

Supplementary Information for the Paper:

Investigation of the Sources and Processing of Organic Aerosol over the Central Mexican Plateau from Aircraft Measurements during MILAGRO

Peter F. DeCarlo^{1,2,+}, Ingrid M. Ulbrich^{1,3}, John Crounse⁴, Benjamin de Foy⁵, Edward J. Dunlea¹, Allison C. Aiken^{1,3}, David Knapp⁶, Andrew J. Weinheimer⁶, Teresa Campos⁶, Paul O. Wennberg⁴, and Jose L. Jimenez^{1,3*}

¹Cooperative Institute for Research in Environmental Sciences (CIRES), ²Department of Atmospheric and Oceanic Science, and ³Department of Chemistry and Biochemistry, University of Colorado, Boulder, CO, USA

⁴California Institute of Technology, Pasadena, CA, USA

⁵Department of Earth and Atmospheric Sciences, Saint Louis University, St. Louis, MO, USA

⁶National Center for Atmospheric Research, Boulder, CO, USA

⁺Now at the Laboratory of Atmospheric Chemistry, Paul Scherrer Institut, Switzerland

^{*}Corresponding Author.

ACPD – MILAGRO special issue

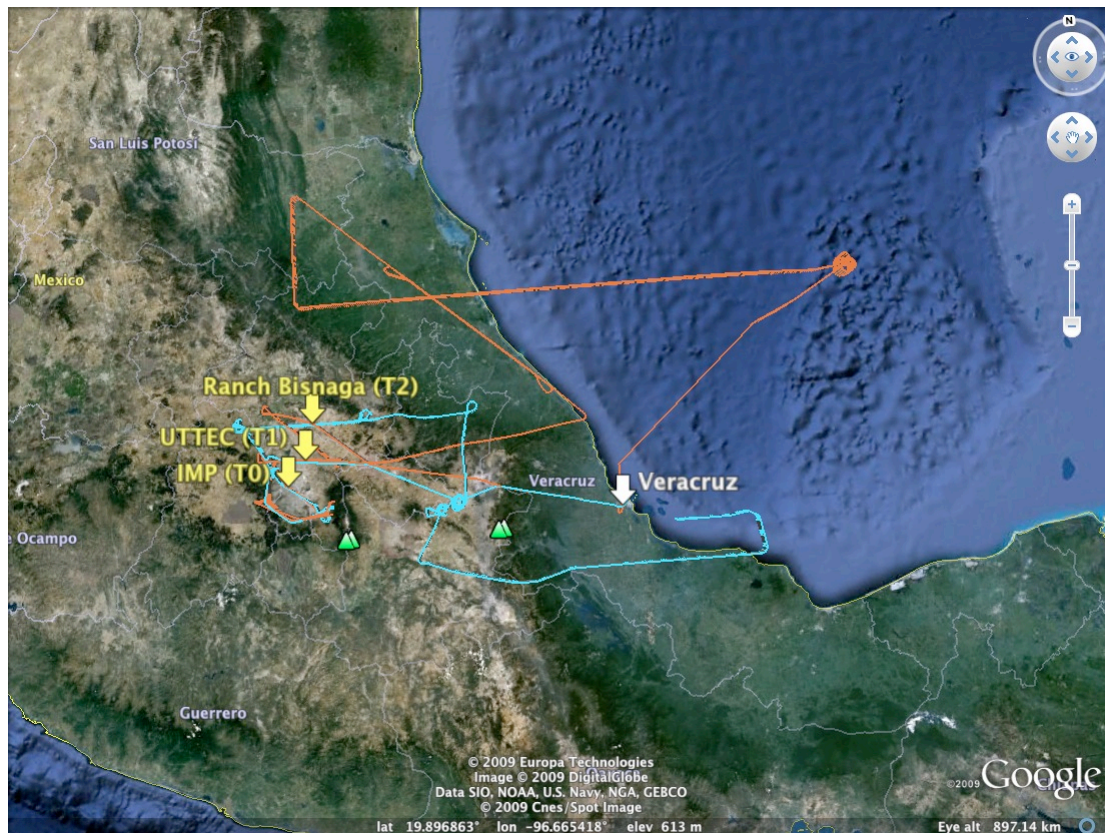


Figure SI-1: Google Earth satellite image of coastal and central Mexico. The flight paths for Research Flight 3 on 10-March-2006 and Research Flight 12 on 29-March-2006, have been marked in orange and blue in the map, respectively, along with the locations of T0, T1, T2, and Veracruz indicated in yellow by arrows.

