

Interactive comment on “Validation of MIPAS IMK/IAA methane profiles” by A. Laeng et al.

Anonymous Referee #1

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This paper provides a useful validation of the MIPAS IMK/1AA methane profiles and precision estimates and is well suited for AMT. However, I would not recommend publication until significant issues are addressed.

Major concern: A sensitivity study to justify the rationale for not applying averaging kernels before comparisons with other satellite reference measurements was discussed in section 2. However, no such study was described for the comparisons with the Mk1V interferometer or the cryosampler balloon profiles, and the figures and text do not imply that MIPAS averaging kernels (AK) were applied to the balloon measurements. These comparisons should be presented with both the measured profiles and the profiles smoothed by the MIPAS averaging kernels, and bias estimates should be computed with respect to the smoothed balloon profiles.

Minor concerns: No description of the cryosampler measurements is given and the ref-
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erences were not especially helpful (Levin et al., 1999 doesn't mention cryosamplers). The measurement technique needs to be described, at least briefly. Mk1V vertical resolution should also be given or included in the table (see comment below).

The introduction has no description of why we care about stratospheric methane – there should be a brief discussion of the chemistry/climate role of methane at different altitude ranges to motivate our need to understand the measurement biases.

Specific comments:

Abstract:

“Precision validation is performed...” is unclear – change to: “Assessment of MIPAS reported precision is performed...”

“Only few significant...” should be “Few significant...”

Line 20: “27 tangent altitudes” – state the total altitude range

Line 24: “The analysis is restrained on the reduced resolution...” Do you mean “The analysis is limited to...”? Also, what do you mean by the “corresponding baseline”?

Table 1. It would be useful to see the vertical range for comparison and representative vertical resolution for all the reference datasets. Also, for the cryosampler, if you have collocation criteria and comparisons, why are there no #matches or time overlap given? For viewing geometry, you could list “balloon, in situ”

Line 105: “To be on the safe side” should just be “However”

Line 113: “artificial 300% bias appeared on the extremities” Are these parts of the profile excluded from the comparison? If either instrument AK is close to zero, then the comparison isn't meaningful. This should be stated here and reflected in the table if comparison vertical ranges are listed.

Line 180: Seasonal (SON) comparisons don't appear to be plotted in Mk1V compar-

isons.

Line 227: “very localized phenomena” Is this still there after applying the MIPAS AK?

Fig. 5: I can't tell the difference between MIPAS seasonal mean and MIPAS mean collocated colors.

Fig. 6: Drift value should have associated error. Also, describe orange solid and dashed lines in figure caption

Fig. 7: Caption should say what you mean by ex-ante and ex-post (shouldn't have to search in text).

Typos:

Line103: from/the

Line 295: polat fortex

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 5565, 2015.