## Supporting Information

Table 1. Pearson’s correlation coefficient (R²) between mass concentrations from ATOFMS (PM$_{2.5}$), TEOM (PM$_{10}$ & PM$_{1}$), ACSM (PM$_{1}$), PILS (PM$_{10}$) and MAAP (PM$_{2.5}$) measurements and OPS number concentrations (/cm³) for the full sampling period, and during specific periods.

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<th>ATOFMS K-rich</th>
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<th>PM$_{1}$</th>
<th>BC</th>
<th>ACSM total</th>
<th>ACSM SO$_{4}^{2-}$</th>
<th>ACSM NH$_{4}^{+}$</th>
<th>ACSM SV-OOA</th>
<th>ACSM LV-OOA</th>
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<th>PILS-IC NH$_{4}^{+}$</th>
<th>OPS 0.3-0.579 µm particles</th>
<th>*PILS Oxalate</th>
<th>*WSOC</th>
<th>**ATOFS fresh sea salt</th>
<th>**OPS 0.579-2.156 µm particles</th>
<th>***PILS MSA</th>
<th>**ACSM NO$_{2}$</th>
<th>***PILS NO$_{3}^{+}$</th>
<th>***PILS SO$_{4}^{2-}$</th>
<th>***PILS MSA</th>
<th>**ACSM NO$_{2}$</th>
<th>***PILS NO$_{3}^{+}$</th>
<th>***PILS SO$_{4}^{2-}$</th>
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*Correlations calculated from 21\textsuperscript{st} June-4\textsuperscript{th} August.

**Correlations calculated from 20-27\textsuperscript{th} June.

***Correlations calculated from 23\textsuperscript{rd} July-5\textsuperscript{th} August.
Figure 1. Individual HYSPLIT 120-hour back trajectories for each cluster for Period 1 during ADRIMED and SAF-MED.
Figure 2. Daytime average aerosol optical depth at 550 nm (AOD$_{550}$) derived from MSG/SEVIRI (Thieuleux et al., 2005) from 17th to 20th June 2013 showing a dust plume transport over the western Mediterranean basin (produced by http://www.icare.univ-lille1.fr). Land and cloudy pixels in dark and light grey, respectively.