

Supplementary Material

Ice Nucleating Particles Variability Across a Megacity

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Table S1. Meteorological parameters for the campaign dates at the southern sampling site (CU).

Date (May, 2022)	Average Temperature (°C)	Relative Humidity (%)	Average Pressure (mb)	Total rain (mm)	Average Radiation (W/m ²)	Average UV Index
12	18.7	50.2	778.5	0.0	175.3	0.9
13	20.4	42.3	777.0	0.0	182.5	0.8
14	20.3	32.1	777.2	0.0	166.8	0.8
15	20.5	32.1	778.0	0.0	172.6	0.8
16	19.0	34.1	778.9	0.0	161.7	0.7
17	21.9	30.8	779.2	0.0	323.3	1.8
18	21.5	31.7	778.4	0.0	190.1	0.7
19	21.9	38.6	776.5	0.0	191.6	0.7
20	22.2	41.3	775.2	0.0	149.6	0.5

Average	20.7	37.0	777.7	0.0	190.4	0.9
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Table S2. Meteorological parameters for the campaign dates at the northern sampling site (C5).

Date (May, 2022)	Average Temperature (°C)	Relative Humidity (%)	Average Pressure (mb)	Total rain (mm)	Average Radiation (W/m ²)	Average UV Index
12	19.9	51.8	781.8	0.0	320.3	1.8
13	21.3	45.1	780.5	0.0	296.0	1.6
14	21.9	37.1	780.6	0.0	306.4	1.7
15	21.5	35.6	781.5	0.0	302.4	1.7
16	21.1	35.0	782.2	0.0	301.9	1.6
17	21.7	37.8	782.7	0.0	296.5	1.5
18	22.7	36.6	781.9	0.0	308.4	1.5
19	23.6	40.1	779.8	0.0	300.3	1.5
20	23.7	43.3	778.7	0.0	266.2	1.4
Average	21.9	40.3	781.1	0.0	299.8	1.6

Table S3. Pearson correlation coefficients of oxidized species at the northern site (C5).

North (C5)	NH ₄ ⁺	NO ₃ ⁻	SO ₄ ²⁻
NH ₄ ⁺	1	0.856	0.976
NO ₃ ⁻		1	0.838
SO ₄ ²⁻			1

Table S4. Pearson correlation coefficients of oxidized species at the southern site (CU).

South (CU)	NH ₄ ⁺	NO ₃ ⁻	SO ₄ ²⁻
NH ₄ ⁺	1	0.574	0.975
NO ₃ ⁻		1	0.543
SO ₄ ²⁻			1

Table S5. Airborne bacteria isolated at the northern (C5) and southern (CU) sites. Green and red colors indicate the presence of species at both or only at one sampling site, respectively.

Species	CU	C5
<i>Acinetobacter schindleri</i>		
<i>Arthrobacter gandavensis</i>		
<i>Bacillus cereus</i>		
<i>Bacillus licheniformis</i>		
<i>Bacillus megaterium</i>		
<i>Bacillus simplex</i>		
<i>Bacillus subtilis</i>		
<i>Exiguobacterium aurantiacum</i>		
<i>Kocuria rosea</i>		
<i>Microbacterium aerolatum</i>		
<i>Microbacterium paraoxidans</i>		
<i>Paenarthrobacter ilicis</i>		
<i>Pantoea agglomerans</i>		
<i>Pantoea vagans</i>		
<i>Pseudarthrobacter chlorophenolicus</i>		
<i>Pseudarthrobacter oxydans</i>		
<i>Pseudomonas antarctica</i>		
<i>Pseudomonas flavescens</i>		
<i>Pseudomonas xanthomarina</i>		
<i>Pseudescherichia vulneris</i>		
<i>Staphylococcus xylosus</i>		

Table S6. Airborne fungi isolated at the northern (C5) and southern (CU) sites. Green and red colors indicate the presence of genera at both or only at one sampling site, respectively.

Genera	CU	C5
<i>Alternaria</i>		
<i>Aspergillus</i>		
<i>Aureobasidium</i>		
<i>Cladosporium</i>		
<i>Epicoccum</i>		
<i>Fusarium</i>		
<i>Penicillium</i>		
<i>Rhizopus</i>		

Table S7. Pearson correlation coefficients of bacteria genera concentration between the northern (C5) and southern (CU) sites.

