

The North Pacific Gyre Oscillation and northern hemisphere stratosphere in winter

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The North Pacific Gyre Oscillation (NPGO) is the 2nd EOF mode of northeast Pacific sea surface temperature/sea surface height. The NPGO is associated with the atmospheric dipole pattern named North Pacific Oscillation. The relationship between the NPGO and the winter stratospheric circulation is examined by using the ERAinterim reanalysis dataset from 1979 to 2016. It is found that the winter polar vortex in the Arctic stratosphere is weak in the positive NPGO years, in particular in December. The major sudden stratospheric warming (SSW) before early January only occurs in the positive NPGO years. Moreover, the SSWs in the positive NPGO years show both wavenumber 1 and 2 signatures and propagate to the troposphere, while those in the negative NPGO years show only wavenumber 1 signature and do not propagate to the troposphere.

Keywords: North Pacific Gyre Oscillation, polar vortex, sudden stratospheric warming, stratosphere-troposphere coupling, North Pacific Oscillation