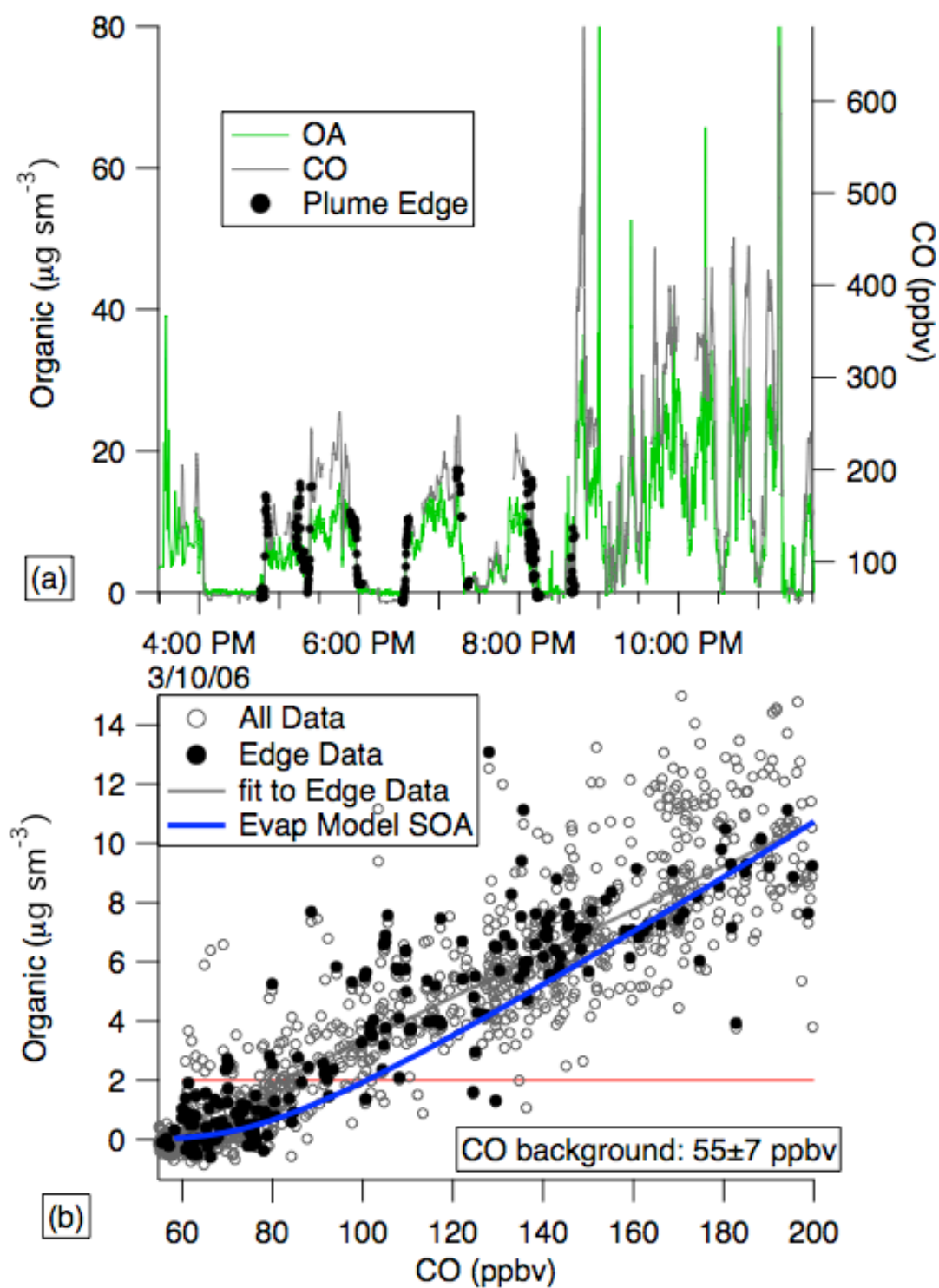


Figure SI-2: Part (a) shows the time series of Organic Aerosol during RF3, with the black data points indicating the edge of the plumes. Part (b) shows the measured organic aerosol vs measured CO data as gray open circles, the edge data is displayed as filled black circles. The ODR regression was performed on the edge data, with the range of background CO values determined by the 1 sigma errors from the regression. The blue line is an estimate of modeled SOA volatility from dilution of the plume.

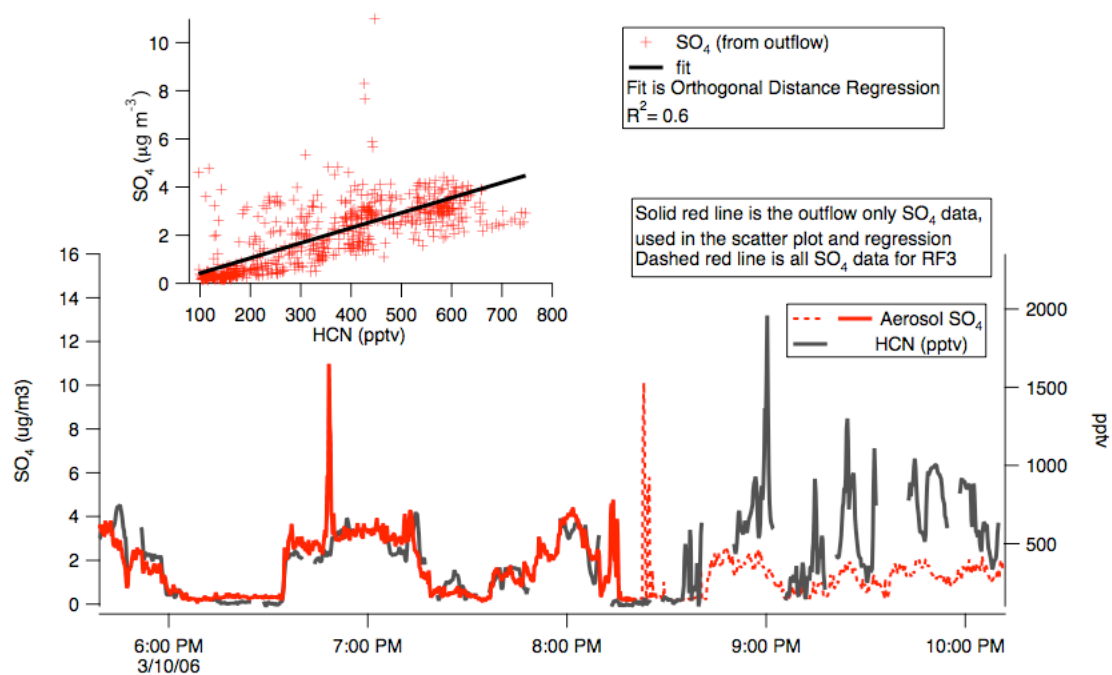


Figure SI-3: A timeseries of SO_4 and HCN is shown with the outflow region shown with the solid red line. Measurements made over the MCMA area are shown with the dotted red line. The scatter plot of SO_4 to HCN shows high correlation of these 2 pollutants in the regional outflow driven by the variation between in- and out-of-plume measurements.

