Supporting information

Table S1: Average correlation coefficients of the average spectra analyzed by the different SPMSs.

Aerosol type	$r_{avg-pos}$	$r_{avg-neg}$
K-feldspar	0.73 ± 0.12	0.57 ± 0.41
Illite NX	0.71 ± 0.13	0.78 ± 0.08
Moroccan desert dust	0.66 ± 0.14	0.89 ± 0.05
Argentinian soil dust	0.71 ± 0.09	0.85 ± 0.06
Propane soot	0.51 ± 0.23	0.35 ± 0.26
α-pinene SOA	0.80 ± 0.14	0.30 ± 0.29
SOA-coated K-feldspar	0.89 ± 0.02	0.73 ± 0.03
Snomax	0.92 ± 0.04	0.90 ± 0.05

Note that, the $r_{avg-pos}$ and $r_{avg-neg}$ are the average Pearson's correlation coefficients for the average positive and negative spectra, respectively.

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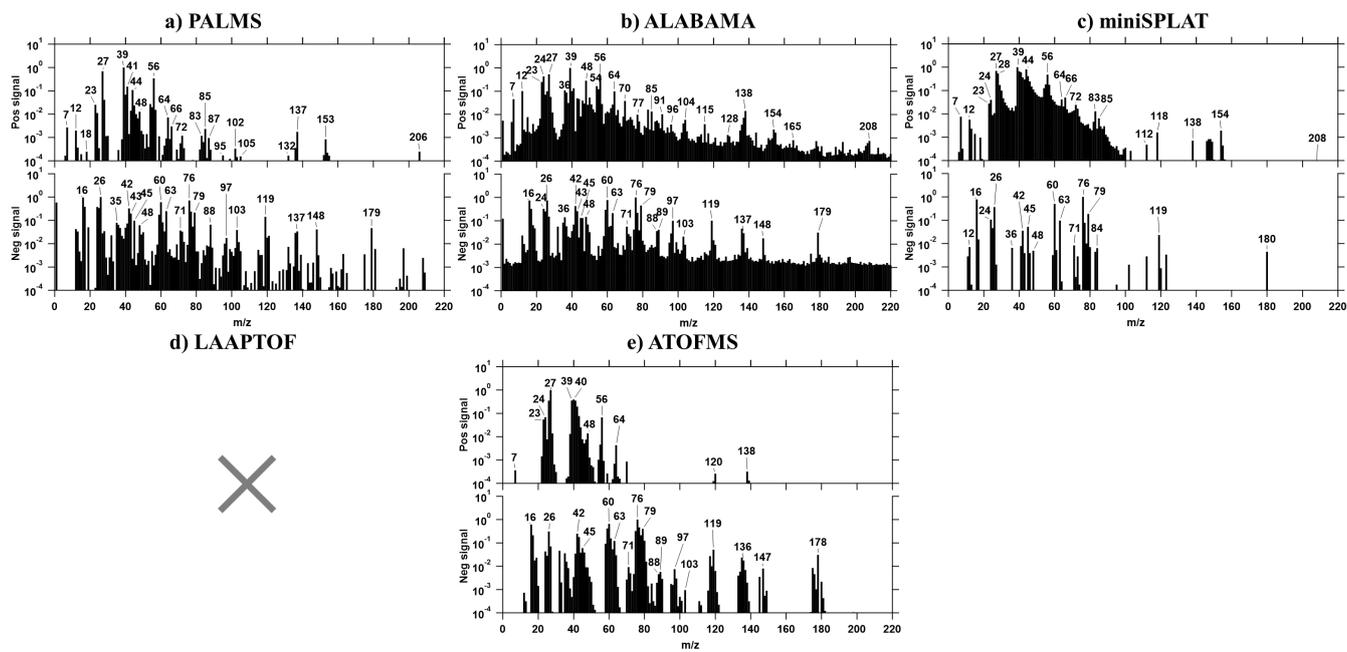
Figure S1: Normalized average mass spectral signal of Argentinian soil dust from a) PALMS, b) ALABAMA, c) miniSPLAT, d) LAAPTOF and e) ATOFMS, respectively. The cross "×" symbol denotes the case where no data is available. The numbers of spectra averaged for each are 870 a), 617 b), 669 c), and 3080 e).
