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The effects of isoprene and NO_x on secondary organic aerosols formed through reversible and irreversible uptake to aerosol water

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This supporting information is composed of eight pages, six figures and one table. Table S1 contains a comparison of ambient RH and RH sampled through the silica gel dryer in Baltimore across the different seasons. Figure S1 is a scatter plot of NOx concentrations measured at two different sites in the Baltimore region. Figure S2 presents seasonal daytime and nighttime $WSOC_{p,dry}/WSOC_p$ ratios. Figure S3 depicts the summertime diurnal profiles of isoprene, and $WSOC_g$ concentrations shifted by 3 h. Figure S4 shows boxplots of $WSOC_p$ and evaporated $WSOC_p$ concentrations as a function of isoprene concentrations at 9 h time delay relative to isoprene concentrations. Figure S5 illustrates the median evaporated $WSOC_p$ concentrations as a function of $WSOC_g$ concentrations at different time delays relative to $WSOC_g$ concentrations, and a scatter and box plot corresponding to one time lag (4 h). Finally, Figure S6 shows scatter and boxplots of $WSOC_g$ and evaporated WSOCp concentrations as a function of isoprene concentrations at 3 h and 9-h time lags, respectively, during the summer.

Table S1. Comparison of ambient RH and RH sampled through the silica gel dryer across the different seasons.

Ambient RH (%)	RH-through dryer Mean ± 1σ (%)			
	Fall	**Winter**	**Spring**	**Summer**
20			10.7 ± 0.5	
30			19.8 ± 0.4	
40			21.1 ± 0.5	32.7 ± 0.7
50		15.5 ± 0.2	16.5 ± 0.3	35.0 ± 0.9
60	46.0 ± 0.7	19.2 ± 0.8	31.4 ± 0.3	36.6 ± 0.4
70	42.3 ± 1.9	20.8 ± 0.7	32.0 ± 0.4	35.1 ± 0.1
80	42.5 ± 0.5	22.8 ± 0.9	22.5 ± 0.6	40.0 ± 0.1
90	42.2 ± 1.2	23.6 ± 0.8		