	<i>Pantoea vagans</i>	<i>Pseudomonas fluorescens</i>	<i>Bacillus subtilis</i>	<i>Kocuria rosea</i>	<i>Pantoea agglomerans</i>	<i>Exiguobacterium aurantiacum</i>	<i>Bacillus licheniformis</i>
Cross-correlation	0.50	0.01	0.12	0.68	0.52	0.33	0.23

Table S8. Pearson correlation coefficients of fungi genera concentration between the northern (C5) and southern (CU) sites.

	<i>Cladosporium</i>	<i>Aspergillus</i>	<i>Penicillium</i>	<i>Alternaria</i>	<i>Rhizopus</i>
Cross-correlation	0.77	0.41	0.15	0.17	0.09

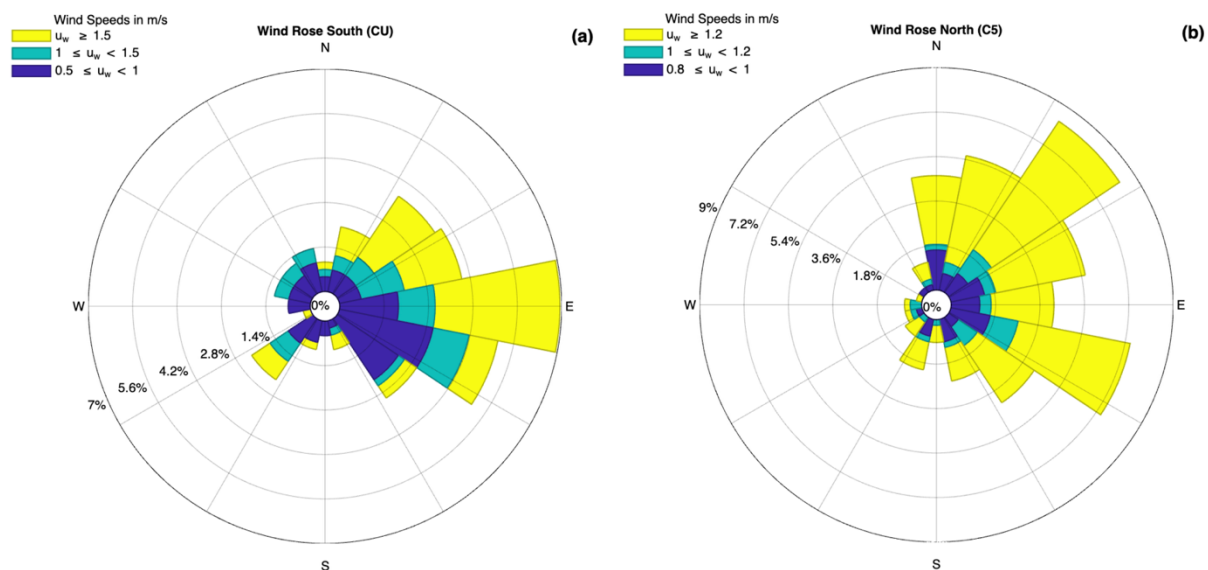


Figure S1. Windrose for the campaign dates (May 12th to May 20th) for (a) the southern sampling site (CU) and (b) the northern sampling site (C5).

