Chemical composition, sources and insights into submicron aerosol processing during wintertime outstanding smog episodes

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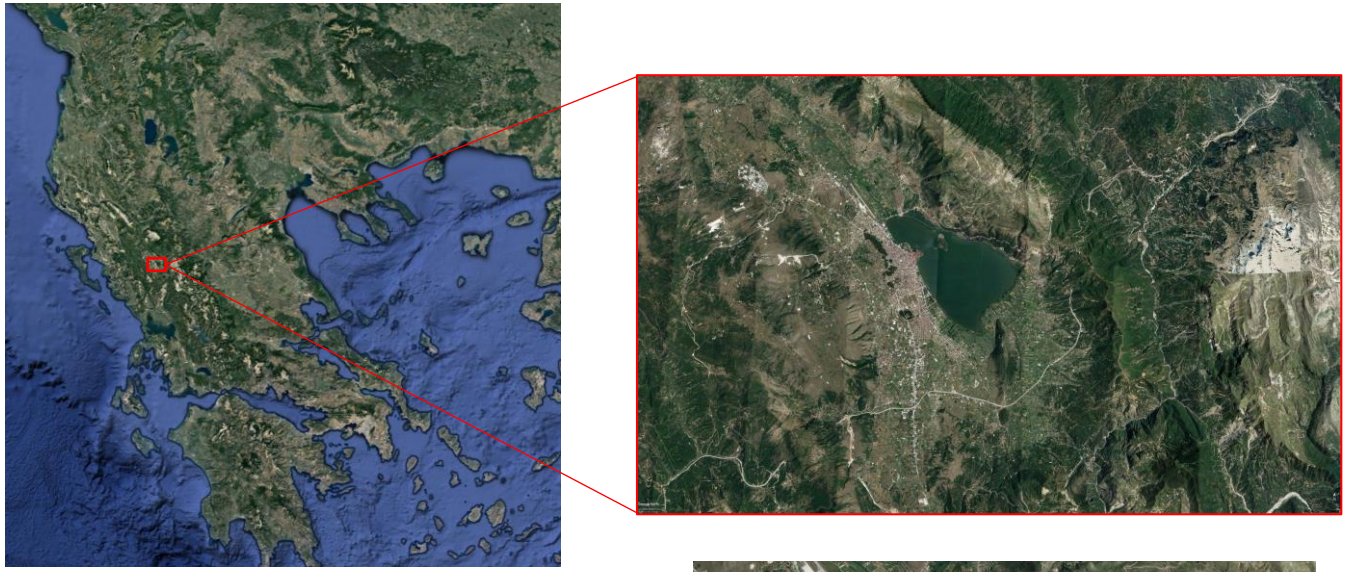
Motivation, Study design, Instrumentation

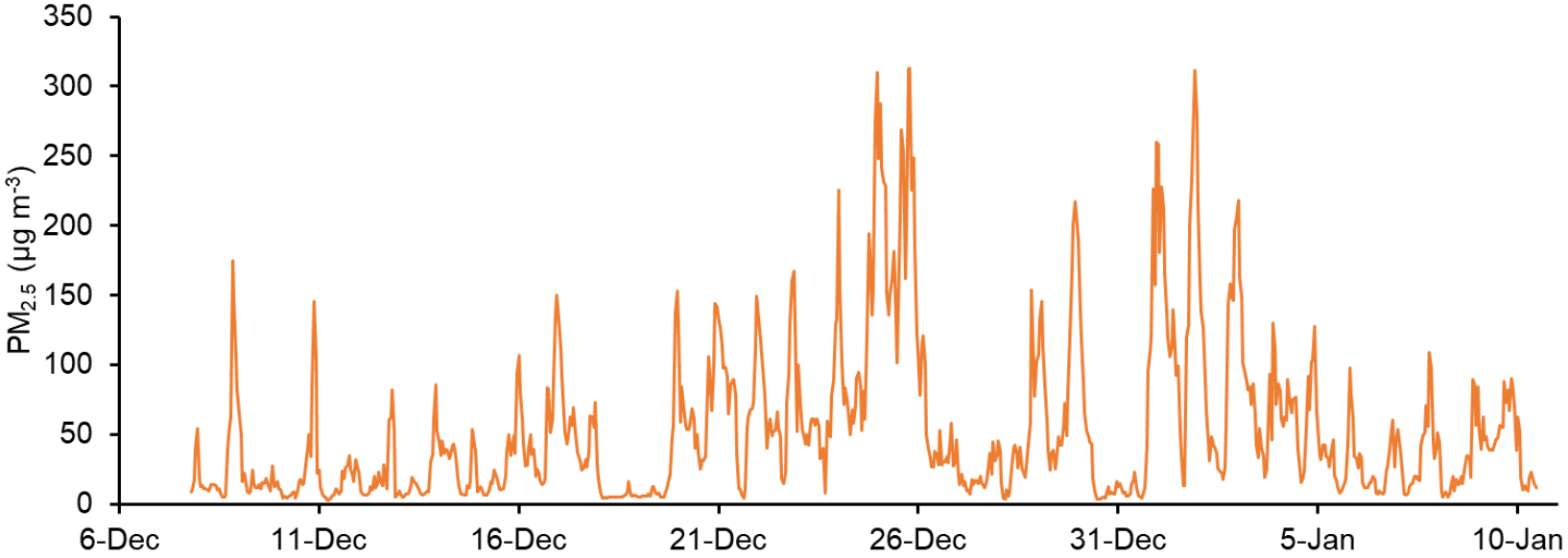


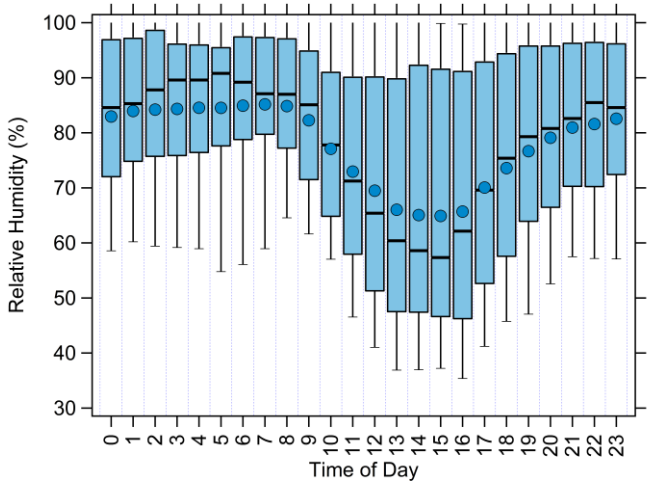
