The Supplemental Material contains one table (Table S1) and eight figures (Figure S1-S8) to provide additional information about and support for the results presented in the manuscript main text.

Table S1. Results from linear fitting of *SAE* versus $f_{sca,PM1}$.

Wavelength Pair SAE	Wavelength $f_{sca,PM1}$ (nm)	Slope*	Intercept#
450-550	450	2.65	-0.34
450-550	550	2.69	-0.05
450-550	700	2.81	0.27
450-700	450	2.63	-0.41
450-700	550	2.70	-0.14
450-700	700	2.92	0.15
550-700	450	2.62	-0.47
550-700	550	2.71	-0.21
550-700	700	3.01	0.05
	T1		
450-550	450	2.62	-0.24
450-550	550	2.66	-0.06
450-550	700	2.76	0.40
450-700	450	2.69	-0.42
450-700	550	2.76	-0.14
450-700	700	2.97	0.18
550-700	450	2.77	-0.59
550-700	550	2.85	-0.31
550-700	700	3.15	-0.02
550-700	700	3.01	0.05

* The fit uncertainties were typically < 0.02, which is much smaller than the experimental uncertainty.
# The fit uncertainties were typically < 0.01, which is much smaller than the experimental uncertainty.

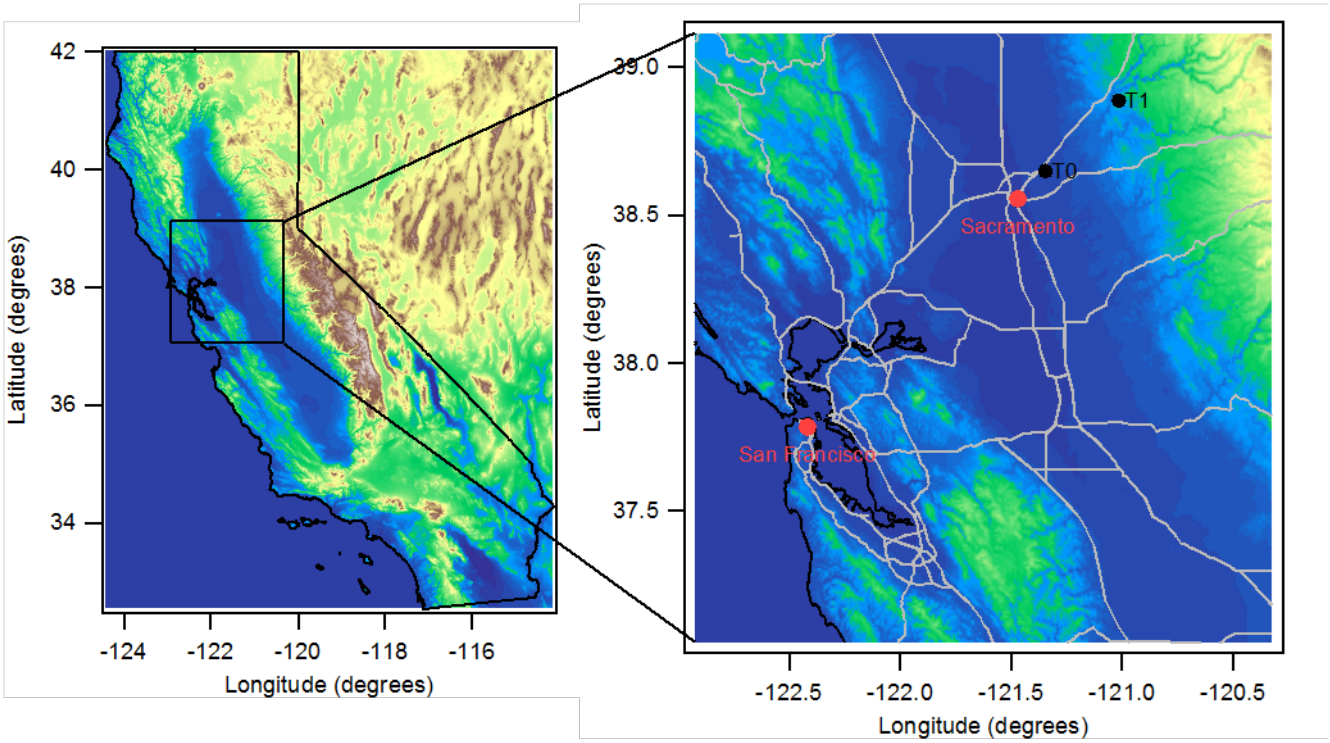

Figure S1. (left) A map of California, showing the general measurement location. (right) A closer-up view of the two observational sites, T0 near Sacramento, CA and T1 near Cool, CA. The gray lines show the main interstate and highway network.

