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Atmospheric Chemistry and Physics Discussions

Interactive comment on "MIPAS reference atmospheres and comparisons to V4.61/V4.62 MIPAS level 2 geophysical data sets" *by* J. J. Remedios et al.

Anonymous Referee #2

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Review of "MIPAS Reference Atmospheres and comparisons to V4.61/V4.62 MIPAS level 2 geophysical data sets" by J. Remedios, R. Leigh, M. Waterfall, P. Moore, H. Sembhi, M. Parkes, J. Greenhough, P. Chipperfield, and D. Hauglustaine.

This paper presents the reference climatology of temperature and constituent mixing ratios used in the MIPAS retrieval operational codes. Comparisons are presented between the climatology and the measured quantities. Overall the paper is well-written and the presentation is logically laid out. However, I have several major concerns (listed below) I feel should be addressed in order to make the manuscript acceptable to ACPD.

Major comments:

1) It is not clear to me that this manuscript falls under the category of a research article, which should "report substantial new results and conclusions from scientific investigations of atmospheric chemistry and physics..." It reads more like a technical report to document the operational code. This is not to say reference climatologies are not a valuable resource that should be documented, but I have difficulty seeing new scientific content in this manuscript. There is some discussion of comparison of MIPAS observations, but little investigation of the causes of reference/data differences. In addition, since the climatologies are used in the MIPAS retrievals, they cannot be considered truly independent.

2) Tropospheric model climatologies are taken from MOZART version 1, a model that was replaced in 2003 by version 2 (Horowitz et al., JGR, 2003). The source code is freely available, and according to the MOZART 2 website (http://gctm.acd.ucar.edu/mozart/models/m2/) "Results of the standard MOZART-2 simulation for one year driven with MACCM3 (Middle Atmosphere Community Climate Model, version 3) are available as data files or plots." Since the Horowitz et al. paper states that version 2 contains considerable improvements, the authors must justify why using output from an outdated model is acceptable.

3) I find calling these reference climatologies "MIPAS reference atmospheres" quite misleading. Unlike the UARS reference atmospheres (coordinated by the first author) that contain UARS data, the MIPAS reference atmospheres do not contain MIPAS data. A better term would be "reference atmospheres for MIPAS retrievals", or something similar.

4) This is no discussion of the diurnal cycle of constituents and at which time in the diurnal cycle the climatologies of constituents correspond to. I would think this is important for NO and NO2 in the stratosphere, and ozone in the mesosphere. If URAP is used then the data from HALOE would be daytime conditions, whereas if model data

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is used it might be a zonal average (day and night).

minor comments and corrections:

Abstract:

l3: “the operational processor” I would suggest re-wording to avoid this term. While I have inferred that “processor” refers to the retrieval algorithms, I don’t think its usage in this manner is standard.

l7: Suggest putting IG2 in quotes or placing it in parentheses after "seasonal climatologies for initial guess profiles"

1 Introduction:

l6: why "but"?

l22: Suggest converting to the present tense. I would think it is still desirable to provide information on infra-red active species, seasonal climatologies and standard deviations, etc.

3 Reference atmospheres

l8: “microwindow optimisation and selection, level 2 ...” Can this be re-worded to avoid jargon?

l10: By “contaminant,” do you mean signal contamination?

3.2

l17: “the MIPAS operational processor including the selection of microwindows and occupation matrices (MW/OM) selection for the operational processor...” Again, this seems to include unnecessary jargon that does not add the accessibility of the manuscript.

l21: “Since the MIPAS operational processor is based on a latitudinal switching of associated files such as microwindows and LUTs,...although the processor itself does

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not allow day/night switching of auxiliary data." It is not clear to me what is meant by latitudinal switching or auxiliary data.

l5: "The sigma data were extracted assuming maximum and minimum profiles were equivalent to 3 sigma of a Gaussian distribution." In the summary, it is stated that "this clearly is not a good assumption for many trace species," which raises the question as to why was this done?

4 Comparisons with MIPAS operational geophysical products

l13 Typo "along an orbit-track,."

4.1

l10 comma missing after "In fact"

4.2

l27 Left-hand should be hyphenated

l27(p9990): typo - "betwen"

Figs. 6-10: It is clear that a log scale was chosen for presentation of climatology constituents because of the larger variation in constituent mixing ratios over the range from the surface to ˜80km. However, this choice renders the data unreadable in many regions. For example, it is difficult to determine water vapor vmrs in the stratosphere to within a factor of 2. A simple question such as what is the peak stratospheric ozone mixing ratio cannot be determined from the figures. Can the authors explore alternative plotting methods (split altitude ranges?) to make the data presented more useful?

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 9973, 2007.