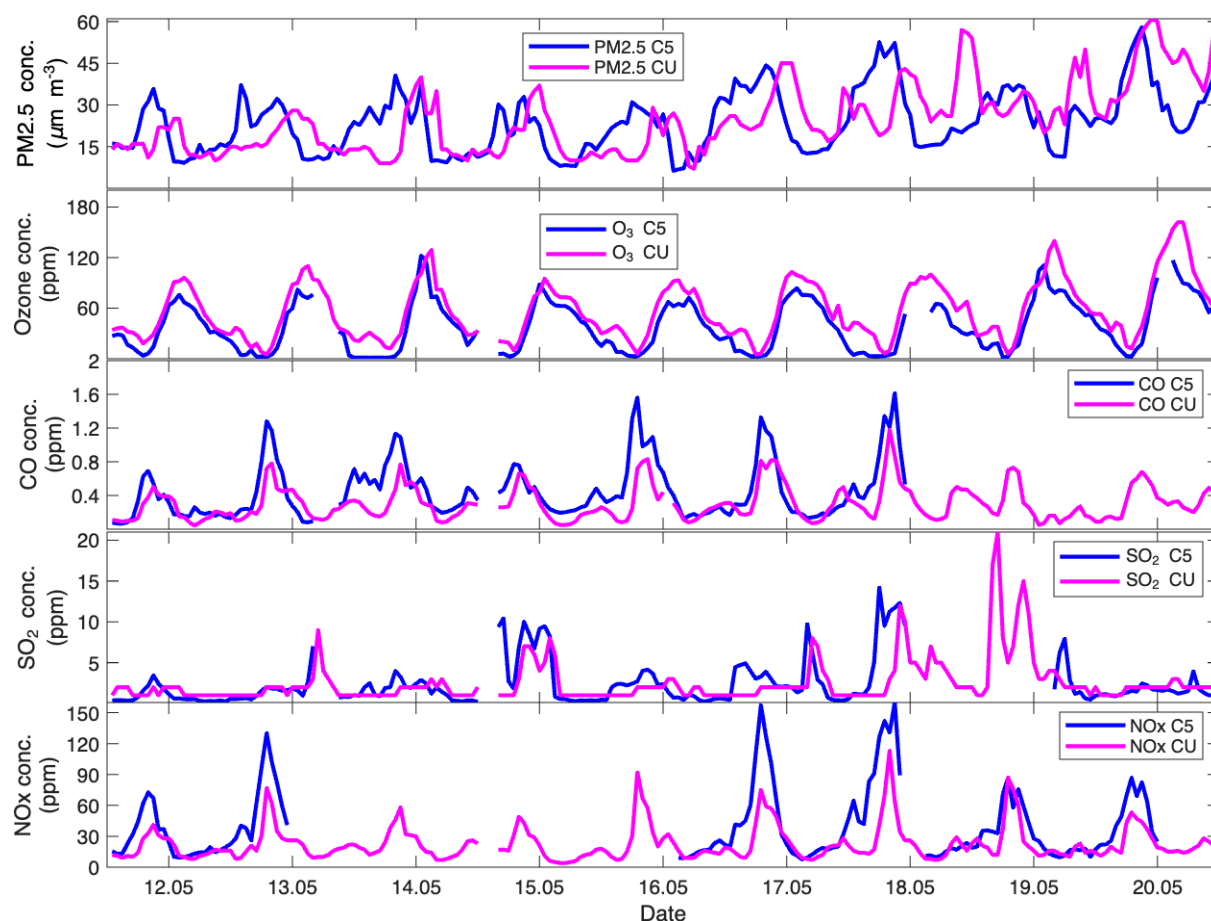


Figure S2. Criteria pollutants concentration time series for the northern (C5, blue) and southern (CU, magenta) sampling sites.

