

Interactive comment on “What controls the seasonal cycle of columnar methane observed by GOSAT over different regions in India?” by Naveen Chandra et al.

Anonymous Referee #2

Received and published: 30 June 2017

General comments

The manuscript discusses the vertical distribution of tropospheric methane over South Asia based on ACTM calculations and GOSAT data. It is a valuable contribution for our understanding of transport and emission contributions to methane mixing ratios at different altitudes, in particular with regard to the influence of convection during the south westerly summer monsoon.

Printer-friendly version

Discussion paper



Specific comments

The text is rather unstructured in some parts, such as subsections 3.1, 3.2 or the conclusion sections) which makes it difficult to read. Having more paragraphs and using less abbreviations could easily improve this. Several times abbreviations are introduced which are not needed because the term does not get used frequently in the text (e.g. first line in abstract SLCF). The abbreviations used for the regions and for the pressure levels are not very intuitive. Abbreviations for the pressure levels may not be needed at all.

The abstract is rather long and too detailed.

The text uses sigma pressure level and pressure numbers in hPa interchangeably. This should be made consistent.

I was wondering whether you checked if for the years studied here, namely 2011–2014, it was checked if the southwest monsoon fitted into the season scheme that was used here, i. e. was June truly a pre-monsoonal spring month in all four years and did the southwest monsoon prevail through September.

Line 86 f Here a contrast to the GOSAT TIR data is mentioned. This is not at all connected to the previous paragraph plus it has not yet been clearly stated that SWIR data is used in this manuscript. It does become later, though, but here the mentioning of the TIR data is confusing.

Line 140 What does AGS stand for?

Line 158 f. It becomes obvious later in section 3.2. what you mean here, but on first reading it was totally unclear to me.

Line 165 What is the maximum spatial difference that will occur?

Line 198 f. I don't understand what was done here. How was the climatology in Figure S1 used for the data shown in Figure 2? Shouldn't it be the other way round, that Figure S1 shows the climatological means resulting from the timeseries shown in Figure 2?

Section 3.1 The discussion lacks a comparison between the GOSAT data and the ACTM results. In particular in June for EIGP, you discuss the difference in emission between the AGS and the CTL model run, but for both scenarios agreement with GOSAT looks rather poor compared to the other months. For arid India this holds also for July. This disagreement makes it difficult to discuss the difference between the model runs in great detail as none of them seem to reproduce the measurements very well.

Also, the monthly climatologies shown in Figure S1 have gaps that result from data lacking due to cloud cover. However, seasonalities shown in Figure 3, although based on the climatological means, do not show these gaps for the model data. So, was the treatment of the model data somehow different for this part of the study than for the previous one? I guess this is what you mean in **Line 208** by 'without sampling'?

Wording

Line 54 'which could fill in gap' does not make sense.

Line 60 f. 'The Indo-Gangetic Plane ... Himalayas' — The wording here does not make sense.

Line 68 It's either convection or convective uplift but not convection uplift.

Line 71 Typo in 'plateau'.

Line 77 'related the high XCH4 values correspond' does not make sense.

[Printer-friendly version](#)[Discussion paper](#)

Line 81 What do you mean by 'inferring the local emissions **to** the higher emissions' ?

Line 86 f Grammar in this sentence is not logical.

Line 92 f 'under the limitations of satellite' — Please re-formulate.

Line 142 change 'kept at constant at a value' to 'kept at a constant value'

Line 156 Why is there an 'and' here?

Line 223/224 'will equally applicable' does not make sense.

Line 320 'we have been observed' does not make sense.

Line 333/334 Grammar is not logical here

Figures and Tables

In general, most figures are too small and use too small fonts for labels and annotations, in particular axis labels. Panel labels a, b, c ... are very difficult to spot which makes it complicate to follow the discussion in the text.

Figure 2 This figure has too many panels resulting in them being too small. Think about separating the map into a decently sized figure on its own and presenting panels b–l in a classical two-column scheme with larger panels.

Figure 5 Y-axis has no label and no units.

Figure 5 Caption: change 'year of 2011' to 'year 2011'.

Printer-friendly version

Discussion paper



Table S1 Table says 'South India' but 'Southern Peninsula' is used throughout the text. Think about also including the abbreviations for the regions used in the text into the table.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-344>, 2017.

Printer-friendly version

Discussion paper