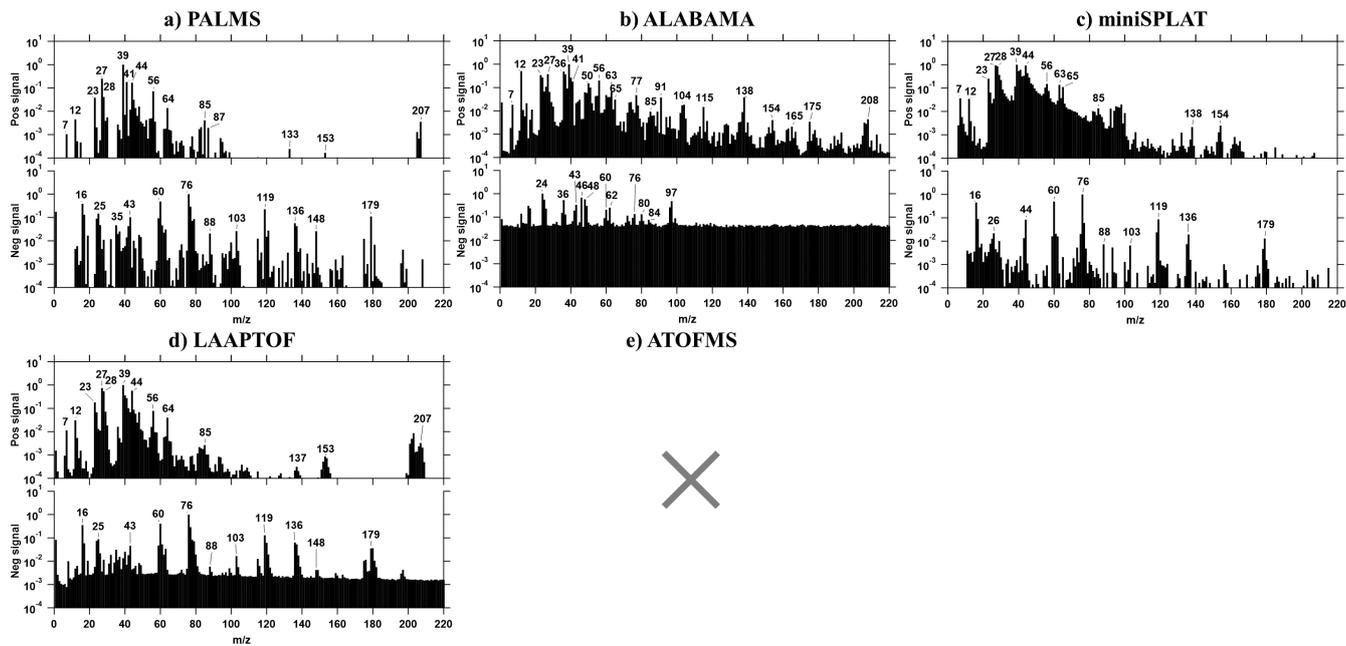
Figure S2: Normalized average mass spectral signal of K-feldspar from a) PALMS, b) ALABAMA, c) miniSPLAT, d) LAAPTOF, and e) ATOFMS, respectively. The cross "×" symbol denotes the case where no data is available. The numbers of spectra averaged for each are 687 a), 297 b), 770 c), and 94 d).
