

**Influence of Solar Irradiation on Nitrous Acid Production in  
Western U.S. Wildfire Smoke**

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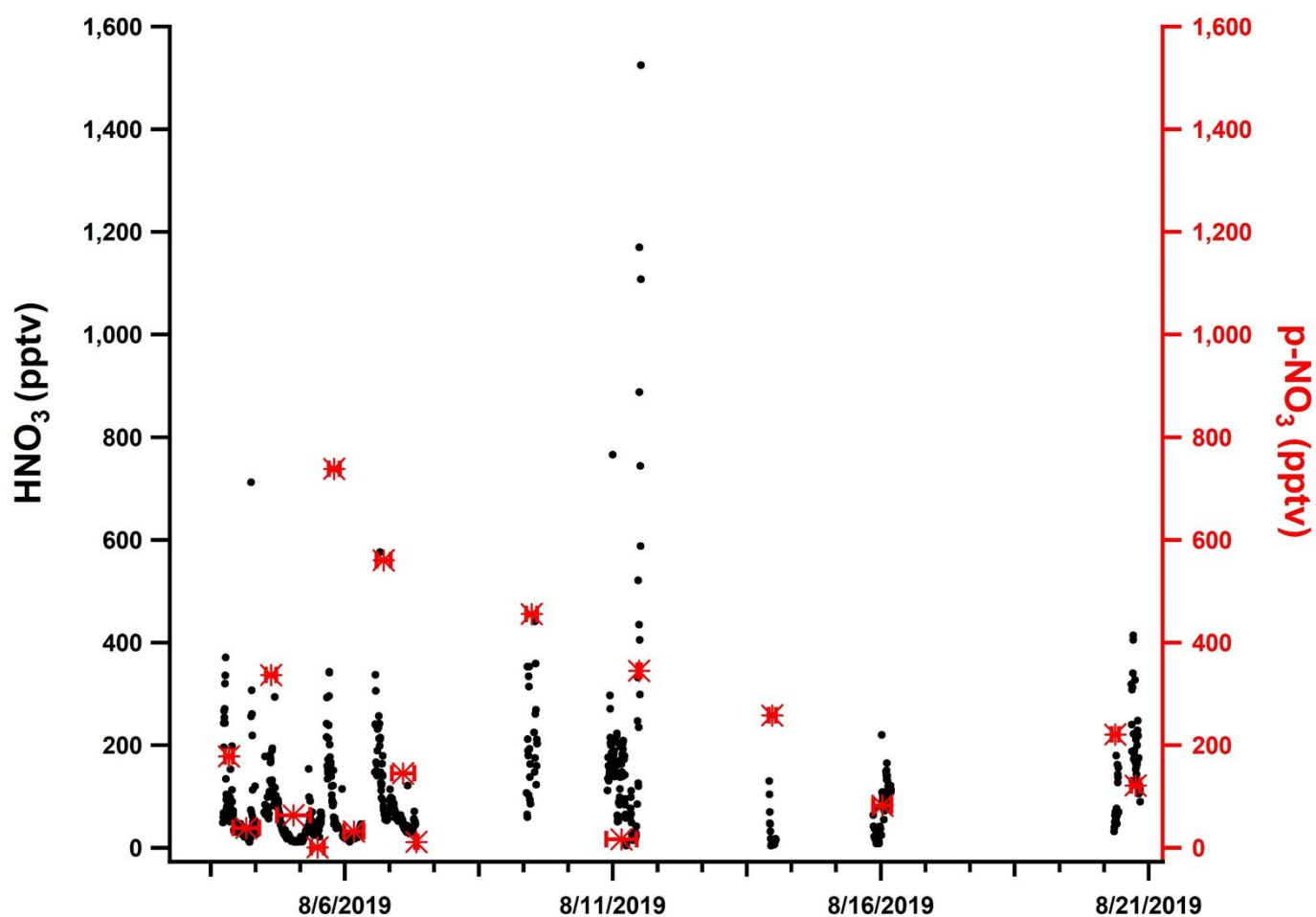
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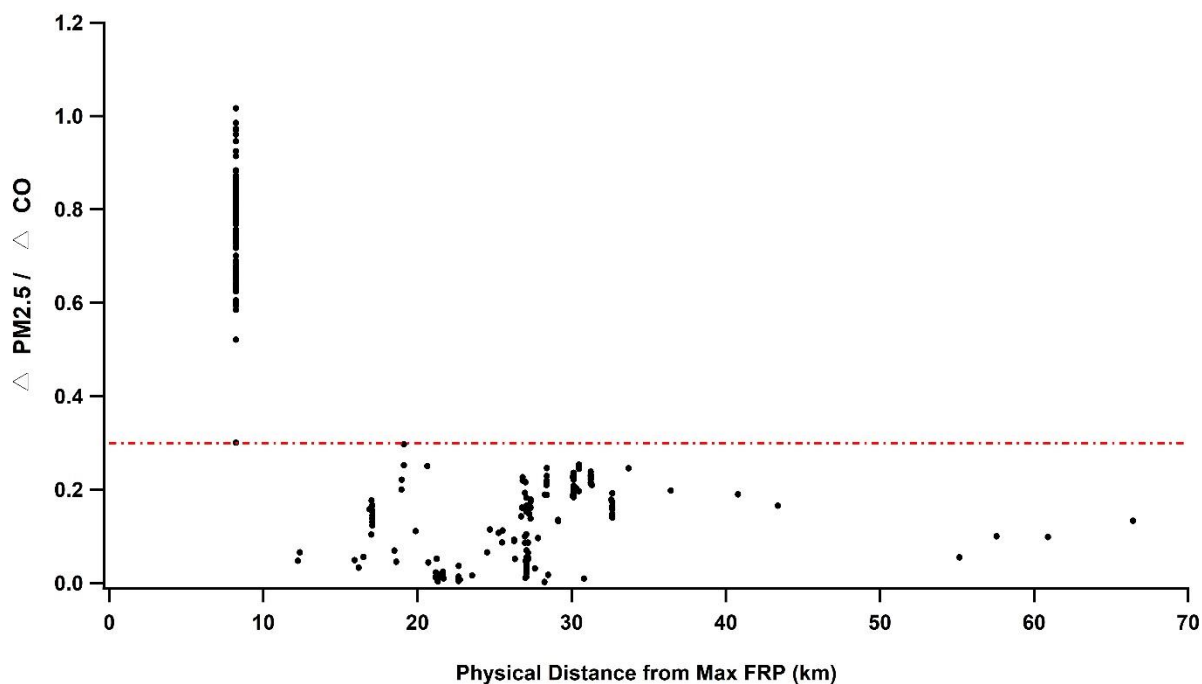
Figures S1 to S3

