Observations of the lower thermospheric neutral temperature and density in the DELTA campaign

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The sounding rocket S-310-35 in the Dynamics and Energetics of the Lower Thermosphere in Aurora campaign was launched at 0:33 UT on December 13, 2004, from Andøya Rocket Range, Norway. In situ rocket measurements of the neutral temperature and density were successfully made at 98-140 km altitude using the onboard NTV instrument. The NTV was designed to measure temperature and density of molecular nitrogen (N2) by applying the Electron Beam Fluorescence technique. The NTV consists of an electron gun to excite and ionize the lower thermospheric N2 and a sensitive spectrometer to detect the subsequent fluorescence of the N2+ first negative system. An analysis of the fluorescence spectra provides the rotational temperature, which is expected to be equal to the kinetic temperature, and number density, which is the main constituent of the neutral atmosphere in this height range. The measured rotational temperature and number density significantly deviate from the MSISE-90 model. The comparisons of the measured rotational temperature with the ion temperature by the EISCAT radar and with the Doppler temperature by the FPI will be reported in this presentation.