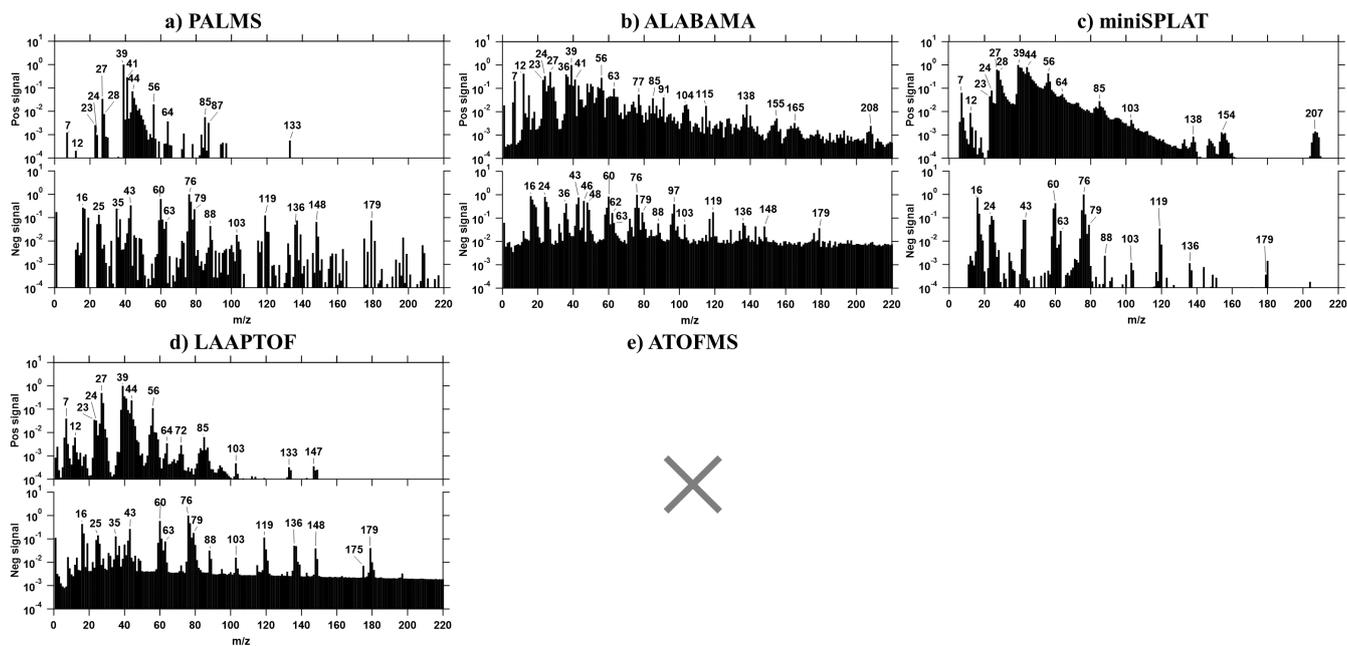
Figure S3: Normalized average mass spectral signal of illite NX from a) PALMS, b) ALABAMA, c) miniSPLAT, d) LAAPTOF, and e) ATOFMS, respectively. The cross "×" symbol denotes the case where no data is available. The numbers of spectra averaged for each are 742 a), 142 b), 645 c), and 807 d).

