OBSERVATIONAL CONSTRAINTS ON TERPENE OXIDATION DURING THE GOAMAZON 2014/5 FIELD CAMPAIGN USING SPECIATED MEASUREMENTS FROM SV-TAG

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Biogenic volatile organic compounds (BVOCs) from the Amazon forest represent the largest regional source of organic carbon emissions to the atmosphere. These BVOC emissions dominantly consist of volatile and semi-volatile terpenoid compounds that undergo chemical transformations in the atmosphere to form oxygenated condensable gases and secondary organic aerosol (SOA). We have deployed the Semi-Volatile Thermal desorption Aerosol Gas Chromatograph (SV-TAG) at the rural T3 site located west of the urban center of Manaus, Brazil as part of the Green Ocean Amazon (GoAmazon) 2014/5 field campaign to measure hourly concentrations of semi-volatile BVOCs and their oxidation products during the wet and dry seasons. Primary BVOC concentrations measured by the SV-TAG include sesquiterpenes and diterpenes, which have rarely been speciated with high time-resolution. Several sesquiterpenes present in ambient data were found to overlap with the sesquiterpene composition in essential oils from the Copaiba tree (C*opaifera officinalis* Jacq. L.), commonly known as the "diesel tree" in the Amazon, suggesting that it and related vegetation may be potential sources of BVOC emissions in the Amazon. We observe sesquiterpenes at levels of tens of ppt_v, and they are anti-correlated with ozone. We estimate that from the observed sesquiterpene and monoterpene concentrations, sesquiterpenes would account for more olefin-channel ozone sink (loss). We also observe periods of enhanced organic aerosol formation (as measured by an oxidation flow reactor) accompanied with higher sesquiterpene concentrations and anthropogenic influence. We further discuss the relative lifetimes of identified sesquiterpenes, chemical mechanisms, and their potential to contribute to ambient SOA formation.