Supplementary Data

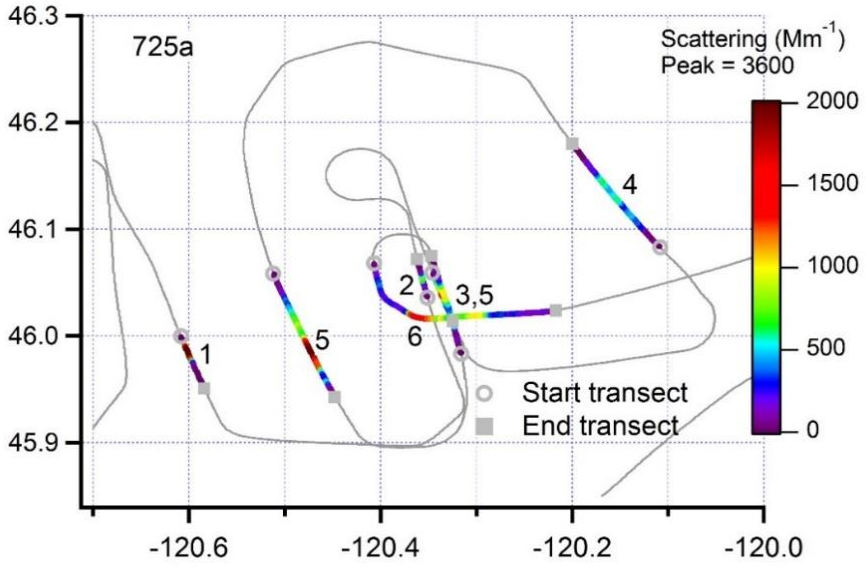


Figure S1. Ground track for flight 726a with transects colored according to light scattering. Transects are labelled 1-6 in order of increasing flight time. Fire is near transect 1. Transect 4 is furthest downwind. Latitude and Longitude not to scale.

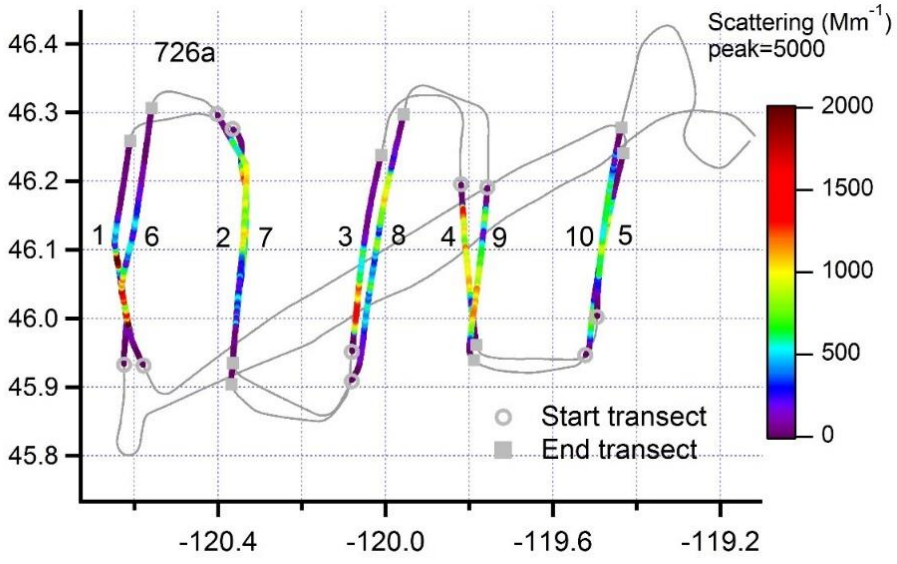
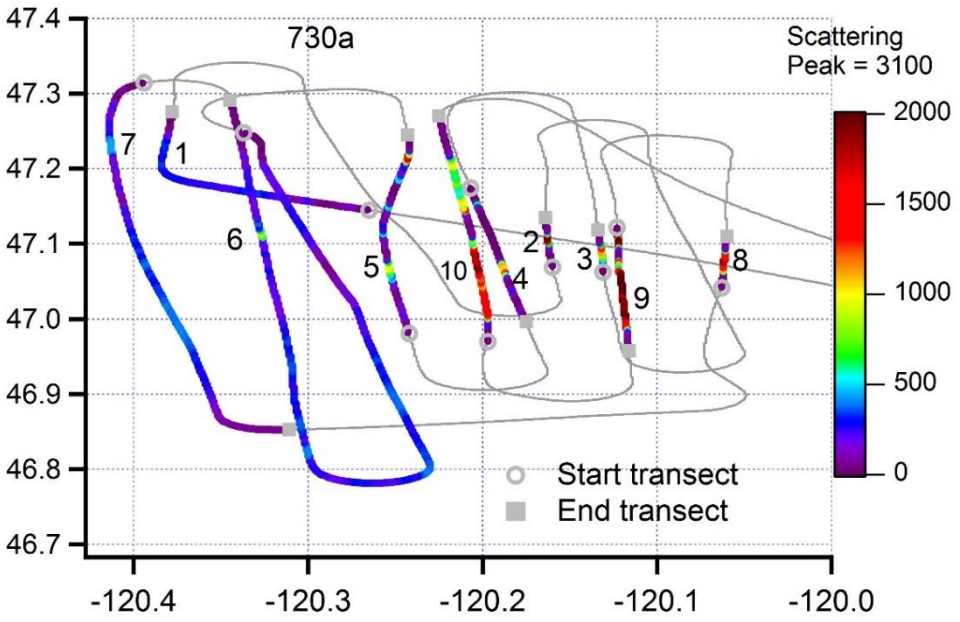


