Relativistic outer radiation belt electrons outward diffused due to ULF waves in the Pc5 frequency range observed deep in magnetosphere.

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Field line resonances in the magnetic pulsations frequency range named Pc 5 are known to be oscillations of magnetospheric field lines. It is observed as a combination of three fundamental modes, namely poloidal, toroidal and compressional. Such a disturbance may have their energy sources arising from external high dynamic pressure solar wind pulsation that induces waves in the day-side sector magnetosphere. Also, low-frequency instabilities of the ring current ions are candidates to promote ultra-low frequency (ULF) waves in the Pc5 frequency range. The toroidal mode is mainly due to upstream solar wind disturbances and it is observed in the dawn-dusk flanks, while compressional and poloidal modes can be originated from local disturbances and they can be observed everywhere in the night side sector. On July 19, 2016, at 2309 UT, the ground magnetometers registered a sudden impulse due to an interplanetary coronal mass ejection (ICME) shock arrival. The solar wind parameters registered by ACE satellite showed a sharp increase in the density and velocity, reaching 40 cm-3 and 450 km/s, respectively. GOES-15(13) satellite that was at noon-to-dusk (dusk-to-midnight) sector noted a major (minor) increase in the magnetic field, followed by oscillations in the horizontal magnetic field. Data from plasma parameters measured by the Themis-D satellite agreed that the geomagnetic field was compressed, the results from empirical models lead to magnetospheric stand-off position compressed to 6.5 Re. In the following, results from the instruments on board the Van Allen Probes A, which traveled from midnight to dawn sector observed a relativistic electron flux dropout two orders of magnitude long, occurred throughout 3 hours following the shock arrival. The ULF waves in a Pc5 frequency range are observed both at the location of the satellite and on the ground, the different magnetometers show that ULF waves reached midi-to-low latitudes with considerable power spectral densities. Regarding the ULF waves are known to contribute with relativistic particles outward diffusion in the Van Allen belts,

including through magnetopause shadowing events, we investigate the ability of the different solar wind parameters to be energy sources to generate Pc5 frequency waves in different modes deep inside the magnetosphere.

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