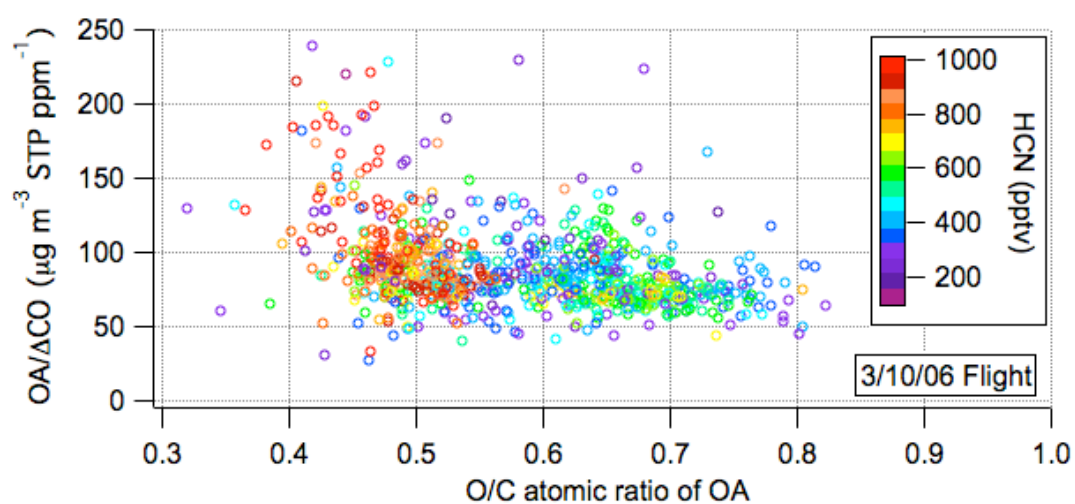


Figure SI-4: This figure shows the OA/ΔCO ratio vs. the O/C atomic ratio for RF3 (same as Fig. 2a) colored by the HCN concentration, showing high HCN concentrations at high OA/ΔCO ratios, decreasing as the O/C ratio increases and the plumes dilute.

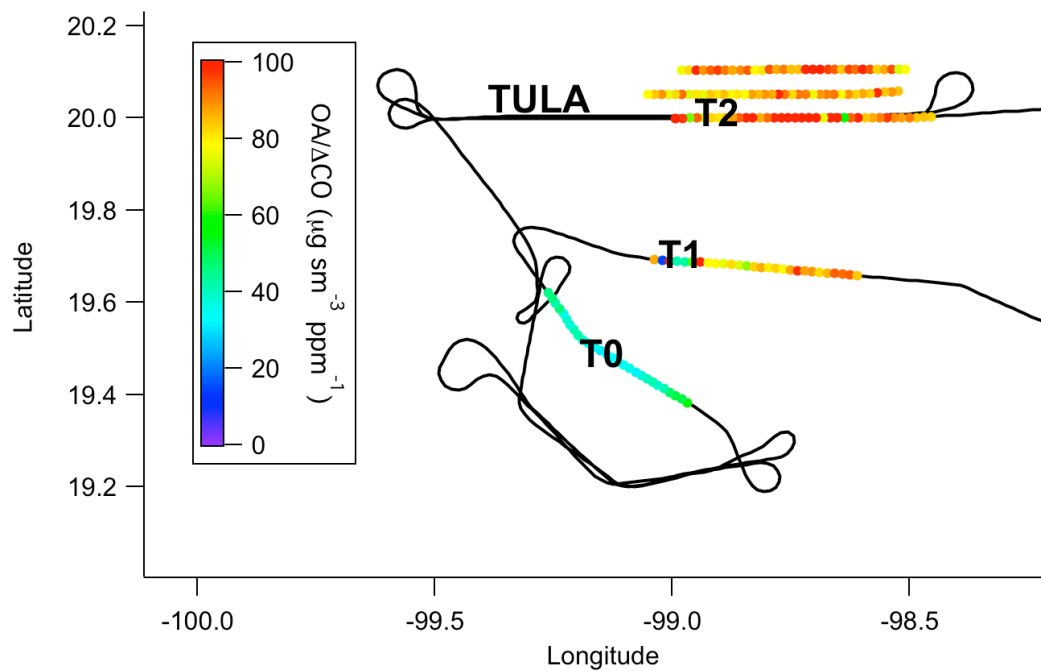


Figure SI-5: The flight track for RF12 for the area near Mexico City shown in black, with the colored dots indicating the legs of the flight averaged together for Figure 7. The colors indicate the OA/ Δ CO ratio for each point in time, showing the increase of this ratio from the urban center to downwind. The three passes around T2 are offset from the flight track so that their differences can be seen.

Figure SI-6: This shows a scatter plot between the measured HCN and CO during RF12. Points in the vicinity of the Tula complex are in red, while city points are colored in green. The red points show clear enhancement in HCN from the Tula refinery, but there was no corresponding increase with organic aerosol.