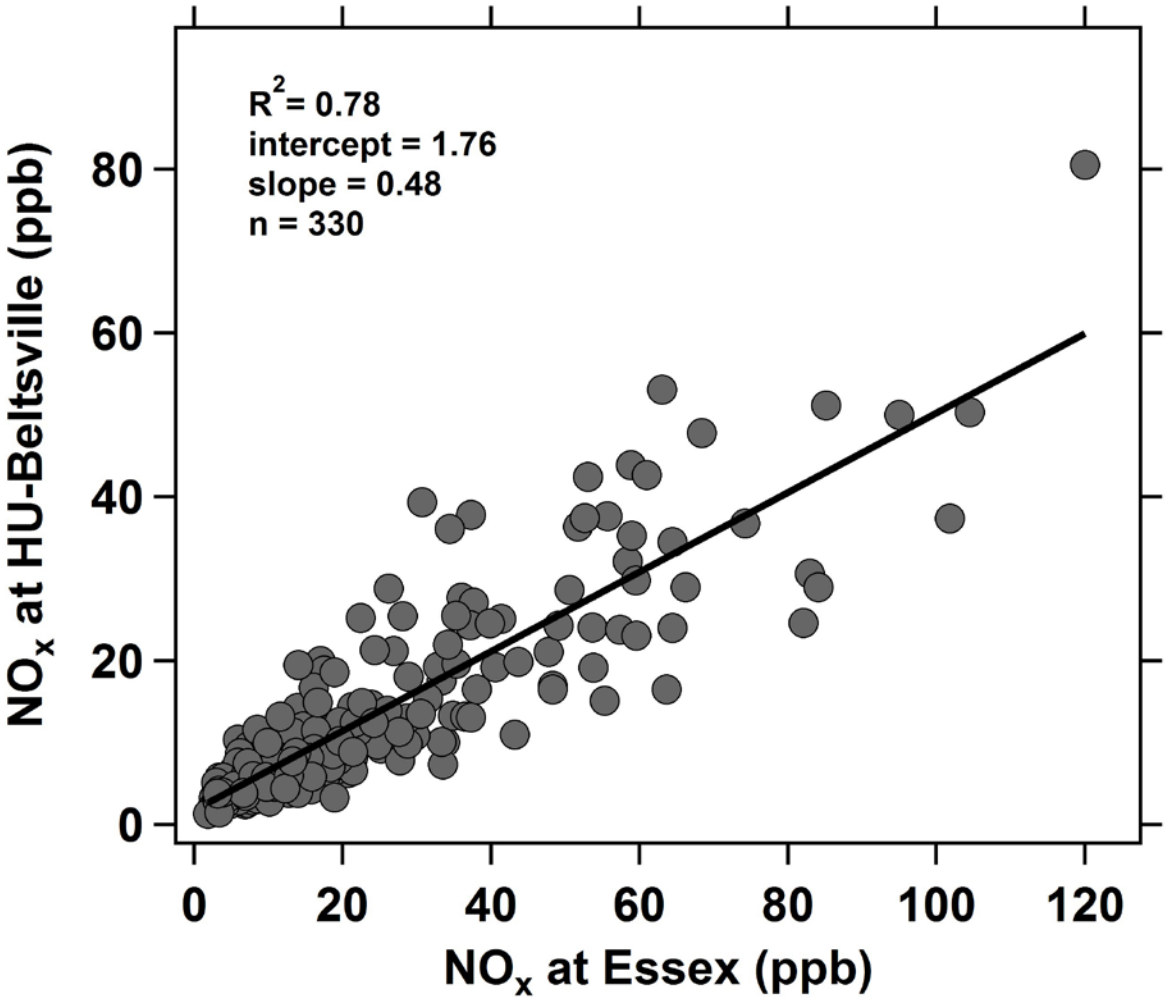

Figure S1: Scatter plot of daily average NO_x concentrations (in ppb or nmol mol^{-1}) at the HU-Beltsville and Essex sites for one year. The solid black line is the linear fit based on a least-squares regression analysis.