Figure S2. Ground track for flight 726a with transects colored according to light scattering. Transects are labelled 1-10 in order of increasing flight time. Wind blows from west. Fire is near transects 1 and 6. Latitude and Longitude not to scale.



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. Wind is from the East. Latitude and Longitude not to scale.

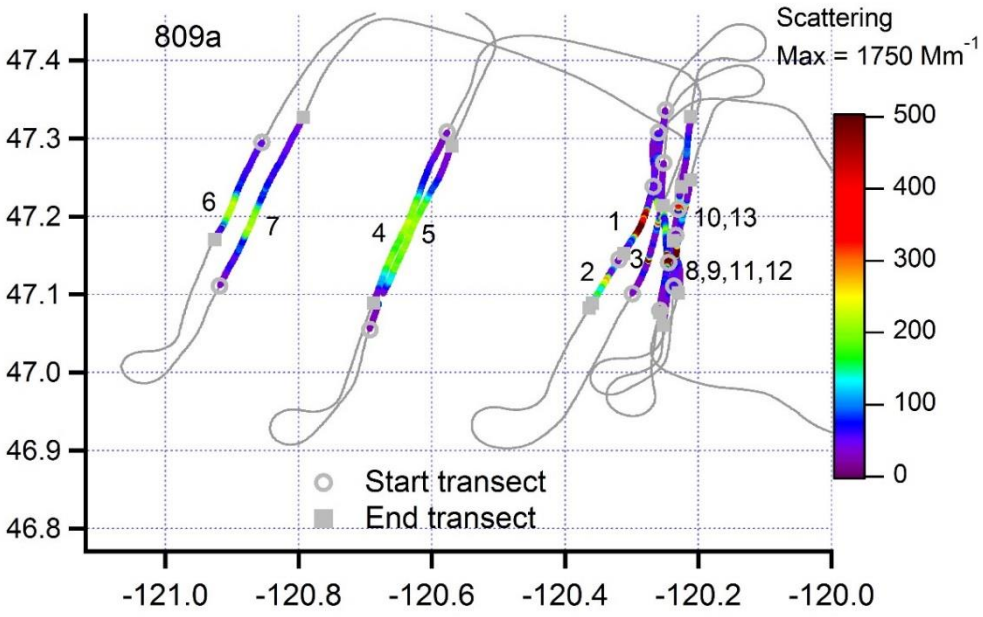


Figure S4. Ground track for flight 809a with transects colored according to light scattering. Transects are labelled 1-13 in order of increasing flight time. Wind is from the East. Transects 8-13 are from 5 crossings of plume. Latitude and Longitude not to scale.

