

Integration of multi instrument ionospheric plasma diagnostics used for near Earth environmental modelling

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In order to enhance our understanding of the rich plasma physical processes that drives the solar-terrestrial space environment we need to dramatically increase our ability to perform multi point measurements with sensors of different types. The magnetosphere-ionosphere-thermosphere system is strongly affected by electric and magnetic fields, particle precipitation, heat flows and small scale interactions. The changes of the near Earth plasma conditions are produced mainly by natural perturbations, but some of them also have anthropogenic origin. The diagnostics of the ionospheric plasma property as electron and ion density, temperature and velocity can provide essential inputs for modeling the Space Weather conditions.

The aim of this presentation is to show global distribution of main plasma parameters during different geomagnetic conditions and seasons diagnosed by various measuring techniques as: in situ wave and plasma diagnostics registered on board of DEMETER satellite, GPS observations collected at IGS/EPN network, GPS observation carried out at the Antarctic and Arctic IGS (International GNSS Service) stations used and the data retrieved from FORMOSAT-3/COSMIC radio occultation measurements. We are willing to present and validate the properties of the ionospheric electron density profiling retrieved from FORMOSAT-3/COSMIC radio occultation measurements. The comparison of radio occultation data with ground-based measurements indicates that usually COSMIC profiles are in a good agreement with ionosonde profiles both in the F2 layer peak electron density (NmF2) and the bottom side of the profiles. For this comparison ionograms recorded by European ionospheric stations (DIAS network) during 2008 year were used. We would like also to discuss the limitation of presented diagnose techniques with respect to different geomagnetic condition and localisation in space.