

D- and E-region ISR spectra measured with EISCAT radar facilities

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The energy from the solar wind is mainly transported to the polar upper atmosphere and causes various phenomena such as auroras characterized by their rapid variability in time and space. Incoherent scatter radar (ISR) located in high latitude is one of the most powerful tools to investigate generation mechanisms of such phenomena and their effects on the atmosphere. The ISR basically gives information of plasma parameters between the bottom-side and topside ionospheres. However, the ISR has several unavoidable limitations to derive ionospheric parameters in the E- and D-region ionospheres, due to limited information of the ISR spectra.

We have investigated ISR spectra in the D- and E-region using the latest techniques of the EISCAT UHF and VHF radars located in Tromsø and EISCAT Svalbard radar in Longyearbyen. Our initial analysis indicates that the EISCAT Tromsø UHF and VHF radars have limitations of plasma parameter derivation below 87-90 and 120 km altitudes, respectively. We discuss lower limits of reliable ion temperature derivation using the latest pulse coding techniques of the EISCAT radars, comparing with ambipolar diffusion coefficients derived from the Tromsø and Longyearbyen meteor radar data at the same altitudes under geomagnetically quiet condition.