Magnetosphere-Ionosphere energy transfer by ULF waves

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ULF waves play a significant role in the dynamics and energy transfer in the Earth's magnetosphere. A complete understanding of how ULF wave energy couples to and affects the ionosphere has been the subject of recent research. While the ionosphere-magnetosphere interface for ULF waves is well understood for vertical geomagnetic field geometries, the oblique nature of the field at lower latitudes, plus inductive feedback effects are recent developments. We have developed numerical and analytic models for the propagation of ultra low frequency (ULF; 1-100 mHz) wave fields from the Earth's magnetosphere through the ionosphere, atmosphere and into the ground. The models are formulated to include solutions for high latitudes where the geomagnetic field, B0, is near vertical to oblique magnetic fields at low latitudes. In this paper we investigate the partitioning of energy deposition associated with ULF wave interaction with the ionosphere. The results show that the dip angle of B0 and the arrival angle of the incident ULF wave affects the energy converted into Joule heating of the ionosphere.