

Supplement of Atmos. Chem. Phys., 20, 13319–13341, 2020
<https://doi.org/10.5194/acp-20-13319-2020-supplement>
© Author(s) 2020. This work is distributed under
the Creative Commons Attribution 4.0 License.



Supplement of

Rapid evolution of aerosol particles and their optical properties downwind of wildfires in the western US

Lawrence I. Kleinman et al.

Correspondence to: Lawrence I. Kleinman (kleinman@bnl.gov)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

Supplementary Data

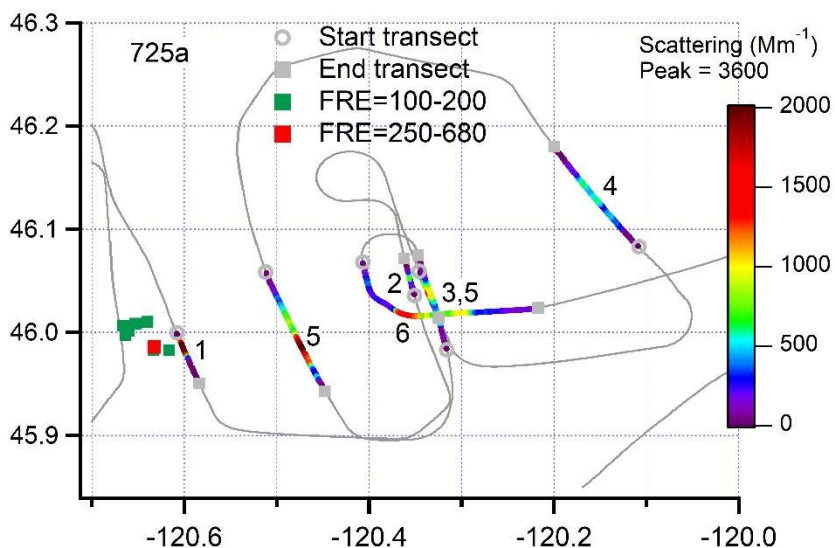


Figure S1. Ground track for flight 725a with transects colored according to light scattering. Transects are labelled 1-6 in order of increasing flight time. FRE is from MODIS 19:25-21:07. Fire is near transect 1. Transect 4 is furthest downwind. Latitude and longitude not to scale.

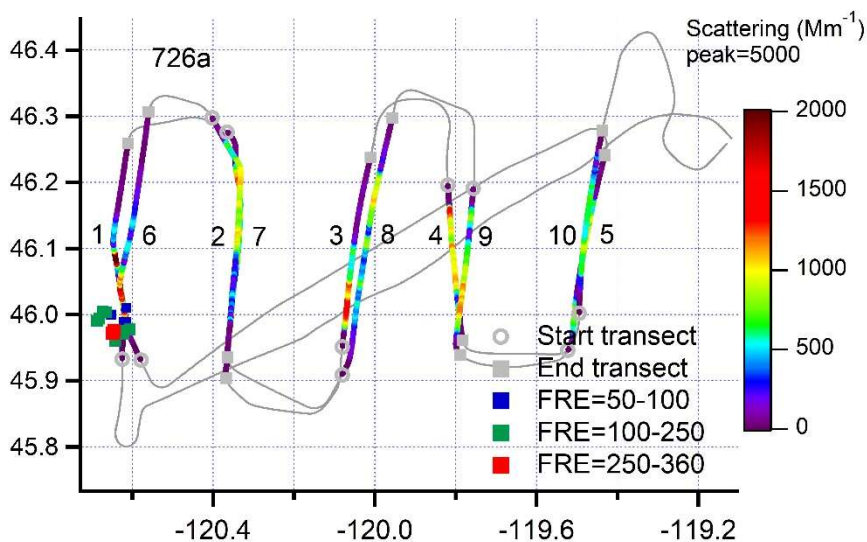
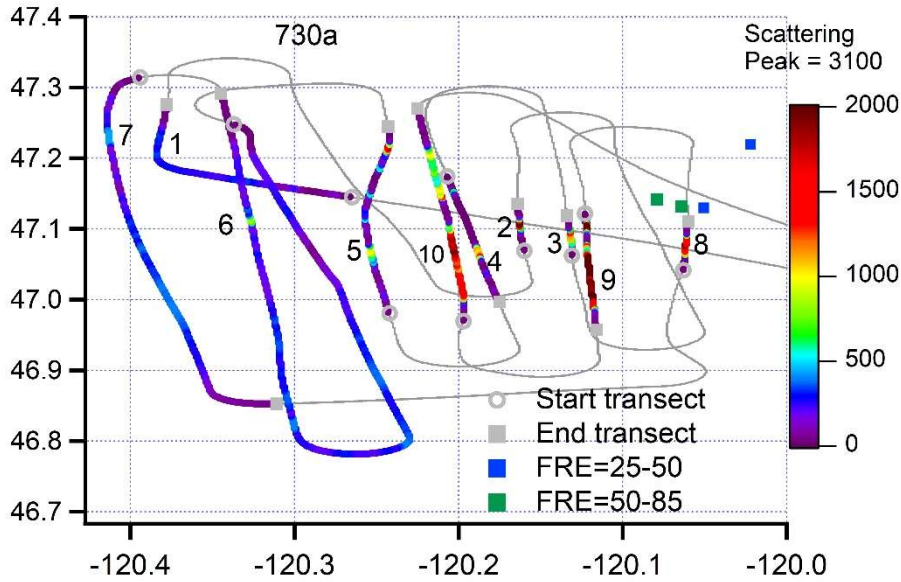


