

## ***Interactive comment on “Mid-upper tropospheric methane retrieval from IASI and its validation” by X. Xiong et al.***

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Received and published: 22 April 2013

Overall, I thought this was a very well written and informative paper that makes a good argument for the importance of satellite retrieved CH<sub>4</sub> products, and highlights well the sensitivity of satellite based remote sensing techniques to tropospheric and stratospheric concentrations of methane. However, there were a couple of issues that I needed further clarification on:

1. On page 2511 lines 16–22, you state that as Averaging Kernels (AKs) were not available for each of the individual retrievals, monthly mean AKs were used instead in order to convolve the HIPPO measured profiles onto that used by the NOAA retrieval scheme, so that a like-for-like comparison could be made. In performing the necessary convolution, the use of monthly averaging kernels in the application of Eq.4 seems to
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me to be a less than ideal solution. Whilst you state that they the NOASS CLASS outputs do not incorporate individual AKs, would a sensitivity study be needed, so as to highlight the effect that using monthly averaged rather than specific AKs has on the convolution? In the future could the outputs of the operational system be modified to include individual AKs as a product?

2. From Fig.7 (RHS), the a priori (dotted green line) actually appears to be doing a better job of capturing both the truth (red dots) and smoothed truth (purple lines). Is this actually the case, and if so what information is being added to the retrieval? Also, would an inclusion of the a priori error bars given an indication of the skill of the retrieval scheme in reducing error (from a priori to retrieved)?

I also noticed a slight technical error on pg 2511 line 1, which I believe should read: “where  $I$  is the identity matrix. . .”

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Interactive comment on Atmos. Meas. Tech. Discuss., 6, 2501, 2013.