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The corrected NOAA/POES energetic particle database for space climate studies

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When studying the effects of geomagnetic variability on the Earth's atmosphere reliable sources of quality long term data are essential. Most past studies concerning the effects of energetic particles precipitating from the magnetosphere into the atmosphere have been forced to use geomagnetic activity indices such as Kp (and Ap) as proxies for the intensity of this particle precipitation. Despite their good long term coverage these indices are only a crude proxy for the particle fluxes. Accordingly, there is a great need for a quality long term dataset of precipitating energetic particles.

The polar orbiting NOAA/POES satellites have measured energetic particles with their MEPED instrument nearly continuously for more than 30 years. Up to now the reliable usage of the data has been severely restricted by several instrumental problems including degradation due to radiation damage, detector noise and contamination of electron measurements by protons. We have extensively studied these issues in the data and have now for the first time produced a new long term NOAA/MEPED database that corrects the data for all the above mentioned problems.

Here we briefly review the problems that have plagued the NOAA/MEPED measurements and discuss the methods used to address them. We show how the corrections change the long term time series of the energetic particle fluxes dramatically. We will also discuss the relation between the energetic particle fluxes and geomagnetic indices to emphasize the difference between the two.