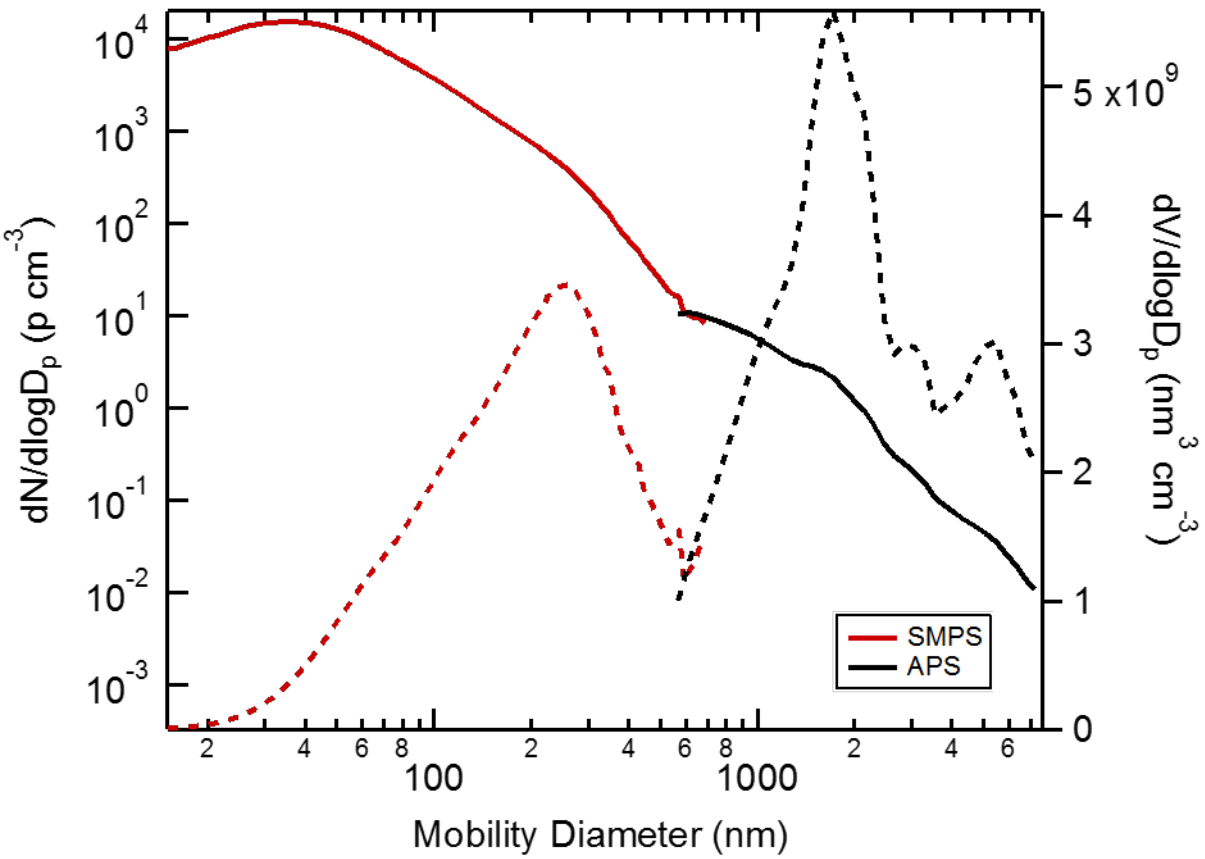

Figure S2. Merged campaign-average mobility-equivalent size distribution for the T0 site showing the measurements made using the SMPS (red) and APS (black). The APS aerodynamic diameters were adjusted to mobility-equivalent diameters assuming a material density of 2.0 g cm^{-3}. The number-weighted distribution is shown as solid lines and the volume-weighted size distribution as dashed lines.