Figure S2. Ground track for flight 726a with transects colored according to light scattering. Transects are labelled 1-10 in order of increasing flight time. FRE from MODIS, 20:08-21:52. Wind blows from west. Fire is near transects 1 and 6. Latitude and longitude not to scale.



Figures S3 Ground track for flight 730a with transects colored according to light scattering. Transects are labelled 1-10 in order of increasing flight time. FRE from MODIS, 06:09-10:19. Wind is from the East. Latitude and longitude not to scale.

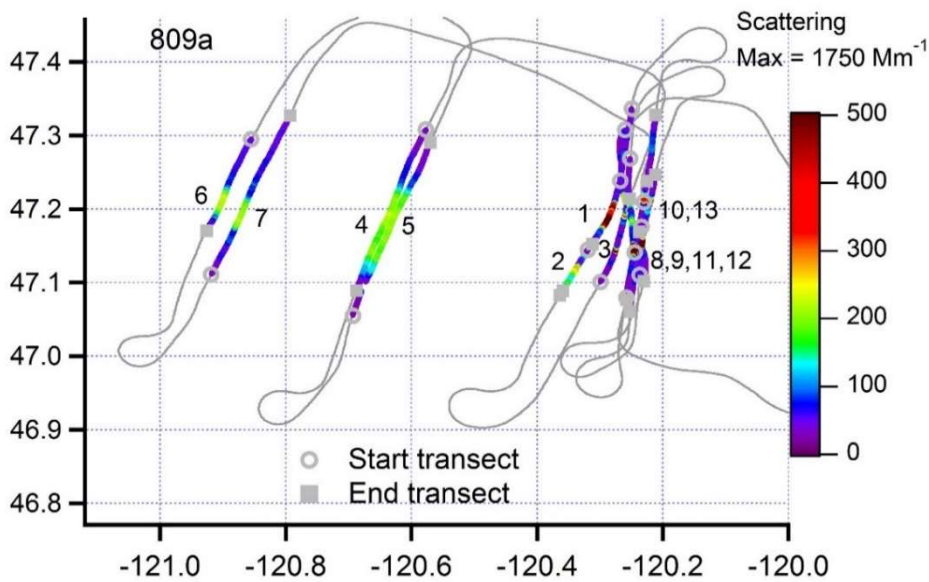


Figure S4. Ground track for flight 809a with transects colored according to light scattering. Transects are labelled 1-13 in order of increasing flight time. MODIS data not available. Wind is from the East. Transects 8-13 are from 5 crossings of plume. Transects 6 and 7 furthest downwind. Latitude and longitude not to scale.