1 month sampling campaign
06/Dec/2021 – 10/Jan/2022

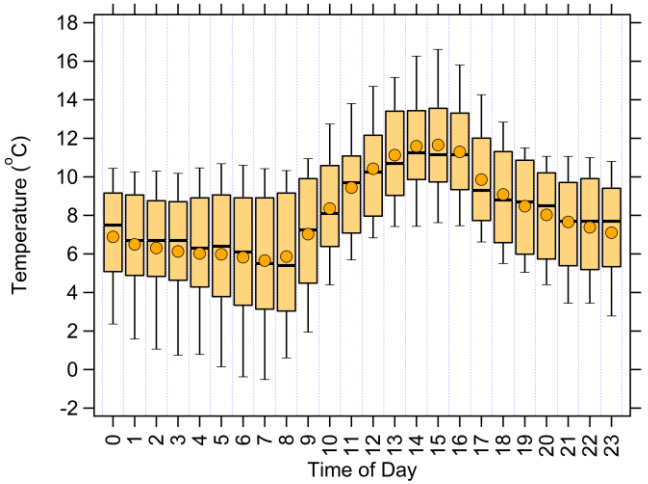
- Aerosol Chemical Speciation Monitor
- 7-wl AE-33 aethalometer

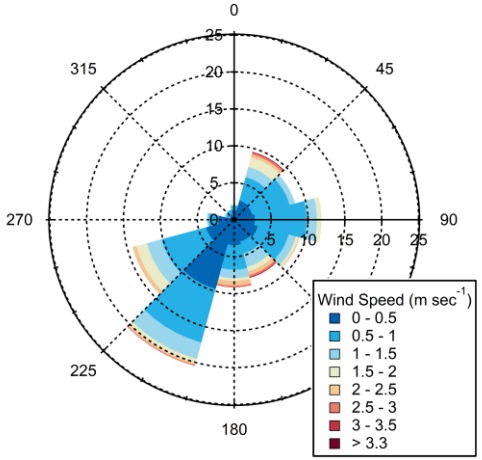
- PTR-ToF-MS

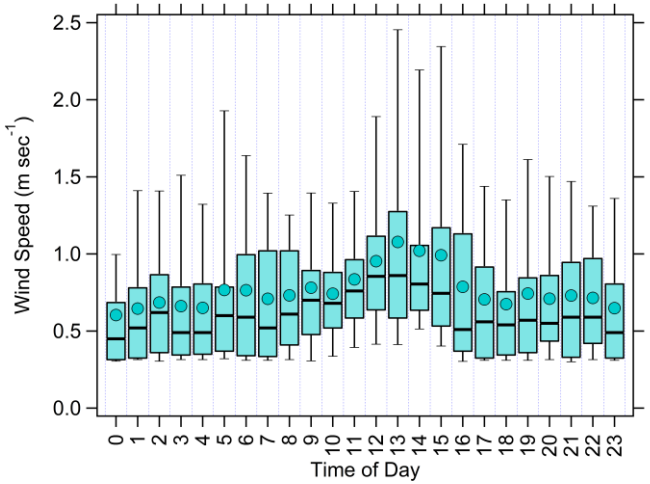
- 12 h LV filter samples
- Standard Gas analyzers
- PM_{10} Beta Atn Monitor
