EVOLUTION OF KELVIN-HELMHOLTZ ACTIVITY ON THE DUSK FLANK MAGNETOPAUSE

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Our purpose is to characterize the evolution of the magnetopause Kelvin-Helmholtz (KH) wave activity with changes in thickness of the adjacent boundary layer, geomagnetic latitude and interplanetary magnetic field (IMF) orientation. As the IMF turns northward, wave activity may be generated at the dayside before propagating down the tail, where the boundary layer is expected to support longer wavelengths. We use two-point observations on the dusk magnetopause at low latitudes, from Geotail on the dayside and Cluster tailward of the dusk terminator. We quantify the wavelength, power, wavefront steepness and propagation direction at Cluster. An estimate of the thickness of the low-latitude boundary layer (LLBL) is obtained by correlating normal distances to the magnetopause, derived from two empirical solar-wind-driven models, with a systematic relationship (the ``transition parameter'') found between the electron number density and temperature; the correlation factor is used to infer the temporal evolution of the thickness of the locally sampled layer. We find that wavelengths are controlled by the IMF clock angle, as expected when generated by the KH mechanism at the dayside, although amplitudes, wavefront steepness and propagation directions are more closely correlated with the layer thickness. A survey of parameter space provides evidence of the contribution of the KH mechanism to the widening of the electron LLBL.

Magnetopause, boundary layer, KH waves

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