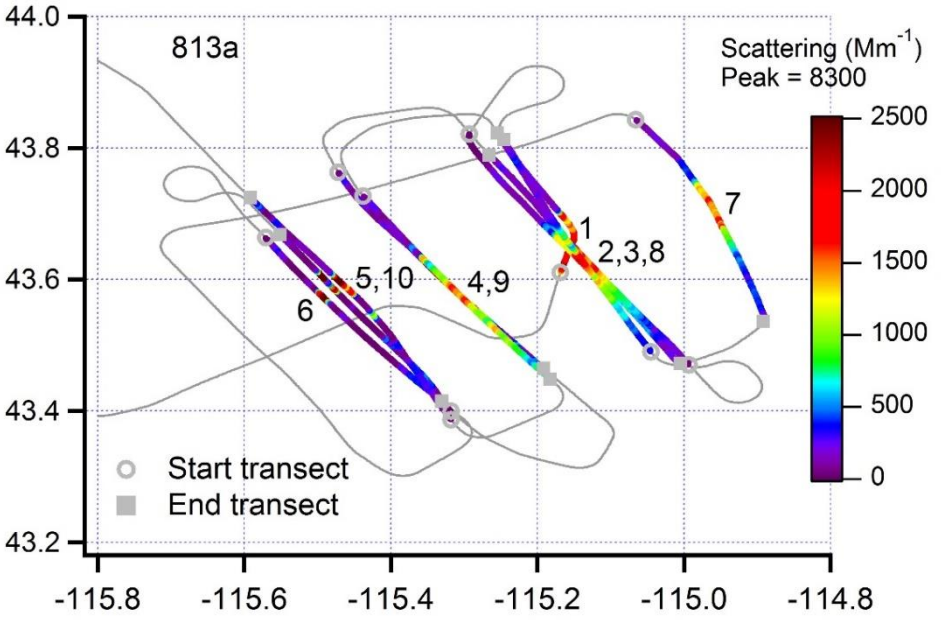


Figure S5. Ground track for flight 813a. Similar format as Fig. 3. Transects 5,6, and 10 are near source, transect 10 furthest downwind.

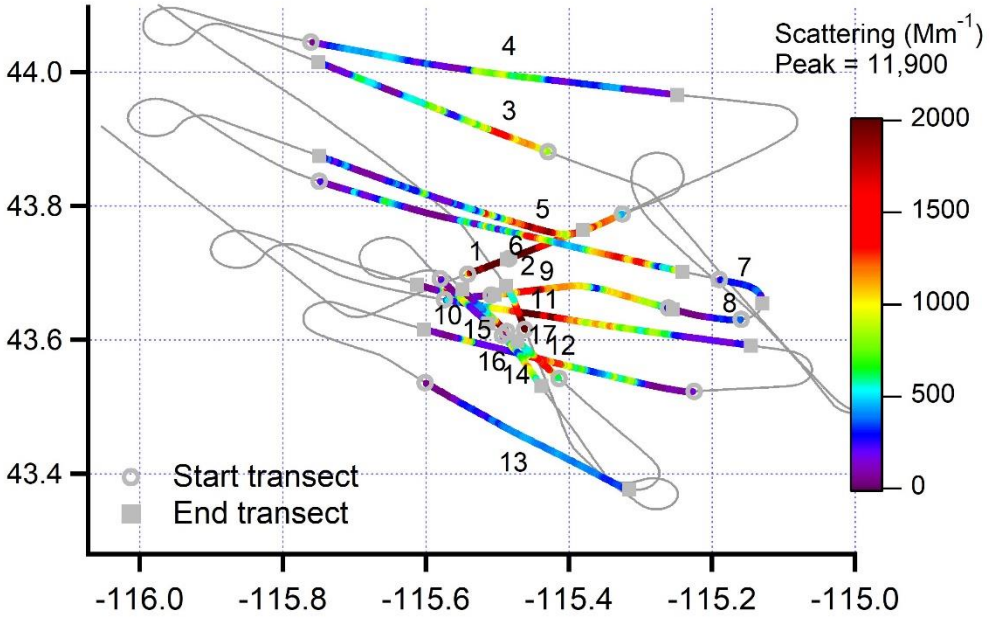
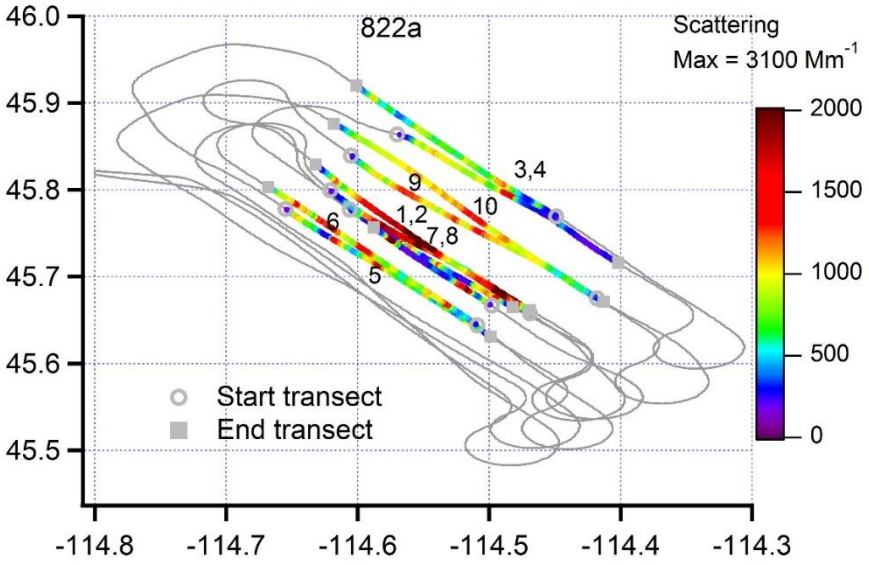