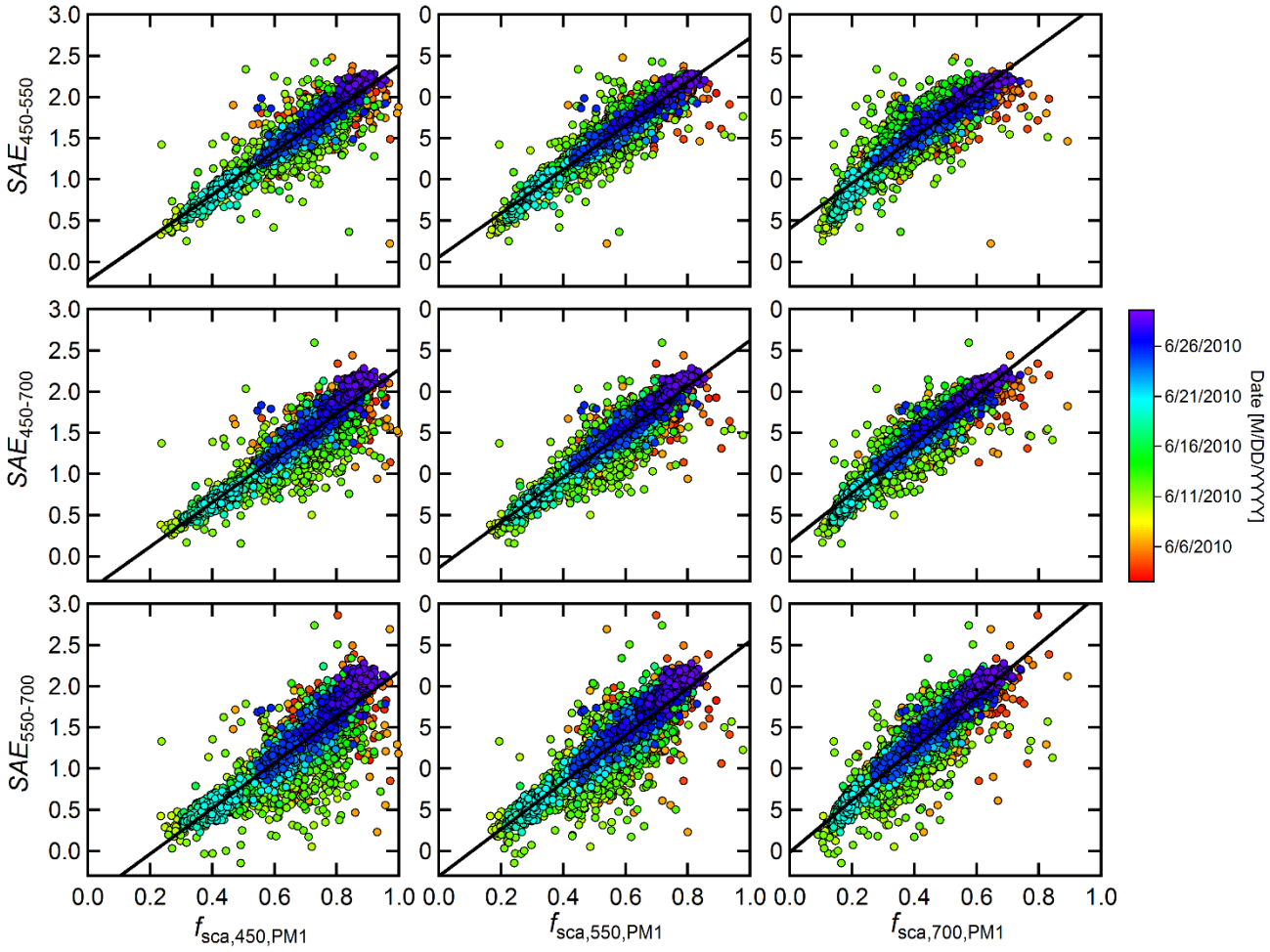

Figure S3. The relationship between the scattering Ångstrom exponent for different wavelength pairs and the PM_1/PM_{10} scattering ratio at different wavelengths for the T0 site. The points are colored according to time during the campaign. Slope and intercept values from the linear fits (black lines) are reported in Table S1.

