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Characteristics of ULF waves observed at low latitudes and their influence on storm-time radiation belt electron enhancements

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Abstract

The magnetospheric environment supports a variety of waves induced by plasma instabilities, which are in turn the ultimate result of the outer and inner magnetosphere's interaction with the solar wind. By using ground measurements from the 210MM and SAMBA magnetometer arrays, along with measurements from the magnetometers on-board GOES satellites, we have studied the development of ultra-low frequency (ULF) waves that have been associated with changes in the flux level of radiation belt electrons. The amplitude of Pc5 waves with frequencies in the range of a few mHz, which are controlled by varying solar wind conditions, decays rapidly with decreasing L shell. During intense geomagnetic storms, however, there is evidence for enhanced geomagnetic field fluctuations in the Pc 5 frequency band at even lower L shells. We discuss the results in the framework of the influence of magnetospheric configuration changes on radiation belt enhancements through ULF wave growth.