

Preliminary results: Measurement of vibrational temperature of N₂ in the lower thermosphere by S-310-30 sounding rocket experiment

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<http://www.ted.isas.ac.jp/earth/rocket/S31030.html>

The vibrational temperature (T_v), the rotational temperature (T_r) and the density of atmospheric molecular nitrogen between 100 - 150 km were measured in situ by a sensitive spectrometer onboard a sounding rocket S-310-30, over Uchinoura, Kagashima, Japan at 19:30 JST on February 6, 2002.

The main purpose of this rocket experiment is to study the dynamics and the thermal energy budget in the lower thermosphere. Particularly, in order to solve the problem on the electron temperature, which is higher than possible neutral temperature around 100 km, we measured T_v , T_r and the density of molecular nitrogen and electron temperature and density simultaneously. T_v and T_r were obtained by fitting observed spectrum for simulated synthetic spectrum, and the density was calculated by comparing observed intensity of spectrum with calibrated data from laboratory experiment.

We will report preliminary results of our measurement of T_v and T_r and discuss interaction between neutral atmosphere and plasma in the lower thermosphere.