

We would like to thank both referees for their time and their comments.

With respect to a discussion of the analysis of errors on the retrievals required by both referees, we have added a specific paragraph in Section 2.2 ('Methane retrieval process'). Comparisons with SCIAMACHY errors cannot be performed directly since a total column of CH<sub>4</sub> is derived from SCIAMACHY whereas a mid-tropospheric column is derived from IASI. Such a comparison should be performed via models or assimilation and goes beyond the scope of this paper.

Reviewer 1 has requested several times to compare the CH<sub>4</sub> fields derived from IASI with TCCON FTIR data. However, as pointed by Reviewer 2, FTIR give access to a total column whereas IASI delivers a mid-tropospheric column. A direct comparison between both datasets is therefore not possible, as opposed to a comparison between TCCON and SCIAMACHY or GOSAT XCH<sub>4</sub>. Moreover, there is no TCCON station in the tropical belt where IASI retrievals are performed. We have added one sentence at the beginning of Section 2.3 to justify not using TCCON data.

Specific comments from reviewer 2

*Abstract 119 : decrease in wetlands emissions for the period 2099-11 as compared to 2007-2008. The global growth rate being smaller but still positive, it might be good to refer to previous period*

Text added.

*P23733 – L6 : the average concentration . . . : the sum of sources and sinks equals the change in methane concentration according to the mass balance equation and not to the concentration itself. Please correct.*

Done.

*P23733 – L9 : for anthropogenic emissions, other citations may be used such as EDGAR inventory maybe*

The reference concerns all the sources, natural and anthropogenic. We have added other references.

*P23733 – 114 : IPCC 2007 should be Denman et al., 2007 (reference of chapter 7)*

Done.

*P23733 – 117-18 : for the range of the sink, a more recent estimate than Fung et al 91 would be better. Maybe the IPCC range (table 7.6 in Denman et al., 2007)*

Done.

*P23733 – 129 : I would add Prinn et al., 2005 with Dentener et al., 2003.*

Done.

*P23734 – 111 : resolve REGIONAL methane fluxes*

Done.

*P23734 – 116 : “smaller sensitivity of ..” : please quote bousquet et al., 2011 on this.*

Done.

*P23734 – 122 : I would introduce the aircraft measurements used after and mention FTIR observations at the end of the introduction.*

Done.

*P23735 – 124 : develop a bit the consequence of replacing AMSU 7 by AMSU 8 in the retrieval process.*

The impact of having to use AMSU7 instead of AMUS8 is detailed in Section 2.2, together with the discussion of the error.

*P23736 – 114 : Is there any hope to extend the retrievals in latitude. I suggest the authors write a few words on this and possible ways to get retrievals for higher latitudes.*

Done.

*P23735-23736 : §2.2 : an analysis of the errors attached to the retrievals is missing (see general comments)*

An analysis of the errors has been done in Section 2.2.

*P23736 – 120 : aircraft campaigns : what about the HIPPO campaigns ? It should be mentioned as well. Why not comparing with IASI ?*

We have compared IASI retrievals with the measurement performed during the five HIPPO campaigns that have been collocated in time and space with IASI (only 63 points remain). The results are presented in the new Figure 5. This comparison confirms the good agreement between IASI CH<sub>4</sub> and the aircraft measurements, already shown by their comparison with both CONTRAIL and CARIBIC. Discussion has been added in Section 2.3.

*P23737 – 126 : No mention is made of FTIR observation from the TCCON network. The authors must quote these data and justify why not comparing with these data, more representative of columns than aircraft measurements (see also general comment)*

Please see answer to general comment.

*P23738 – 127 : “. . . in the free troposphere, LOWER than the maximum sensitivity of IASI retrievals” (suggestion). A justification of the altitude of OH loss can probably be found in Voulgarakis et al., 2012, ACPD, Analysis of present day and future OH and methane lifetime in the ACCMIP simulations*

We have rephrased according to “... in the mid-troposphere between 700 and 500 hPa

(Spivakovsky et al., JGR, 2012)”.

*P23739 – 15-8 : Why IASI retrievals should be closer than NOAA04 scale than to NIES94 ? this bias correction is unclear. How much of the bias can be attributes to scale differences ? Please precise.*

The sentence has been removed. The bias is given regarding each datasets which are given on various scales.

*P23739 – 115 : what is the standard deviation of IASI data. No value is given. Please be more precise.*

The standard deviation of IASI data are plotted in Fig. 2 (light red envelope).

*P23740 – 113 : “higher concentrations. . .” How much higher ? please be more precise in the text.*

Done.

*P23740 – 118 and following : the authors mention the lack of retrievals on Jan 18th ? please be more precise. Evaluate how much it may affect the comparison. Also, no detailed analysis is given for the large discrepancies of Dec 12th. Please provide hypotheses.*

Done. As said in the text, the lack of retrievals come from persistent cloudiness over this region of high methane concentration, thus preventing IASI to see the high values of methane measured in-situ by CARIBIC. For December 12<sup>th</sup>, the discrepancy might come from: i) the difference in time and space between IASI en CARIBIC (and as seen on many flights, values of methane can vary by ten or so ppbv in a few degrees); ii) the difference between a single point measurement at 10 km and mid-tropospheric column integrating methane from 6 to 12 km.

*P23741 – 114 : “good agreement” : I would says there is more a statistical consistency (considering the errors) than a good agreement there.*

Corrected.

*P23741 – 17-8 : what about the growth rate in 2010 ?*

It has been added to the text.

*P23741 – 121-22 : Show/explain more the extrapolation procedure or remove 2007 from the table. Else it is hard to say how this extrapolation influences the high growth rate inferred. Why should it be higher because only half of the year is available ?*

To extrapolate to 2007, we have applied the coefficients of the fit derived from the IASI period (July 2007-December 2011) to the first 6 months of 2007. Since these 6 months were not constrained by IASI data, the resulting standard deviation associated to the growth rate for these first 6 months is higher than for the constrained period.

*P23743 – 116-17 : I suggest to add : R08 finds a large but uncertain change in OH*

*concentrations in 2007 as compared to 2006 (-4±14%)*

Done.

*P23743 – 123-25 : decrease of methane emissions in the tropics, AS COMPARED TO PREVIOUS YEARS.*

Done.

*P23743 – 125 : precipitation decreased in 2009-11 after increasing from 2005 to 2008. Maybe precise the year of the maximum precipitations over tropical lands.*

Done.

*P23745 – 19-10 : again FTIR observations are completely absent there. Please correct this.*

See answer to general comments.

*Figure 2 & 4 : What are the envelopes for IASI ? Variability ? uncertainties ? please be more clear (see also general comments)*

The envelopes are monthly standard deviation of the IASI retrievals collocated in space on the CONTRAIL or CARIBIC tracks.