

Interactive
Comment

***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**

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Firstly, we thank both the anonymous referee and the editor for taking the time to read and provide useful comments on this comment paper. We aim to respond the comments below.

“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.”

As also mentioned in the comment paper, we acknowledge there have been investiga-

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tions prior to the publication of Mogensen et al., 2011 that have addressed part of the vertical OH reactivity. However, our point is that Mogensen et al., 2011 was the first paper to model the “total” vertical OH reactivity, and not only the reactivity attributed to a small selection of measured compounds.

"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."

Yes, it is correct that Mao et al., 2012 measured the reactivity of OH at several heights, however, this paper was published after Mogensen et al., 2011. Further, Wolfe et al., 2011 provide modelled vertical profiles of several organic as well as inorganic compounds. The OH reactivity at 10 m is calculated, however, no vertical profile is provided.

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

Both papers were published after Mogensen et al., 2011.

Comment 1-3: We suggest to make an addition to the paper along the lines of: "Upon publication of Mogensen et al., 2011 has followed several measurement and modelling papers investigating the vertical dimension of the OH reactivity (e.g. Mao et al., 2012, Hansen et al., 2014, 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 chem-

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istry 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."

This task might seem quite straightforward, however, it was not done.

Thornton: *"The comment should address additional previous studies of OH reactivity in forested regions, as pointed out by referee 1."*

The comment paper do mention previous studies (Stroud et al., 2005 and Mao et al., 2009). The references mentioned by the reviewer are all published after Mogensen et al., 2011.

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