Vertical structures of stratospheric and mesospheric temperature changes during sudden stratospheric warming in northern high latitude

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We analyze the temperatures obtained from Fourier Transform Spectrometer (FTS) and Micro Limb Sounder (MLS) onboard Aura satellite for two major SSW occurred in Jan. 2006 and Jan. 2009 in order to investigate the vertical structures of the stratospheric and mesospheric temperature changes with SSW phase. For our purpose, we divide wintertime into three periods and compute the height profiles of the correlation coefficients between daily MLS temperature anomalies of 45 height levels and about 33 km height, which can be though to represent the stratospheric variability, using the mean value averaged over 65°N latitude. Our results showed that there seem to be a relatively weak and broad negative correlation between temperature anomaly at about 33 km height and temperature anomalies in mesosphere during pre-SSW, while this pattern seems to become stronger negative correlation during main phase. In addition, during the recovery phase, it seems to be shallower within the altitude range between about 40 and 80 km with strong positive correlation in the altitude range above about 80 km. We compare the results from observation with those from WACCM simulation and also investigate ozone variability in stratosphere during the recovery phase of major SSW. Preliminary results and some discussions will be presented.

Keywords: Stratospheric and mesospheric temperatures, Vertical profiles of correlation btw. stratosphere and mesosphere, Mesospheric cooling during SSW