GEOMAGNETIC TOPOLOGICAL EFFECTS ON HIGH LATITUDE FIELD LINE RESONANCES.

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It has been suggested that in high latitude ULF data, the length of closed field lines threading the ground stations is a major factor that determines the frequency of FLRs. The general topology of the dayside magnetopause results in longer field lines and therefore lower resonant frequencies on the dawn and dusk flanks, and the shortest field lines/ highest resonant frequency for field lines near noon, passing through the sub-solar point.

High latitude magnetometer data (such as Davis, Antarctica (74.49° S, 100.03° E CGM)) often exhibit spectral characteristics which can be interpreted as field line resonance (FLR) signatures of the last closed field-lines in the dayside magnetosphere. Diurnal variations in the frequency at which maximum power occurs in the Pc5 (1-10 mHz) band, often shows an arch-shaped variation with local magnetic time. We present a rigorous eigenfunction solution of ULF wave modes, accounting for the curvature and torsion in the geomagnetic field lines which have their footprint at Davis. This provides an explanation for our observations of a saddle in the Pc5 arch, observed as a decrease in frequency centred on local magnetic noon that is often seen in high latitude magnetometer data near the open-closed field line boundary. The effect of this distorted geomagnetic topology on FLR frequencies and the implied plasma mass density will be discussed.

Resonances, Topology, Torsion

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