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A multiple instrument investigation of the nature of geomagnetic pulsations

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Abstract content
   (Max 300 words)

Geomagnetic ultra low frequency (ULF) oscillations (frequency range 1mHz to 1Hz) have been observed for many years in magnetometer data and are endemic within the magnetosphere. A subset, pulsations in the Pc5 band (1-5mHz) are global magnetohydrodynamic (MHD) events in the magnetosphere. We use an IDL Automated Pulsation Finder (APF) program (Magnus et al., 2009) to identify suitable Pc5 pulsations events for study in the radar and magnetometer data. Those events which also have a good data from magnetometer chains in the field of view of HF radars are chosen for analysis. These two instruments complement each other. One strong in sensitivity and temporal resolution while the other in spatial resolution. We combined these two instruments to investigate the exact nature of the pulsations. Are they toroidal or poloidal? We present complex demodulation to determine amplitude and phase relationship between field components observed by the radar and magnetometer chains. We determine the time development and decay of the resonance after excitation and match magnetometer response to ionospheric currents observed by radar. Further, by determining their polarization and investigating amplitude and phase information, other characteristics can be determined, e.g. wave number. We present results in a graphical form and discuss them in the context of MHD theory of magnetic pulsations.

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