- Meteo station











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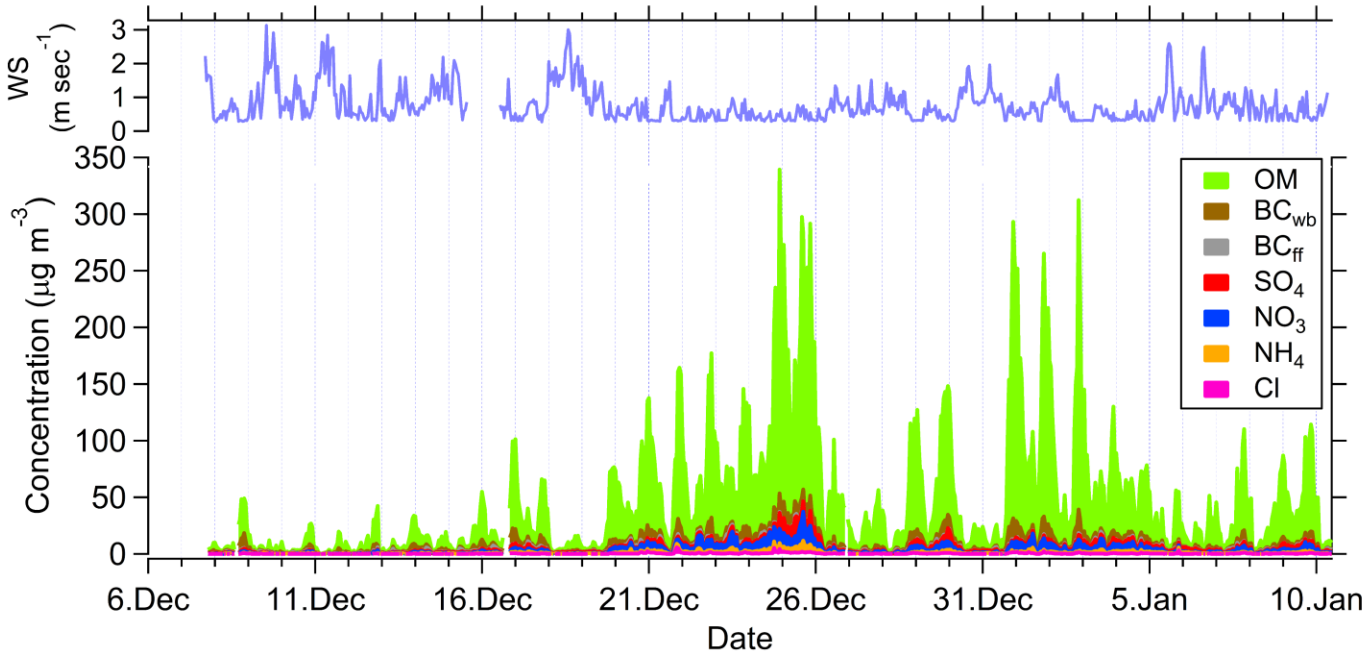

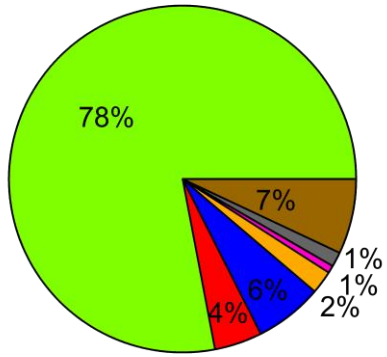

