

Interactive
Comment

***Interactive comment on* “Boundary layer concentrations and landscape scale emissions of volatile organic compounds in early spring” by S. Haapanala et al.**

S. Haapanala et al.

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The authors wish to thank Anonymous Referee #2 for valuable comments and suggestions to improve the manuscript. We have answered each of the specific comments below. Whenever the referee is cited, the text has been written inside quotation marks.

Materials and Methods

“The location of the SMEAR II site should be marked on the map. Some indication of the type of flight plan that was used should also be indicated on the map. This would show where the measurements were taken in relation to the SMEAR site, but would also show how the flight pattern relates to the terrain. In the text, there should be a full discussion of the type of flights made e.g. what flight levels were used and why; were

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measurements taken during straight and level flight; were profile ascents/descents made specifically; how long were the flights; what time of day were the flights and did this have any effect on the values observed. It is clear from the figures that measurements were made at different heights, but how long was spent at each height, how long between each measurement height in a given profile? “The location of SMEAR II is now shown in the map. We have added Table 1 to show a summary of flights. During the aircraft flights, a constant flight altitude was maintained for about 10 minutes, which was the duration of Tenax sampling. Flight routes were straight lines near SMEAR II station. During hot air balloon flights, the measurements were performed during descend of the balloon. Descend velocity was not controlled. Samples were taken during descend of a few hundred meters and mean altitude was used in the further analysis. Figure 2 shows some balloon flight profiles.

“On P10571 line 20, it is stated that one canister filling could take anything from 0-200s filling time - the exact value will have a significant effect on the area for which the measurement is representative. How consistent were the filling times and why were they different?” Correct canister filling times were between 60 s and about 180 s. They were different during balloon flights because of differences in altitude intervals.

“Some of these questions are more relevant to either the aircraft or the balloon, but some comment should be made at this point on whether the type of measurement platform makes any difference to the way in which the observations are analysed and interpreted e.g. the aircraft measurements may be representative of a greater footprint than the balloon measurements. A Table listing the flights might be useful, as this would give a better idea of the extent of the dataset from which the observations and conclusions are made. Such a table might also indicate the expected footprint of the measurements.” We have now tried to make it clear whether the results originate from aircraft or from balloon measurements. A table listing the flights is now added. Footprints were not estimated because of practical problems in estimating concentration footprints.

Results and discussion

“The results should be discussed in relation to the flight conditions under which the measurements were made. Without this aspect of the discussion, it is difficult to have confidence in the significance of the observations. It is stated that the gradients are seldom “well behaved” without saying what part of the uncertainties are due to deficiencies in sampling time, whether the different points in the profile are co-located, and what time differences exist between different points in the profile.” We have now answered these questions in the improved manuscript whenever possible. Generally, the profiles did not clearly differ from each other depending on the flight conditions.

“3.2 Estimates of surface emissions Far more discussion is required on the large discrepancy between the estimates using land-use data and the actual observed/calculated values presented in the paper. Also, Figure 8 shows an “algorithm prediction” which is not described in the text: this should be elaborated on, accompanied with a fuller explanation of the deviation of the algorithm from the observed measurements.” The algorithm is now explained in the text and differences between observer values and algorithm prediction are discussed.

Conclusions

“This section needs to be expanded to incorporate a more detailed critique of the benefits/disadvantages of the two airborne platforms and what relevance this has to the conclusions drawn, since the authors clearly believe one method is better than the other.” Conclusions are now mostly re-written and we have tried to address the comments presented by the referees.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 10567, 2006.

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