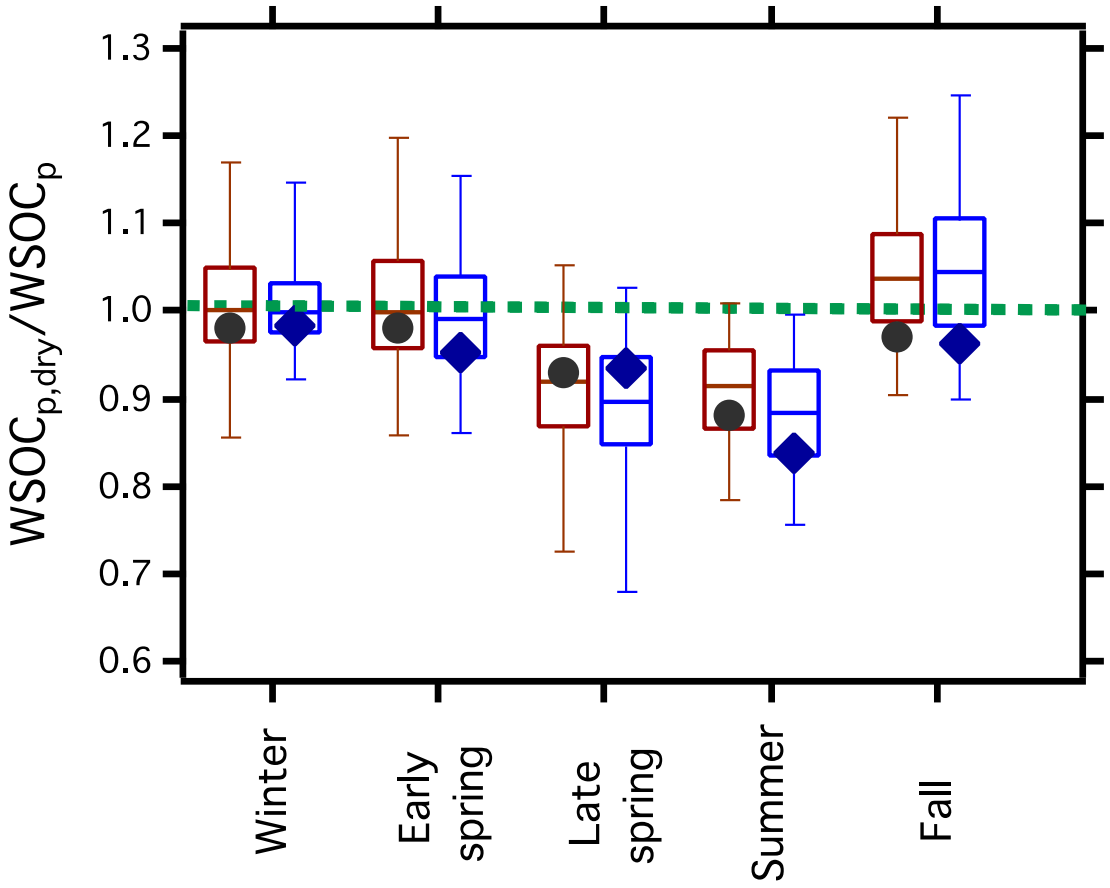

Figure S2: Daytime (brown) and nighttime (blue) seasonal $WSOC_{p,dry}/WSOC_p$ ratios. Circles and diamonds represent the daytime and nighttime averages, respectively. The green dotted line at unity is for visual reference.

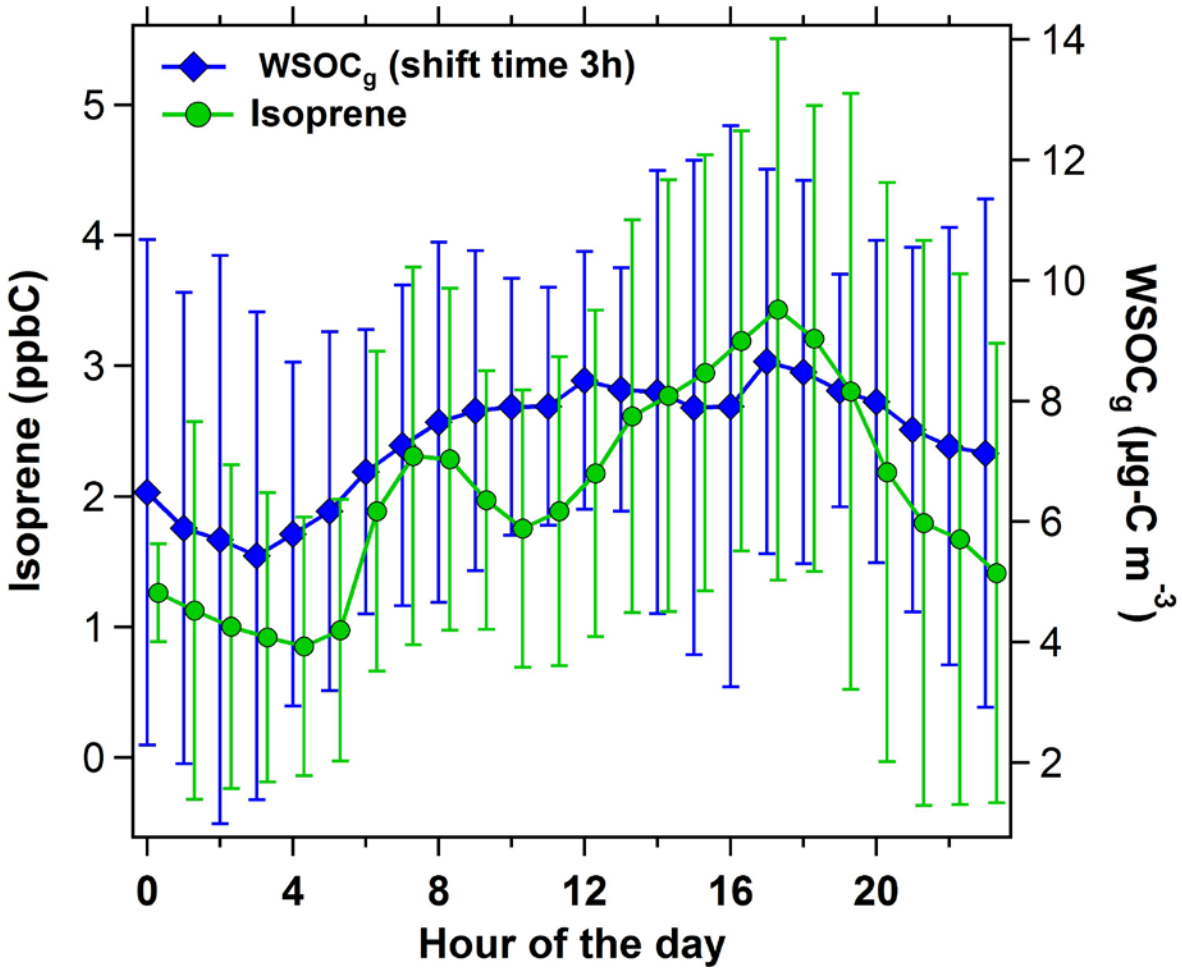

Figure S3: Summertime average diurnal profiles of isoprene concentrations (in ppbC, or nmol C mol^{-1}, green circles), and WSOC$_g$ concentrations shifted 3 h prior to their measurement (blue diamonds). All concentrations pertain to the summer, ozone season (starting from early June until late August of 2015) when hourly isoprene measurements were available. Error bars represent ±1σ. The two series were offset by 0.3 h for clarity.