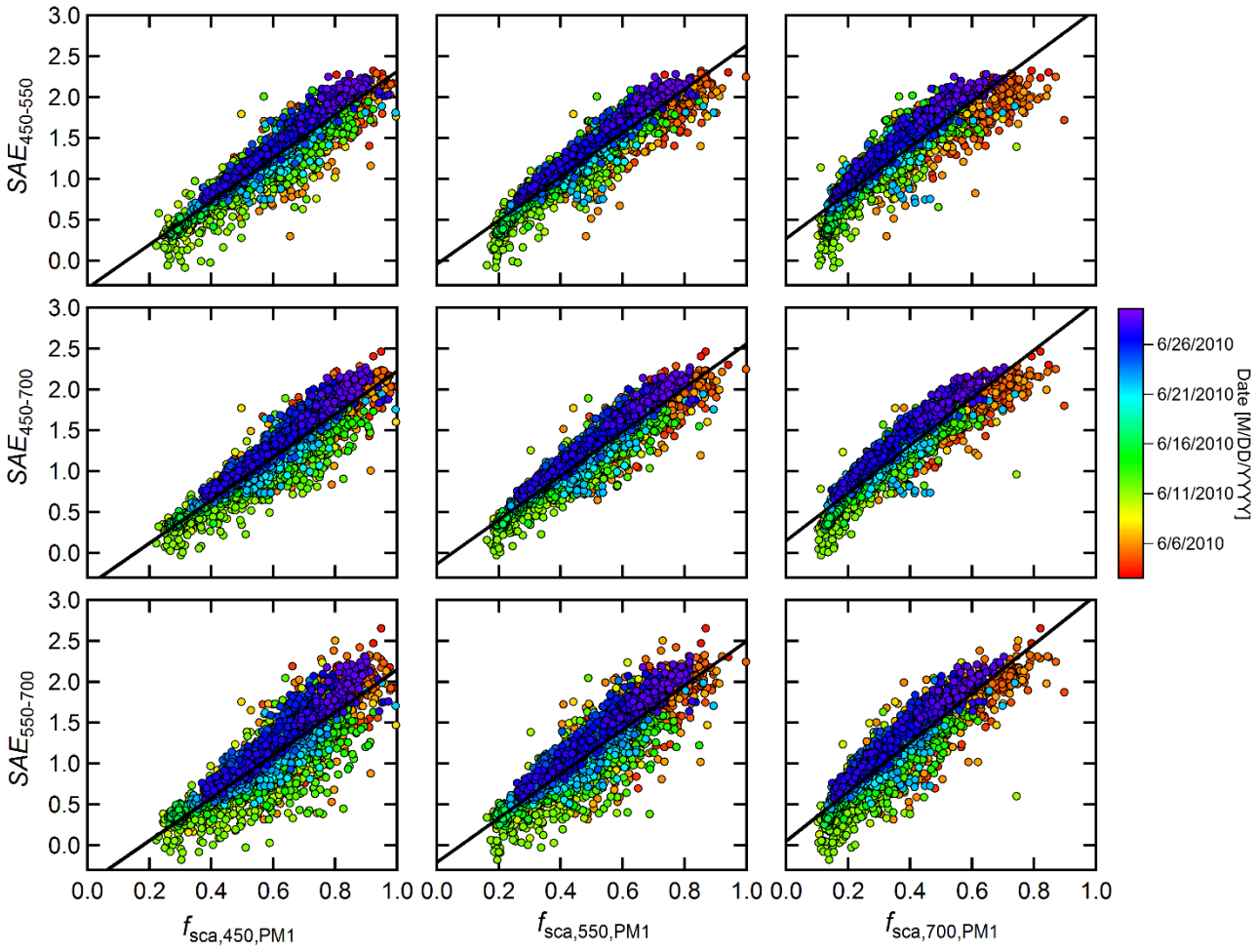

Figure S4. The relationship between the scattering Ångstrom exponent for different wavelength pairs and the PM_1/PM_{10} scattering ratio at different wavelengths for the T1 site. The points are colored according to time during the campaign. Slope and intercept values from the linear fits (black lines) are reported in Table S1.

