**Atmospheric
Chemistry
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Discussions**

Interactive comment on "Modelling day-time concentrations of biogenic volatile organic compounds in a boreal forest canopy" *by* H. K. Lappalainen et al.

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We think that simple temperature based models along with more sophisticated atmospheric chemistry models could be valuable tools for making estimates of the ambient VOC concentrations. Our study strongly based on the assumption that temperature is the main driving factor for the biogenic synthesis process (photosynthesis) and the biogenic emissions and consequently the ambient air concentrations. Thus the approach was very much source orientated. We also tested if the temperature based ,referring to photosynthetic efficiency, improved the temperature model. In our earlier

paper "Day time concentrations of Day-time concentrations of biogenic volatile organic compounds in a boreal forest canopy and their relation to environmental and biological factors" by H. K. Lappalainen et al. 2009 we show that studied compounds are inter-correlated. In this article we also evaluate in more detail how well the concentrations represented the local emissions of the forest. Based on the wind rose analysis we filtered out the possible emissions the sawmill and used also filtered data in this manuscript. We have also studied the effect of the height of atmospheric boundary layer (hours scale) on VOC concentration but did not find any correlation (not published data) during day time. In our case we lacked parallel measurements of the emissions and concentrations and we needed to use some indirect methods to maximize the link between local emissions / photosynthesis and ambient concentrations. In this task we used filtered data, specific time windows (day time data). To make the dataset representative of the postulated maximum emissions, we used day-time medians of the BVOC concentrations. The time windows specified for each season represented the time when the sun is high enough to cause atmospheric mixing. Furthermore the daytime observations presented the gas exchange from stomata to air rather than the VOC deposition to leaves, which may occur during night. We fully agree with the referee that the unexplained the part of the variation is related to atmospheric chemistry and meteorology and we have now emphasized the aspect in more detail in the corrected manuscript.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/10/C12425/2011/acpd-10-C12425-2011-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 20035, 2010.

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Discussion Paper