

PEM032-17

Room:103

Time:May 27 08:30-08:45

Summary of observational results obtained with the new Tromso sodium LIDAR

Satonori Nozawa^{1*}, Takuya Kawahara², Takuo Tsuda¹, Tetsuya Kawabata¹, Norihito Saito³, satoshi Wada³, Toru Takahashi¹, Shin-ichiro Oyama¹, Hitoshi Fujiwara⁴, Ryoichi Fujii¹

¹STEL, Nagoya University, ²Faculty of Engineering, Shinshu Univ, ³RIKEN, ⁴Graduate School of Science, Tohoku Univ.

On October 1, 2010, the new sodium LIDAR installed at Ramjordmoen, Tromsø (69.6N, 19.2E), where the EISCAT radars have been operated, started observations of neutral temperature in Mesosphere-Lower Thermosphere (MLT) region (80-110 km). The new LIDAR can provide temperature data with time resolution of 10 min - 20 min with good quality. This talk will give an overview of results obtained with the new sodium LIDAR over 6 months (October 2010 - March 2011). We have operated the sodium LIDAR as follows: about 1 month in October 2010, about 2 weeks in November 2010, about 2 weeks in January 2011. In total, we succeeded in obtaining neutral temperature data for about 180 hrs. We plan to operate the LIDAR for about 2 weeks in February 2011, and about 2 weeks in March 2011. So far, major results are summarized as follows:

(1) Simultaneous observations with the EISCAT UHF radar. For 2 nights, October 5-6, 2010 and November 14, 2010, we succeeded in conducting simultaneous observations with the EISCAT UHF radar. During the period, the electric field values were relatively small. We have compared neutral temperature values observed by the LIDAR with the ion temperature values by the EISCAT UHF radar between 95 and 105 km. In general, it is found in fairly good agreement.

(2) Periodic variations of neutral temperature for about several hours. On October 29, 2010, we observed that the neutral temperature varied clearly with time between 80 and 105 km for about 9 hrs. We have derived the period to be about 4 hrs as well as the vertical wavelength to be about 10 km for this event. In addition, We have obtained the neutral temperature data with 12 hrs -15 hrs interval for 4 nights on January 7, 8, 11, and 12, 2011. Clear temporal variations are identified in the datasets, thus we will derive tidal amplitudes and phase as well as shorter interval periodic variations.

(3) Sporadic sodium layer. On January 11, 2011, we observed a sporadic sodium layer event, which showed high sodium density (one order higher than usual density values) for about 3 hrs. We have analyzed MF radar data, meteor radar data, magnetometer data, aurora camera, and ionosonde data to investigate its cause.

We will present summary of observational results over the 2010 season, and also present our upgraded plan of the LIDAR system.

Keywords: polar region, neutral temperature, mesosphere, lower-thermosphere, sodium LIDAR, Tromsø