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Comment

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

### **Anonymous Referee #2**

Received and published: 13 December 2006

#### A. General Comments

Although this paper extends the range of conditions under which measurements of VOC concentrations have been made over boreal forests, substantially more detail is required on the methodology, and the discussion and conclusions should be expanded before publication.

#### B. Specific comments

2. 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

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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 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? 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?

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.

3. 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.

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 ob-

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served/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.

4. 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.

C. Technical Corrections There are a large number of grammatical corrections to be made - far too numerous to list here. The manuscript should be checked by a native English speaker before publication.

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

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