



Variations in the mesosphere and the lower thermosphere associated with stratospheric sudden warming events

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It is known that the impact of stratospheric sudden warming (SSW) events reaches the mesosphere and the thermosphere. Particularly, the amplification of semidiurnal tides and the significant cooling in the thermosphere have been reported in association with SSWs. However, the observational evidence seems to be insufficient, so that detailed 3-dimensional structure and the dynamical mechanism are still unknown. Hence, we investigate variations in the mesosphere and thermosphere along with the stratosphere in association with SSWs by using TIMED/SABER satellite data and radar data.

The SABER observes the atmospheric temperature field in high altitudes up to the lower thermosphere (~ 120 km). The time series of the SABER data includes tidal variations, because the satellite orbit is not perfectly sun-synchronous and the local time of observation is gradually decreased at a specific latitude. The separation of the time series into tidal and daily variations is difficult especially when diurnal variations are amplified. Therefore, we additionally analyze the radar data. While the radar does not have a global coverage, it is appropriate for the analysis of tidal variations. In the presentation, we discuss general circulation changes up to the lower thermosphere in association with SSWs by complementary use of the satellite and radar data.