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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Large XCH_4 anomaly in summer 2013 over Northeast Asia observed by GOSAT" *by* M. Ishizawa et. al.

Anonymous Referee #2

Received and published: 27 October 2015

This work details observations from both satellite and ground-based systems of enhanced methane over North-East Asia in Summer 2013.

Major Comments

1) It is unclear how much the GOSAT data itself contributes to this work and whether it is really capturing the signals that are claimed. For example, there are very large discrepancies between GOSAT and TCCON throughout the time period, with GOSAT seemingly having a large amount of variability (noise?).

Some quantification of the uncertainty on the GOSAT would make it more convincing that the observed anomalous high values can be trusted.

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Interactive Discussion

Discussion Paper

P25001L15/Fig 4. – What is the error on these data points? The GOSAT data seems highly variable and it is difficult to see a correlation until the latter time period. Statements like “data agree overall” need to be quantified.

2) The use of wind fields in Fig. 8 to argue that this observed enhancement is due to atmospheric transport do not appear to be very convincing. If anything, they would seem to suggest that Saga would primarily be observing clean ocean air. Further analysis/quantification is needed here to make the argument more convincing.

3) It is unclear what exactly is shown in Figure 7. If it is the enhancement above the South Pole values as it seems, that does not seem to be a useful quantity. It would be of interest to see the actual modelled data here, rather than this enhancement (or have the enhancement calculated in a more meaningful way).

4) Figure 2 shows a significant increase in the number of GOSAT soundings over Japan in 2013/2014. Presumably this is due to the change in the GOSAT sampling strategy. This should be discussed in more detail, especially regarding any implications this may have that lead to a sampling bias for these latter years. A spatial map of the GOSAT soundings for each year would be of interest and help to indicate whether the enhancement seen in GOSAT is related to the increase in spatial sampling.

5) This manuscript, while generally well-written, would benefit from proof reading by a native English speaker as some sentence structure is grammatically poor and/or confusing. There are too many instances to list each individually but some examples include:

Since 2009, Greenhouse gases Observing SATellite (GOSAT) has been provided column-averaged dry-air mole fractions of atmospheric CH4 (XCH4).

As charactering the observed extreme event

The GOSAT orbiting with three-day recurrence successfully observed the synoptic-scale XCH4 enhancement in the comparable accuracy to the TCCON data.

ACPD

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6) The manuscript would benefit from further explanation on where this work sits in the context of other recent GOSAT/CH4 studies. As mentioned by the other reviewer, the literature review here is sorely lacking and would add important context to this work.

Minor Comments/Technical Corrections

P25001L4 – Please include the version number for the TCCON data. TCCON data now also has a DOI and should be cited accordingly.

P25008L19 - CCON data -> TCCON data

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 24995, 2015.