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Comparison between two ground-based millimeter wave radiometers at IRF Kiruna and Aura/MLS for the winter/spring season 2013

Uwe Raffalski (1), Niall J. Ryan (2), Kaley A. Walker (3), and Jochen Gross (4)

(1) Swedish Institute of Space Physics, Atmospheric Physics Programme, Kiruna, Sweden (uwe.raffalski@irf.se), (2) Institut of Environmental Physics, University of Bremen, Germany., (3) Department of Physics, University of Toronto, Canada., (4) Karlsruhe Institute of Technology, IMK-ASF, Germany.

The Swedish Institute of Space Physics in Kiruna (67.8N/20.4E) operates two millimeter wave radiometers for atmospheric remote sensing of strato-mesospheric ozone, the Swedish KIruna Millimeter wave RAdiometer and, since November 2012, the German MIllimeter wave RAdiometer 2, installed by the Karlsruhe Institute of Technology, KIT. In this study we compare ozone measurements by KIMRA and MIRA2 at 230 GHz and 273 GHz, respectively. Additionally data from Aura/MLS (Microwave Limb Sounder) is used to compare the ground-based data set with the satellite data.

The ozone concentration profiles are retrieved using an optimal estimation inversion technique, covering an altitude range of ∼16 – 56 km, with an altitude resolution of, at best, 8 km. From this comparison it can be seen that KIMRA has a rather strong +/- 1ppmv bias in the altitude range of ∼20-35 km, most likely due to standing wave features. However, both data sets compare quite well with the Aura/MLS data. This shows that even in the future ground-based remote sensing radiometry is a powerful tool for longterm ozone monitoring covering several solar cycles over many decades.