



Radiotomography observations of large scale high-latitude ionospheric structure by the IITC: influence of IMF, season and longitude

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The high-latitude ionosphere is a very structured medium comprising plasma density structures on a wide range of spatial scale sizes. Of particular interest to this study are the large-scale structures such as the tongue-of-ionisation, polar patches, night-side density blobs and electron density troughs. The morphology of these features is determined by ionisation production processes, solar radiation and charged particle precipitation, loss by recombination and plasma transport. Of particular interest to this study is the role of the high-latitude plasma convection in the plasma transport. These processes are in turn influenced by the interplanetary magnetic field, season and longitude sector of observation.

Observations by the International Ionospheric Tomography Community (IITC) in different longitude sectors provide an opportunity to gain a semi-global insight into the plasma distribution, as part of activities of the International Heliophysical Year (IHY). Tomography reconstructions from satellite receiver chains in the European and Alaskan sectors are used to investigate the dependence of the high-latitude plasma distribution on the IMF, season and the longitude sector of observation. Interpretation of the results is enhanced by comparison of the observations with the output from runs of the Coupled Thermosphere Ionosphere Plasmasphere (CTIP) model, where electric potential patterns given by the SuperDARN radar network are used as an input for the plasma convection. This allows consideration of high-latitude convection appropriate for conditions of both IMF Bz negative and positive.