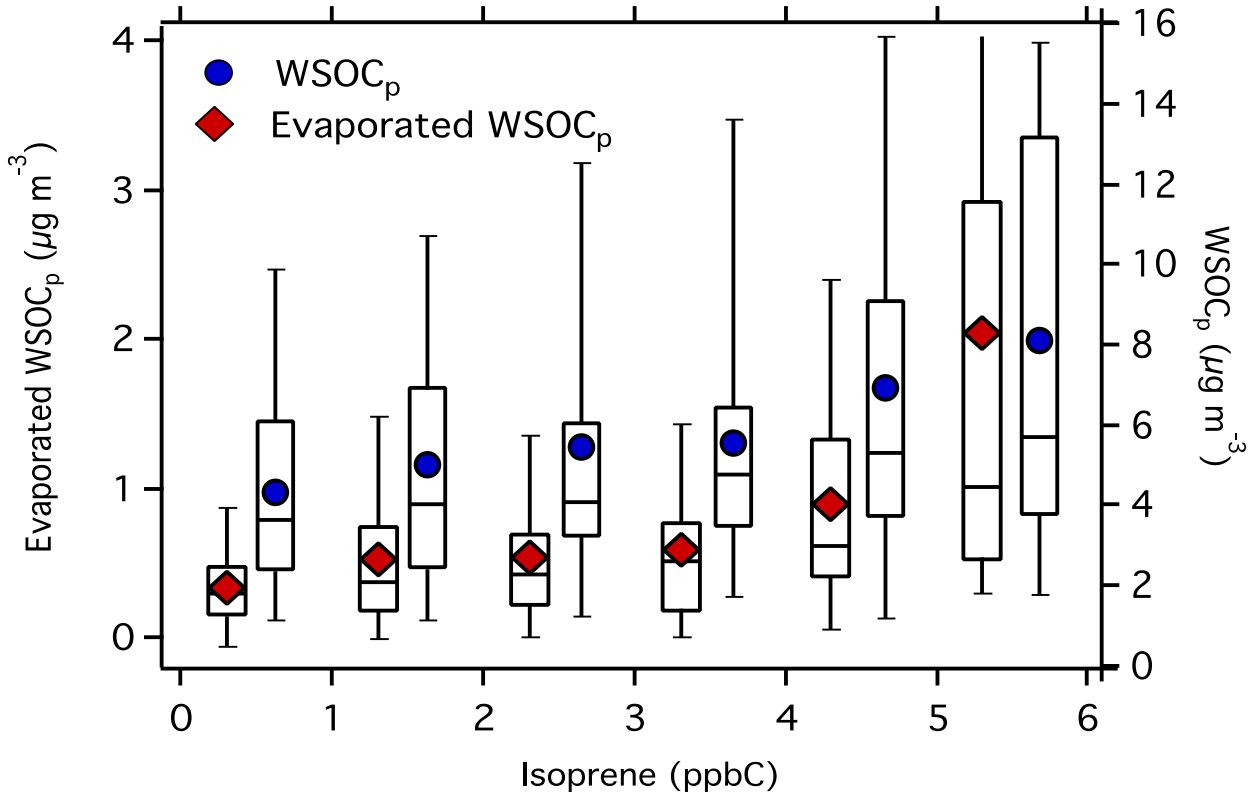

Figure S4: Boxplots of $WSOC_p$ and evaporated $WSOC_p$ concentrations as a function of isoprene concentrations (in ppbC, or nmol C mol^{-1}) at 9 h time delay (n = 9 h) relative to isoprene concentrations. Blue circles and red diamonds represent the means of the $WSOC_p$ and evaporated $WSOC_p$ concentrations at each isoprene bin, respectively. Note that the 95th percentile of the evaporated $WSOC_p$ concentration for the highest isoprene bin (> 5 ppbC, or 5 nmol C mol^{-1}) is off scale (7.6 μg m^{-3}).