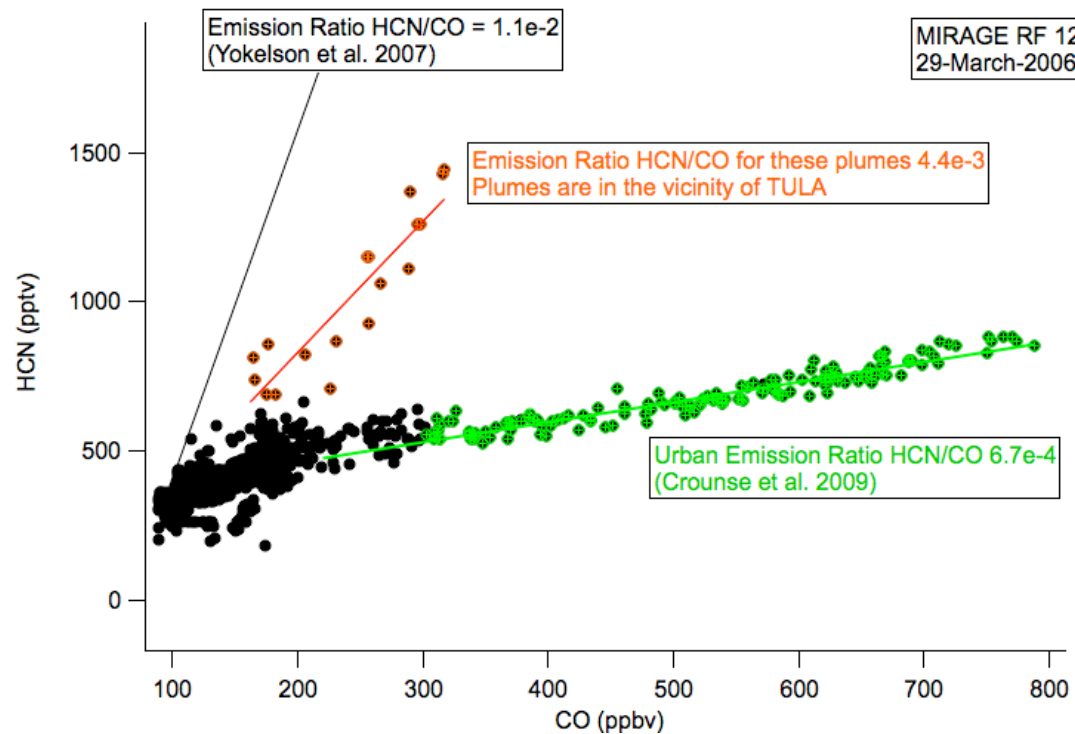


Figure SI-7: Example Mass Spectra of PMF solution types from appendix, colors follow the same scheme as Figure 5.

Figure SI-7a: Family 2 example Mass Spectra.

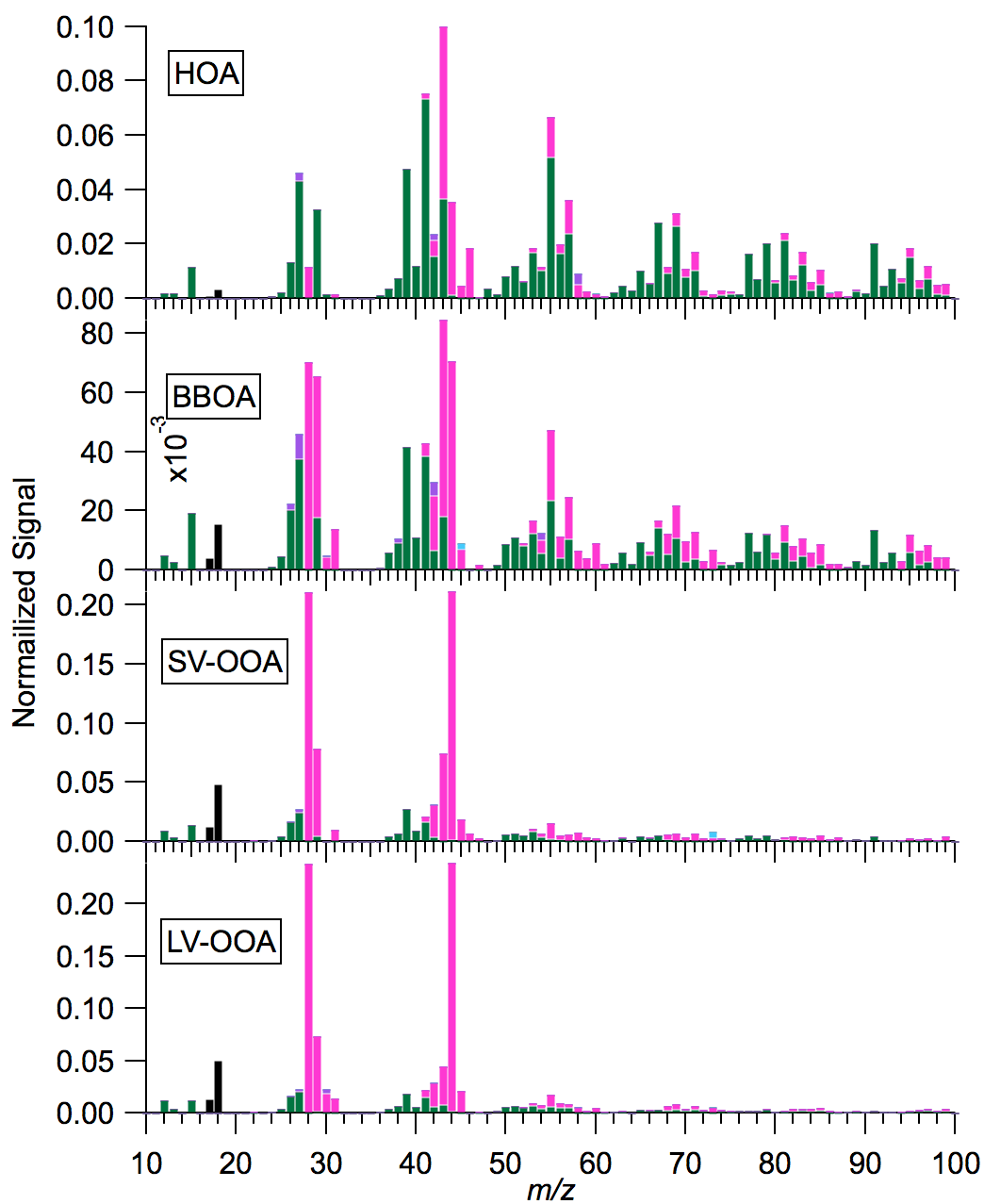


Figure SI-7b: Family 3 example Mass Spectra.