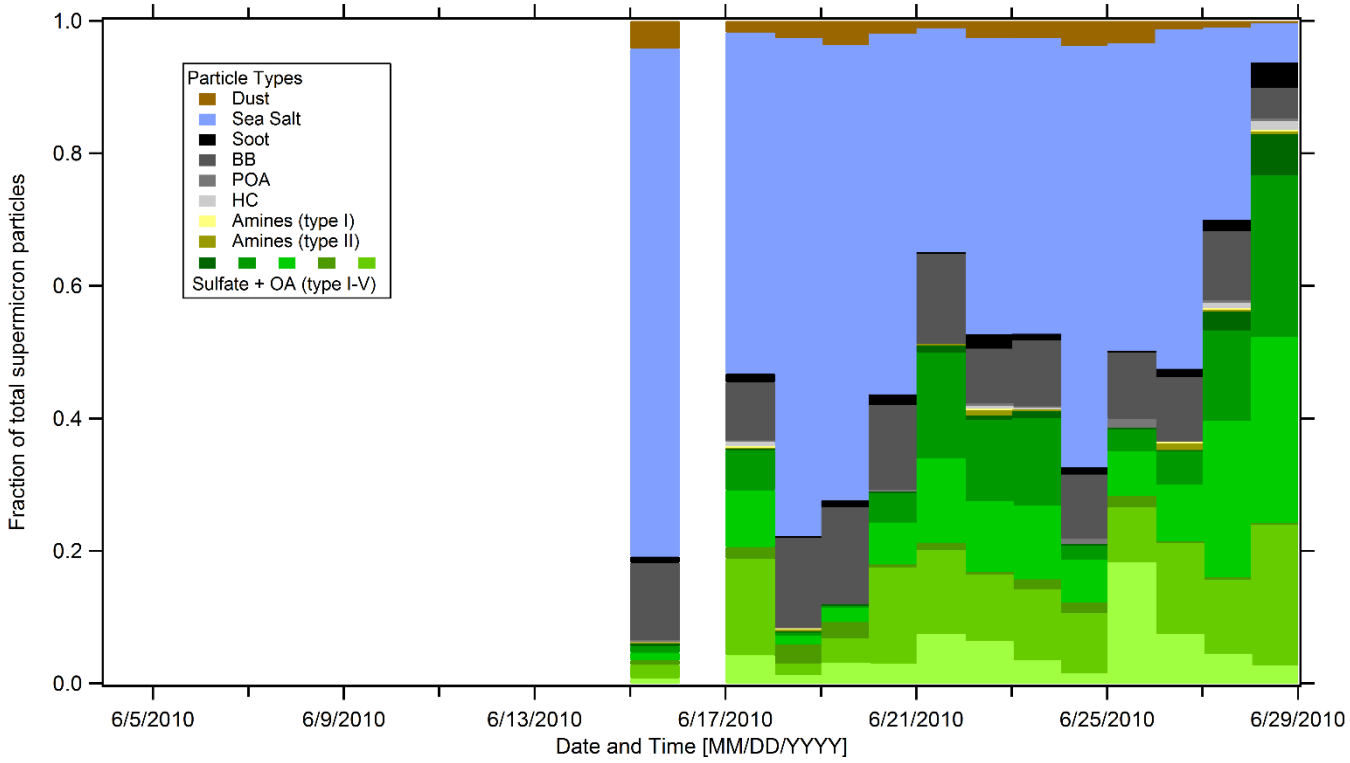

Figure S5. Fractional number abundance of supermicron particles (d_{va} > 1 micron) as measured by the SPLAT-II instrument at the T0 site. It should be noted that the upper-limit sampling range for SPLAT-II is around 2 microns, and thus supermicron particles that are larger than this are not characterized.

