PC 5 PULSATIONS AT ULTIMA STATIONS DURING THE RELATIVISTIC ELECTRON ENHANCEMENT

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ULF waves with frequencies between 1.67 and 6.67 mHz, that is, Pc 5 magnetic pulsations, are believed to contribute to the REE in the outer radiation belt during magnetic storms. Theoretically, for example, toroidal Pc 5 waves can transport electrons from the magnetopause to the inner magnetosphere by radial diffusion accelerating them from 10-100keV to MeV in energy (Elkington et al., 1999, 2003). Moreover, poloidal Pc 5 waves can locally accelerate source electrons with energies of 100-300keV in the inner magnetosphere (Summers and Ma, 2000). Ground-based observations have suggested that high-speed solar wind and large-amplitude Pc 5 waves with a long duration during the storm recovery phase are closely associated with the production of relativistic electrons (Baker et al., 1998; Rostoker et al., 1998; Mathie and Mann, 2000; O'Brien et al., 2001, 2003). However, observational evidence for the acceleration of electrons by Pc 5 waves is limited.
Using magnetometer data obtained globally from ULTIMA (Ultra Large Terrestrial International Magnetic Array, http://www.serc.kyushu-u.ac.jp/ultima/ultima.html) stations, we investigate the distributions of occurrence, amplitude and narrowband (or broadband) Pc 5 pulsations during magnetic storms. We compare these characteristics among different magnetometer chains (330MM chain; McMAC and CARISAM, 210MM and Africa chain; MAGDAS/CPMN) for each magnetic storm phase (initial, main and recovery phase). This paper shows the local-time and latitudinal distributions of Pc 5 parameters (power intensity, frequency and polarity) and their sequence in terms of the Relativistic Electron Enhancement (REE) during magnetic storms.

Pc 5 pulsation, geomagnetic storms, relativistic electron enhancement

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