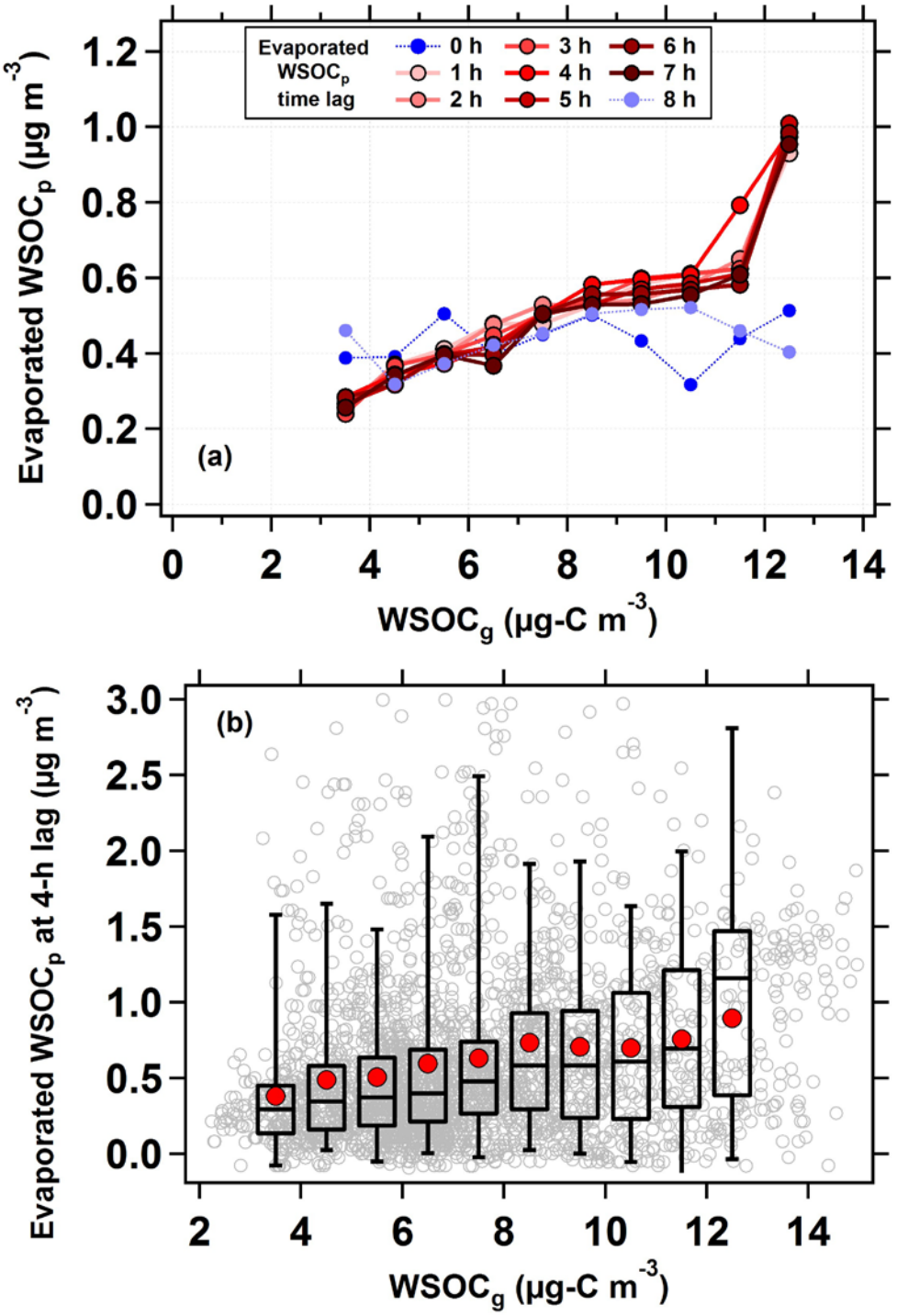

Figure S5: (a) Median evaporated $WSOC_p$ concentrations as a function of $WSOC_g$ concentrations at different time delays relative to the $WSOC_g$ concentrations. (b) Scatter and box plot (median, inter quartile range, and 5th and 95th percentiles) of the evaporated $WSOC_p$ concentration at 4-h time lag vs. $WSOC_g$. Red circles represent the mean of each bin. Note that approximately 2% of the individual measurements are off scale.

