



Characterizing biogenic emissions of sesquiterpene and oxygenated terpene compounds

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Evidence for very reactive biogenic VOCs (BVOCs) has been observed at Blodgett Forest, a coniferous forest in the Sierra Nevada Mountains of California. The evidence has included chemical ozone loss in the forest canopy and the presence of BVOC oxidation products in and above the canopy. To measure emission rates of these reactive BVOCs, we placed enclosures over branches of the dominant species at the site – Ponderosa pine, ceanothus, and manzanita – in the summer of 2005. Zero air, with ambient CO₂ concentrations, flowed through the chamber system and VOC emission measurements were made by proton transfer reaction mass spectrometry (PTR-MS), solid phase microextraction (SPME) on fibers followed by direct injection into a gas chromatograph with an ion trap mass spectrometer (GC-ITMS), and by in-situ GC with a flame ionization detector (GC-FID). Multiple studies have characterized oxygenated BVOC and monoterpene emissions at this site; here we focus on the identification and quantification of sesquiterpene and oxygenated terpene emissions. We report emission profiles over the three month sampling period showing variation among different branches and over time. We suggest that previously undetected sesquiterpenes and oxygenated terpenes significantly contribute to the total reactive biogenic emission profile from this field site.