

## ***Interactive comment on “Variability of tropospheric methane above the Mediterranean Basin inferred from satellite and model data” by P. Ricaud et al.***

**Anonymous Referee #1**

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General comments: 1. The authors mentioned: a. The IASI methane profiles have not been validated and therefore, not operational (p.9983, l.29) b. The number of daily total column of methane is highly variable. c. The different height of maximum sensitivity: IASI at 8 km (p.9983, l. 26); AIRS at 9-12 km (p. 9984, l. 23) The authors should comment on these 3 issues and their respective influence on the results obtained. 2. a. The MOCAGE calculated profiles seem to be not consistent with the seasonally averaged profile obtained from AIRS and GOSAT for 2010 (Fig. 8) neither consistent with the modeled profiles for JJA 2009 (Fig. 3). b. The calculated methane concentration differences between EMB and WMB by CNRM-AOCCM and LMDz- OR- INCA

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are not very consistent regardless of the IPCC scenarios (Fig. 10). The manuscript would benefit much if the authors include a section while discussing these large discrepancies while explaining their possible reasons. Specific comments: 1) p. 9979, l. 3-24: I strongly suggest to insert a Table which includes all these details on the several platforms, their time of operations and the measured species. 2) p. 9979, l. 23-28: The authors are encouraged to describe briefly the benefits and drawbacks of other measurements as done for TIR and SWIR channels. 3) p. 9982, l. 23-25: The location of the statement on NCEP/NCAR Reanalysis is not appropriate, pls place it in another place along the text. 4) p. 9991: Correction of the title of Section 4.1 instead of “Global” I suggest the following title : “Methane spatial distribution over the MB” 5) p. 9989, l. 1-15: This part of the text should be moved to p. 9990 after l. 7. 6) p.9990, l. 18-20: The interpretation here is wrong. The subsidence is caused mainly by the Subtropical High positioned over the EM rather than the cooler SST as compared to the land surface temperature. 7) p. 9989: The title of Section 3 is too vague and recommended to be changed by: “Atmospheric conditions controlling the spatial distribution of methane” 8) p. 9994: I suggest to replace the title of Section 4.3 to: “ The east-west seasonal variations -measured and calculated differences”. 9) Replacing some parts of the text. Please add the text from p. 9995 l. 10-28 to p. 9996 l. 1-23 to Section 4.3. 10) p. 9996 l. 23: I strongly suggest changing the title “Discussion” to “Contribution of the Asian Monsoon Anticyclone” before l. 23. 11) p.9999 l. 18-26: The text in these lines was already mentioned. Please omit it. 12) p. 9999 l. 4: Please change to :” assess the spatial variability of methane over the EMB and to attribute the variability to differing synoptic and global scales.” 13) p. 9981 l. 8: Please change to : “ attribute the variability to different processes at both, synoptic and global scales.”

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