Black: referee's comments *red: authors' answers*
First of all, we want to thank the two referees for the detailed analysis of our paper.
For the details, please look into the paper with keeping track of changes.

Referee 1:

The paper by Zhou el al reports ground based data from two measurement sites in the Indian Ocean, namely Maido and St Denis, both located on La Reunion Island. The datasets, from the NDACC and TCCON networks, are analysed for CO and CH4 columns, and then the Xco and Xch4 mole fractions are computed (TCCON via O2, and NDACC via pressure). These data are compared with in-situ vmr data of CO and CH4 from Picarro instruments. St Denis has the full range of NDACC, TCCON and in-situ instrumentation, while Maido does not have a TCCON instrument. These data are then compared with model data from GEOSCHEM. The datasets are described for each instrument, their respective measurement details and analysis procedures, and the information content of the column data is discussed in terms of the FTIR data. A comparison between the FTIR data and in-situ data is first described in terms of methodology. Tropospheric components are developed based on partial columns from the NDACC data, while a stratospheric N2O based method is used to obtain the equivalent TCCON tropospheric product. The paper does a good job to describe the instrumentation, what to expect from each dataset (the FTIR's in particular), the limitations of FTIR technique in terms of the information content and how this can be managed to compare the remote sensing data with both in-situ data and model output. The discussion part gives a good account of how these quite different measurement techniques can still produce useful comparisons even though at first glance they are sampling different parts of the atmosphere and are indeed influenced by different airmasses. Via the use of models (both GEOSCHEM and FLEXPART), they are able to tease out a nice coherent picture of how land masses and the oceans play a part in the observed behaviour of CO and CH4 on short to medium time scales. In general, the paper is well written and quite clear in its purpose, outline, methods, discussion and conclusions. There are only a few relatively minor points to correct, but the paper is scientifically sound. Below is a short list of corrections and comments for the authors to consider.

1). Page 1, line 19; "by the vertical transport" => "by vertical transport"
corrected

2). Page 2, line 2; "CH4 of" => "CH4 trend of"
corrected

3). Page 2, line 14; reference missing
corrected

4). Page 2, line 31, "to measure" => "of measuring"
corrected

5). Page 3, line 31; "labellisation" is a French word. The equivalent English word is "labeling", but in this context the word should probably be "certification"
corrected

6). Page 4, table 1 caption; insert space between random and uncertainty
corrected

7). Page 4, table 1 caption; why would TCCON to in-situ validation set the systematic uncertainties to zero. Would this not actually quantify the uncertainty?

Since the TCCON and surface in-situ measurements are calibrated and validated with WMO standards, and their products are already corrected based on the calibrations. Therefore, it is assumed that the systematic uncertainty is zero for these datasets.

8). Page 4, line 16; "provide a continuous" => "provide continuous"

corrected

9). Page 5, line 9; "range or the" => "range of the"

corrected

10). Page 9, line 26; "to a year-to-year" => "to year-to-year"

corrected

11). Page 10, line 4; if this is the statistical standard deviation, then should this be written as 15+/-10?

corrected

12). Page 10, line 11; "is a also" => "is also a positive"

corrected

13). Page 13, line 14; There are a few instances of the phrase "layers' information". The copy editors might correct me but a apostrophe after the word is used in the possessive noun case. The word layer is not a noun. So should read "layers of ".

corrected

14). Page 18, figure 11 top left; "partical" => "partial"

corrected

15). Page 18, line 5; "kernels such as to" => kernels to"

corrected

16). Page 19, line1; "we tested by using"? We tested what exactly? Subject of sentence is missing.

corrected

17). Page 19, line 2; "and without smoothed model" => "and unsmoothed model"

corrected

18). Page 19, line 5; "than the one without" => "than the Xch4 without"

corrected

19). Page 19, line 17; "air particles over" => air parcels over"

corrected

20). Page 20, line 17; "systematically larger than the CO". This does seem reasonable but can this be quantified in someway. Is it a 5% or 20% effect? Is it always higher or just is there are biomass burning plumes for example.

Changed the sentence in the text.

21). Page 20, line 19; "the one" => "the trend of"
corrected

22). Page 20, line 29; "by the vertical" => "by vertical"
corrected

23). Page 21, line 7; "which could be obtained" => "which can be obtained". Just assuming that you do really want to release the data, yes? Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2018-218, 2018. C4
corrected

Referee 2:

In this paper two sites at reunion island, equipped with ground based sensors and solar FTIRs have been employed to study the abundance of CH4 and CO in the atmosphere. The value of the paper lies in the position of the sites with valuable data in the southern hemisphere of two gaseous species which are important for the climate and the general atmospheric chemistry, due to their large impact on the abundance of OH. The site is also positioned at a latitude with affected largely by wild fires from Africa and South America and can hence improve the understanding of emissions. The paper provides a good description of FTIR column data with a solid error description, demonstrating the usefulness of column data and what extra information can be obtained compared with in situ ground based data. The authors make a nice demonstration how to interpret the column data and motivates why it is different from in situ data, especially for CH4. Overall I believe this is a solid paper that provides a good description of the methodology on how to interpret column data and useful data for future studies, especially in the context of being in a remote area with very few available measurements. The paper is nicely written with illustrative figures and I don't see any obvious errors. I therefore suggest it can be published as it is.
Many thanks for your positive comments! Several mistakes have been corrected based on the comments from Referee #1