

成層圏突然昇温にともなう北極域下部熱圏・中間圏変動

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Changes in the polar lower thermosphere and upper mesosphere related to SSWs above Tromsø, Norway

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We have made an EISCAT special experiment using the UHF radar at Tromsø (69.6 deg N, 19.2 deg E) and the EISCAT Svalbard radar (ESR) at Longyearbyen (78.2 deg N, 16.0 deg E) from 23 UT on February 10 to 20 UT on February 12, 2016 connecting to an ip2 run (one of EISCAT common programs) conducted from 08 UT on February 5 to 23 UT on February 10. In those experiments, the UHF antenna at Tromsø and the ESR 32 m antenna were scanned to derive ion velocity vectors between about 100 and 500 km in the ionosphere. We have succeeded in obtaining 7.5 day length of EISCAT radar data with a 6-hr data gap occurring from about 01 to 07 UT on February 7 at Tromsø. Sodium LIDAR observations, which provided temperature, winds, and sodium density data between about 80 and 110 km, collocated at the Tromsø site were also made together with (continual) meteor radar and MF radar wind observations in the upper mesosphere between about 70 and 100 km.

Minor Sudden Stratospheric Warmings (SSWs) occurred (probably) on February 1 and 9, 2016, just before and during the EISCAT radar observations. Thus, we have analyzed the campaign datasets to investigate changes of temperature and winds in the polar lower thermosphere and upper mesosphere due to SSWs. Nocturnal mean temperature decreased (i.e., cooling) around the SSW peak occurring on February 1, 2016, and the semidiurnal tidal (more exactly, 12 hour variation of winds) amplitude was reduced around the SSW peak in the polar upper mesosphere. We have compared these results with those of other SSW events occurring in January 2012 and 2015. The weakened amplitude of the semidiurnal tide seems a common feature above Tromsø around the SSW peaks. To investigate possible causes of these changes, we have investigated GAIA (Ground-to-topside model of Atmosphere and Ionosphere for Aeronomy) predictions. We will present observational results GAIA results, and then will discuss possible causes of the reductions.