

***Interactive comment on “Comment on
“Observation and modelling of HO_x
radicals in a boreal forest” by Hens et al. (2014)”
by D. Mogensen and M. Boy***

Anonymous Referee #1

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This comment attempted to make a point about the vertical variability of OH reactivity. There are several things that should be pointed out:

1. As far as I know, measurements of OH reactivity have been conducted at three heights at Blodgett Forest Station in 2007 and 2009. Many other VOC measurements were also conducted at the same time. A paper by Wolfe et al. (2011) has done quite a bit modeling on comparing vertical profiles of VOCs with their model. Presumably OH reactivity was also compared in that study.

2. Another measurement on OH reactivity at three different heights has been recently

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published by Hansen et al. (2014).

3. Besides Wolfe et al. (2011), I also noticed another paper on 1-D modeling in forests by Pratt et al. (2012).

4. I should also point out, that there have been measurements on vertical profiles of isoprene, monoterpenes and sesquiterpenes in forests, for example by Kim et al. (2009) and many others. There are also some modeling studies on the resulting chemistry at different heights (Fuentes et al., 2007). It seems pretty straightforward to infer the vertical profiles of OH reactivity from these studies, if one assumes that NMHCs are the dominant component of OH reactivity.

While I agree with authors that there can be large vertical variability on OH reactivity in forests, such variability may have been investigated in several studies, at least to some extent.

Reference

Fuentes, J., Wang, D., Bowling, D., Potosnak, M., Monson, R., Goliff, W., and Stockwell, W.: Biogenic Hydrocarbon Chemistry within and Above a Mixed Deciduous Forest, J. Atmos. Chem., 56, 165–185, 10.1007/s10874-006-9048-4, 2007.

Hansen, R. F., Griffith, S. M., Dusanter, S., Rickly, P. S., Stevens, P. S., Bertman, S. B., Carroll, M. A., Erickson, M. H., Flynn, J. H., Grossberg, N., Jobson, B. T., Lefer, B. L., and Wallace, H. W.: Measurements of total hydroxyl radical reactivity during CABINEX 2009 – Part 1: field measurements, Atmos. Chem. Phys., 14, 2923–2937, 10.5194/acp-14-2923-2014, 2014.

Kim, S., Karl, T., Helmig, D., Daly, R., Rasmussen, R., and Guenther, A.: Measurement of atmospheric sesquiterpenes by proton transfer reaction-mass spectrometry (PTR-MS), Atmos. Meas. Tech., 2, 99–112, 10.5194/amt-2-99-2009, 2009.

Pratt, K. A., Mielke, L. H., Shepson, P. B., Bryan, A. M., Steiner, A. L., Ortega, J., Daly, R., Helmig, D., Vogel, C. S., Griffith, S., Dusanter, S., Stevens, P. S., and Alaghmand,

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M.: Contributions of individual reactive biogenic volatile organic compounds to organic nitrates above a mixed forest, *Atmos. Chem. Phys.*, 12, 10125-10143, 10.5194/acp-12-10125-2012, 2012.

Wolfe, G. M., Thornton, J. A., Bouvier-Brown, N. C., Goldstein, A. H., Park, J. H., McKay, M., Matross, D. M., Mao, J., Brune, W. H., LaFranchi, B. W., Browne, E. C., Min, K. E., Wooldridge, P. J., Cohen, R. C., Crounse, J. D., Faloona, I. C., Gillman, J. B., Kuster, W. C., de Gouw, J. A., Huisman, A., and Keutsch, F. N.: The Chemistry of Atmosphere-Forest Exchange (CAFE) Model – Part 2: Application to BEARPEX-2007 observations, *Atmos. Chem. Phys.*, 11, 1269-1294, 10.5194/acp-11-1269-2011, 2011.

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