



Enhanced short-term stratospheric ozone fluctuations observed by the GROMOS microwave radiometer during winter at Bern

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The ground-based millimeter wave ozone spectrometer (GROMOS) has been continually measuring stratospheric and lower mesospheric ozone volume mixing ratio (VMR) profiles above Bern, Switzerland (46.95°N, 7.44°E, 577 m) since 1994. The high temporal resolution of GROMOS (30 minutes) allows the analysis of short-term fluctuations. The present study analyses the temporal perturbations, ranging from 1 to 4 hours, observed in stratospheric ozone from June 2011 to May 2012. We observe an increase in mid- and upper stratospheric ozone fluctuations of about 0.05 ppm or 0.9% from December to January. The strongest variations of stratospheric ozone above Bern are due to displacements of the polar vortex to mid-latitudes, related with sudden stratospheric warming (SSW) events and produced by breaking of planetary Rossby waves. The breaking of planetary waves and the disruptions of the polar vortex edge can also generate fluctuations in stratospheric ozone, for instance the so-called stratospheric streamers. The increase of inertia-gravity wave activity at the polar vortex edge during these SSW events can also be related with the short-term fluctuations observed in mid- and upper stratospheric ozone during winter.