Geophysical Research Abstracts, Vol. 7, 08610, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08610

Mountain Waves explain the Formation of first NAT PSCs detected by MIPAS in the Antarctic Stratosphere

M. Höpfner (1), G. Stiller (1), T. von Clarmann (1), H. Fischer (1), N. Larsen (2), S. Svendsen (2), R. Spang (3), J. Ma (4), S. D. Eckermann (4), D. Broutman (4), P. Massoli (5), F. Cairo (5), B. Luo (6), U. Biermann (7)

(1) Institut für Meteorologie und Klimaforschung, Forschungszentrum Karlsruhe, Postfach 3640, 76021 Karlsruhe (michael.hoepfner@imk.fzk.de), (2) Middle Atmosphere Research Division, DMI, Copenhagen, (3) Institut für Chemie und Dynamik der Geosphäre, Forschungszentrum Jülich, (4) US Naval Research Laboratory, Washington, DC, (5) Istituto di Scienze dell'Atmosfera e del Clima, CNR, Roma, (6) Institut für Atmosphäre und Klima, ETH, Zürich, (7) Max-Planck-Institut für Atmosphärenchemie, Mainz. Now at: Referat für Umwelt- und Energiepolitik des SPD-Parteivorstandes, Willy-Brandt-Haus, Berlin

Due to a globally changing climate with decreasing stratospheric temperatures, polar stratospheric cloud (PSC) occurrence might intensify in future. This could counteract the recovery of the ozone layer due to a decreasing stratospheric chlorine loading as consequence of the Montreal protocol and its amendments. To improve models of future ozone loss it is necessary to answer still open questions regarding composition and nucleation processes of nitric acid containing solid cloud particles. We present an analysis of the onset of extended NAT cloud formation in the Antarctic stratospheric vortex. This investigation is based on observations with the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS). MIPAS spectroscopically measures the mid-infrared radiation of the Atmosphere in limb geometry. Thus, MIPAS measurements are not dependent on sunlight and can probe the distribution of PSCs in the stratospheric vortex during polar night. Due to a distinct spectroscopic signature, it is possible to distinguish NAT particles from other kinds of PSCs. Over Antarctica 2003, first PSCs were detected by MIPAS on May, 21st. However, NAT clouds were first observed from June, 11th onwards. This event was correlated to strong mountain wave activity over the Antarctic Peninsula. We will show results of microphysical PSC-box model calculations on basis of mountain wave corrected temperatures which support the assumption of orographically induced early NAT formation.