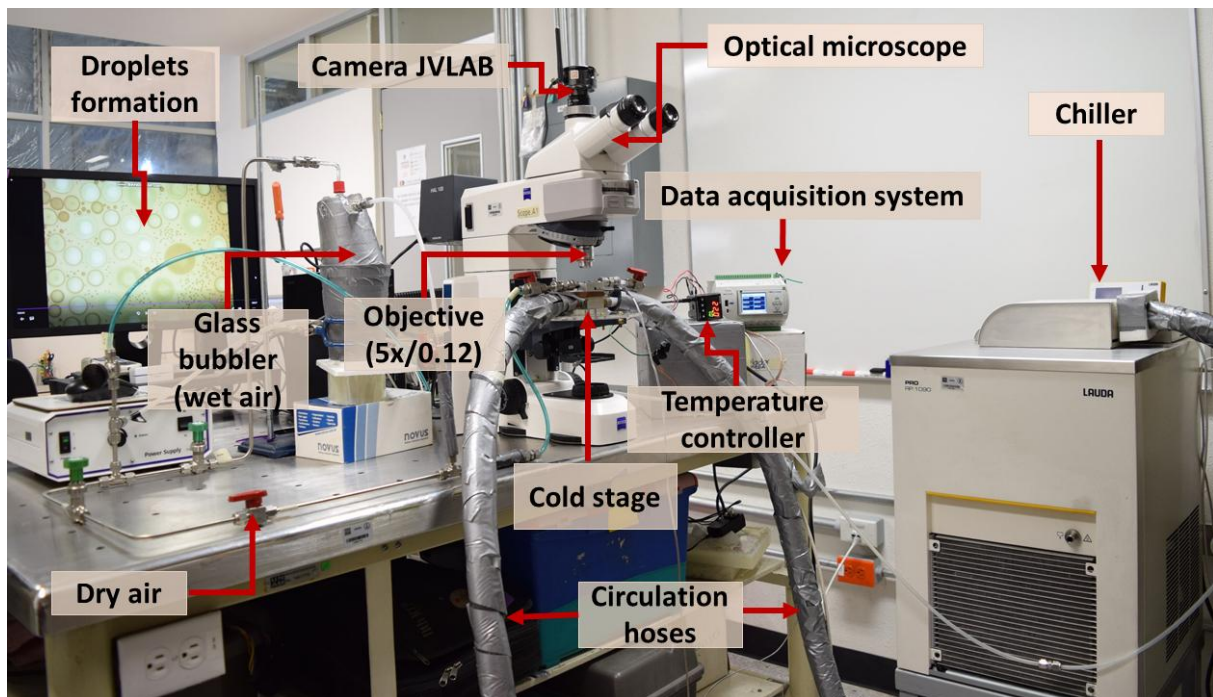


Figure S3. The UNAM-MOUDI-DFT experimental setup with its main components. Adapted from Córdoba et al. (2021).

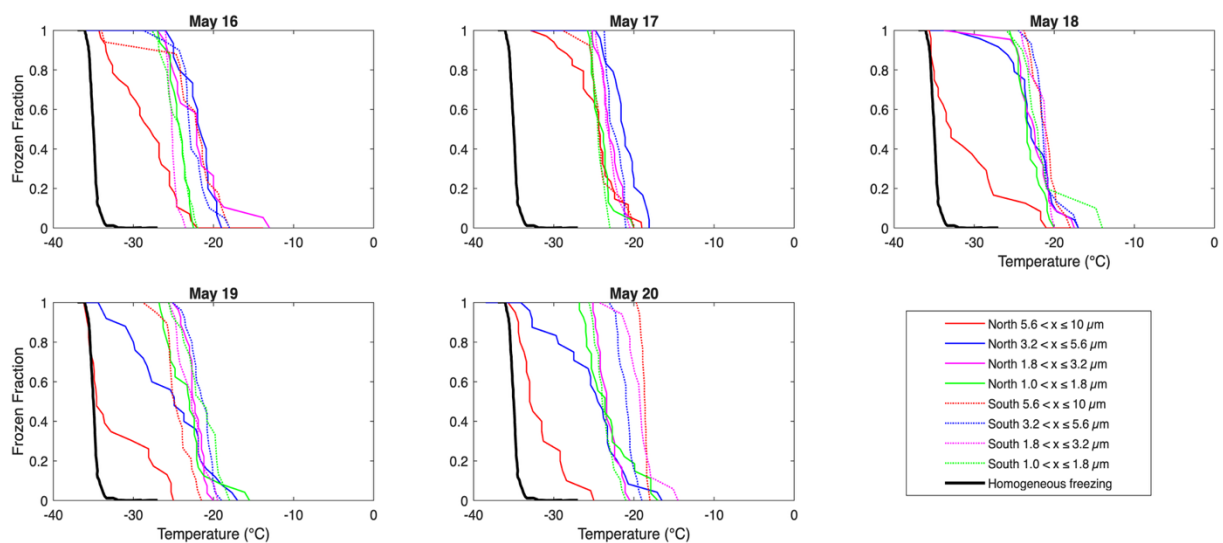


Figure S4. May 16th, 17th, 18th, 19th and 20th frozen fraction curves as a function of temperature for the northern (solid lines) and southern (dotted lines) samples (with aerodynamic diameters between 1.0 μm and 10 μm). The black line shows the average homogeneous freezing curve.

