PROBING MAGNETOSPHERIC MASS DENSITY USING ULF WAVES OBSERVED FROM SPACECRAFT

KAZUE TAKAHASHI

The Johns Hopkins University Applied Physics Laboratory, USA, e-mail: kazue.takahashi@jhuapl.edu

The magnetosphere sustains both compressional and shear eigenmodes, and the frequency and spatial structure of the modes can be related to the mass density distribution in the magnetosphere. This presentation describes how Pi2 pulsations (compressional mode) and Pc3-5 pulsations (shear Alfvén mode) observed from the CRRES and GOES spacecraft are used to infer the mass density. The highlight is a recent statistical analysis of the solar-cycle variations of the mass density based on GOES magnetometer data. We find that the Alfvén wave frequencies at GOES decrease by a factor of ~2 from the solar minimum to the maximum, which translates to a factor of ~4 increase of the mass density. The primary controlling factor of the density is the solar radiation (F10.7) but geomagnetic activity level (Dst) also affects the density.

eigenmodes, density, spacecraft

Kazue Takahashi, Johns Hopkins University Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099, USA. e-mail: kazue.takahashi@jhuapl.edu