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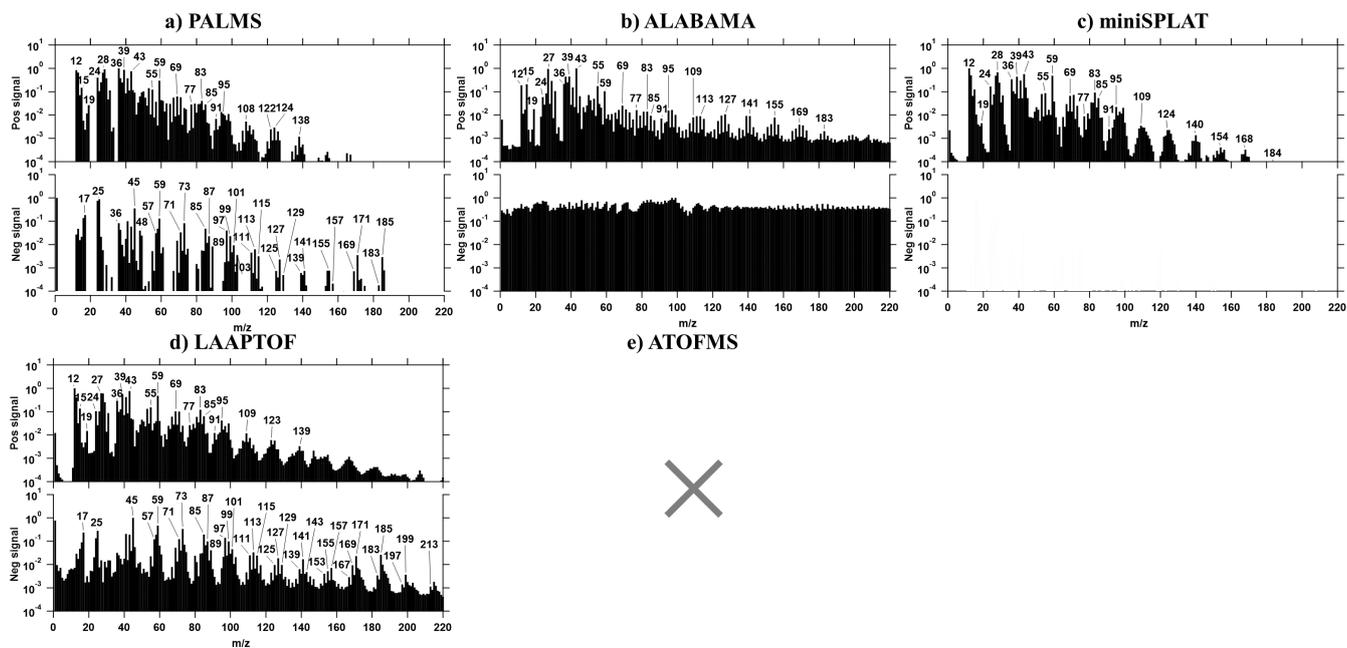
Figure S4: Normalized average mass spectral signal of α-pinene SOA from a) PALMS, b) ALABAMA, c) miniSPLAT, d) LAAPTOF, and e) ATOFMS, respectively. The cross "×" symbol denotes the case where no data is available. The numbers of spectra averaged for each are 389 a), 1042 b), 10792 c), and 2818 d).
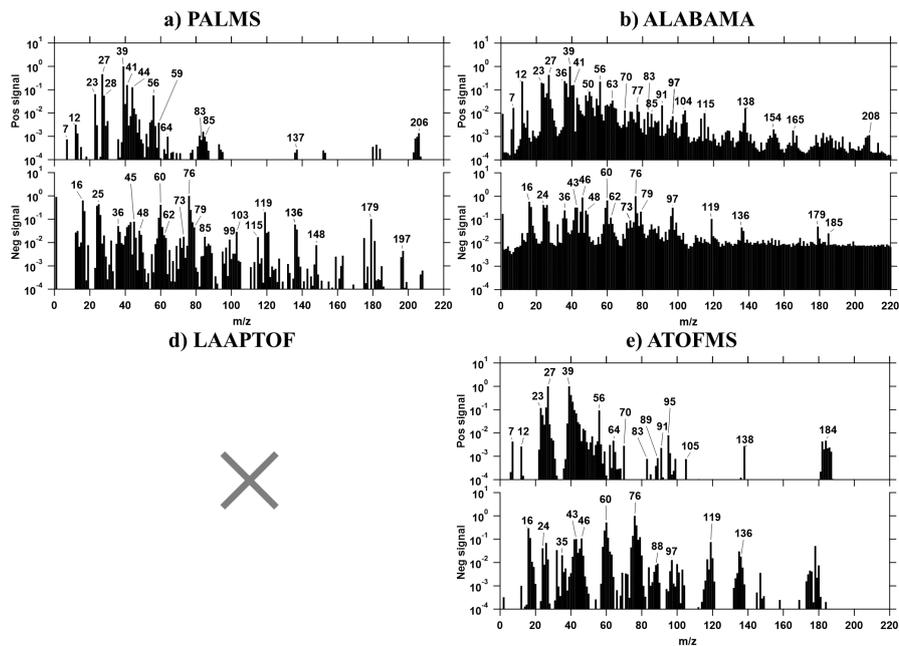
Figure S5: Normalized average mass spectral signal of SOA-coated K-feldspar from a) PALMS, b) ALABAMA, c) miniSPLAT, d) LAAPTOF, and e) ATOFMS, respectively. The cross "×" symbol denotes the case where no data is available. The numbers of spectra averaged for each are 1674 a), 1067 b), and 363 e).