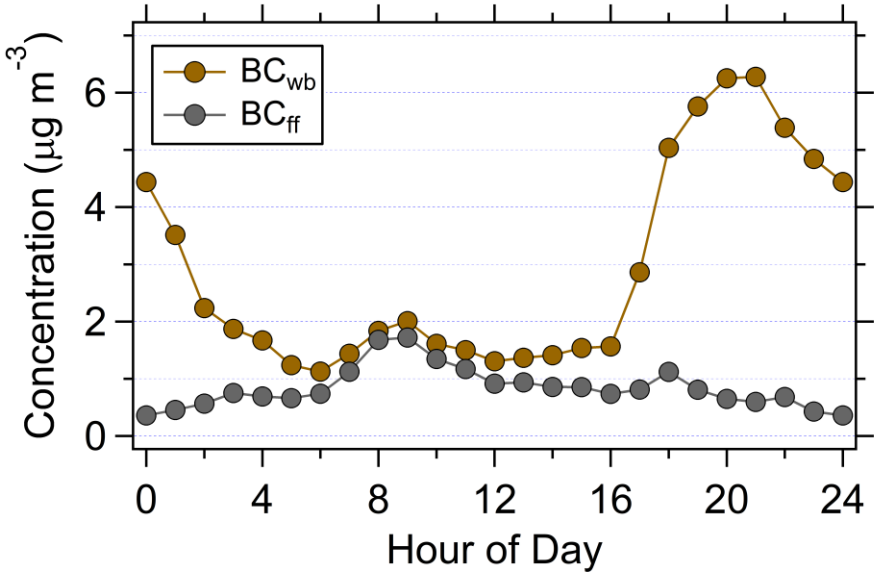

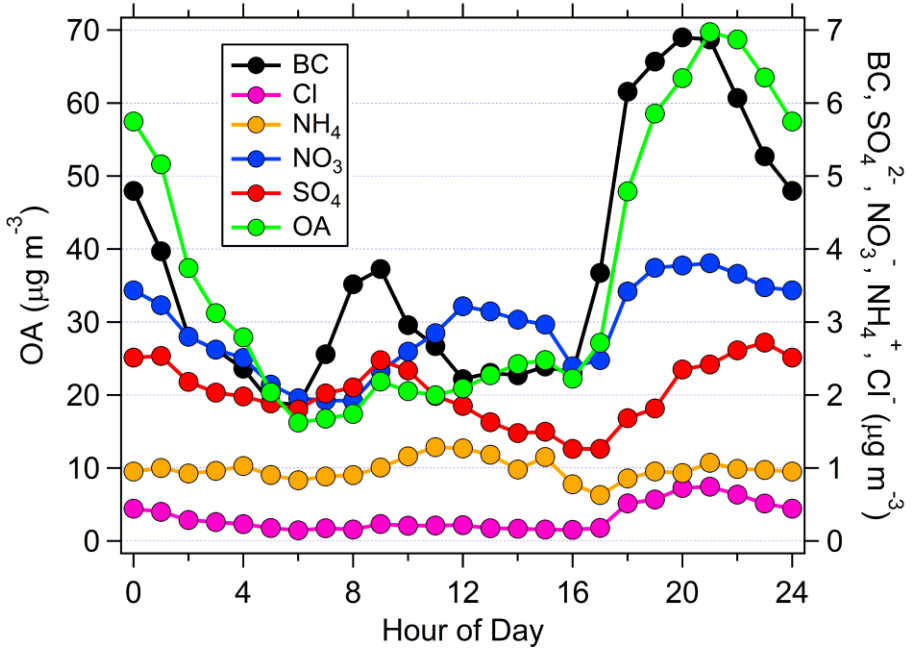

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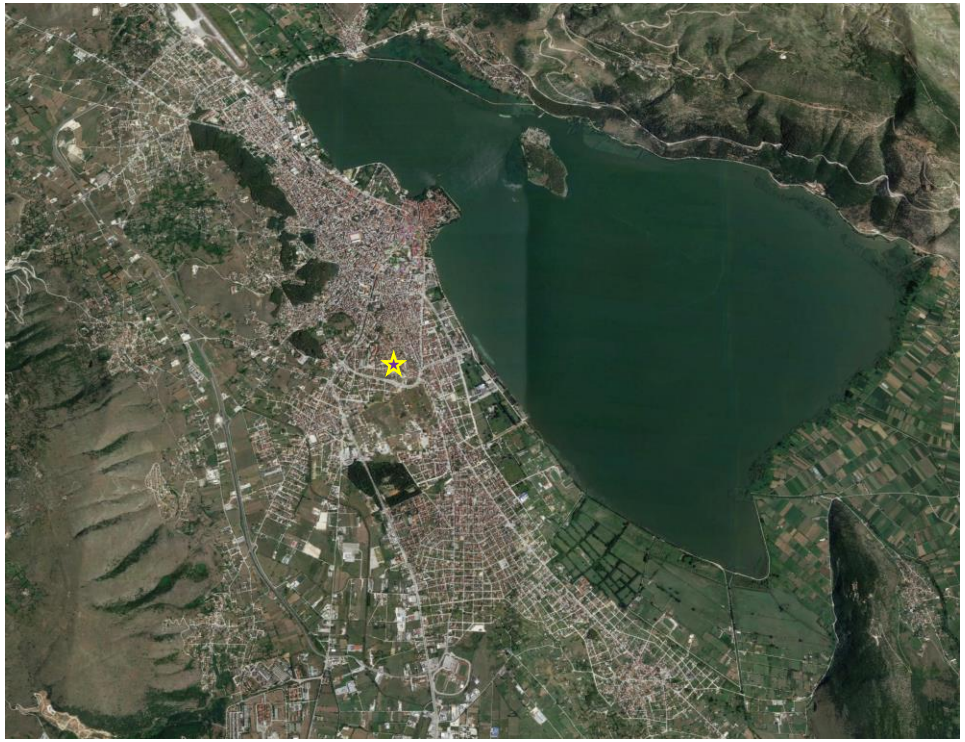