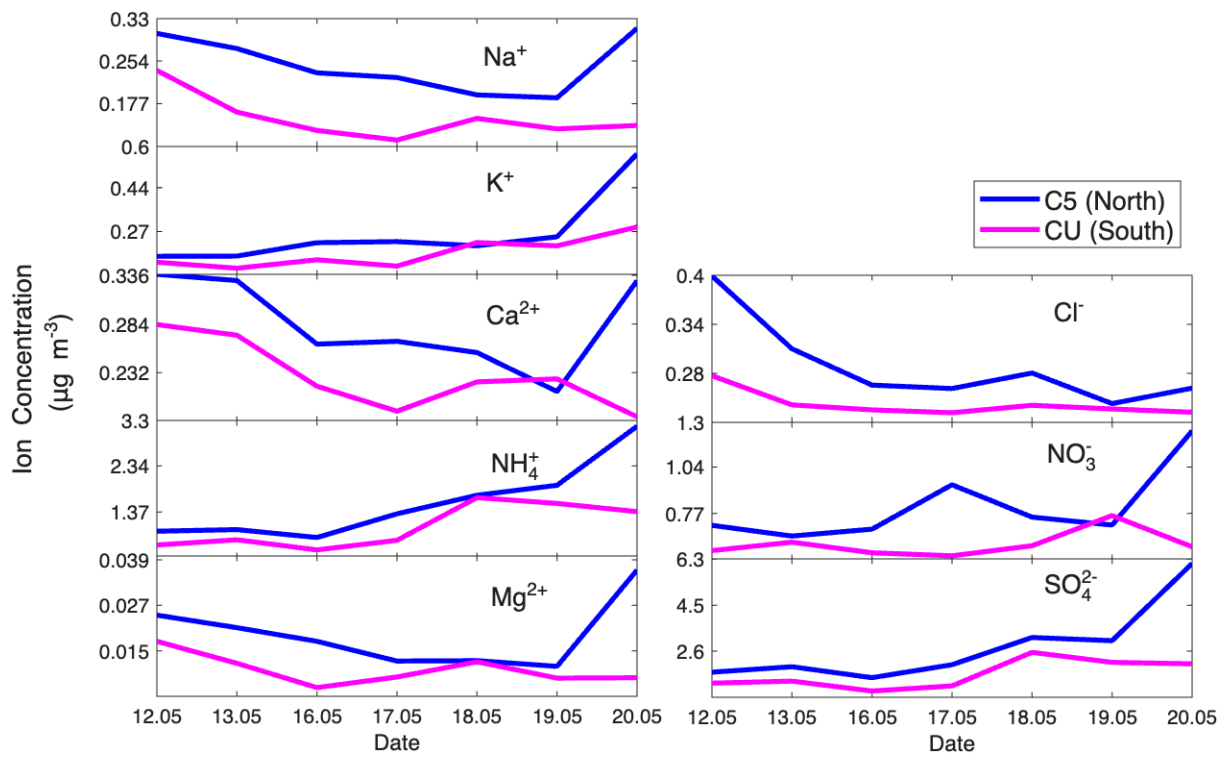


Figure S5. Time series of the cations (left) and anions (right) concentrations measured in the northern (C5, blue) and southern (CU, magenta) sites.