Figure S6. Ground track for flight 814a. Similar format as Fig. 3. Winds are from the South.



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. Nominally upwind transects 5 and 6 have similar photochemical age ~ 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).

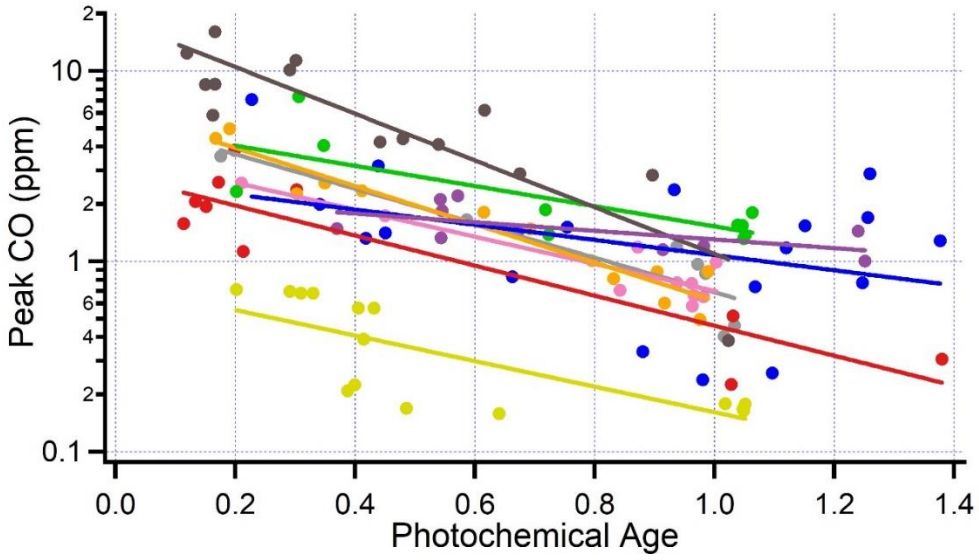


Figure S8. Maximum CO (ppm) for each transect, identified by flight, as a function of photochemical age. Linear least squares fit done on Log_{10} (CO). CO mixing ratio decreased by a factor of 4.3 (average of 9 flights) between Age = 0.2 and 1.0. 9-flight average $r^2 = 0.65$.

