

Space weather modelling of the dayside polar ionosphere and thermosphere

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From the European Incoherent Scatter (EISCAT) radar observations, we have shown some features of the ionospheric disturbances in the dayside polar cap region where ionospheric and thermospheric observations are not enough to understand the space weather effects. For example, some ionospheric disturbances have been observed in the northward of Longyearbyen ($> 80^\circ$ latitude) even during geomagnetically quiet periods, while disturbances are generated in the auroral region (at Tromsø) during the geomagnetically disturbed periods. CME-induced disturbances and ionization due to high energy particle precipitation have been also observed in the dayside polar ionosphere.

In order to understand and predict the phenomena in the dayside polar ionosphere and thermosphere, we have also made modelling/simulation studies. In particular, we focus on modelling the effects of precipitating particles on the dayside polar ionosphere and thermosphere in the context of the Japanese Space Weather projects. In the present study, we will show some observational and simulation results: for example, the dayside ionospheric disturbances observed with the EISCAT radar system and simulations with a GCM. In addition, we will introduce our attempt to estimate productions of ions, NO_x, and HO_x in the altitude of 50-500 km due to precipitating particles.

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