Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2017-247-AC1, 2018

Atmospheric Measurement Techniques Discussions

Interactive comment on "Identification of spikes associated with local sources in continuous time series of atmospheric CO, CO_2 and CH_4" *by* Abdelhadi El Yazidi et al.

Abdelhadi El Yazidi et al.

abdelhadi.el-yazidi@lsce.ipsl.fr

Received and published: 6 January 2018

We would like to thank referee #2 for the valuable comments and her/his time to review this paper. Our answers to the points raised in this review are presented below.

Comment on section 3.1.2 1- Referee's comment: "In section 3.1.2 the authors indicate that test values ranging Beta from 1 to 10 had been done. The results of these tests should be presented (at least in the supplementary information). Otherwise, the affirmation that the optimal value is Beta=8 seems arbitrary."

2- Author's response: We agree with the referee that it is important to show the sensi-

tivity of Beta values on the REBS method since the choice of Beta modify significantly the results. Our choice of Beta was mainly based on the comparisons between REBS method results and known spikes selected by site managers. For this study, we estimated that Beta=8 respond better to our need, even though we wish we could have more events clearly identified by the site managers to validate this choice.

3- Author's changes in manuscript: Line 273: We further compared these two values of Beta at the four stations every week for the year 2015 (from January to December). Line 278: Spike detection statistics for Beta ranging between 1 and 10 are presented in Table S1, and additional illustrations for Beta =1, 4, 8, and 10 are in figure S3. Table S1 and figure S3 are now available in the supplement.

Comment on section 3.2 1- Referee's comment: "In table 4 it could be interesting to show also the number of spikes manually reported by site managers, at least for the sites where this information is available. (in AMS are close to 0.1% for all species and 1% for CO2 according to text)."

2- Author's response: The main issue we are facing with the manual detection of spikes is the lack of systematic information. At most sites, there is no permanent staff, and consequently, the report of spikes with identified local processes are very sparse. We have used the few available periods, presented in section 3.4 for the Pic De Midi case (three months of winter 2015) and Finokalia (few weeks during the two years of the study) as case studies, but the comparison with the two years of systematic identification of spikes (Table 4) may be misleading because of the lack of completeness of the reports of the station managers.

3- Author's changes in manuscript: Line 286: The statistics for local spikes detection with the three methods are given in Table 4. Due to the lack of completeness of the reports by the staff about potential local contaminations, we cannot compare those average statistics to the manual spike detection.

Comment on section 3.4 1- Referee's comment: "The overestimation is not reflected in

the paper (not even in section 3.3). Probably is very low for both SD and REB methods (as in fact they underestimate the number of events) but needs to be quantified. For example, in section 3.4: was there any event not considered by manual spike detection that was considered as spike by any of the 2 detection methods?"

2- Author's response: It is very difficult to quantify possible overestimation of the number of spikes determined by the automatic algorithms, due to the non-systematic determination of spikes by the site managers, as explained in the previous point. We have run few additional tests to quantify the number of events not considered by the manual spike detection and considered by the automatic methods. For the Pic du Midi (section 3.4) the SD and the REBS methods detect a total of 3402 and 2981 contaminated data respectively with 211 (for SD) and 133 (for REBS) data not considered by manual detection. These events represent a percentage of 0.25% data considered by the SD method and not considered by the manual detection from December to March, and 0.15% for REBS method. It should be noted, however, that the manual spike detection information is not exhaustive in a sense that the person in charge does not necessarily have information on all contaminated events. Due to these missed detections, we think we cannot qualify these differences as overestimations.

3- Author's changes in manuscript: Line 397: We have also calculated the number of events not considered by the manual flagging and considered by the automatic methods. For a total of 3402 data detected by the SD method, only 211 data were not considered by the PI, which represents 0.25% on the whole period. For the REBS method, 133 data out of 2981 were not detected by the PI (nearly 0.15%). However, these statements should be used with caution since the manual spike detection information is not exhaustive, and the person in charge does not necessarily have information on all contaminated events.

Comment on section 3.4 1- Referee's comment: "In Table 6, it will be interesting to add the percentage for each classification on the whole series (e.g. OPE filtered data is, in 53% of cases, higher than 1ppm from non filtered. But which percentage of hours

this represents on the whole series?)." "In figure S6: please, use percentage of hours instead of number of hours. Graph will also be clearer with another X scale. Moreover, as in the text is said the figure is similar for other stations, it will be interesting to add the histograms of all sites."

2- Author's response: Accordingly, to the comment we have changed in table 6 the percentage on the impacted hours to the percentage on the whole time series. We agree that it is interesting to show the percentage of hours instead of the number. X scale were readjusted by fixing the number of intervals to 15. We assume this distribution will the graphs clearer.

3-Author's changes in manuscript: Table 6 is updated. Figure S6 is updated to figure S7, and it is now completed by results for all four sites.

Comment on bibliography 1- Referee's comment: The reference Foster et al. does not seems to be related with this article.

2- Author's response: We have corrected the reference list

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-247, 2017.