

Brown Carbon Absorption Linked to Organic Mass Tracers in Biomass Burning Particles

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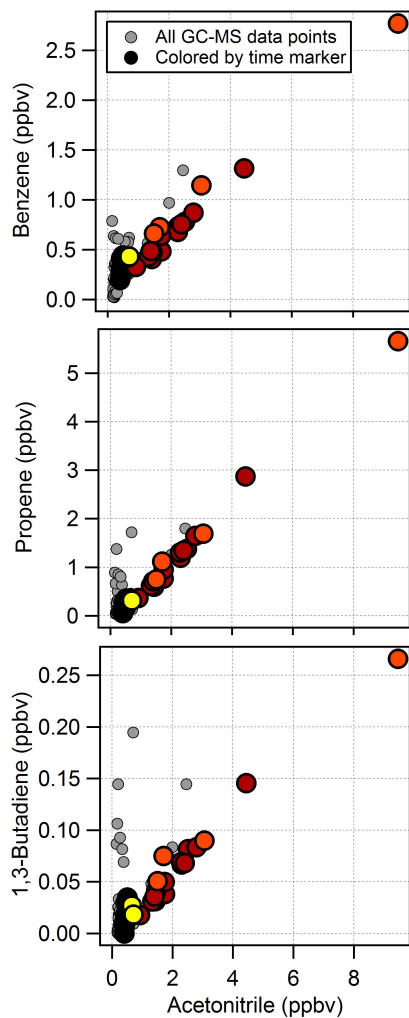
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1 Supplemental Material

1.1 Air Mass Aging

In an effort to deduce the contribution of aging to the variability in particle chemistry within the sampled air mass the relationship between specific VOCs and acetonitrile is assessed. Acetonitrile is a relatively long-lived gas-phase BB tracer ($k_{\text{OH}} = 0.02 \times 10^{-12} \text{ molec cm}^{-3}\text{s}^{-1}$) (Atkinson, 1986). Benzene ($k_{\text{OH}} = 1.2 \times 10^{-12} \text{ molec cm}^{-3}\text{s}^{-1}$) (Atkinson, 1986), propene ($26.3 \times 10^{-12} \text{ molec cm}^{-3}\text{s}^{-1}$) (Atkinson, 1986) and 1,3-Butadiene ($66.7 \times 10^{-12} \text{ molec cm}^{-3}\text{s}^{-1}$) (Atkinson, 1986) are reactive VOCs that are emitted during BB as well as various anthropogenic sources (Friedli et al., 2001). All of these VOCs are strongly correlated with acetonitrile for the two BB plumes sample (Figure S1). The two BB plumes are colored orange and brown based on the sampling periods described in the main text and in Lack et al. (2012b). If each plume were subjected to varying degrees of atmospheric processing (i.e. different photochemical ages), then one would expect to see an increasingly large difference in the VOC enhancement ratio for the more reactive VOCs (i.e. the orange and brown points would not lie on the same line). This assumes that both plumes are of the same fuel type with similar emission ratios. Figure S1, shows that the observed enhancement ratios within both BB plumes does not change indicating that mixing had a larger effect on the variability of the observed mixing ratios than photochemical processing of the BB plume. This is explained by the proximity of the fire to the measurement site and that the BB plumes were encountered prior to sunrise or very soon after.

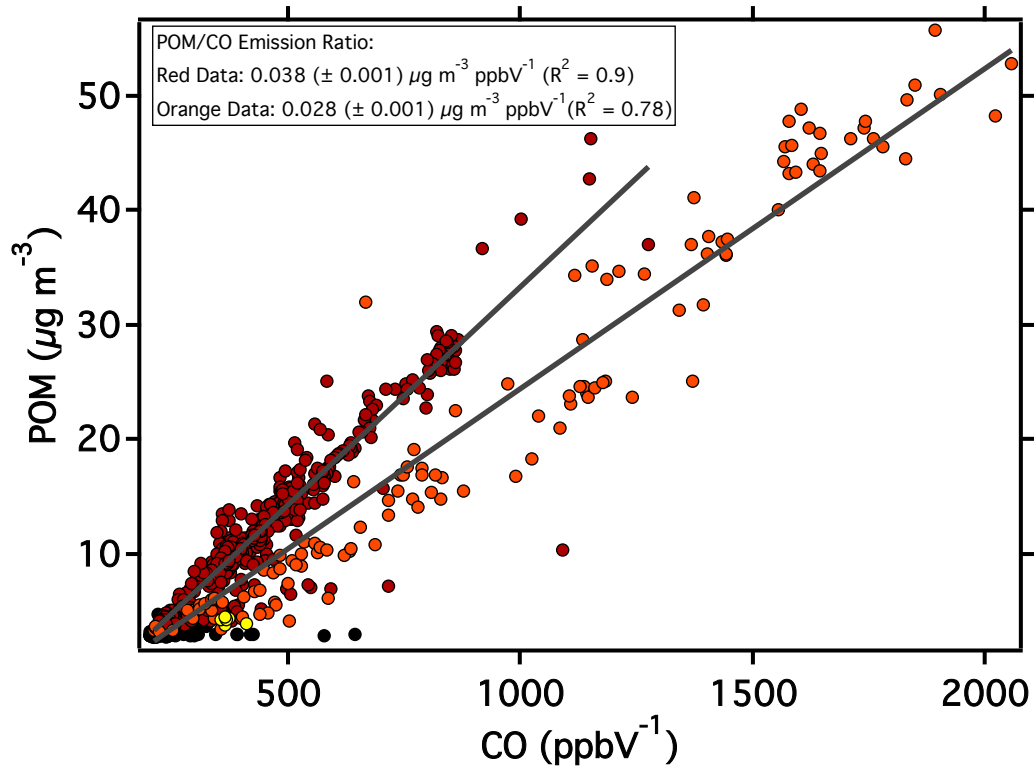


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2 **Figure S1, Relationship of Benzene, Propene and 1,3-Butadiene with Acetonitrile.**

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2 **Figure S2. Emissions ratio of POM to CO for the two heavily biomass burning-influenced**
3 **plumes are presented.**

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