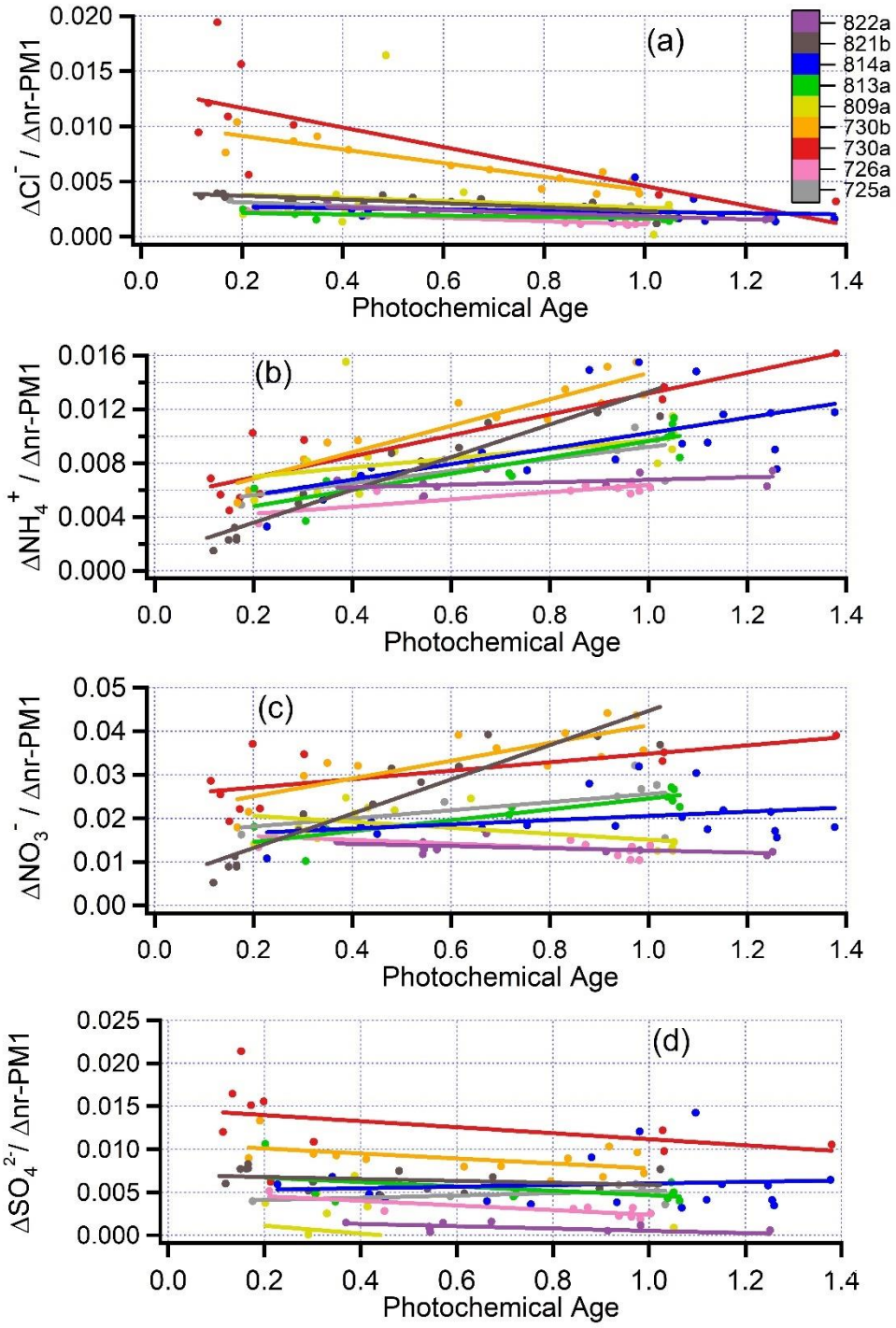


Figure S9. Fractional contribution of 4 inorganic ions to nr-PM1 as a function of photochemical age. Format is the same as Fig. 10. (a) Cl^-, (b) NH_4^+, (c) NO_3^-, (d) SO_4^{2-}. Negative values for ΔSO_4^{2-} / Δ nr-PM1 on flight 809a are due to sulfate in background air in excess of plume values.

