



Middle atmosphere ionization from particle precipitation as observed by the SSUSI satellite instruments

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Solar, auroral, and radiation belt electrons enter the atmosphere at polar regions leading to ionization and affecting its chemistry. Climate models usually parameterize this ionization and the related changes in chemistry based on satellite particle measurements. Precise measurements of the particle and energy influx into the upper atmosphere are difficult because they vary substantially in location and time. Widely used particle data are derived from the POES and GOES satellite measurements which provide electron and proton spectra.

We present electron energy and flux measurements from the Special Sensor Ultraviolet Spectrographic Imagers (SSUSI) satellite instruments. This formation of satellites observes the auroral zone in the UV from which electron energies and fluxes are inferred. We use these observed electron energies and fluxes to calculate ionization rates and electron densities in the mesosphere and lower thermosphere ($\approx 40\text{--}200$ km). We also present an initial comparison of these rates to other models and compare the electron densities to those measured by the EISCAT radar.