

EVIDENCE OF SCATTERING OF TROPOSPHERIC RADIATION BY PSCS IN MIPAS-B SPECTRA

M. Höpfner (1), H. Oelhaf (1), G. Wetzel (1), F. Friedl-Vallon (1), A. Kleinert (1), A. Lengel (1), G. Maucher (1), H. Nordmeyer (1), N. Glatthor (1), G. Stiller (1), T. v. Clarmann (1), H. Fischer (1), C. Kröger (2), T. Deshler (2)

(1) Institut für Meteorologie und Klimaforschung, Forschungszentrum Karlsruhe, Postfach 3640, D-76021 Karlsruhe, Germany (michael.hoepfner@imk.fzk.de), (2) Department of Atmospheric Science, University of Wyoming, Laramie, WY 82071, USA (deshler@uwyo.edu)

On January 11, 2001, the high resolution mid-IR limb emission spectrometer MIPAS-B (Michelson Interferometer for Passive Atmospheric Sounding, Balloon borne version) observed synoptic polar stratospheric clouds (PSCs) during a flight from Kiruna (northern Sweden). Apart from the broadband continuum PSC signal the limb spectra showed highly resolved spectral features which were not present in PSC-free measurements. It will be demonstrated that these features are due to scattering of tropospheric radiation by PSC particles with radius around $1\ \mu\text{m}$ and larger. It will also be shown that in such a situation a large part of the continuum radiance is caused by scattering of the emission of the earth surface and the troposphere into the line of sight. Thus, reasonable PSC volume density profiles can only be retrieved if scattering is taken into account. We solved this problem by implementation of a Mie code into the line-by-line radiative transfer model KOPRA. Further, it was investigated how the tropospheric situation influences the retrieval results. Remaining residuals between modeled and measured spectra will be discussed.

These findings have strong implications for the retrieval of PSC properties from satellite limb emission spectrometers like ISAMS or CLEAS, and in particular on the future mission MIPAS on ENVISAT. In the latter case the high spectral resolution will allow to obtain more information on PSC size than previously thought.