Surface waves on the dawn magnetopause: Connection with groud Pc 5 pulsations

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Observations of the Geotail spacecraft show that ion flow oscillations in the Pc 5 frequency range are fairly common at the equatorial region in the dawn magnetosphere (-5 XGSM 5). It is found that plasma flow oscillations near the magnetopause correspond closely with magnetic field pulsations at latitudes of 70 - 75 degrees on the ground. Outward and sunward flows, whose magnitudes are greater than those in the magnetosheath, were observed in the magnetosphere after inbound crossings, while inward and tailward flows were detected before outbound crossings. These characteristics are not necessarily consistent with the excitation of surface waves by the Kelvin-Helmholtz instability.

Observations of the Geotail spacecraft show that ion flow oscillations in the Pc 5 frequency range are fairly common at the equatorial region in the dawn magnetosphere (-5 XGSM 5). The amplitudes of these oscillations sometimes exceed 250 km/s. We examined in detail several events associated with temporal magnetopause crossings during the course of oscillations. It is found that plasma flow oscillations near the magnetopause correspond closely with magnetic field pulsations at latitudes of 70 - 75 degrees on the ground, although the form of the flow oscillation is spiky rather than sinusoidal. The boundary normal inclines sunward (tailward), when the spacecraft enters the magnetosheath (magnetosphere). Most of magnetopause crossings analyzed are cases with high magnetic shears (Bz in the magnetopause was negative in most cases). Outward and sunward flows, whose magnitudes are greater than those in the magnetosheath, were observed in the magnetosphere after inbound crossings, while inward and tailward flows were detected before outbound crossings. These characteristics are not necessarily consistent with the excitation of surface waves by the Kelvin-Helmholtz instability. A high-speed flow with the sunward and outward component was also observed in the magnetosphere after the inbound crossing with high magnetic shear in an isolated and temporal magnetopause crossing event driven by a pressure pulse.