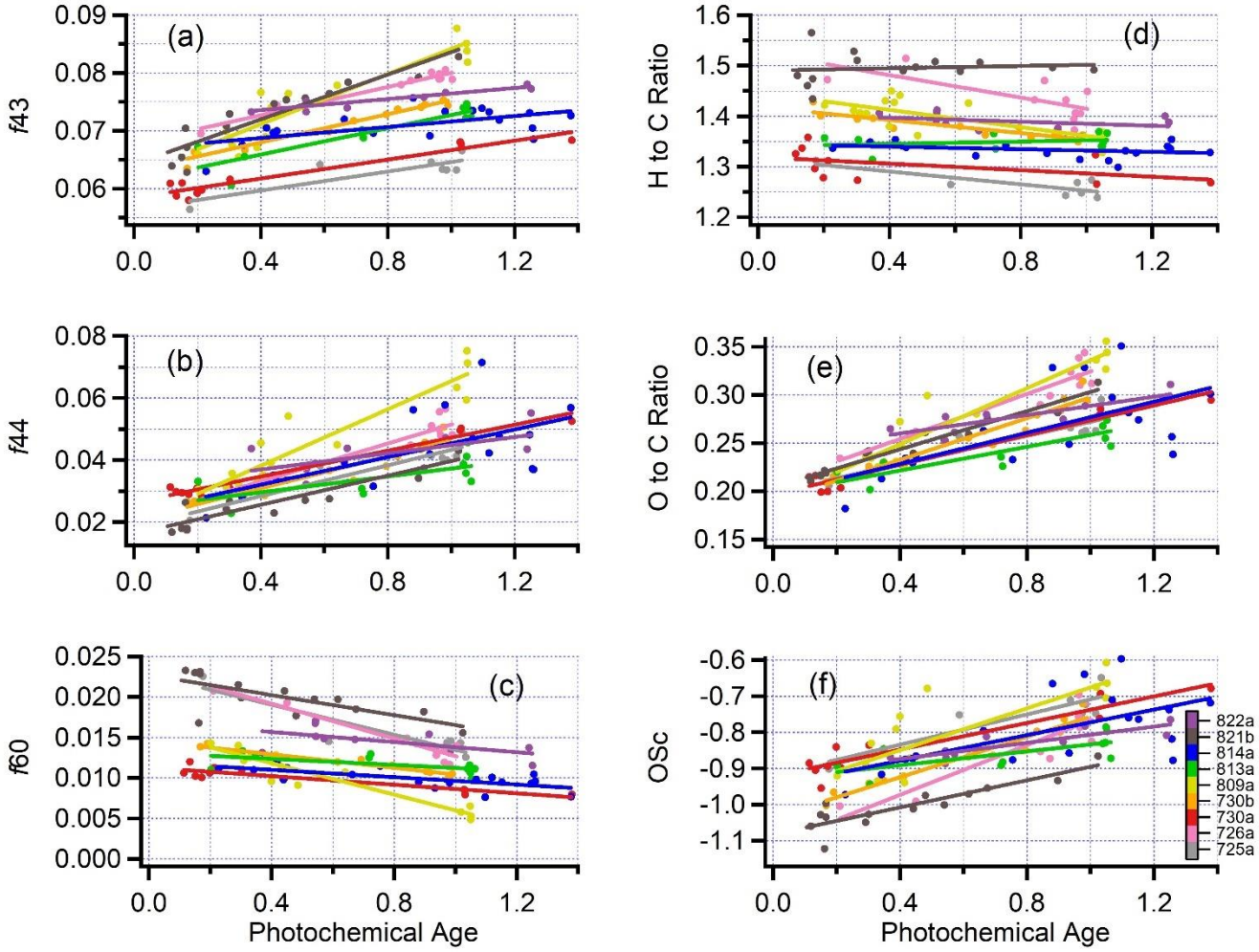


Figure S10. Transect-average contribution of SP-AMS unit mass peaks to nr-PM1, elemental ratios, and carbon oxidation state as functions of photochemical age. Format is the same as Fig. 10. (a) *f*43, (b) *f*44, (c) *f*60, (d) H to C ratio, (e) O to C ratio, and (f) OSc.