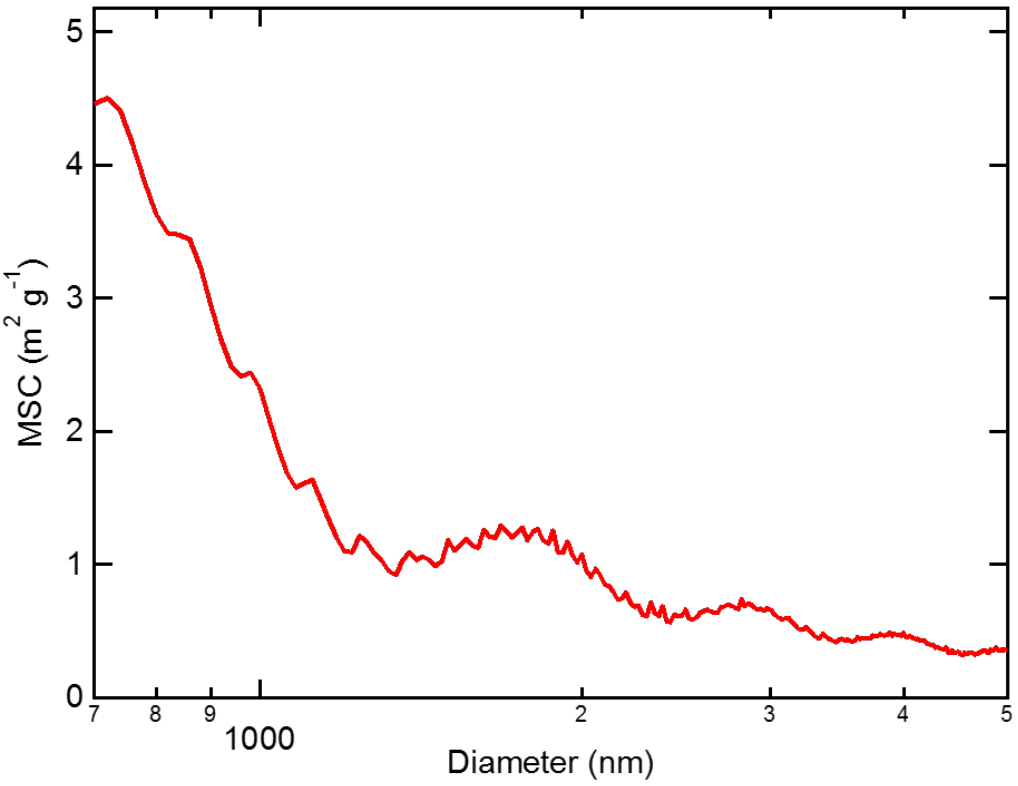

Figure S6. Calculated relationship between the mass scattering coefficient and mobility diameter for spherical particles with density = 2 g cm^{-3}. A complex refractive index of RI = 1.5 + 0.0*i* was used.

