



Influence of Sudden Stratospheric Warming on Tropical Troposphere

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A study on the influence of sudden stratospheric warming on the tropical lower stratosphere and troposphere over tropics has been carried out utilising the state-of-the art 205 MHz Stratosphere Troposphere (ST) Wind Profiler Radar installed at Cochin (10°2'31" N, 76°19'54" E), a near-equatorial coastal station, located in the southern Peninsular region of India. Recent two major warming events, one occurred on 1st February 2017 and the other on 11th February 2018 have been selected. The latter mid-winter stratwarming event is the first major wave-2 SSW event where the stratospheric polar vortex splits into two, after a decade. The temperature in the polar night stratosphere increased by about 40 C and the average winds at 60 N, reverse the direction from the prevailing westerlies to easterlies. From the high resolution radar wind data, it is evident that the zonal winds in the lower and middle troposphere change its direction from westerlies to easterlies during the event and swing back to the westerly winds soon after the SSW event. Associated with the formation of SSW at high latitudes, a downward flow from the lower stratosphere to the upper troposphere is seen from the Wind profiler radar observations. In addition, a sudden enhancement of the convective activity is observed in the tropics at the time of the occurrence of SSW. The surface temperature over Cochin indicates a sudden increase around the peak day of the stratwarming event. The temperatures in the stratosphere and troposphere vary inversely in response to the stratospheric warming period. The present study indicates that there is a strong link between the polar and tropical atmosphere during the period of sudden stratospheric warming.