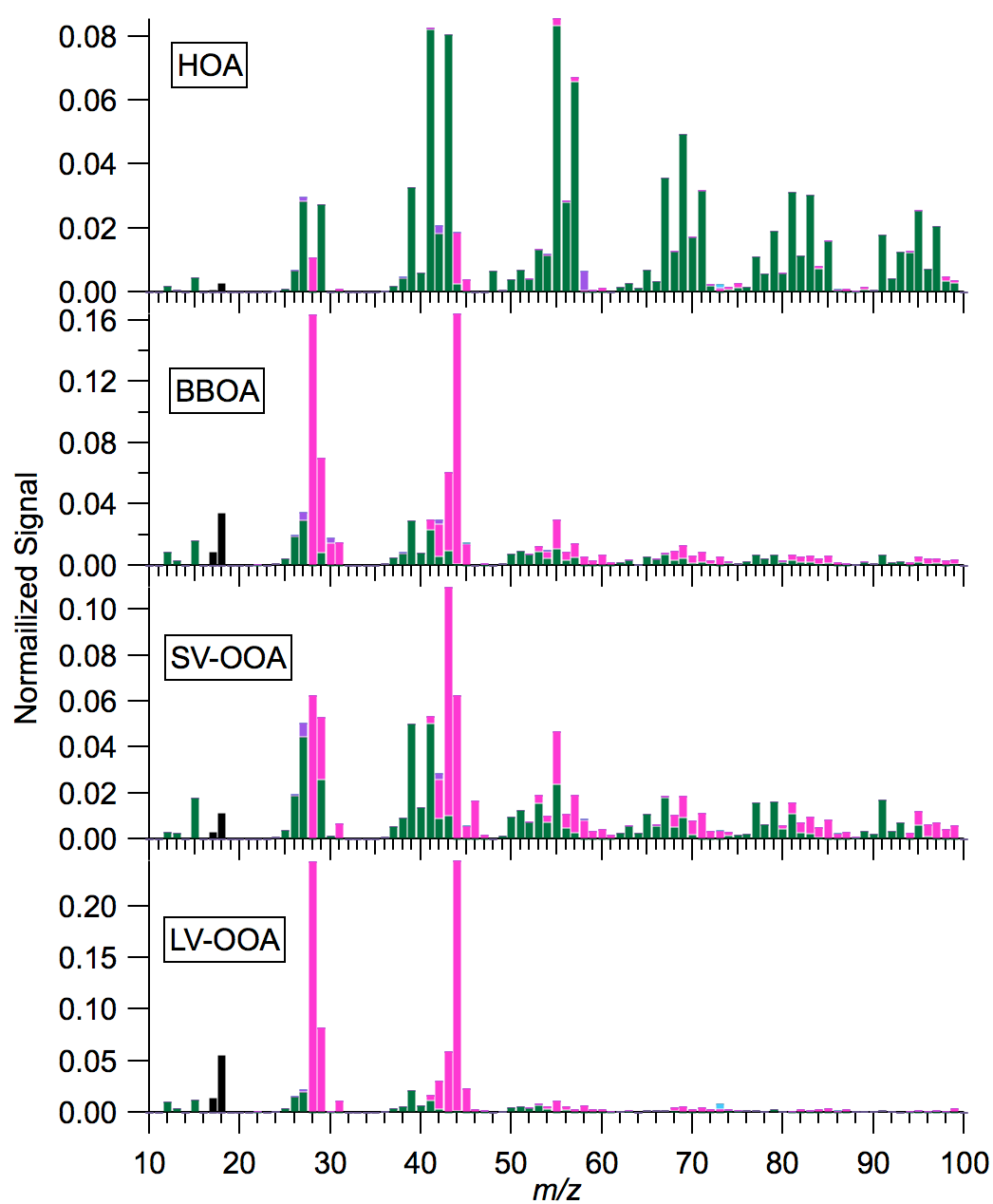


Figure SI-7c: Family 4 example Mass Spectra.