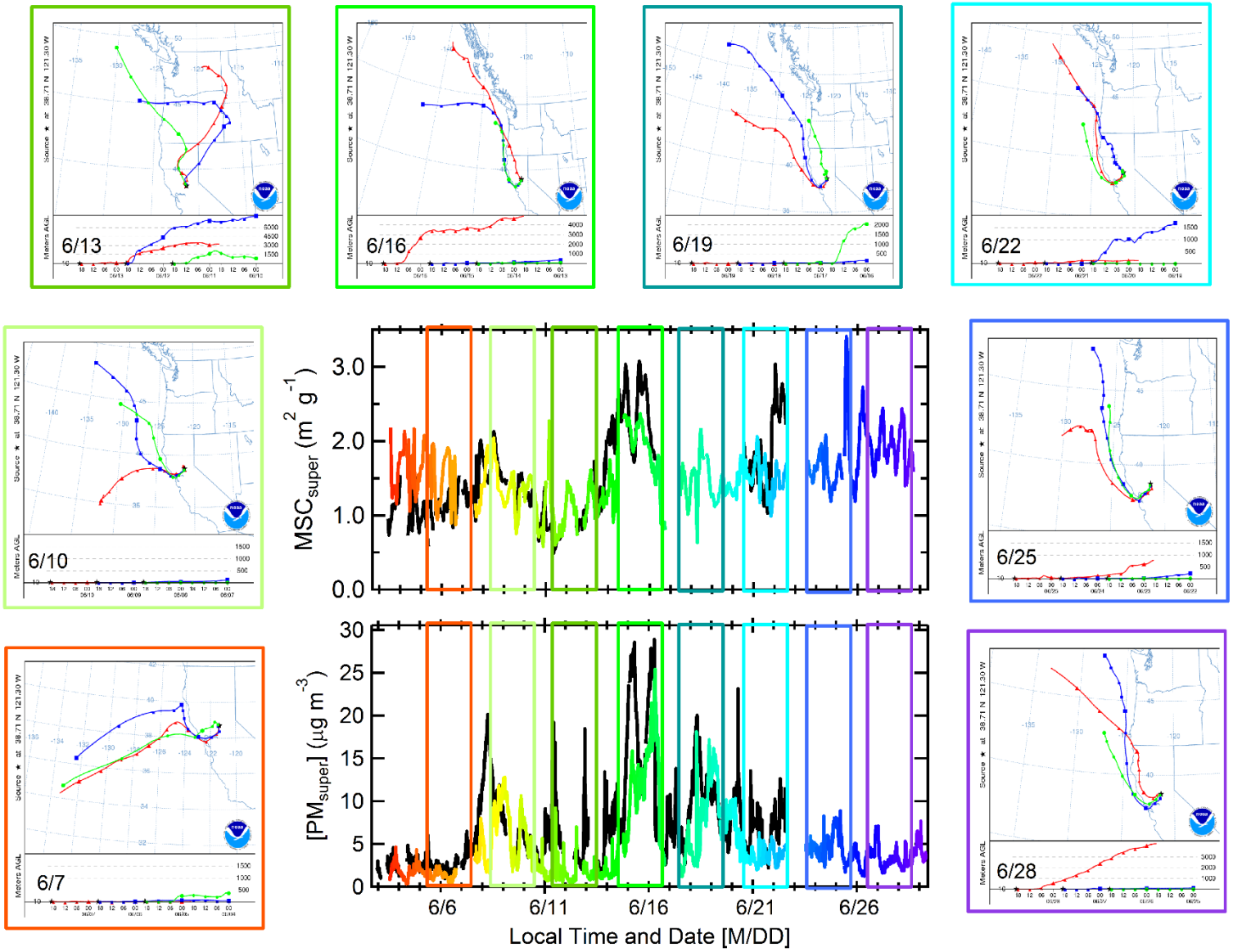

Figure S7. The central panels show time-series of the mass scattering coefficient and PM concentration for supermicron particles for both T0 (black lines) and T1 (colored lines). The outer panels show back trajectories calculated form HYSPLIT, using the NAM meteorological data, arriving at the T0 site at noon local time each day. Each outer panel shows three back trajectories that are separated by 24 hours (note that time goes backwards in these panels). The boxes around each outer panel correspond in color to the boxes shown in each of the central panels and provide a visual reference as to which trajectories correspond to which time period.

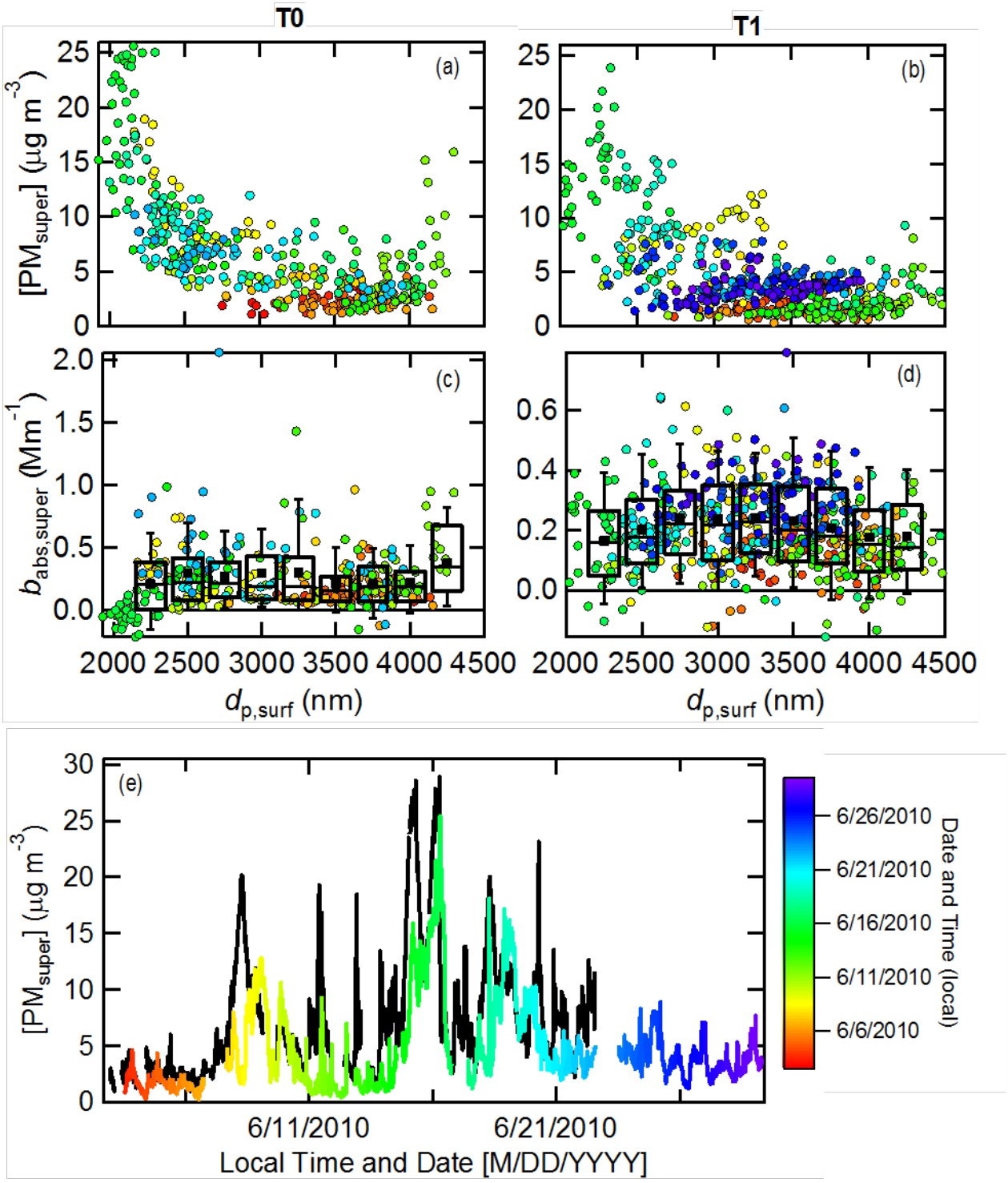

Figure S8. The relationship between the supermicron particle concentration (a,b) or the absolute supermicron absorption at 532 nm (c,d) and the surface-weighted median diameter of the supermicron mode. Observations from T0 are shown in (a) and (c) and from T1 in (b) and (d). For reference, the time series of [PM_{super}] is shown for both sites in panel (e), where T0 is shown in black and T1 in color. The points are colored according to date, as indicated in the color scale.