**Introduction**

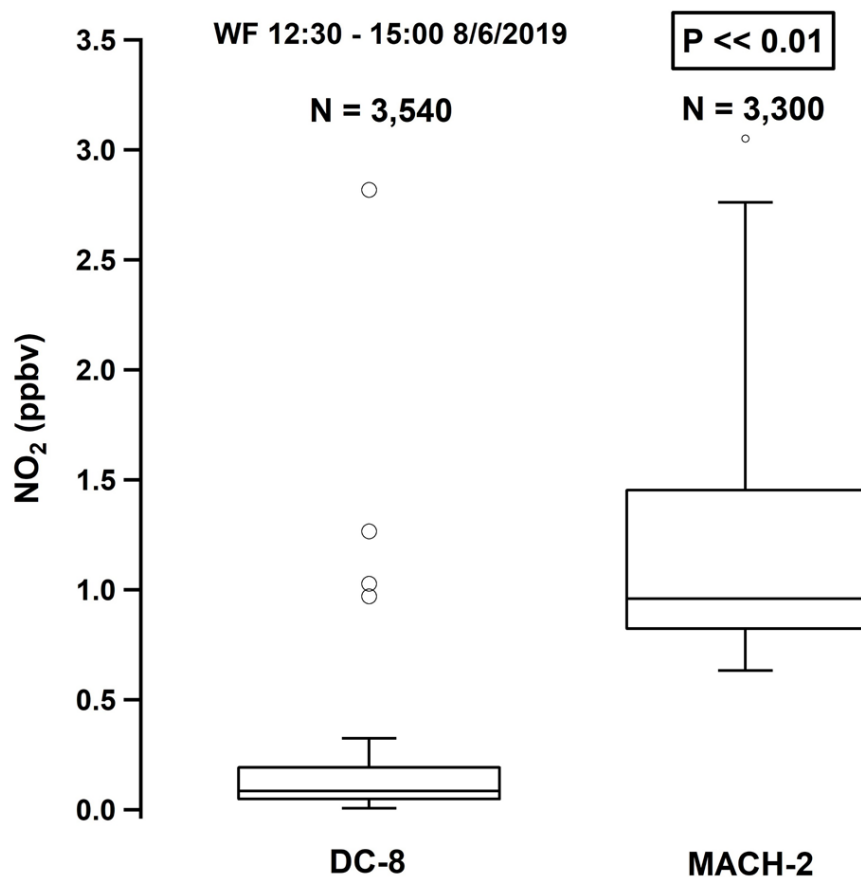
Figure S1 highlights the nitrate partitioning between the gas and particle phase for the Williams Flats, Nethker and Little Bear fires. Figure S2 provides verification for chemical ageing classifications for the Williams Flats fire. Figure S3 serves as a comparison between measured distributions in NO<sub>2</sub> mixing ratios for the MACH-2 and DC-8 platforms. These data are from a sampling overlap period that occurred on August 6<sup>th</sup>, 2019 at the Williams Flats fire. Differences in reported N values are a result of a slight shift in the overlap period by four minutes. Special thanks to Carrie Womack for collecting the DC-8 data sets used in this analysis.



**Figure S1. Gas and particle phase ( $\text{p-NO}_3$ ) partitioning for  $\text{HNO}_3$  for the Williams Flats, Nethker and Little Bear fires.  $\text{HNO}_3$  favored  $\text{p-NO}_3$  approximately 60% of the time over the course of these fires. For  $\text{p-NO}_3$  stars indicate local midpoint-times while horizontal bars indicate the start and stop times for each filter.**



**Figure S2. Physical distance verification of young vs. aged  $\Delta \text{PM}_{2.5} / \Delta \text{CO}$  binning for the Williams Flats fire. The red dashed line indicates the  $\Delta \text{PM}_{2.5}$  to  $\Delta \text{CO}$  ratio of 0.3 used to distinguish young from aged smoke. The red dashed line indicates the  $\Delta \text{PM}_{2.5}$  to  $\Delta \text{CO}$  ratio of 0.3 used to distinguish young from aged smoke for the Williams Flats data.**



**Figure S3. Comparisons between  $\text{NO}_2$  average mixing ratios and distributions. Statistical P values were determined using a 95% confidence interval and N values represent population sizes. The average  $\text{NO}_2$  mixing ratio measured by MACH-2 is approximately 6.5x that which was measured by the DC-8 during the August 6<sup>th</sup> overlap of the Williams Flats fire.**