

Interactive comment on “

Summertime total OH reactivity measurements from boreal forest during HUMPPA-COPEC 2010” by A. C. Nölscher et al.

Anonymous Referee #2

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The authors presented an interesting dataset of OH reactivity in a boreal forest in Finland. The specific research forest (SMEAR II) has been an important research site the investigations of roles of BVOCs in photochemistry and secondary aerosol formations in the past decade. Therefore, the presented observation results certainly could provide quantitative information about the unconstrained BVOCs in the ecosystem. Furthermore, the observations happen to be conducted a series of unique physical environments such as higher than usual ambient temperature and regional wildfire episodes, which certainly make the dataset very unique. However, I found inconsis-

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tencies and rooms for improvements in the current data analysis. I would recommend authors to conduct further data analysis to publish this dataset in ACP. Followings are the main improving points that I see.

The main flaw in the data analysis is that the mid-day temperature during the “pollution” period is actually higher than “stress” period according to the daily ambient temperature variation in the figures. Based on the descriptions about “stress” in the manuscript, it was all about the heat stress so during the “pollution” period, the forest environment may actually experience a stress both from pollution and heat. Therefore, I urge the authors to regroup the dataset for better data analysis. The other aspect that can make the manuscript clear is about monoterpene speciation analysis. Although PTR-MS was deployed in the field campaign (Table 2), it is appeared that the authors only applied the GC-MS measured monoterpene concentrations for the calculated OH reactivity estimations. There is an anecdotal evidence that GC techniques may not be able to detect significant portions of very reactive monoterpenes (~ 30 %) that on the other hand can be detected by the PTR-MS technique (Lee et al., 2005 ACP). I recommend authors to include the PTR-MS measured monoterpene dataset if available. Further discussion is also recommended that how much of reactive monoterpenes or sesquiterpenes is required to explain the observed missing OH reactivity. My expectation is if that much of unmeasured reactive species existed inside of the canopy, you should be able to see significant differences in secondary photochemical oxidation product distributions such as ozone and SOA between the “stressed” and “normal” boreal environments. I would like to see the discussions on this aspect also.

Minor Points - Add the statistics (e.g avgs, and S.D.) of ambient temperatures in the text. - Table 2. I am not familiar with the Smear II method for SO₂ analysis. describe it or put a reference about it. - Figure 4 and 5 It is very hard to read axis labels. Use a bigger font size - Figure 5. Add error bars that indicate standard deviations.