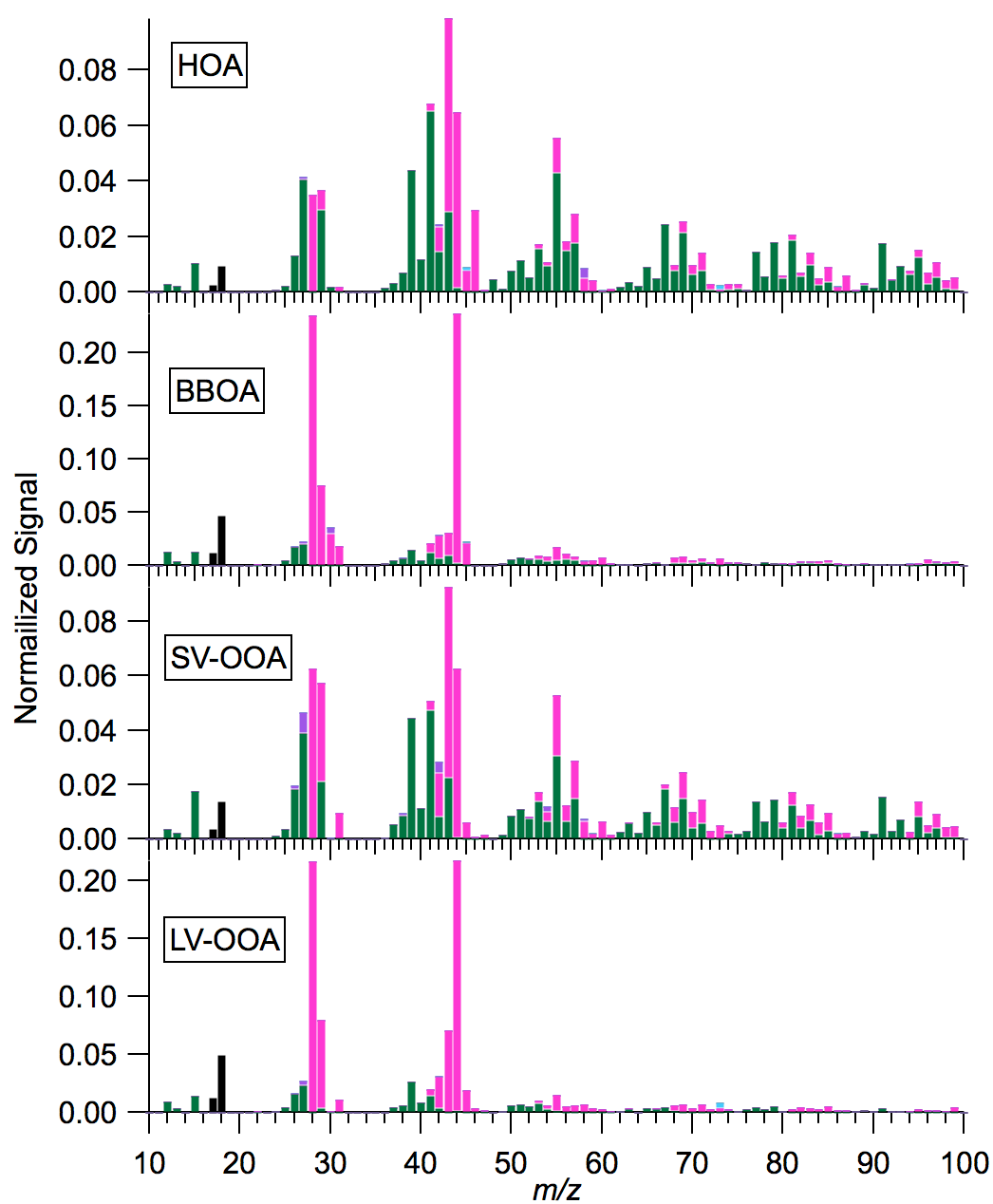


Figure SI-7d: Family 5 example Mass Spectra.

