

# 1 **Brown Carbon Absorption Linked to Organic Mass Tracers in**

## 2 **Biomass Burning Particles**

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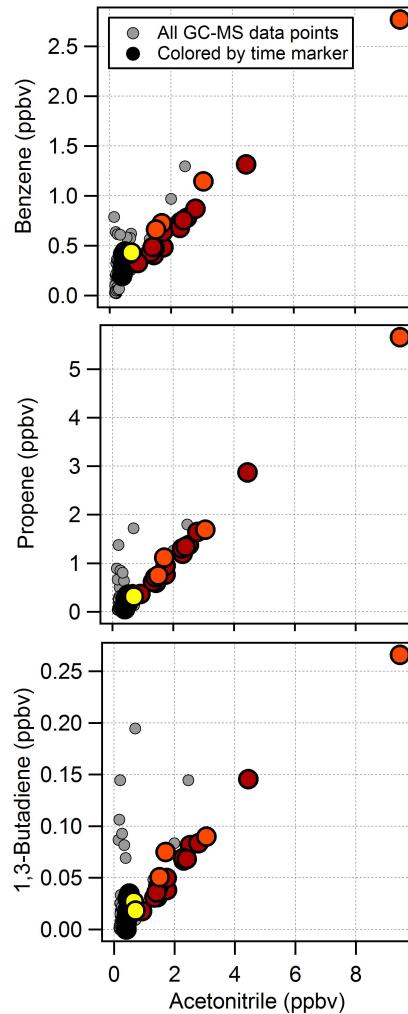
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## 12 **1 Supplemental Material**

### 13 **1.1 Air Mass Aging**

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

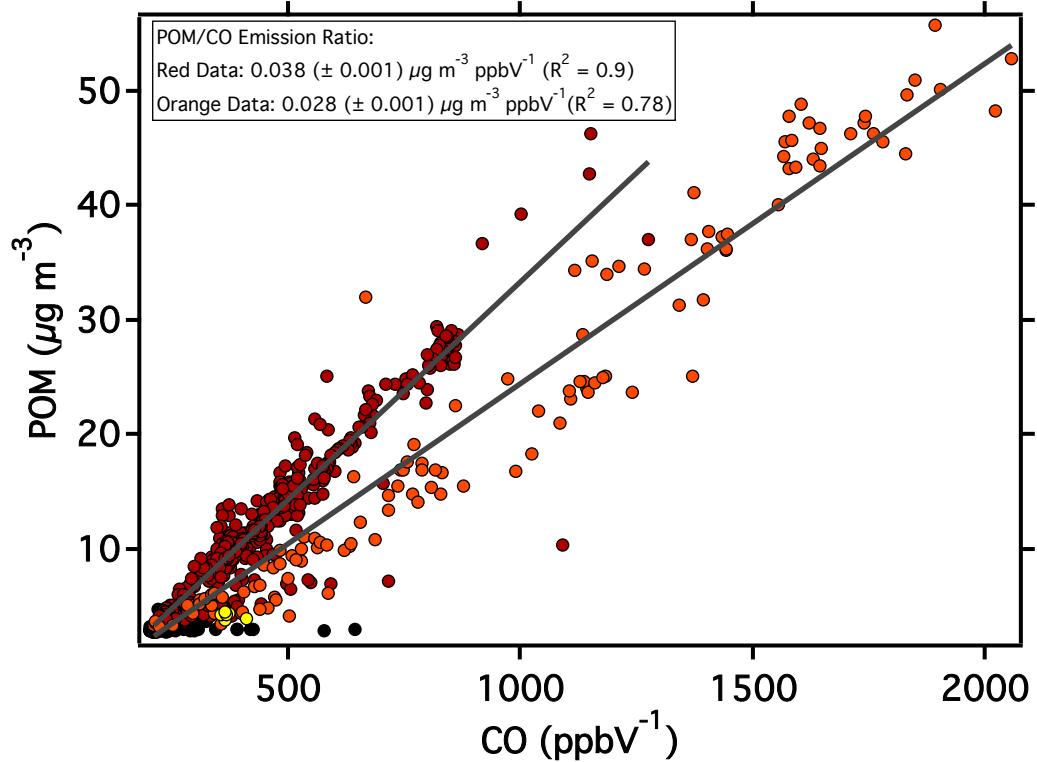


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2 **Figure S1, Relationship of Benzene, Propene and 1,3-Butadiene with Acetonitrile.**

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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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