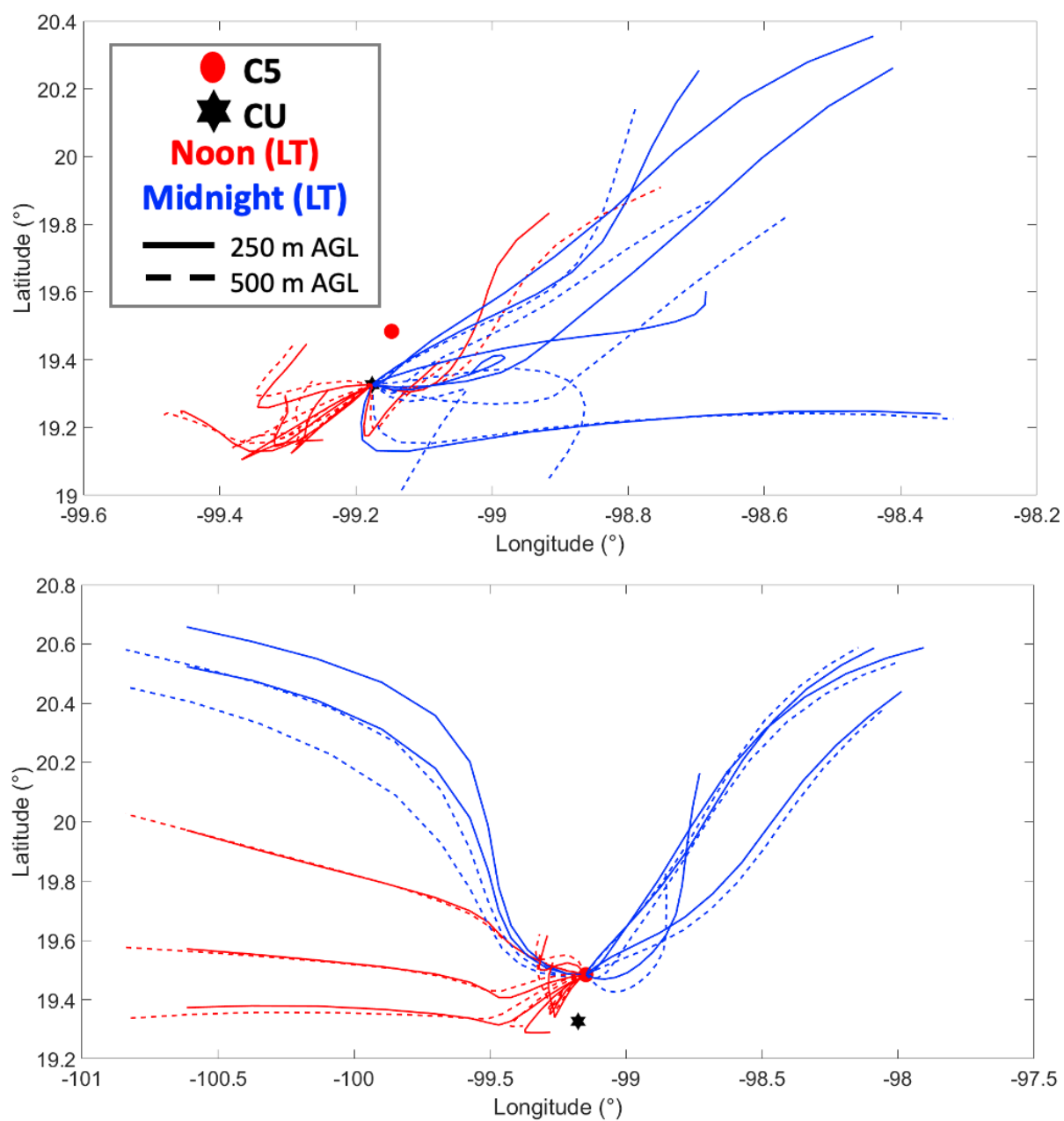


Figure S6. HYSPLIT backward trajectories for south (top) and north (bottom) sampling sites in May 2022 at noon (red) and midnight (blue) local time.