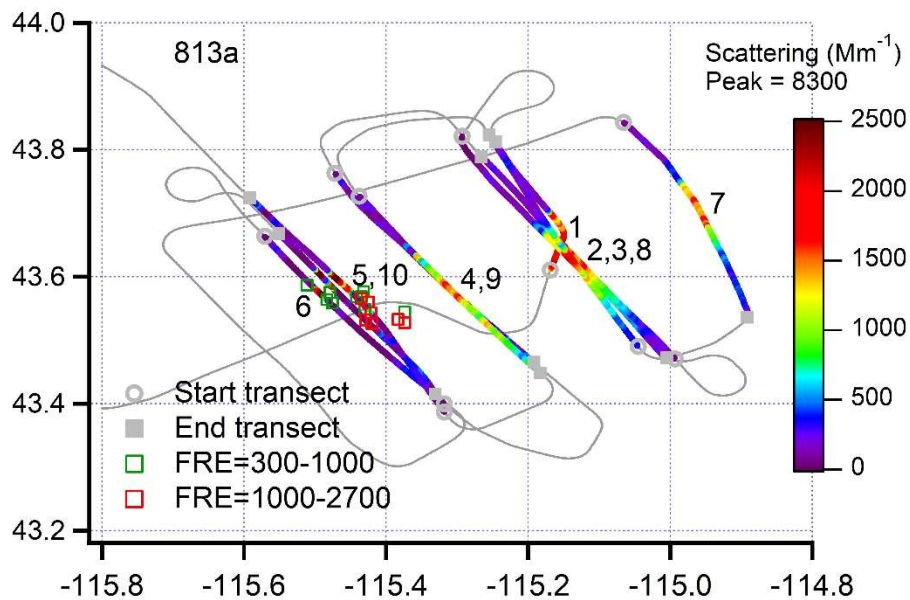


Figure S5. Ground track for flight 813a. Similar format as Fig. 3. FRE from MODIS, 19:01-20:43. Transects 5,6, and 10 are near source, transect 10 furthest downwind. Latitude and longitude not to scale.

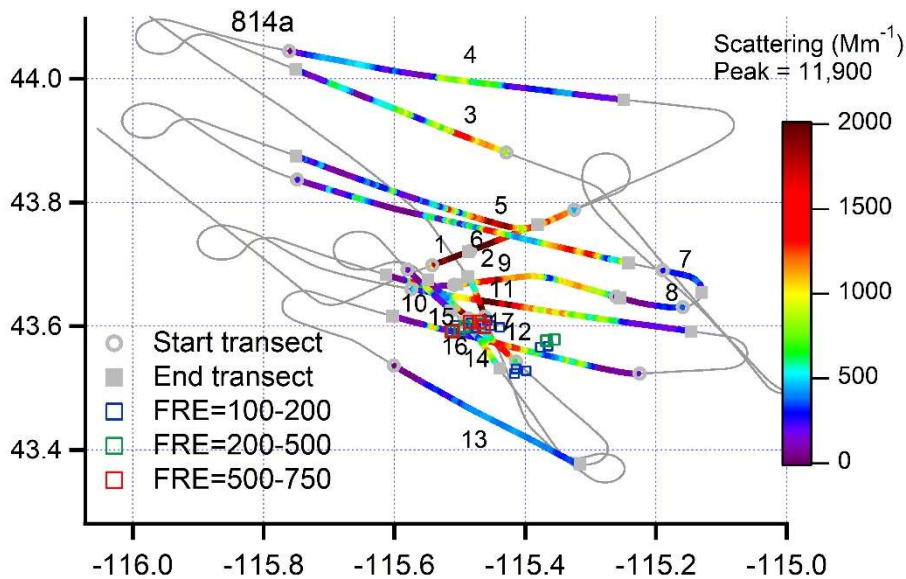
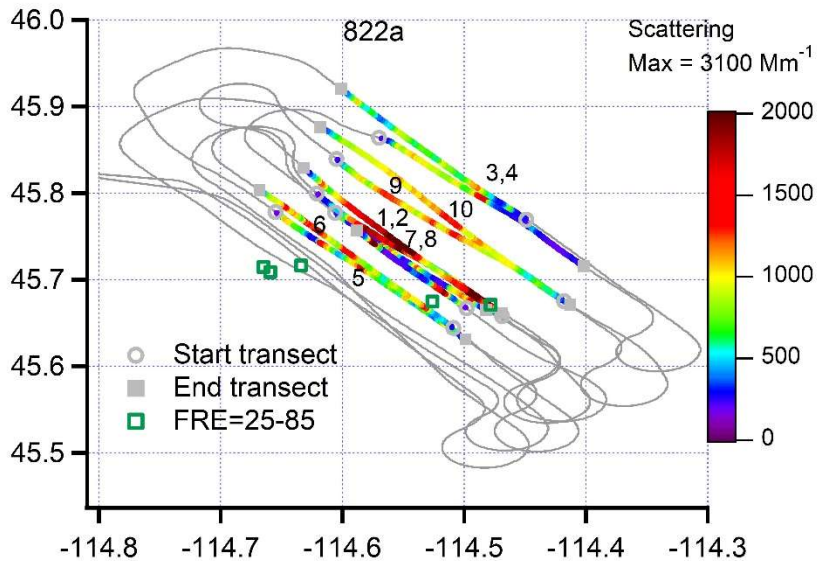


