



Ozone as a tracer of short period gravity waves in the stratosphere and lower mesosphere

K. Hocke, N. Kämpfer, and T. Flury

University Bern, Institute of Applied Physics and Oeschger Centre for Climate Change Research, Bern, Switzerland
(klemens.hocke@iap.unibe.ch)

One of the earliest works on atmospheric gravity waves reports about remarkable surface pressure oscillations with periods from 5 to 15 minutes in presence of large temperature inversions which are usually accompanied by fog or low stratus (Gossard and Munk, 1954). Gravity waves with similar periods also have been observed in mesospheric airglow. On the other hand, observations of short period gravity waves and associated ozone perturbations at stratospheric altitudes are almost not available yet though numerical simulations predict an upward propagation of tropospheric short period gravity waves through the stratosphere and mesosphere. Ozone profiles with a unique time resolution of 3 min, covering the altitude range from 20 to 70 km are provided by ozone microwave radiometers operated by the Institute of Applied Physics (University of Bern) and MeteoSwiss (Payerne). We have started to investigate if the continuous ozone observations are appropriate to monitor short period gravity waves in the stratosphere and lower mesosphere. The gravity wave-ozone perturbation relationship and the measurement principle of ground-based microwave radiometry are sketched. An example is shown for a gravity wave-induced ozone perturbation in the lower stratosphere. Results of the time evolution of gravity wave flux over Switzerland during the sudden stratospheric warming of February 2008 are presented as well as initial validation work of the temporally high resolution ozone profiles.