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Diurnal variation in mesospheric ozone by ground based microwave radiometry at Ny-Alesund

F. Schranz, S. Fernandez, K. Hocke, and N. Kämpfer

University of Bern, Switzerland (franziska.schranz@iap.unibe.ch)

The vertical ozone distribution in the middle atmosphere is measured by the ground based ozone monitoring system for campaigns (GROMOS-C), a microwave radiometer developed by the University of Bern, Switzerland. The instrument is located at the AWIPEV research base at Ny-Alesund/Svalbard (78°N/12°E) in the Arctic since September 2015. Microwave radiometry allows continuous observation of the ozone profile with a high time resolution. The instrument is capable to observe in the four cardinal directions (N-E-S-W) with an elevation angle of 22°. We investigate the diurnal variation of ozone in the mesosphere which is induced by photolytic effects. The measurements of the four spatial directions are used to study the diurnal variation as a function of the solar zenith angle. The slow transition of the mesospheric ozone amount from polar day to polar night and its daily modulation at approximately 70 km altitude within the tertiary ozone maximum can clearly be seen in the data from our instrument. The results are further compared to simulations with the specified dynamics version of the whole atmosphere community climate model (WACCM).