Figure S6. Ground track for flight 814a. Similar format as Fig. 3. Winds are from the South. FRE from MODIS, 19:07-20:50. FRE and scattering indicate two fire centers, approximately east and west of longitude -115.4. Latitude and longitude not to scale.



Figures S7 ground track 822a with transects colored according to light scattering. Transects are labelled 1-10 in order of increasing flight time. Transect 1 samples the least aged aerosol with photochemical age = 0.37. Winds are from the WSW. MODIS data from AM and PM combined. Nominally upwind transects 5 and 6 have similar photochemical age $\sim 0.5-0.65$ as 7 and 8. Transects 9 and 10 are older (~ 0.95) and transects 3 and 4 older still (~ 1.25). MODIS coverage limited to morning more than 12h before flight. Latitude and longitude not to scale.

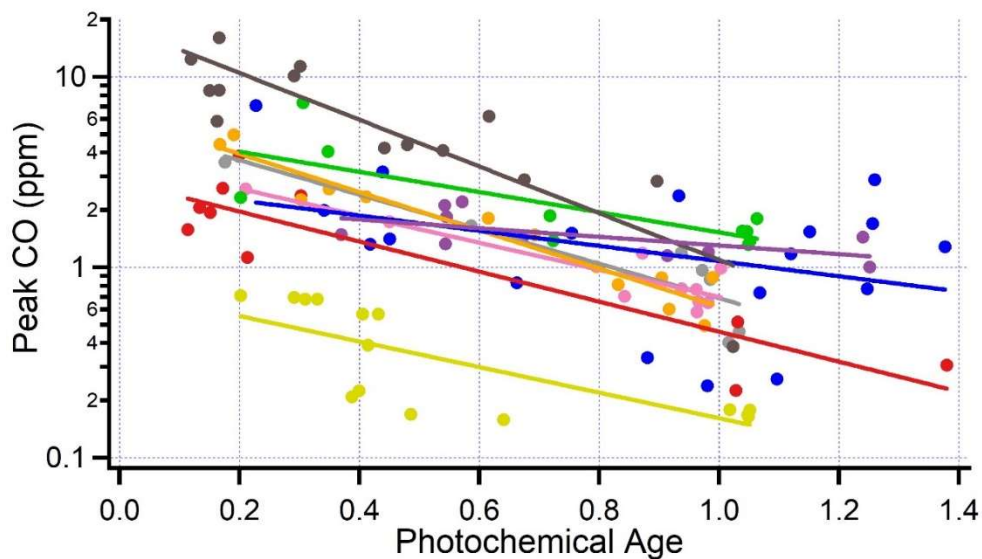


Figure S8. Maximum CO (ppm) for each transect, identified by flight, as a function of photochemical age. Linear least squares fit done on $\text{Log}_{10}(\text{CO})$. CO mixing ratio decreased by a factor of 4.3 (average of 9 flights) between age = 0.2 and 1.0. 9-flight average $r^2 = 0.65$.

