Geophysical Research Abstracts
Vol. 12, EGU2010-9056, 2010
EGU General Assembly 2010

Cavity resonance triggered by inward movement of a plasmaspheric plume

Harri Laakso, C.P. Escoubet, M.G.G.T Taylor, and A. Masson
ESA, RSSD, Noordwijk, Netherlands (Harri.Laakso@esa.int)

We investigate the formation of a cavity resonance in the density cavity between the plasmapause and the plasmaspheric plume in the dusk sector. This is formed when the inner edge of the plume is suddenly pushed earthward from L=8 to L=6 by an increased plasma pressure during a weak substorm event. The event is recorded by five spacecraft, four Cluster and GOES 8 spacecraft, that are all located in different positions within or near the cavity: one spacecraft is in the plasmasphere, one at the plasmapause and three in the cavity at different L shells between L=4-6.6. The outbound-moving Cluster spacecraft stop observing the resonance when they exit the cavity and enter the plume. The four spacecraft in the cavity observe ULF wave mode at $\sim$5 mHz at the same frequency and in the same phase even though the spacecraft are widely separated in L shell and also in latitude and MLT (GEOS 8). One spacecraft in the plasmasphere observes somewhat different and less clear resonance. Furthermore during the event the L shells of the Cluster spacecraft vary significantly while the observed resonance period on all spacecraft remains constant. All these suggest that the observed event is the fundamental mode of a cavity resonance. The 90º phase shift between E- and B-fields also suggests that the wave is a resonance mode. The mode is right-hand polarized and nearly circular in the middle of cavity while at the plasmapause it is closer to a linearly polarized mode. In the plasmasphere the polarization of the mode is unclear, although the wave period is near 5 mHz.