



Impact of Stratospheric Sudden Warming on East Asian Winter Monsoons

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Fifty-two stratospheric sudden warming (SSW) events that occurred from 1957 to 2002 were analysed based on the 40-year European Centre for Medium-Range Weather Forecasts Reanalysis dataset. Those that could descent to the troposphere were composited to investigate their impacts on the East Asian winter monsoon (EAWM). It reveals that when the SSW occurs, the Arctic Oscillation (AO) and the North Pacific Oscillation (NPO) are both in the negative phase and that the tropospheric circulations quite wave-like. The Siberian high and the Aleutian low are both strengthened, leading to an increased gradient between the Asian continent and the North Pacific. Hence, strong EAWM is observed with widespread cooling over in land and coastal East Asia. After the peak of the SSW, in contrast, the tropospheric circulation is quite zonally symmetric with negative phases of AO and NPO. The mid-tropospheric East Asian trough deepens and shifts eastward. This configuration facilitates warming over the East Asian inland and cooling over the coastal East Asia centered over Japan. The activities of planetary waves during the lifecycle of the SSW were analysed. The anomalous propagation and the attendant altered amplitude of the planetary waves can well explain the observed circulation and the EAWM.