Interactive comment on “Hydrocarbon fluxes above a Scots pine forest canopy: Measurements and modeling” by J. Rinne et al.

Anonymous Referee #2

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The paper by Rinne et al. describes hydrocarbon fluxes above a Scots pine forest canopy. It presents novel results using eddy covariance measurements of VOCs at the SMEAR II station and, based on a stochastic Lagrangian transport model, discusses the implication of measuring canopy scale fluxes of short lived VOCs. As such the manuscript merits publication in ACP after addressing the following comments:


Page 2365, line 5 cc: A constant OH profile throughout the canopy seems to be very simplified. For example Stroud et al. (Role of Canopy-Scale Photochemistry in Modifying Biogenic-Atmosphere Exchange of Reactive Terpene Species: Results from the CELTIC Field Study., JGR, 2005) found that OH within the forest canopy varies signifi-
cantly according to the extinction of photolysis rates.

Page 2365, line 19: It appears that Boy et al., (2005) treated the canopy as a ‘big leaf’ without subdividing it into several layers each exhibiting different oxidant levels (e.g. low OH and high NO3 in lower canopy). How will different profiles of OH and NO3 in the canopy affect the presented analysis?

Page 2366, line 12cc.: It is not clear what source distribution within the canopy was used to investigate the effect of chemistry on fluxes?

Minor Comments:

Page 2360, line 1: change hydrocarbon to VOC

Page 2361, line 4 cc: revise sentence: ... but does not lead to systematic errors as long as the averaging period is much longer....

Page 2367, line 25. Revise to ...of the measured total VOC emissions on a mass basis...

Page 2368, line 20: Revise to ...emissions from the forest floor...

Page 2369, line 6: Revise to ...Fluxes of all four compounds...

Page 2371, line 12: Revise to ...the chemical degradation has the largest effect ...