621

THE TRANSMISSION OF ULF WAVES FROM THE MAGNETOSPHERE THROUGH THE IONOSPHERE TO THE GROUND

B J Fraser[1], H J Singer[2], P V Ponomarenko[1]

[1]CRC for Satellite Systems, University of Newcastle, Callaghan, NSW, Australia,
[2]NOAA/SEC, Boulder, CO, United States

External solar wind sources transfer energy, either directly or indirectly, into the Earth's dayside magnetosphere to drive ultra-low frequency (ULF) waves in the Pc3-5 (1-100mHz) band. The wavelength of these waves is of the same order as the scale size of the magnetospheric cavity and consequently ULF wave energy is generally observed as standing wave resonances, either Alfven mode field line resonances or fast mode cavity/waveguide resonances. The ULF wave spectra seen by ground magnetometers contains information relating to the properties of the wave source and the magnetosphere and ionosphere regions and associated boundaries through which wave energy must travel to reach the ground. This study tracks individual daytime Pc3-5 wave trains, seen in the outer magnetosphere at geostationary orbit in September 2003 by magnetometers onboard the GOES 8 and 9 satellites (195 and 205 degrees west longitude), down through the ionosphere where they are observed by the Tasmanian TIGER SuperDARN HF radar, and to the ground where they are observed by the ground magnetometer at Macquarie Island. Of particular interest is a comparison of wave amplitudes seen in the magnetosphere, ionosphere and on the ground. Ionospheric ULF wave azimuthal wave numbers are known to differ from those measured on the ground due to spatial integration. Wave numbers in the magnetosphere, ionosphere and on the ground will be compared, and other wave properties observed simultaneous between the three regions, including travel time, phase and polarization characteristics will be discussed. This provides new knowledge on the transfer of ULF wave energy from the magnetosphere to the ground.