

## A04-P01

### VERTICAL STRUCTURE OF TEMPERATURE VARIATIONS IN THE MESOSPHERE AND LOWER THERMOSPHERE REGION DURING STRATOSPHERIC SUDDEN WARMING

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We analyzed the atmospheric temperature data obtained from the microwave limb sounder (MLS) onboard Aura satellite and the polar cap index (PCI) of MERRA re-analysis data during the period of 2004 through 2013, in order to statistically investigate the variations of the stratospheric, mesospheric, and the lower thermospheric temperatures during northern stratospheric sudden warming (SSW) events. In this study, we investigated the height profiles of the correlation coefficients between MERRA daily PCI anomalies at 10hPa and MLS daily temperatures of 55 height levels in the range of 1 km to 100 km during northern winter seasons. The results showed that there is a weak and broad negative correlation between PCI and temperature anomalies in the entire mesosphere during the period when there is no SSW. During major SSW, however, there is a strong positive correlation between the PCI and temperature anomalies in the upper mesosphere while a strong negative correlation appears in the lower mesosphere. This is in a good agreement with the previous in <sup>1</sup>Siskind et al. (2005). We also present the comparison of our results with the Whole Atmosphere Community Climate Model (WACCM) simulation.

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<sup>1</sup> Siskind, D. E., L. Coy, and P. Espy (2005), Observations of stratospheric warmings and mesospheric coolings by the TIMED SABER instrument, *Geophys. Res. Lett.*, 32, L09804, doi:[10.1029/2005GL022399](https://doi.org/10.1029/2005GL022399)..