Geophysical Research Abstracts
Vol. 12, EGU2010-3344, 2010
EGU General Assembly 2010

Influence of the Western Pacific pattern on the wintertime Arctic stratosphere

Kazuaki Nishii (1), Hisashi Nakamura (1), and Yvan Orsolini (2)

(1) Dept of Earth and Planetary Sciences, University of Tokyo, Japan, (2) Norwegian Institute for Air Research (NILU), Norway (orsolini@nilu.no)

The importance of West-Pacific pattern, a meridionally oriented dipole anomaly over the Pacific, on the tropospheric circulation is well recognized. It strongly modulates the storm track activity and the occurrences of blockings over the Pacific, as well cold surges over the Far East. Here, we show that the positive phase of the West-Pacific pattern is a precursor of cold episodes in the polar stratosphere in winter. More precisely, we use composites and a case study to demonstrate that blocking-like flow configuration associated with this pattern is followed by cold stratospheric anomalies lasting about one month. Further analysis shows that the cold period in the stratosphere follows a reduction of meridional eddy heat fluxes involving the interaction of transient, westward-propagating anomalies with the background planetary wave trough over the North Pacific. The vertical propagation of wave activity flux in the stratosphere is hence reduced following the erosion of the background trough.

The aim of this work is to unravel precursory disturbances in the troposphere, which are conducive to a cold winter polar stratosphere with a strong potential for ozone depletion.