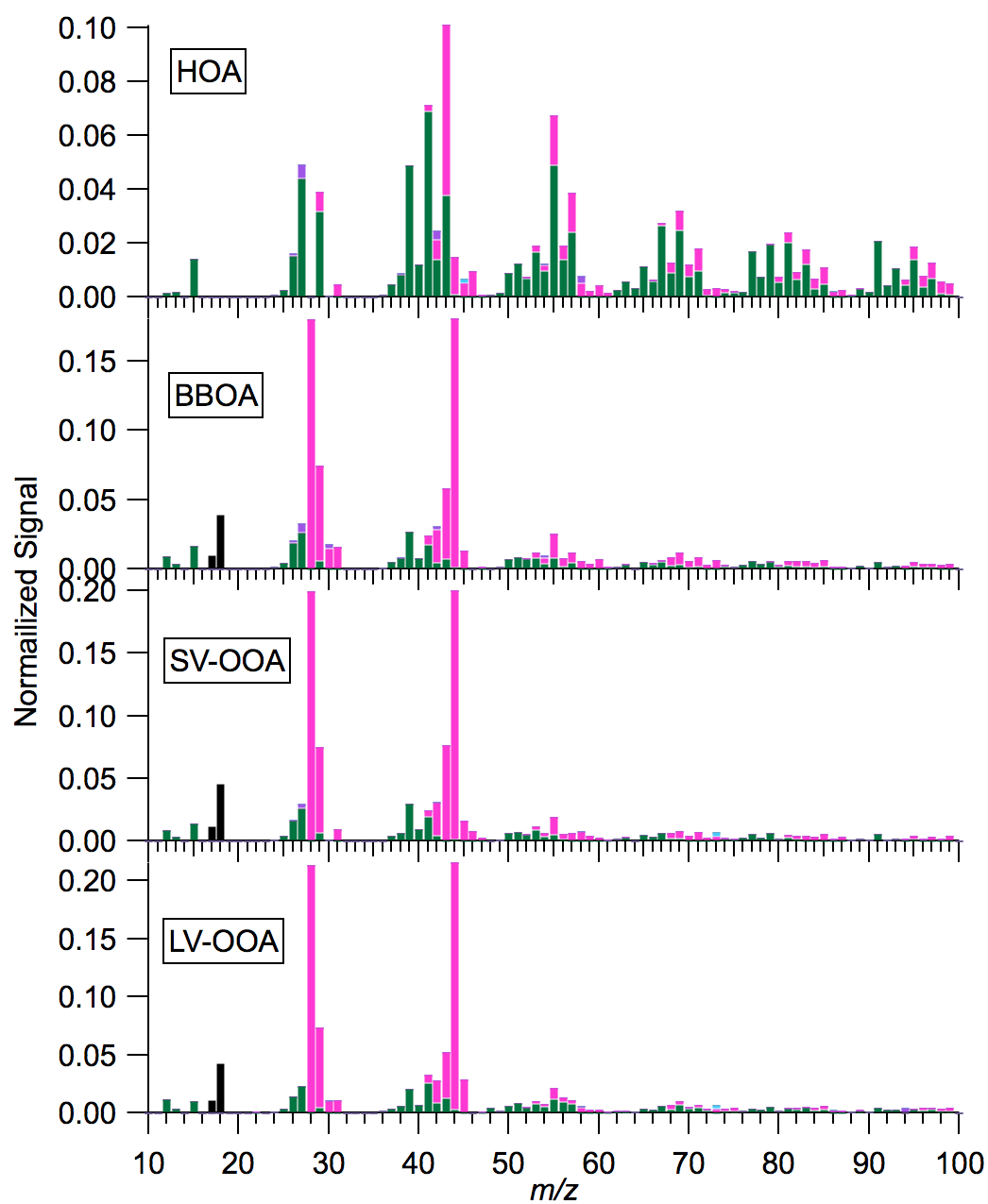


Figure SI-8: Example Time Series of PMF solution types from appendix.

Figure SI-8a: Family 2 example Time Series.

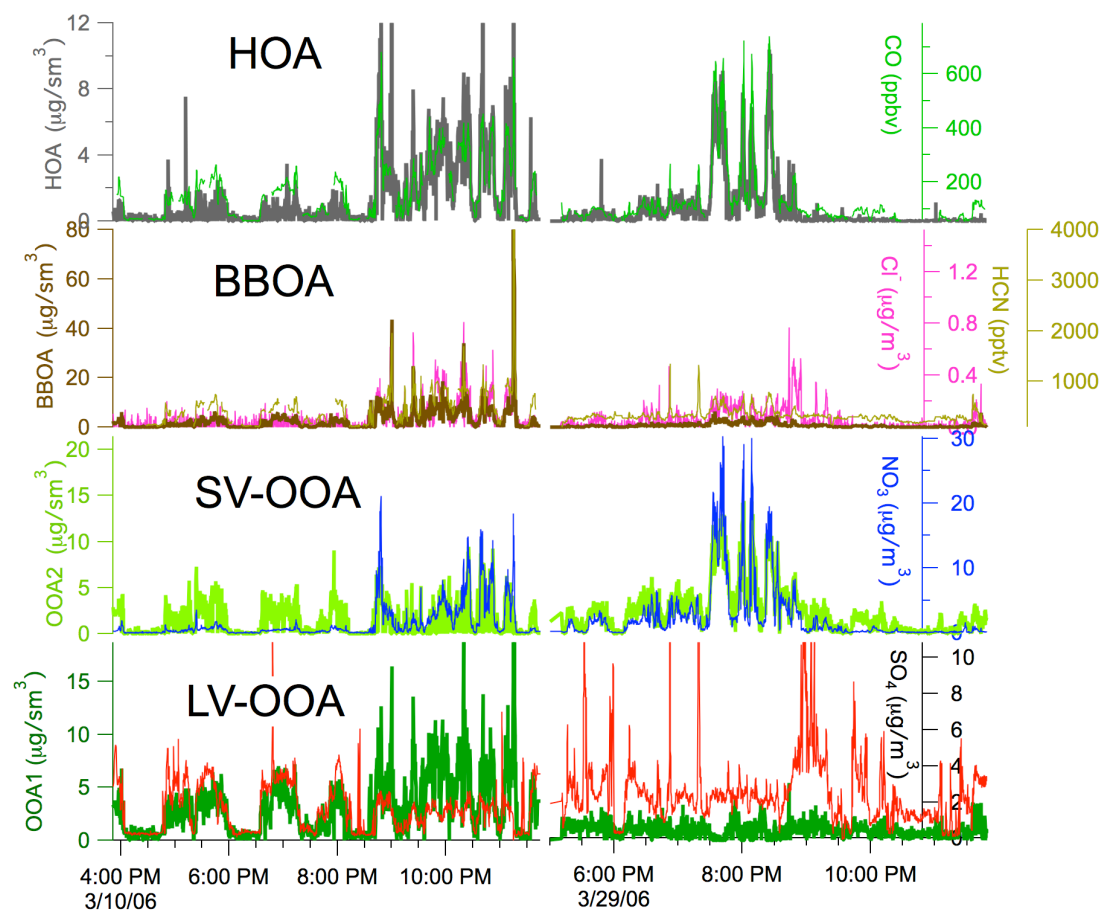


Figure SI-8b: Family 3 example Time Series.

