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Ozone, polar stratospheric cloud and stratospheric water vapor observations in northern Finland

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Larger than average ozone losses were observed in the Arctic stratosphere in the 2006/2007 winter/spring. During this period a series of ground based and balloon borne observations were made at Sodankylä in northern Finland (67.4° N, 26.6° E). Here we report the polar ozone observations by ground based spectrophotometers and balloon borne ozonesondes and profile observations of polar stratospheric clouds and stratospheric water vapor. The data from 2006/2007 are compared to the previous winter/springtime observations at the site. The radiosonde observations at Sodankylä showed that the polar stratospheric cloud formation temperatures occurred on 33 % of days in the December-February period. This is higher than average from the 42 year observational record at the site. The in situ aerosol backscatter sonde measured on January 24, 2007 a vertically thick polar stratospheric cloud between the altitudes of 18 to 24 km. The maximum backscatter ratio at 940 nm was 16 at the altitude of 20 km. The observed layer between 18 and 22 km is here interpreted as composing primarily of the STS particles and the layer between 22 and 24 km as composing of the NAT particles. In the calculation of the model threshold temperatures we used the balloon borne water vapor observations by cryogenic frostpoint hygrometer. Finally we present stratospheric water vapor observations made inside the vortex during the winter 2006/2007 and comparison with the earlier winters.