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Discussions

Interactive comment on "Impacts of H_2O variability on accuracy of CH_4 observations from MIPAS satellite over tropics" *by* Temesgen Yirdaw Berhe et al.

Anonymous Referee #2

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Paper review

This paper shows that water vapor variability impacted the methane concentration retrievals from MIPAS 220 and is improved in the 224 version. The paper uses a methodology of using coincident measurements from two data sources to derive the atmospheric variability and each intrument's random noise contribution following a technique published by Fioletov 2006. First here are some major issues I have with the paper. Given the basic assumptions the Fioletov method I believe is OK however I think the authors need to consider some possible limitations. One being that the instrument noise may depend on the concentration amount of methane due to forward model non

linearities. This can be checked by correlating the retrieved amount against its reported uncertainty supplied by the MIPAS team. Secondly when deriving the instrument noise estimate from the coincident data, it would be interesting to compare that to the value supplied with the data set as a validation of the method. Neither of these were not done.

The presentation is not clear in many places and needs to be reworked a lot in order to publish this. Figure 4 for example shows a before and after like correlation analysis for methane version 220. In the after figure the authors say they subtracted water vapor variability from the CH4 retrieval and show how much better the corrrelation has improved. I have no idea how you can after the fact remove the water vapor variabilty impacts from the 220 data set or the 224 (figure 5) data set (which itself is significantly improved in this regard due to the simultaneous retrieval of H2O and CH4). Because the authors provide no explaination of how this is done, I am recommending rejection. The "removing" the effect of H2O interference leading to greatly improved agreement with correlative data is the central point of the paper and establishment of cause described in the title, this needs to be much better explained.

The text was hard to follow and comprehend and I give a few examples of this below.

On page 9 line 18 there is a reference to a middle panel in figure 4 a figure with 4 panels in a 2X2 arrangement. What is the middle panel?

Figure 7 show profiles of H2O variability at three station sites. The profile at some altitudes is clipped at zero suggesting that it either is negative (not possible) or unknown. One profile it is exactly zero which is extremely unlikely (ie absolutely no atmsopheric variability).

I dont know why the figure 8 scatter plot of monthly averages in one height range for the 224 data set contains many more the 36 points for 3 year monthly averages.

A sentence on page 13, line 15 seems to refer to a figure not included in the paper. It

cannot possibly be describing figure 8.

There are a lot wording and grammer errors in here that need improving.

C3