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Poster
Accurately quantifying the global precipitation of energetic electrons is critical for assessing electron loss from the inner magnetosphere and its effects on magnetosphere-ionosphere coupling and atmospheric chemistry. Modeling the energetic electrons at low altitudes also has important space weather applications, e.g., for the proliferated low-Earth orbit constellations. The electron fluxes measured by multiple NOAA/POES and MetOp satellites near and inside the loss cone have been extensively used in studies of global electrons precipitation. However, nominal field-of-view (FOV) response of the MEPED particle telescopes on POES and MetOp has been most used in the literature. In our recent published work, we found that the 0-degree MEPED telescope, intended to measure precipitating electrons, instead usually measures trapped or quasi-trapped electrons as the 90-degree telescope, except during times of fast pitch angle diffusion. Consequently, using a nominal FOV response of MEPED could lead to an overestimation of the electron precipitation by orders of magnitude. In this work, we will implement the realistic angular response of MEPED into a drift-diffusion model to create a revamped model for the global precipitation of energetic electrons. The model includes the physics of pitch angle diffusion, azimuthal drift, and atmospheric backscatter and will be used to simulate the low-altitude electron distributions observed by multiple POES and MetOp satellites. The newly modeled global precipitation maps of energetic electrons will be compared with the ones that were generated by assuming nominal FOV response functions to illustrate the significance of using the realistic MEPED response functions in the precipitation quantification.

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