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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Global dataset of biogenic VOC emissions calculated by the MEGAN model over the last 30 years" *by* K. Sindelarova et al.

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We would like to thank the reviewer for his/her review. Our responses to the comments and questions follow, point by point. The review comments are written in italic.

The manuscript has been largely improved. It is suitable for publication after addressing these comments:

1. P10735 L5: "Yuan et al. (2011) processed the MODIS Collection 5 LAI data with a quality control algorithm in order to diminish uncertainties and inconsistencies". Has this method been used in this study to process the MODIS LAI?

- In our study we used the MODIS LAI data provided by the authors of the Yuan et al. (2011) paper. The data were processed following the method described in the paper. In order to be clear on this in the manuscript, the sentence on P10735, line 3 now reads:
  "We have used the 8-day high spatially resolved LAI data processed by Yuan et al. (2011) from global retrievals of the Moderate-Resolution Imaging Spectroradiometer (MODIS, Collection 5) for the period of 2000-2009. Yuan et al. applied a quality control algorithm in order to decrease uncertainties and inconsistencies."

2. P10738 L4: Since "As previously shown by Guenther et al. (2006) and Arneth et al. (2011), isoprene emissions are very sensitive to the driving meteorological data, especially temperature and solar radation", why the MS only considered the sensitivity of isoprene emissions to PAR. Moreover, "radation" should be "radiation".

- In the paper we wanted to evaluate the calculation of PAR from shortwave radiation: this approach is often applied due to the fact that PAR variable is scarcely available from meteorological preprocessors. We agree with the reviewer that the sensitivity of biogenic emissions to meteorological inputs, most importantly temperature and solar radiation, could be investigated more. However, we think this deserves another study. We are currently working on a paper that will follow up with the Guenther et al. and Arneth et al. papers and will evaluate impact of different meteorological data on biogenic emissions.
  The typo was corrected.

3. In Section 3.2.1-3.2.6, authors separated the different input data with results. It is easy to confuse readers. So I suggest to combine the description of different input data and results in the one section.

- Since we compare the results of the different studies in 3.2.6, we have preferred to analyze all the results in one section. We could indeed discuss the results in

each section, but this would have led to a lot of repetitions, and we would then need a section on the synthesis of the results. We think that this would make the full 3.2 section difficult to read.

4. The same as sensitivity analysis. Section 4.1 can be removed. Moreover, Table 3 is not needed while Table 4 is used.

- We think that information given in Section 4.1 is different from that in Section 4.2. Section 4.1 provides a more general overview of global and regional studies on isoprene, while Section 4.2 focuses on more detailed spatial and temporal analysis of global isoprene estimates.
  Tables 3 and 4 contain different information. Table 3 shows the comparison of the results from this study with previous regional estimates, while Table 4 summarizes the 5 global datasets that were used for more detailed comparison of isoprene emissions.

5. As for REA data, why there are negative values? Authors should explain the reason and the negative emission fluxes of isoprene and a-pinene should be excluded during the calculation.

- The REA measurement data were revised and error bars were added in Fig. 15 in order to illustrate the uncertainties on the measurements.
  The negative values are a result of subtraction of updrafts and downdrafts sampled by the REA system meaning that the actual overall flux was oriented down into the canopy. There is no evidence of a technical or processing failure, which would indicate a necessity of rejecting these values. However, measured negative fluxes are now excluded from the calculation of statistical characteristics for the comparison in Table 6. This is because the MEGAN model simulates only the

net primary emission from the ecosystem and does not account for a downward flux into the canopy. Similarly, values for OP3 study in Table 6 were recalculated taking into account only positive emission fluxes.

6. As shown in Fig.13, the results obtained by bottom-up method tend to be higher than that obtained by top-down method. More discussion should be given to explain it.

- Isoprene emissions calculated by bottom-up methods are indeed higher than those calculated by a top-down method for the datasets used in Figure 13. However, as can be seen in Figure 10, top-down methods can also give higher values.

7. Eq (2) cannot be found.

- Eq. (2) is located on page 10731, line 15.

References

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 10725, 2014.