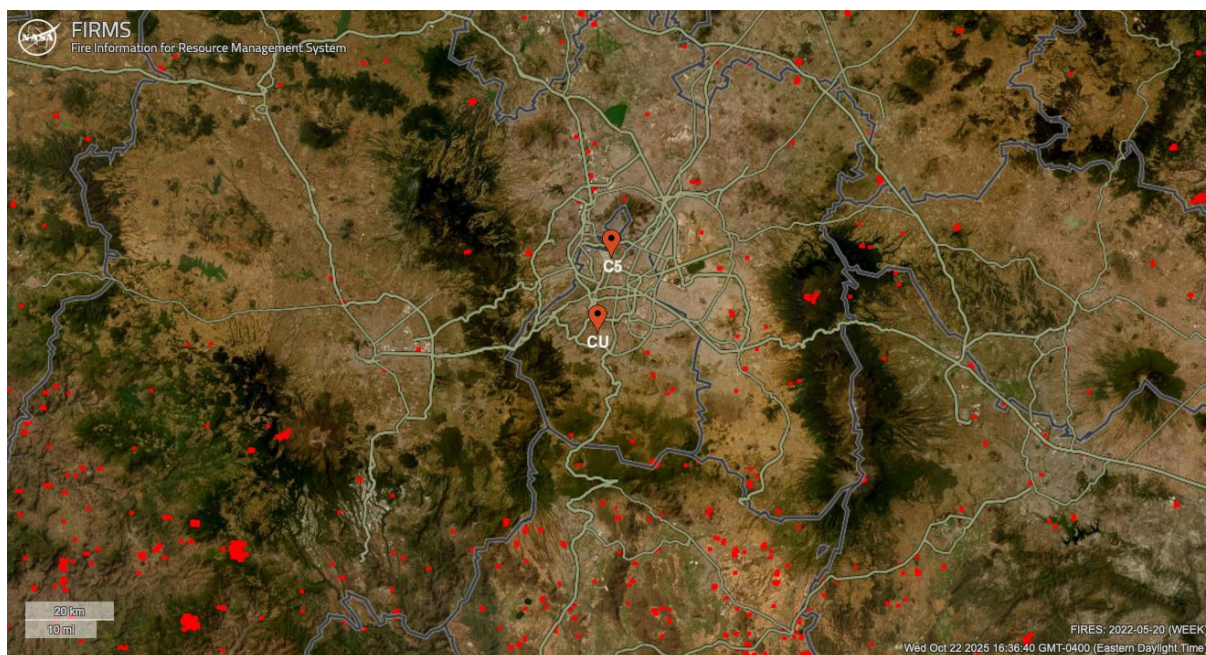


Figure S7. NASA FIRMS real-time active fire locations for May 16th to 20th. South (CU) and north (C5) MCMA sample site's locations marked at image.

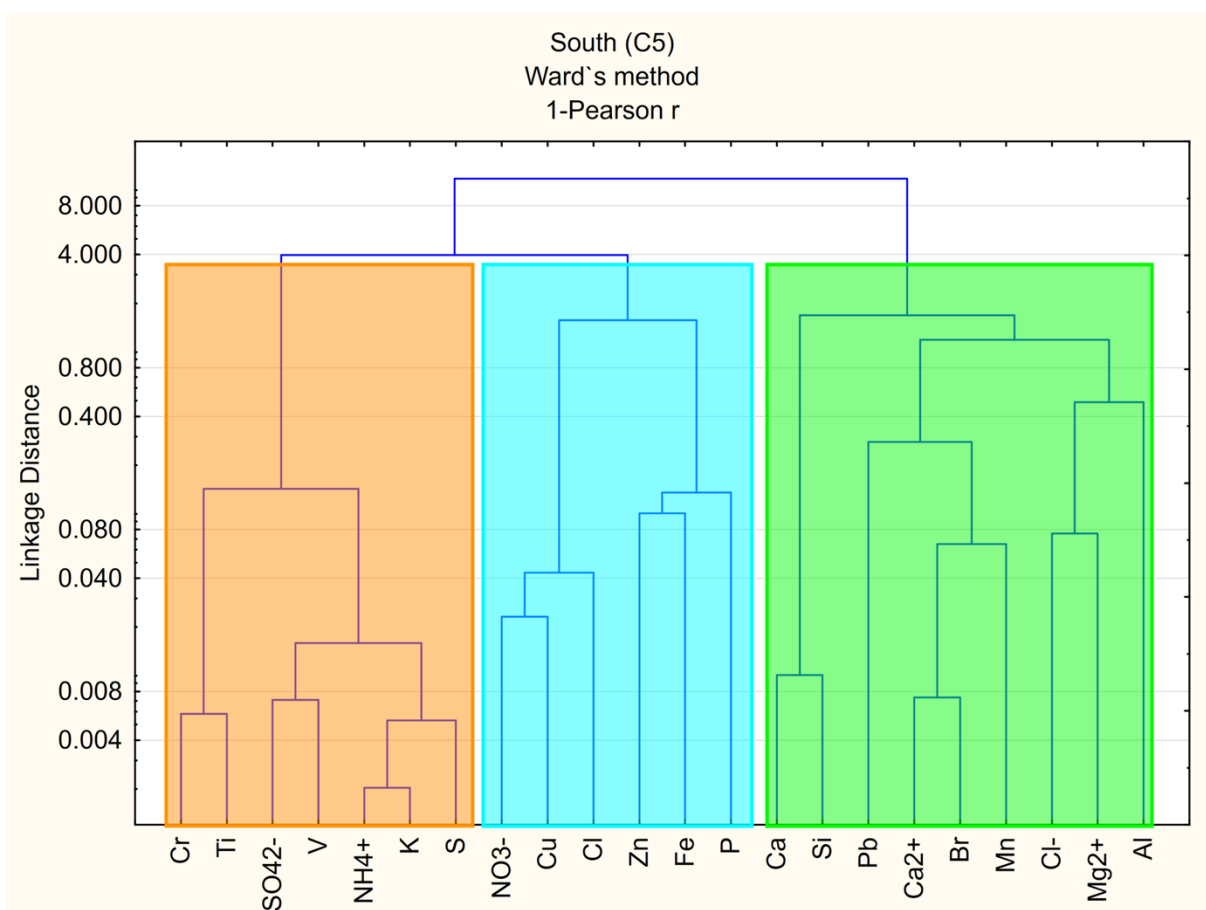


Figure S8. Dendrogram obtained using Ward's method based on Pearson correlation coefficients of every chemical species analyzed in the southern site (CU).

