

COMPARISONS OF LOW ENERGY ($E > 20$ MEV) PROTON GEOMAGNETIC CUTOFFS

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A computer model, SEPTR (solar energetic particle tracer), has been developed at Rice University to calculate upper rigidity cutoffs of energetic particles entering the magnetosphere. This model may serve as a tool for making space environmental predictions during solar energetic particle (SEP) events and therefore must be tested using SEP data from polar orbiting spacecraft. Because of its zenith pointing, an ideal instrument for this purpose is the Proton/Electron Telescope (PET) on the SAMPEX satellite. Using PET data from the 20 - 29 and 29 - 64 MeV proton channels for a number of polar cap passes during large SEP events, we determined the experimental geographic cutoff latitudes for the two energy ranges. These are compared with the calculated cutoff latitudes based on the SEPTR program. With the International Geomagnetic Reference Field (IGRF) of 1995 as the geomagnetic field in SEPTR, we find that the SEPTR program predicts cutoff latitudes systematically too high (i.e., poleward) by about 5 to 10 degrees. The differences are considerably reduced with the use of the Tsyganenko magnetospheric field model, but a systematic poleward error remains. We have examined the trends in the latitudinal cutoff differences with increasing K_p in SEP events accompanied by geomagnetic storms.