

# Sodium lidar measurements of waves and instabilities near the mesopause during the Delta campaign

# Bifford Williams[1]; Joe Vance[2]; Chiao Yao She[3]; Takumi Abe[4]; Junichi Kurihara[4]

[1] Colorado Research Associates, NWRA division; [2] Physics Dept, Colorado State University; [3] Colorado State University, Physics Dept; [4] ISAS/JAXA

The sounding rocket for the DELTA campaign was successfully launched from Andoya at 00:33 UT on Dec 13. Though it was cloudy at the time of launch, the Weber Na lidar was operating off and on between 20:00 UT and 23:30 UT, Dec 12, observing Na density, temperature and meridional wind between 80 and 100 km. The observation condition was better between 20:00 UT and 21:10 UT, with near continuous observation. After this time, there were 2 periods of ~15 min observation, near 22:00 UT and 23:20 UT, respectively. While data analysis is still in progress, the atmosphere appeared to become more active as the launch time approached. At the last 15 min with data, at ~23:20 UT, Dec. 12th, the lidar profiles revealed a gravity wave in both beams with a magnitude of 5-10K in temperature and approximately 5km vertical wavelength.

The large background shear plus the wave perturbation produced regions with potentially unstable wind shear in meridional wind between 90 and 95 km, and the temperature gradient surpassed the adiabatic lapse rate at 83, 88, 94, and 98 km altitude. The lidar data after full analysis will be compared to the observation on-board the rocket and radar observations at Andoya, as well as EISCAT radar in Tromso and Fabry-Perot Interferometer in Skibotn.