Project Details

ROSES ID: NNH06ZDA001N
Selection Year: 2007
Program Element: Focused Science Topic

Topic: Investigate the Global Distribution, Sources and Effects of Large Electron Density Gradients at Middle and Low Latitudes

Project Title:
An investigation of the highly structured topside ionosphere at mid- and low-latitudes and its dependence on magnetic storms as observed with the DEMETER and DMSP satellites

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Summary:
This investigation will explore the plasma structure and irregularities in the topside ionosphere (660-830 km altitude) at mid- and low-latitudes using data from the DEMETER and DMSP satellites. We will examine the ion drifts, plasma density and temperature, electric field and plasma density irregularities, and in some cases, the magnetic field irregularities that characterize the unstable, topside ionosphere. A chief goal of the investigation is to determine how this structure depends on magnetic storms and penetration electric fields. The mid-latitude irregularities are compared with those associated with equatorial spread-F as well as with the intense irregularities associated with the trough region that are observed at sub-auroral latitudes during geomagnetic storm periods. The observations will be related to theories of mid-latitude, topside plasma density structuring during magnetic storms. This research is highly germane to NASA's interest to understand the geospace environment and to space weather effects regarding disruption of communication and navigation signals in the near-space environment.

Publication References:

Summary: no summary

Reference: Malingre, M.; Berthelier, J.-J.; Pfaff, R.; Jasperse, J.; Parrot, M.; (2008), Lightning-induced lower-hybrid turbulence and trapped Extremely Low Frequency (ELF) electromagnetic waves observed in deep equatorial plasma density depletions during intense magnetic storms, Journal of Geophysical Research: Space Physics, Volume 113, Issue A11, CiteID A11320, doi: 10.1029/2008JA013463