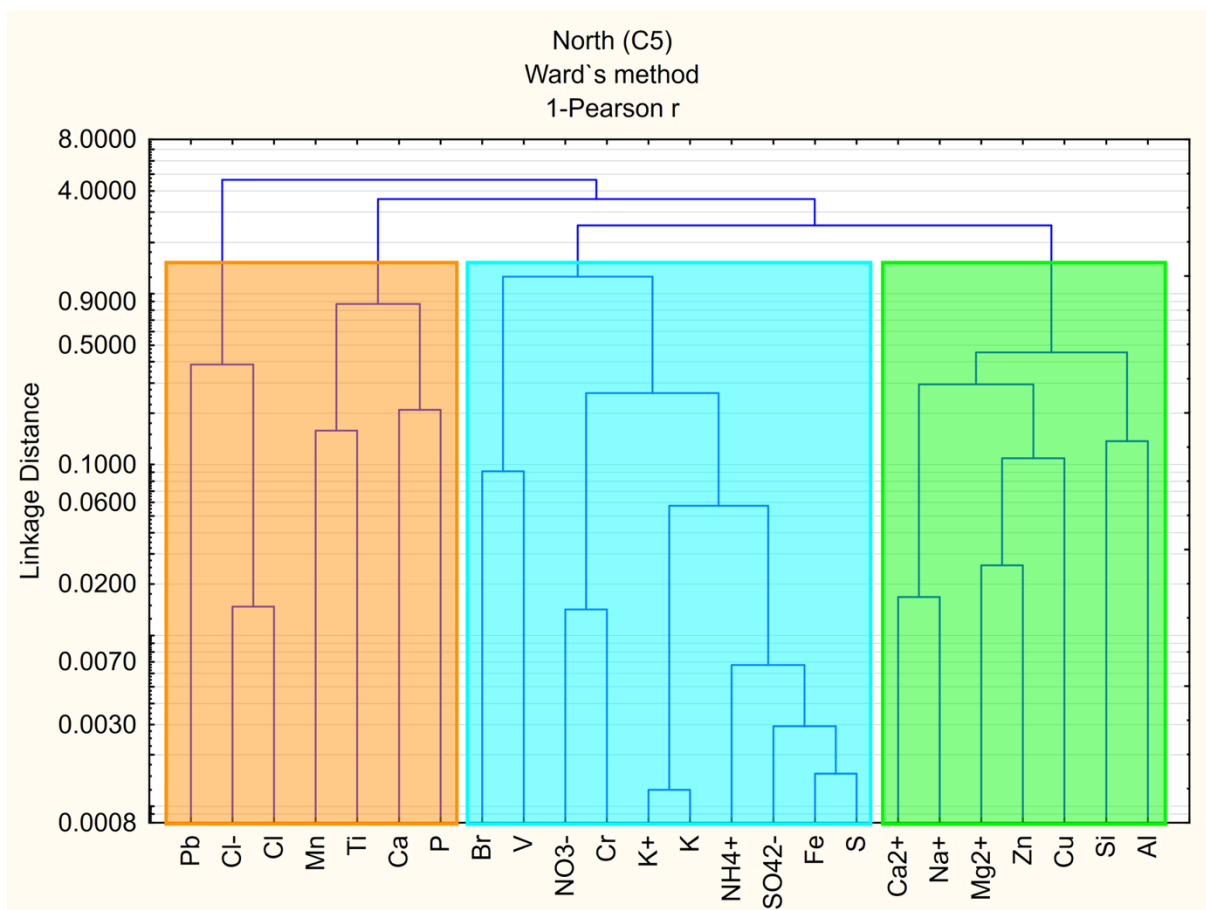


Figure S9. Dendrogram obtained using Ward's method based on Pearson correlation coefficients of every chemical species analyzed in the northern site (C5).