

Statistical analysis of the large-amplitude Alfvén waves observed in the magnetotail by Geotail

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Alfvén waves were found to propagate toward the earth in the nightside magnetosphere by the Polar and other satellites. They are considered to be associated with the auroral activity at the ionospheric altitudes. We have investigated the electric and magnetic field variations in the frequency range from 1 to 100 mHz measured by Geotail in the mid-tail region, 10-30 Re. We also found the large-amplitude electric field fluctuations and the corresponding magnetic field fluctuations having the components in the direction perpendicular to the ambient magnetic field. Matsuoka et al. (2000, 2002) identified Alfvén waves in the magnetosheath by investigating the correlation between the electric and magnetic field components and the ratio of the amplitudes. We applied a similar method to the electric and magnetic field fluctuations seen in the magnetosphere, and identified these fluctuations as Alfvén waves. These large-amplitude Alfvén waves were often found at the plasma-sheet boundary layer (PSBL), and their propagation direction coincides with the flow direction of the plasma. We will report the statistical result about the Poynting flux of the Alfvén waves and their correspondence with the magnetospheric activity.