CORRELATIONS BETWEEN SAMPEX DETECTED RELATIVISTIC ELECTRON PRECIPITATION AND PERTURBATIONS IN GROUND BASED VLF SIGNALS DURING PERIODS OF EXTREME GEOMAGNETIC DISTURBANCE

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Bursts of relativistic (>1 MeV) electron precipitation from Earth's radiation belts are detected by the Solar Anomalous and Magnetospheric Particle Explorer (SAMPEX), a low Earth orbiting satellite. During periods of enhanced geomagnetic activity, perturbations can be found in very low frequency (VLF) signals received by the Antarctic-Arctic Radiation-belt (Dynamic) Deposition - VLF Atmospheric Research Konsortium (AARDDVARK). One such class of these VLF perturbations have been termed FAST events, which are characterised by their large perturbation amplitude, both positive and negative, their temporal brevity (t~<1 s) and their occurrence only during periods of heightened geomagnetic disturbance with Kp>6. These FAST events are observed across multiple VLF channels and are thought to be caused by a “rainstorm” of spatially small (tens of kilometres or less) bursts of precipitation striking the atmosphere. It is seen that periods of FAST event activity coincide with periods of SAMPEX detected relativistic electron precipitation, which are termed microbursts.
SAMPEX is usually measuring both the drift and bounce-loss cones, while the AARDDVARK measurements are of local precipitation from the bounce-loss cone. A statistical analysis of the nature of the correlation between FAST events and SAMPEX precipitation during times of enhanced geomagnetic disturbance is currently being undertaken. Emphasis is being placed on periods during which SAMPEX was viewing the bounce-loss cone but not the drift-loss cone.

radiation belts, energetic electron precipitation, microbursts

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