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Karlsruher Meteorologisches Kolloquium

Einladung zum Vortrag

" Radiative and dynamical influences on polar stratospheric temperature trends"

Herr Ass.-Prof. Mag. Harald Rieder, Universität Graz, Österreich

Dienstag, den 16. Mai 2017, 15:00 Uhr s.t.
Campus Nord, Gebäude 435, Raum 2.05

Since the detection of the Antarctic ozone hole in the late 1980s the state of the Earth's stratosphere has received much attention. Especially changes in stratospheric composition and dynamics are of importance as radiative and dynamical heating rates control stratospheric temperatures. The state of the ozone (O_3) layer is of central interest in stratospheric research and it is well understood that chlorofluorocarbon induced O_3 loss has caused widespread cooling in the middle atmosphere over recent decades. Besides O_3, well-mixed greenhouse gases (WMGHG) such as CO_2, CH_4 und N_2O are of particular importance. While radiative forcing due to WMGHG is positive in the troposphere, their increase causes cooling at higher levels, particularly in the upper atmosphere. Stratospheric cooling influences the stability of the polar vortex and has been shown to significantly alter the large-scale atmospheric circulation. Today it is well understood that changes in stratospheric composition and stratosphere-troposphere exchange have important implications for surface climate variables. While concentrations of ozone depleting substances are projected to decline to pre-1980 values over the course of the 21st century, concentrations of WMGHG are projected to rise. Thus quantifying the radiative and dynamic contributions to past, present and future stratospheric temperature trends is essential for our understanding of the stratosphere's role in the climate system. In this presentation I will illustrate the role of O_3 depletion and increasing WMGHGs for radiative temperature trends in the Polar regions, quantify radiative and dynamical contributions to observed temperature trends, and present selected aspects from recent modeling studies.

gez. Prof. Dr. Johannes Orphal