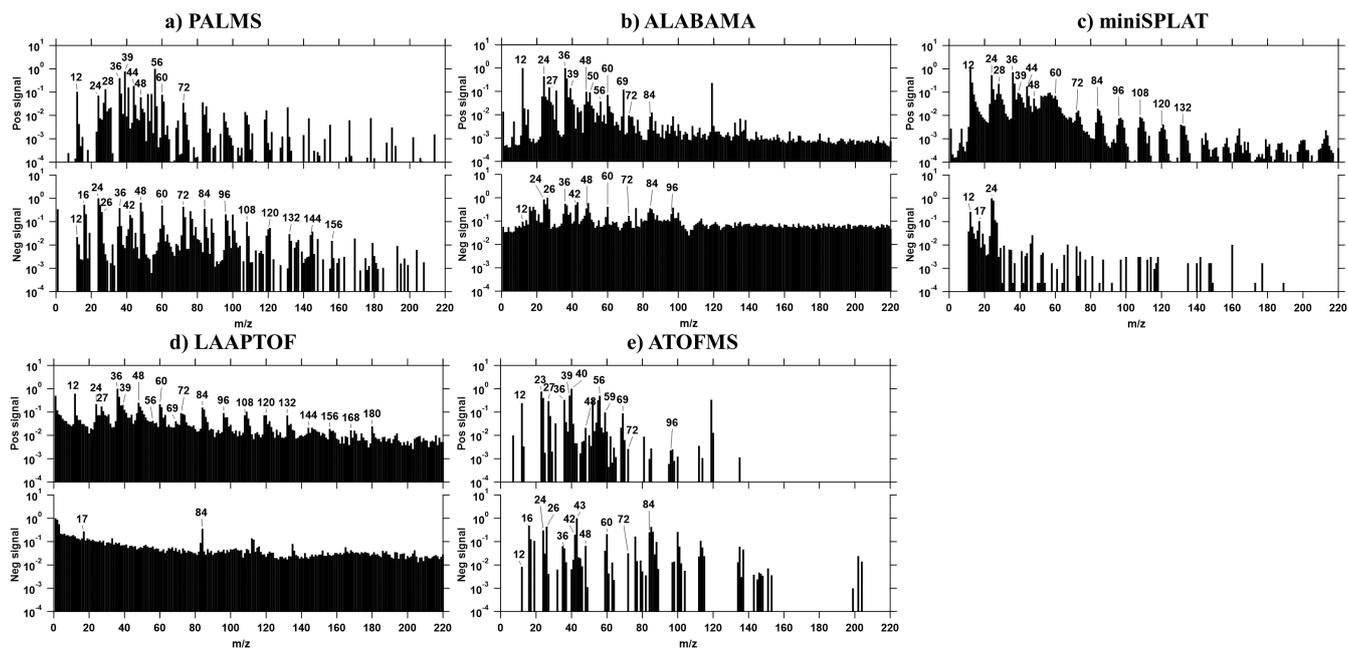
Figure S6: Normalized averages mass spectral signal of propane soot from a) PALMS, b) ALABAMA, c) miniSPLAT, d) LAAPTOF, and e) ATOFMS, respectively. The numbers of spectra averaged for each are 73 a), 334 b), 327 c), 339 d) and 30 e).

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