical Pacific Ocean to obtain the tropical Pacific SST-forced large scale atmospheric patterns. Focus is given to the second pair of SVD mode (SVD2) which bear many similarities in the Z500 field to the Arctic Oscillation (AO) but can impact the SAT over a larger area of Asian-Pacific than the AO. In the winter of a positive SVD2 the SAT over the mid-to high-latitude Asian continent, the Arctic Ocean, the Indian Ocean and the western subtropical Pacific Ocean tend to be warmer-than-normal while the North Pacific Ocean around the Bering Strait is abnormally cold, and vice versa. Examination of the associated surface general circulation shows that corresponding to a positive SVD2 the Siberian High is weaker-than-normal and the Aleutian low shifted eastward resulting in abnormalous weak pressure gradient between the Asian continent the North Pacific and abnormalous southerly wind along the east coast of the Asian continent. At the same time, the East Asian trough at mid-troposphere becomes weaker-than-normal and the East Asian westerly jet stream is shifted northward. The analysis of the wave activity flux and the precipitation associated with the SVD2 show a possible influence of the western tropical Pacific SST forcing on the SVD2.