



High latitude ionisation structures and their effects on navigation

Ingemar Häggström, Carl Fredrik Enell, Assar Westman, and Anders Tjulin
EISCAT Scientific Association, EISCAT Headquarters, Kiruna, Sweden (ingemar@eiscat.se)

Several ionisation structures can develop under different space weather conditions. The combination of solar and magnetic activities drives instability mechanisms that form “irregularities” capable of disrupting satellite signals for navigation and telecommunications. Under adverse space weather conditions harmful structures exist at high latitudes like drifting polar cap patches, arcs, sporadic E layers, ionisation structures following auroral particle precipitation.

Electron density profiles from the EISCAT incoherent scatter radars are calculated during times of relevance, to match co-located ground GNSS observations of the same ionisation structures. This is complemented by the information available from ionosondes (i.e. presence of sporadic E layers and/or spread F) which will clarify the type and evolution of structures involved in the scattering mechanism. These estimates contribute to resolve structures at high and low latitudes as well as possibilities to track their evolution in space and time, and in comparison with that observed by ground GNSS receivers.