

Electron spectra calculated from EISCAT data compared with those observed by the S310-35 rocket during the DELTA campaign

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In the lower ionosphere, precipitating energetic particles are decelerated and scattered by collisions with neutral particles where also ionization occurs. These processes control the shape of electron energy spectra at different altitudes and also of the ionospheric electron density profile.

We have investigated energy spectra derived from ionospheric electron density profiles measured by the EISCAT Tromsø UHF radar between 00:34-00:38 UT on December 13, 2004, and compared them with electron spectrograms obtained simultaneously with the S310-35 sounding rocket.

Energy spectra of electrons in a strong auroral arc, observed with the APD (Avalanche Photodiode) on the S310-35 rocket show an accelerated Maxwellian distribution at energies below 15 keV and a power-law distribution above 15 keV [Ogasawara et al., 2006]. The spectra calculated from the electron density profiles show the same features. At other times when the precipitation is less intense, both spectra can be often fitted with kappa distributions having thermal energies of a few hundreds of eV.