

Interactive comment on “In-situ ambient quantification of monoterpenes, sesquiterpenes, and related oxygenated compounds during BEARPEX 2007 – implications for gas- and particle-phase chemistry” by N. C. Bouvier-Brown et al.

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Brown et al. present interesting and novel results of monoterpene and sesquiterpene mixing ratios at the Blodgett research site. The authors report that beta caryophyllene and alpha – humulene were completely lost in the sampling inlet, which questions how quantitative sesquiterpenes can be measured in ambient air using conventional GC-MS setups. The authors might not be aware of a study by Arnts et al. (ES&T, 2008) who

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propose a novel concept for measuring sesquiterpenes and other reactive terpenes with GC-MS in ambient air by adding t2-butene to the inlet line. Thus the statement that “The discrepancy between the relative mixing ratios measured in the 15 branch enclosures and that measured in ambient air must be due to more rapid chemical losses of the reactive sesquiterpene compounds. Many sesquiterpenes observed in branch enclosure experiments cannot be detected in ambient air due to their rapid loss via oxidation.” needs to be taken with a grain of salt, because it implies that reactive sesquiterpenes can be quantitatively measured in ambient air. In any case it would be interesting to compare the total amount of sesquiterpenes to that of monoterpenes in ambient air between the GC-MS and the PTR-MS during BEARPEX. From our work at a deciduous forest in Michigan (see Kim et al., AMT, 2009) we see that the total flux of sesquiterpenes relative to the total flux of monoterpenes measured by PTRMS can be potentially much larger without invoking extremely rapid chemistry inside the forest canopy (e.g. the ecosystem sesquiterpene flux can be as much as 30-50% of the ecosystem scale monoterpene flux).

References:

Arnts et al., ES&T, doi : 10.1021/es800561j, 2008.

Kim et al., Atmos. Meas. Tech., 2, 99–112, 2009.

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