

STATISTICAL EVALUATION OF UPPER MESOSPHERIC AND LOWER THERMOSPHERIC TEMPERATURE EFFECTS CAUSED BY ENERGETIC PARTICLE PRECIPITATION

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A statistical evaluation of the upper mesospheric and lower thermospheric temperature effects caused by energetic particle precipitation is performed based on data from the TIMED and NOAA 15, 16 and 17 satellites. By combining particle measurement from the Medium Energy Proton and Electron Detectors (MEPED) on board the NOAA satellites, crude maps of the global particle precipitation can be obtained close in time to the SABER (Sounding of the Atmosphere using Broadband Emission Radiometry) temperature retrieval. The particle measurements are projected down to about 100 km where they are sorted into a geomagnetic grid, where each cell covers 4° in latitude and 10° in longitude. A global distribution of the precipitating energetic particles is then obtained by interpolating linearly between cells at the same geomagnetic latitudes for the passes of the different satellites. The temperature measurements are sorted into the same geomagnetic grid as used for the particle measurements. A total amount of 80 days of SABER and MEPED data is investigated. The data are sorted by season, latitude, and local time in order to reduce potential effects from temperature climatology. We investigate both the immediate temperature response as well as possible temperature effects accumulated over time in regions of particle precipitation.

Energetic particle precipitation, MLT temperature effects

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