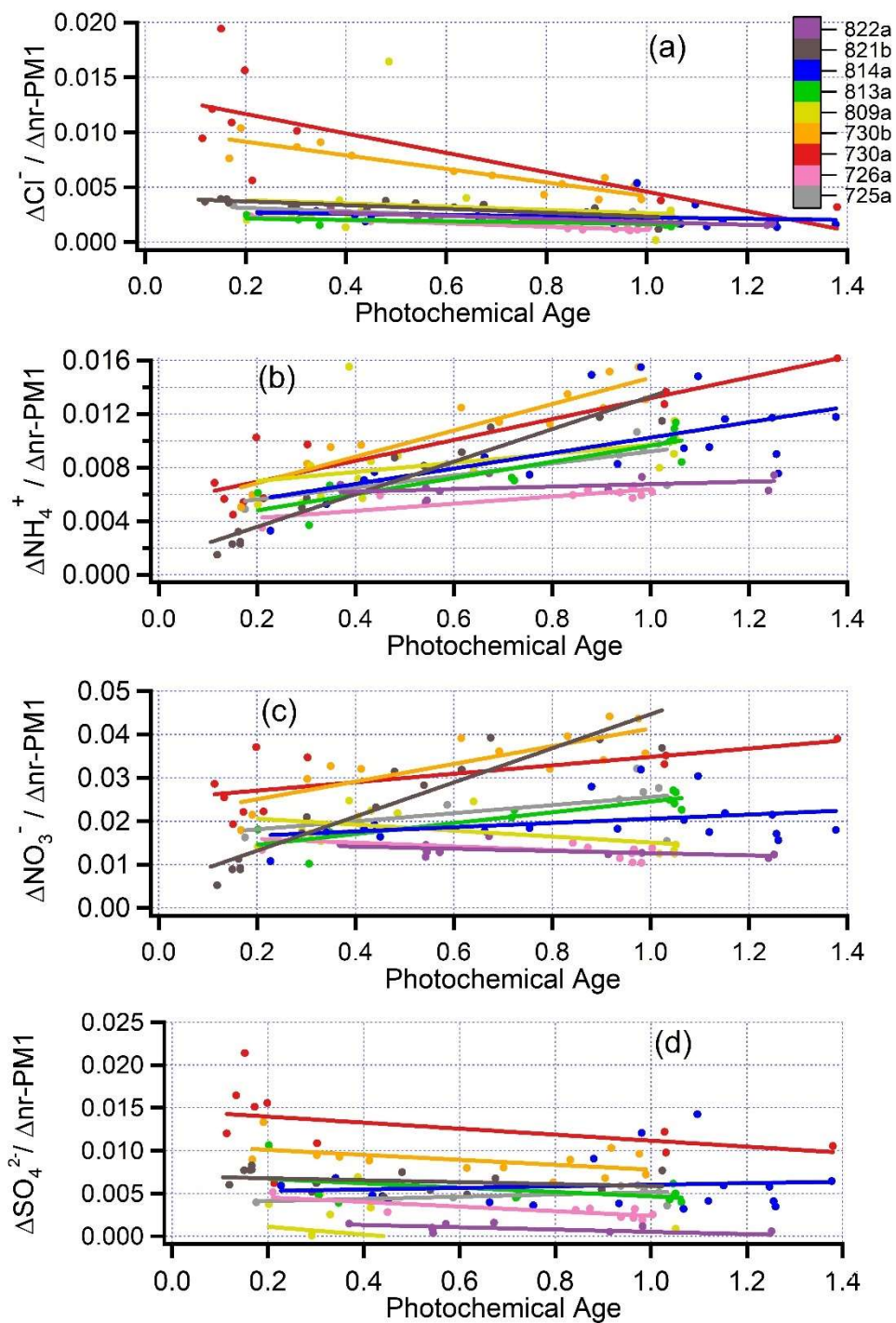


Figure S9. Fractional contribution of 4 inorganic ions to nr-PM1 as a function of photochemical age. Format is the same as Fig. 10. (a) Cl^- , (b) NH_4^+ , (c) NO_3^- , (d) SO_4^{2-} . Negative values for $\Delta\text{SO}_4^{2-} / \Delta\text{nr-PM1}$ on flight 809a are due to sulfate in background air in excess of plume values.

