Universität Bern
Institut für Angewandte Physik
Sidlerstrasse 5
3012 Bern, Schweiz

Telefon: +41 (0)31 631 89 11
E-Mail: iapemail@iap.unibe.ch
www.iap.unibe.ch

UNIVERSITÄT BERN

Seminar über Microwave Physics and Atmospheric Physics

Referent/in: Guochun Shi, Institute of Applied Physics & Oeschger Center for Climate Change Research, University of Bern, Bern, Switzerland

Titel: Ozone and water vapor variability in the middle atmosphere observed with ground-based microwave radiometers at Ny-Ålesund, Svalbard (79◦ N, 12◦ E) for the 2015-2021 period

We performed continuous ozone and water vapor measurements with the two ground-based radiometers GROMOS-C and MIAWARA-C at Ny-Ålesund, Svalbard (79◦N, 12◦E) since in September 2015. We retrieved the ozone and water vapor profiles with a high time resolution of about 2 hours for the period 2015-2021. The climatologies of MLS and the radiometers agree within ±10% during this period. However, a climatological comparison to the reanalysis MERRA-2 and GROMOS-C 5 and MIAWARA-C indicates larger discrepancies above 0.1 hPa because of the implemented radiative transfer schemes and other model physics. Moreover, we performed a conjugate latitude comparison by defining a virtual station in the Southern Hemisphere at the geographic coordinate (79◦S, 12◦E) to investigate interhemispheric differences. The southern hemisphere is characterized by a more stable polar vortex and colder temperatures in the polar cap that results in more favorable conditions to form polar stratospheric clouds and, thus, more efficient ozone destruction by catalytic reactions causing the well-known 10 ozone hole. The polar stratospheric cloud formation is accompanied by a reduction of the water vapor mixing concentrations at the same altitudes in the lower stratosphere. Both trace gases show a much higher variability in the Northern hemisphere due to increased planetary wave activity. Furthermore, we considered water vapor as a dynamical tracer to infer the strength of the residual circulation by the up- and downwellings above Ny-Åesund and the corresponding to the conjugate latitude. Typical ascent rates during the summer transition reached values of 0.5-4 mm/s and for the downwelling, in the fall transition, vertical 15 velocities of 2-8 mm/s were estimated. The northern hemisphere also reflects a much more pronounced inter-year variability compared to southern polar latitudes

Zeit: Freitag, 09. Dezember 2022, 10:15 Uhr

Ort: Room A97, Sidlerstrasse 5, 3012 Bern
https://unibe-ch.zoom.us/j/97081325603?pwd=d0ozME5xOS9pQVNxallLem81VHQyZz09
Meeting ID: 970 8132 5603
Passcode: iapmw