

## Lidar Observation of impact of the 2009 Sudden Stratospheric Warming Event on Midlatitude Mesopause Region Temperature, and Winds

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A Sudden Stratospheric Warming (SSW) event is considered one of the most dramatic meteorological events in polar stratosphere; it typically impacts temperature and winds in the polar mesopause region. The major SSW in January 2009 is believed to be among the strongest, so it can potentially impact midlatitude mesosphere and lower thermosphere (MLT) as well. Using the unique full-diurnal-cycle observations of Colorado State University (41degN, 105degW) Na lidar, we follow the evolution of the tidal-removed mean temperature and wind fields during the peak of this major warming event and compare them to respective climatology. Our study shows that this major SSW event indeed impacts the midlatitude mesopause region, leading to excessive cooling in the MLT below 90 km, reversing the mean zonal wind profile, followed by a change in meridional flow from northward to southward.