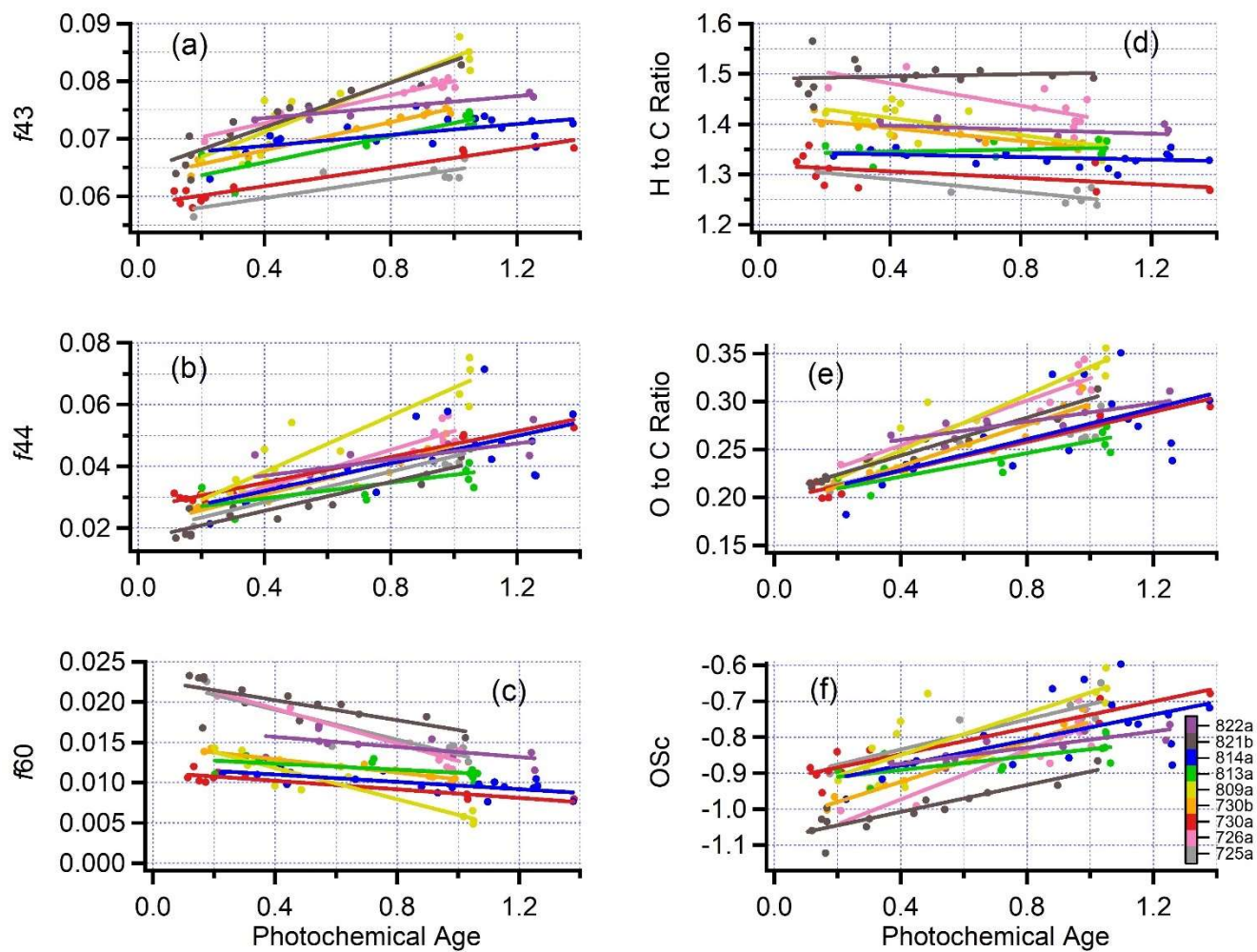


Figure S10. Transect-average contribution of SP-AMS unit mass peaks to nr-PM₁, elemental ratios, and carbon oxidation state as functions of photochemical age. Format is the same as Fig. 10. (a) f_{43} , (b) f_{44} , (c) f_{60} , (d) H to C ratio, (e) O to C ratio, and (f) OSC.