

Interactive comment on “Retrieval and validation of METOP/IASI methane” by Evelyn De Wachter et al.

Anonymous Referee #1

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General comments

Overall the paper is very well written and introduces a new IASI CH₄ retrieval. This however is not the first methane data produced from IASI so some discussion on the existing retrievals (Crevoisier 2009; Siddans 2016; Garcia, 2017) and how this work differs or builds on these would be beneficial.

The paper provides a detailed validation assessment against NDACC stations but there is a lack of discussion on what these validation results imply. Is this IASI data useful for ultimately estimating sources and sinks of methane? Or does it lack the necessary precision and accuracy? Some discussion of user requirements here is needed (see e.g. GHG-CCI User Requirements Document).

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Validation comparisons against the TCCON network would have also been useful to include in addition to the NDACC data and I'd recommend adding these if that were possible. The paper discusses various next steps for validation (such as against Air-Core measurements) and these are all potentially very valuable. Is there a reason that they have not been performed for this paper? If there was a good reason that these have not been performed then I'd accept that but simply "saving" them for another publication when they'd add a lot of value here is probably not a justifiable reason.

There is now a long timeseries of IASI measurements so for example, looking at the validation against NDACC/TCCON over time would be of value rather than just a scatter plot that loses any temporal information.

Overall I'm happy to accept this paper for publication but I'd like to see the work put more into context of both the existing literature (and pre-existing IASI CH4 datasets) and the scientific usefulness of this data (i.e. estimating sources/sinks). This latter point might require further work on the validation aspect of the paper or at least a discussion on the utility of the data.

Minor comments

Page1 Line 14 – Name methane (CH4) and carbon dioxide (CO2) first time they are mentioned.

P2L2 – Are you referring to the IPCC scenarios? Needs to be clearer.

P4L24 – As methane has a steep gradient above the tropopause, the a priori and covariance can become important. Some more discussion on this aspect would be useful. In particular, how well does WACCM generally reproduce the atmospheric profile.

P5L5 – Typo “constrained with of an a priori”

P5L11 – Typo “su rface”

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P7L8 – Why only 2011-2014 and not the full IASI time period?

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Figure 4 – Why only show daytime retrievals?

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