

Interactive comment on “MIPAS detects Antarctic stratospheric belt of NAT PSCs caused by mountain waves” by M. Höpfner et al.

Anonymous Referee #1

Received and published: 16 December 2005

Höpfner et al. have submitted two corresponding papers to ACPD about analysis of MIPAS observations of Antarctic Polar Stratospheric Clouds (PSCs). The current paper about the detection of an Antarctic belt of Nitric Acid Trihydrate (NAT) PSCs depends on the results of the previous paper, Höpfner et al., 2005. While the previous paper introduces the method to assign different types of PSCs to different signatures in MIPAS spectra, the current paper analyses observations from May/June 2003 over the Antarctic. Observational data is divided into 4 classes according to the previously introduced scheme, which relates the measurements to different PSC types. The important observation is the apparent formation of a belt of NAT PSCs in June 2003. The main point of the paper is the following comparison of these observational data with output

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from a sophisticated model of PSC formation. As the synoptic temperature analysis does not provide NAT formation conditions, the authors investigate different schemes of temperature fluctuations induced by mountain wave activities. Such more realistic temperature fields allow in turn to apply microphysical models of PSC formation. Here, the authors successfully use the possibility of comparing MIPAS measurements with model outputs to constrain not precisely known parameters like nucleation rates.

The paper is well written and timely for the discussion of PSC formation processes and it is a very welcome contribution to this discussion from the good spatially resolved satellite data. The conclusions have implications for further application of PSC formation models, in that they provide some constraints on parameters otherwise hard to determine. From this aspect, the paper is almost ready for publishing as it is.

However, as the contents of the paper strongly depend on the results presented in the companion paper (Höpfner et al., 2005), I suggest to link the publication of both papers. It would not make sense to publish this one, while the previous one is still under review.

Here follow some further technical remarks:

for 1 Introduction: line 18: explain "NO_y"

for 2 Identification ...: line 17: "... is used in the plots to follow to depict the location ..." has two verbs

for 3 Antarctic NAT belt: page 10730 line 19/20: can a reference be given for the "initial high-latitude mid-May profiles of H₂O and HNO₃ ?

Reference:

M. Höpfner, B. P. Luo, P. Massoli, F. Cairo, R. Spang, M. Snels, G. Di Donfrancesco, G. Stiller, T. von Clarmann, H. Fischer, U. Biermann, Spectroscopic evidence for NO_y -NAT, STS, and ice in MIPAS infrared limb emission measurements of polar stratospheric clouds Page(s) 10685-10721. SRef-ID: 1680-7375/acpd/2005-5-10685

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