

Variations of the polar lower thermosphere and mesosphere in February 2016 using EISCAT radar, meteor radar, MF radar, and sodium LIDAR observations

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We made an EISCAT special program (SP) experiment, under collaborations of Japan, Sweden, and Norway, to study variations of a quasi-two day wave (Q2DW) and tidal waves in the polar lower thermosphere using the EISCAT UHF radar at Tromsø (69.6N, 19.2E) and the EISCAT Svalbard radar at Longyearbyen (78.2N, 16.0E) for 45 hours. The SP started at 23 UT on February 10, 2016, just after EISCAT CP2 (Common program 2) run made for 135 hrs, and ended at 20 UT on February 12, 2016. By combining the EISCAT CP2 run and our SP run, we have, in total, made a data set of 7.5 day length. Unfortunately, there was a data gap from about 01 UT to 07 UT on February 7 due to a problem of data recording at the Tromsø site. Except for the gap, the operations went well without no serious problems at both the EISCAT radars. Sodium LIDAR observations of wind, temperature, and sodium density collocated at the Tromsø site were also made during dark time intervals together with meteor and MF radar continuous observations. We have analyzed the data sets, and derived Q2DW and 24h/12h tides. An SSW occurred in this time interval, so we focus on changes of the waves around time interval of the SSW.

Keywords: Lower thermosphere, Mesosphere, tidal waves, quasi-two day wave, EISCAT radar, sodium LIDAR