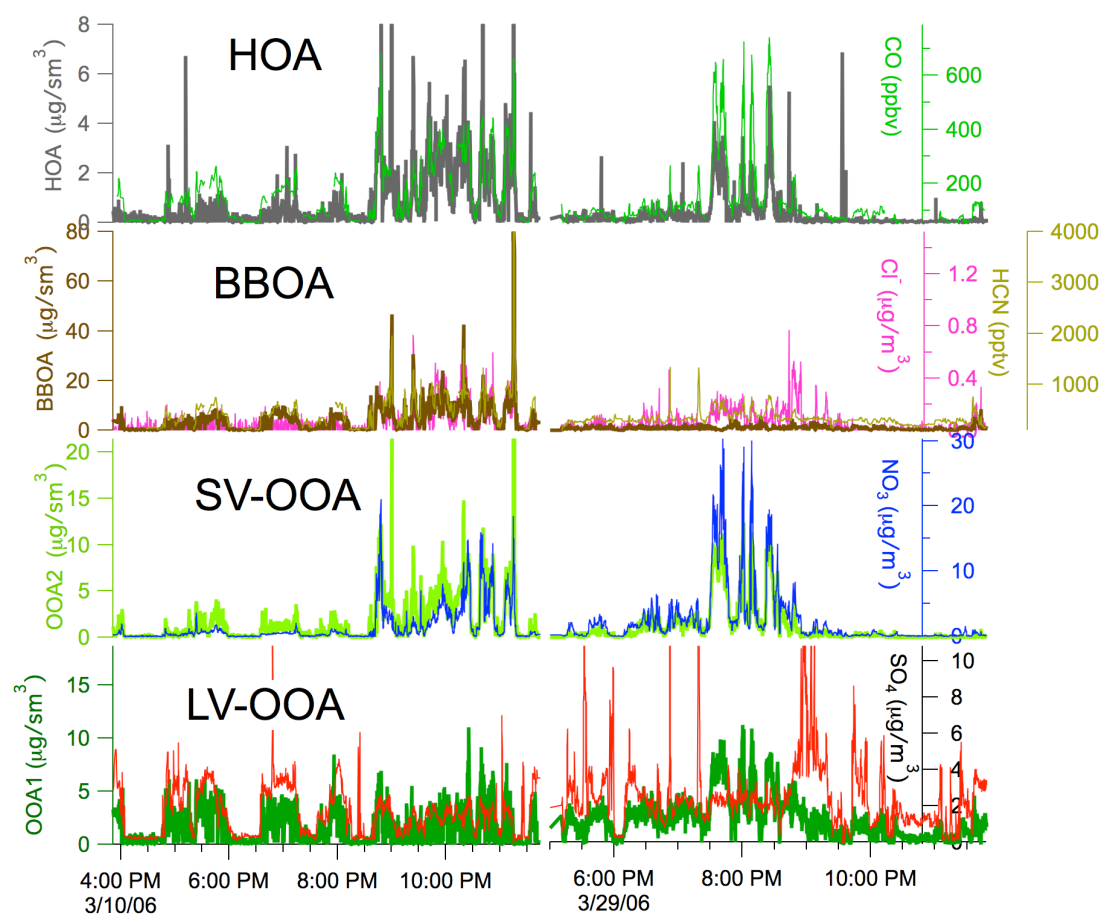


Figure SI-8c: Family 4 example Time Series.

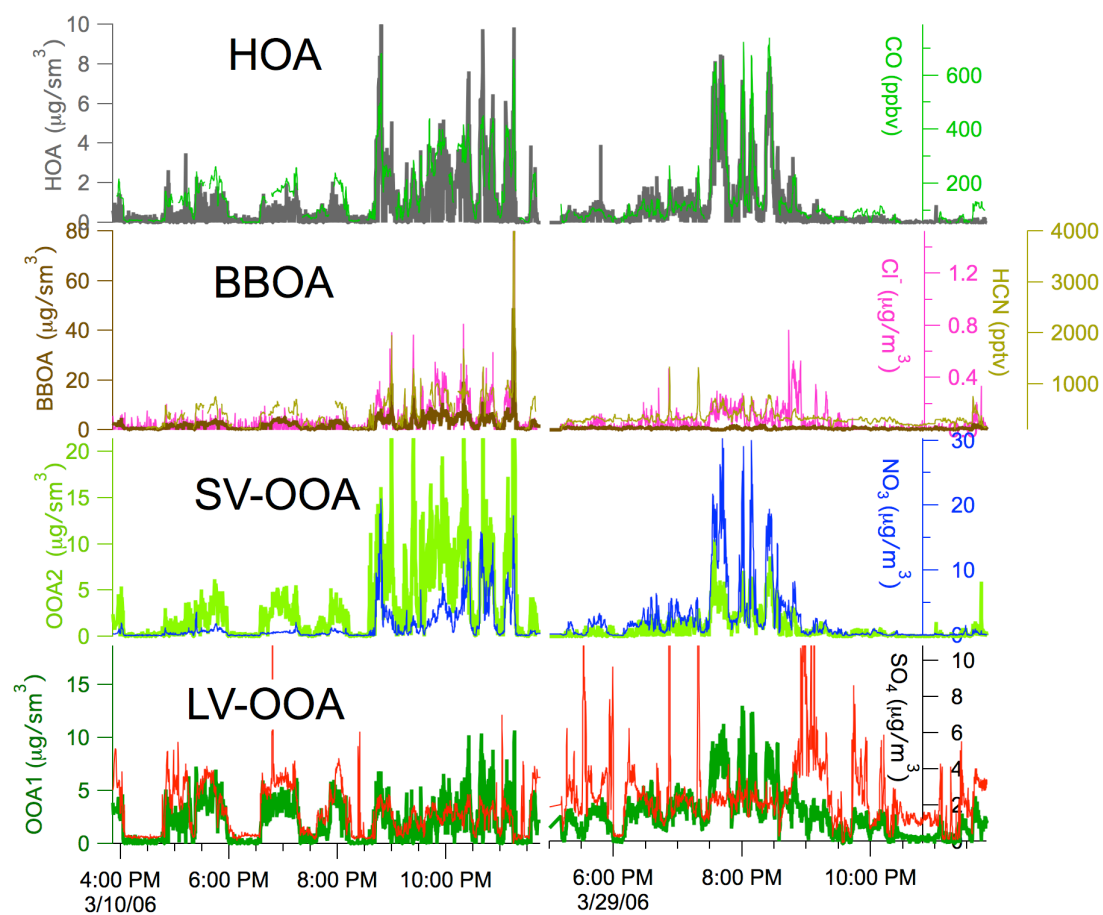


Figure SI-8d: Family 5 example Time Series.

