

Energetics of ULF Waves in the Magnetosphere

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Wave mode and Poynting flux of Pc 3 and Pc 5 type ULF waves observed near the dayside magnetopause have been examined with the magnetic and electric field data measured by Geotail during the period of 27 months from December 1994 to February 1997. The results show that typical three types of wave mode are coexisted, and exhibit as radially and azimuthally transverse waves, and compressional waves, respectively. The examinations of Poynting fluxes reveal that Pc 3 and Pc 5 waves are observed with the energy of 10 to 50 W/m^2 , and 1 to 50 $\mu\text{W/m}^2$, respectively, whose energy partly propagates into the inner magnetosphere, and /or partly makes resonances along the magnetic field-line. These waves propagate into the magnetosphere and dissipate the energy in the ionosphere with the amount of about 10^{12} J/h for Pc 3 and 10^{13} J/h for Pc 5, respectively. Although the amount per hour is one or two order less than the substorm energy of about 10^{14} - 10^{15} J, the wave energy are continuously propagates into the magnetosphere. Therefore, the ULF wave energy seems to be very important when we consider the energetics of the magnetosphere and the ionosphere. .