THE USE OF ELECTROMAGNETIC FIELD SYMMETRIES IN RADIO PHYSICS

Thide B.
Swedish Institute of Space Physics, Box 537, Uppsala, Sweden

Abstract:

Tomographic images of the high latitude F region, covering one year of observations, have been used to investigate the statistical behaviour of the trough. We have used the vertical profiles of the electron density obtained by means of stochastic inversion from the phase differences of satellite signals recorded by the tomographic chain of receivers from Tromsø (69.66°N, 18.94°E), Kilpisjärvi (69.02°N, 20.86°E), Kiruna (67.84°N, 20.41°E), Luleå (65.58° N, 22.17°E) and Kokkola (63.83°N, 23.06°E). We will present our conclusions regarding the seasonal patterns in the occurrence of the trough. The width and trough walls gradients are also investigated. We will refer to the relationship between the occurrence of the trough and the terrestrial and interplanetary magnetic fields. Also, we show that, for different levels of the geomagnetic activity, a relationship between the By and Bz components of the interplanetary magnetic field and the occurrence of the trough exists. The observed characteristics of the trough and of its seasonal morphology will be compared with the coupled thermosphere ionosphere plasmasphere electrodynamics (CTIPe) model results for each season (equinoxes and solstices), for different IMF clock-angle projections and Kp values. The CTIPe model is a non-linear, coupled thermosphere-ionosphere-plasmasphere physically based numerical code that includes a self-consistent electrodynamics scheme for the computation of dynamo electric fields.