Interactive comment on “On the quality of MIPAS kinetic temperature in the middle atmosphere” by M. García-Comas et al.

M. Kaufmann (Referee)
m.kaufmann@fz-juelich.de

Received and published: 25 October 2011

The paper "On the quality of MIPAS kinetic temperature in the middle atmosphere" is well written, interesting and scientifically sound. It may be accepted for publication in ACP after addressing a few points:

page 24235, line 8: spectral range of MIPAS is up to 14.6 um (not 15.6 um)

page 24237, line 11: CRISTA was mounted on the free-flying ASTRO-SPAS satellite. It was launched with the U.S. Space Shuttle in November 1994 and August 1997, yielding about one week of atmospheric measurements, each.

mann et al. [2002] for the CRISTA-1,2 experiments. I would not call the non-LTE retrieval a 'reviewed processing'. The LTE T-retrievals up to 85 km are presented by Riese et al. [1999] and non-LTE retrievals (up to 110 km) by Gusev et al. [2006].

page 24237, line 14: 74 deg S - 74 deg N

page 24242, line 22: Can you comment (shortly, a few words) on the accuracy of the statistical band methods used here?

page 24243, line 12ff: Please clarify, why you chose a different VV scheme than Lopez-Puertas et al. [2009a]

page 24247, line 22: Since laboratory and atmospheric measurements give rate constants differing by a factor of four (for CO2-O VT collisions), why do you assume a factor of two uncertainty for this rate constant, only?

page 24247, line 11: An uncertainty of 15% for CO2 vmr in the UMLT is not adequate. Several publications (e.g., Lopez Puertas, 2000; Kaufmann et al., 2002, Beagley et al., 2010) exhibit much larger uncertainties, which are larger than 100% at 100 km. Please revise this source of uncertainty.

page 24247, line 23: Figure 3 in your paper demonstrates, that tidal signatures are visible down to 35 km.

page 24248, line 16: Since uncertainties in the spectroscopic data are based on personal communication with J.M. Flaud, they should be given explicitly in the paper.

page 24249, line 11: As far as I remember, 6-2 rotational temperatures may be affected by rotational non-LTE. If you agree, I suggest to use a different wording than 'non-LTE free measurements'.

page 24249, line 20: time difference is in UT? Please clarify.

page 24250, line 19: To my opinion, it is not appropriate to add systematic uncertainties of two instruments quadratically, since this is not a random variable. In particular,
MIPAS and SABER T data exhibit the same sources of uncertainty (and even the same values for certain rate constants) in many cases. This type of uncertainty should be considered in the comparison with T data from other measurement techniques, but it should not in the SABER-MIPAS comparison. I propose to calculate T uncertainties for the MIPAS-SABER comparison comprising of only those components, which differ between the two datasets, such as radiance uncertainties, utilization of different atomic oxygen profiles, etc.

Page 24252, line 4: Please specify 'un-physical retrievals' quantitatively.

Page 24256, line 2 and page 24273ff: You mentioned on page 242532 that you use atomic oxygen data from the NRLMSIS-00 model. Comparison with SABER data and also your T data comparisons suggest, that the MSIS atomic oxygen is too low. Is this (more general) statement correct? If yes, I suggest to add (this more general statement) in the paper as well. However, Smith et al. [2010, JGR] pointed out, that SABER atomic oxygen data is a factor of 2–5 larger than MSIS and other measurements, which may be mentioned in this context as well.

Page 24286: I suggest to define 'Non-LTE' (including atomic oxygen uncertainty?) and 'Total Sys' (root sum square?) uncertainties in the table caption.

Page 24289: I would define the acronyms (such as MLO) in the table caption.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 24233, 2011.