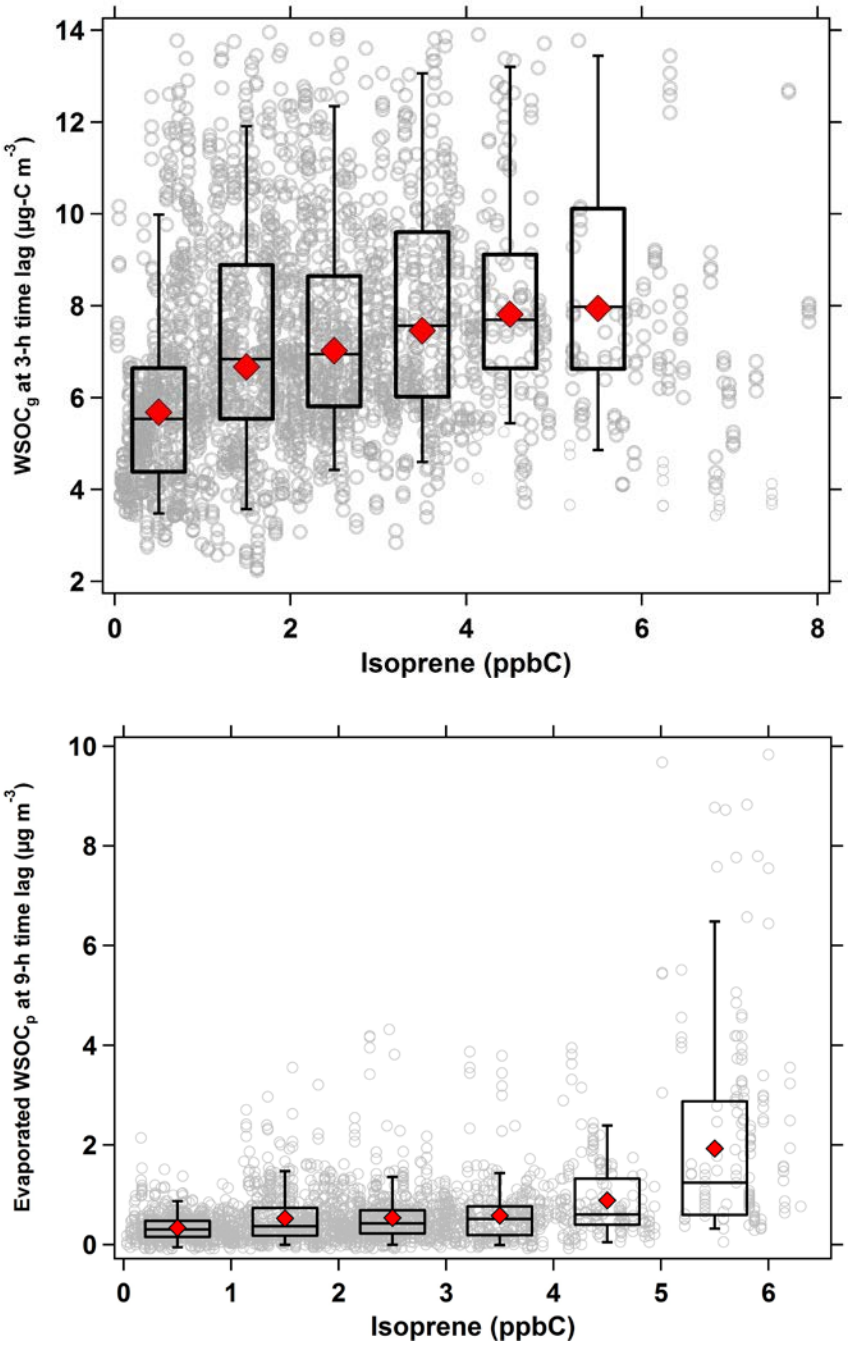

Figure S6: Scatter and boxplot of $WSOC_g$ concentrations with a 3-h time lag (top) and the evaporated $WSOC_p$ concentrations with 9-h time lag (bottom) as a function of isoprene concentrations (in ppbC, or nmol C mol^{-1}) during the summer. The following isoprene concentrations bins were defined: < 1, 1 − 2, 2 − 3, 3 − 4, 4 − 5, and > 5 ppbC (nmol C mol^{-1}). For each bin, mean (red marker), median (horizontal black line), 25th and 75th percentiles (lower and upper box values), as well as 5th and 95th percentiles (vertical lines) are shown. Note ≈1% of the data are off scale in each figure.