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Atmospheric Measurement Techniques Discussions

Interactive comment on "Validation of stratospheric and mesospheric ozone observed by SMILES from International Space Station" *by* Y. Kasai et al.

Anonymous Referee #1

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Review of

Title: Validation of stratospheric and mesospheric ozone observed by SMILES from International Space Station Author(s): Y. Kasai, H. Sagawa, D. Kreyling, K. Suzuki, E. Dupuy, T.-O. Sato, J. Mendrok, P. Baron, T. Nishibori, S. Mizobuchi, K. Kikuchi, T. Manabe, H. Ozeki, T. Sugita, M. Fujiwara, Y. Irimajiri, K.-A. Walker, P.-F. Bernath, C. Boone, G. Stiller, T. Clarmann, J. Orphal, J. Urban, D. Murtagh, E.-H Llewellyn, D. Degenstein, A.-E. Bourassa, N.-D Lloyd, L. Froidevaux, M. Birk, G. Wagner, F. Schreier, J. Xu, P. Vogt, T. Trautmann, and M. Yasui MS No.: amt-2013-31

General comment:

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Interactive Discussion
Discussion Paper

Kasai et al. present a detailed quality assessment of the SMILES ozone data product. They address the uncertainties of the SMILES measurements by means of a theoretical error analysis (which at least meets the order of magnitude). They find a difference in the results of two radiometer bands and are able to argue that Band B is better than Band A. Finally they provide intercomparisons of SMILES with other satellites and ozonesondes. Thus the article can be recommended for AMT and it will be a valuable information source for other groups working on atmospheric radiometry.

Minor comments:

I am not sure if the title "Validation ..." is well chosen since the authors don't remove the systematic error . They say that they can reduce the uncertainty in the next retrieval version. I think "Intercomparison ..." would fit better. In addition nobody knows which satellite is right. It is a question if Aura, MIPAS, SMR, ACE are really independent from each other. So even if three of them agree and SMILES has a bias with respect to them, it can be due to the fact that the retrieval developers already "harmonized" their data sets.

In the present paper, it is said in the conclusions that SMILES has a negative bias above 6 hPa and I don't understand why a tangent height error should be induced by a gain calibration error? (page 2678). I like to repeat that the other satellite experiments don't know if their values are correct by 10% above 6hPa. The present paper of Kasai et al., provides the misleading impression that some experiments measure the true ozone values.

Abstract: The abstract should provide the important information that the data users should consider band B rather than band A.

p. 2645, line 10 ... components: error analysis; ... p.2645, line 21 maybe: " ...and the gain calibration." (calibration problem sounds not well) p.2647, line 5, Sect. 3 consists of ... p.2647, line 15: ... of O3 from SMILES is shown in Sect.5. p.2648 line 9, Did you explain band C?

AMTD

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Error analysis: The main result might be that the error analysis provides smaller error bars than the external comparison. Is it due to a too "optimistic" error estimation? It might be of general interest to comment on the advantages and drawbacks of error analysis.

p.2661 line 12 unclear: "This" refers to smoothing of ozonesondes (some sentences before)?

p.2663 ECC: I could imagine that "precision" is a problem for intercomparisons with ozonesondes in regions of high ozone variability since the ozonesondes perform point measurements.

p. 2673, line 7, ther ? line 12: what do you mean with "lower sensitivity"? e.g., is it due to an unstable retrieval of SMR data? Or to a static retrieval of SMILES?

p.2676 line 5, Is there somewhere a proof that Aura or Mipas measure the "true values"? Please give a reference to this proof.

abstract and conclusion: the diurnal variations of ozone are only treated on a half page. So I would not mention the "diurnal variations" in the start sentence.

I wonder that you did not consider ground-based remote sensing in the cross-validation since it is easy to find coincident profile pairs in case of a ground station. Some ground stations can provide the diurnal ozone variation too. Maybe you consider it in a later study.

Figure captions Often it is not described if you took the difference "SMILES - X" or "X - SMILES" e.g. Figure 8 Comparison .... I would suggest something like this : Difference profiles of ozone: SMILES(NICT) - SMILES(JAXA) ...

Thank you

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 2643, 2013.