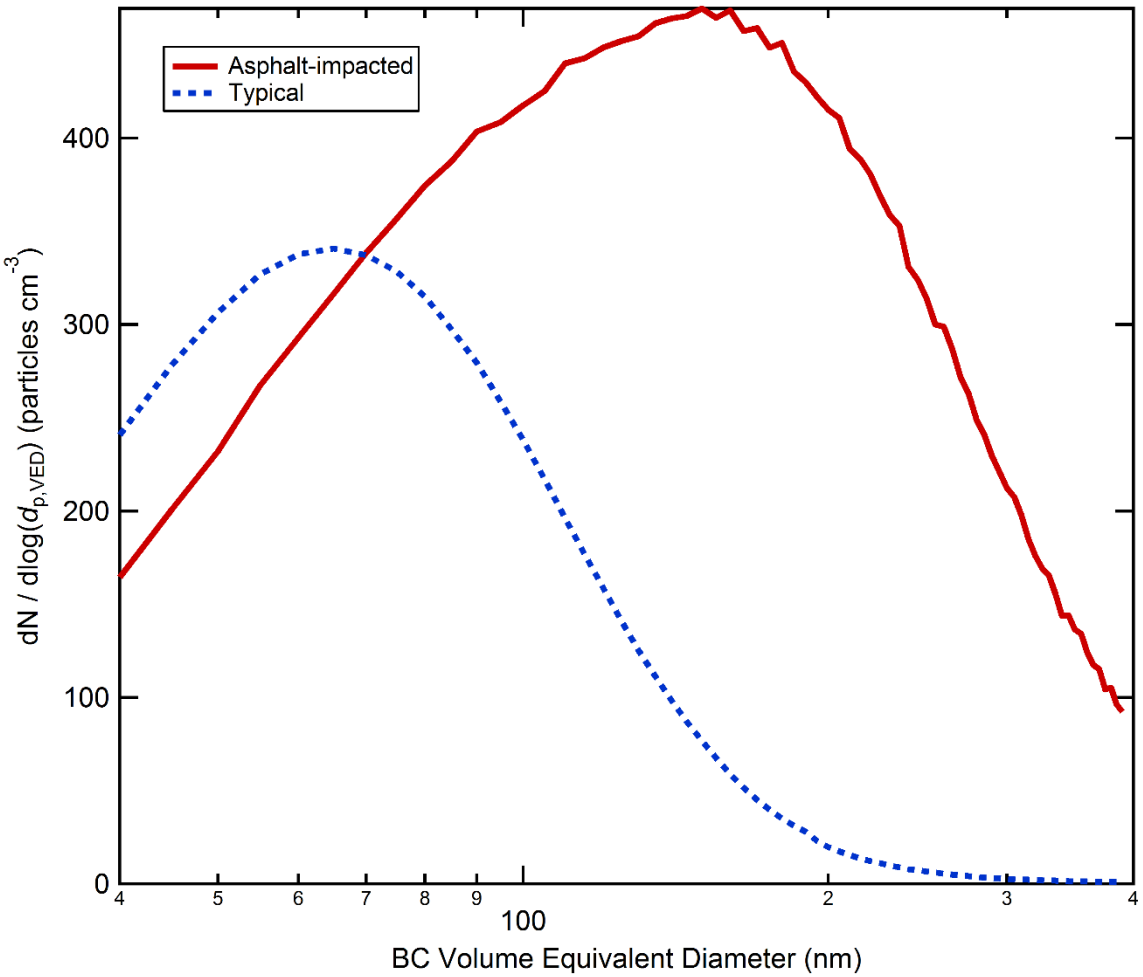

Figure S9. Refractory BC number-weighted size distributions measured by the SP2 during the asphalt impacted period (22 June between 1:15 am and 2:30 am, local time) and during typical time periods. The typical size distribution is shown as a dashed blue line and the asphalt-impacted period as a red line.