

Interactive comment on “Global distribution of mean age of stratospheric air from MIPAS SF₆ measurements” by G. P. Stiller et al.

Anonymous Referee #2

Received and published: 12 November 2007

General Comments:

This paper presents a new global data set of SF₆ VMR profiles obtained from the MIPAS satellite instrument between September 2002 and March 2004. The data set has been validated against in situ measurements obtained with a balloon-borne whole-air sampler. The global distribution of the apparent mean age of air has been calculated from the MIPAS SF₆ data and compared to results from the KASIMA chemical transport model to understand the impact of intrusions of mesospheric air into the stratospheric vortex on the age of air results.

This work is appropriate for publication in ACP after revisions to address the comments below. The paper provides important details on the retrieval process and bias-corrections used to produce this new global SF₆ data set. The global age of air distri-

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butions from SF₆ are a useful contribution to the scientific literature.

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Specific Comments:

Page 13663, Lines 6-10. Section 3.3 describes the bias due to imperfect gain calibration that has been corrected in the SF₆ data set. It should be made very clear at the end of this section that subsequent references to "bias-corrected" data mean that the gain calibration correction has been made. (Maybe the term "gain bias correction" could be used.) It took a couple of readings of Sections 3.2 and 3.3 to figure that this is what the authors meant.

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Page 13665, Lines 3-9. I found the description of how the SF₆ results were converted into mean ages to be too short. I think that this section should be expanded to provide more detail on how the calculation was done.

Section 7.2. The discussion of interannual variability and seasonal variation is quite difficult given the relatively short time period of the MIPAS observations (less than 2 years). I think that the authors should clarify this section by talking about differences within their specific data set.

Technical Corrections:

Page 13658, Lines 11-2. It appears that the acronym KOPRA does not match the name given. I thought that it was the "Karlsruhe Optimized and Precise Radiative transfer Algorithm".

Page 13660, Lines 25-26. Has an "all-zero flat a priori profile" been used SF₆ in the retrieval? This does not correspond to the "first guess profile" shown in Figure 2. This should be clarified.

Page 13660, Line 9. The abbreviation vmrs has already been defined and should be used consistently.

Page 13661, Line 14. In the line "...which contributes with approximately 5

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Page 13663, Line 17. "Kiruna, Sweden" should be used.

Page 13664, Line 1. "using" should be used in place of "on basis of".

Page 13664, Line 22-24. The acronym NOAA/ESRL/GMD has already been defined for this name and should be used consistently.

Page 13666, Line 12. "a ges" should be "ages".

Page 13668, Footnote 1. "stratospshere" should be "stratosphere".

Page 13669, Line 15. "w e" should be "we"

Page 13669, Lines 15-16. The capitalization of "KArlsruhe SImulation model of the Middle Atmosphere" should be used to explain the abbreviation better.

Page 13673, Line 7. "...restrict ourselves to correcting..."

Page 13673, Line 10. "Equally distributed" should be used in place of "equidistributed".

Fig. 1, 2, 4, 9, and 13. The font seems very small and the readability of the plots would be improved if the font size could be increased.

Fig. 3. It is unclear from the caption how the relative differences were calculated. Is it relative to the standard retrieval?

Fig. 7. Green traces are quite faint. The line thickness should be increased to make these more visible.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 7, 13653, 2007.

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