Determining latitudinal extent of energetic electron precipitation using MEPED on-board NOAA POES

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Energetic electron precipitation (EEP) from the plasma sheet and the radiation belts, can collide with gases in the atmosphere and deposit their energy. EEP increase the production of NOx and HOx, which will catalytically destroy stratospheric ozone, an important element of atmospheric dynamics. The particle precipitation also causes variation in the radiation belt population. Therefore, measurement of latitudinal extend of the precipitation boundaries is important in quantifying atmospheric effects of Sun-Earth interaction and threats to spacecrafts and astronauts in the Earth's radiation belt.

This study uses measurements by MEPED detectors of six NOAA/POES and EUMETSAT/METOP satellites during the year 2010 to determine the latitudinal boundaries of EEP and its variability with geomagnetic activity and solar wind drivers. Variation of the boundaries with respect to different particle energies and magnetic local time is studied. The result will be a key element for constructing a model of EEP variability to be applied in atmosphere climate models.