Effects of asymmetric plasmasphere on MHD waves in a three-dimensional dipolar magnetosphere

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The plasmaspheric region shows relatively strong longitudinal asymmetry in the sense that the location of the plasmapause and the density distribution significantly vary with respect to local time, and this asymmetry effect has been neglected in previous magnetospheric ULF wave studies. In this study, we numerically examine the MHD wave properties of field line resonances (FLRs) and Pi2 pulsations when the inner magnetosphere is assumed to be asymmetric. We use the dipole magnetic field model, but our density model is based on observational data from the IMAGE satellite. We assume an impulsive input in the magnetotail, which can be associated with a substorm onset. Our results suggest that local FLRs appear in both the radial and azimuthal oscillations owing to the asymmetry. Plasmaspheric Pi2 signals appear in the compressional component, but they are more strongly affected by ambient plasmaspheric structure than the FLRs. We compare our results with the observational data of Pi2 events.