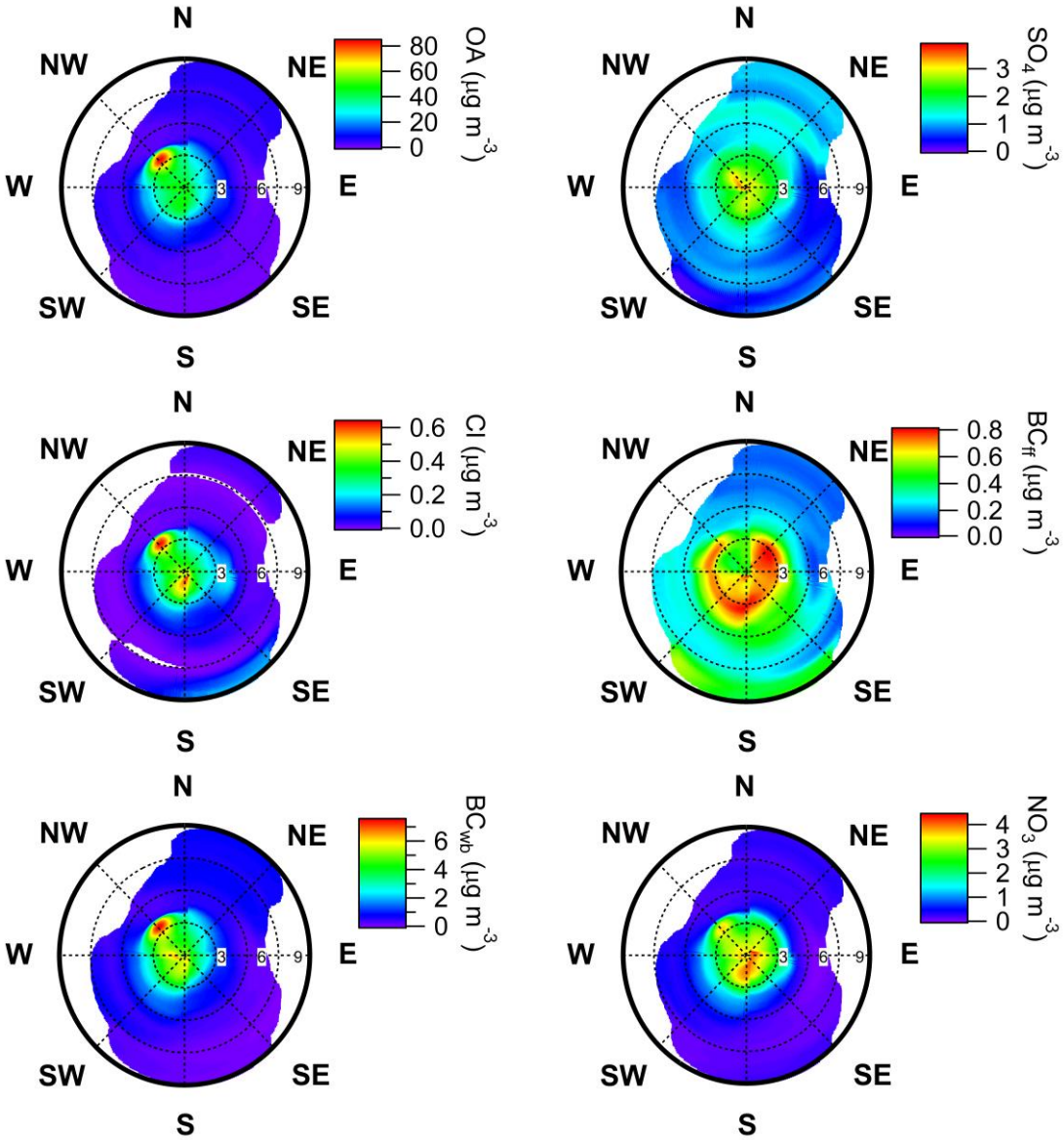
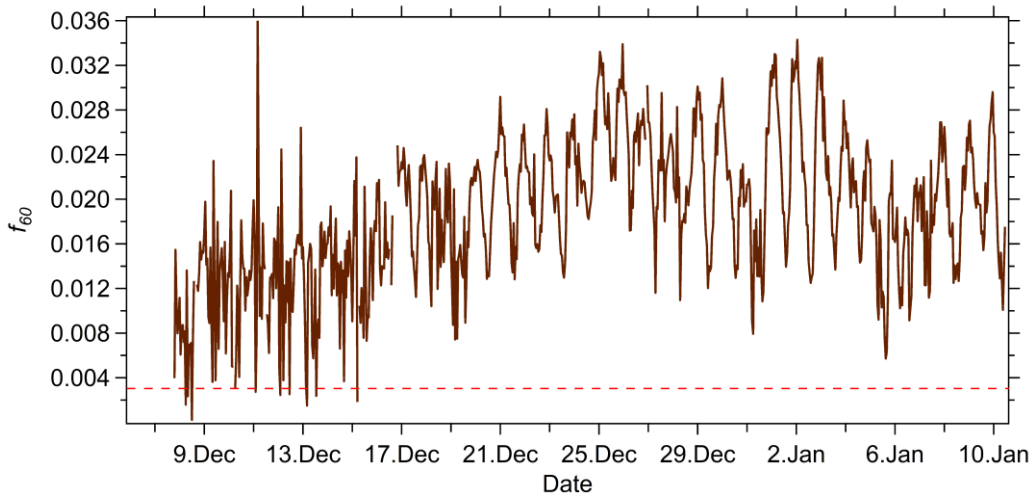
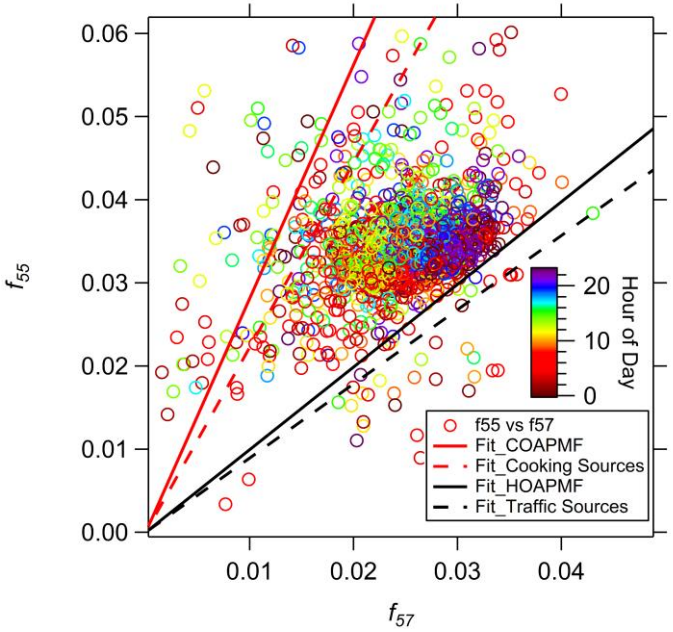
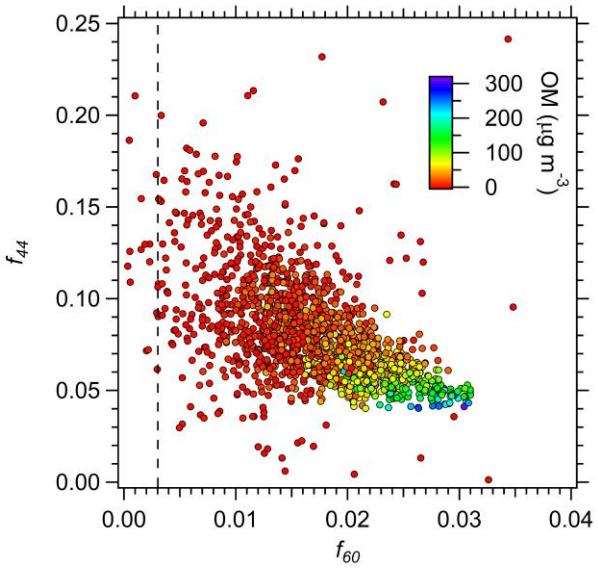
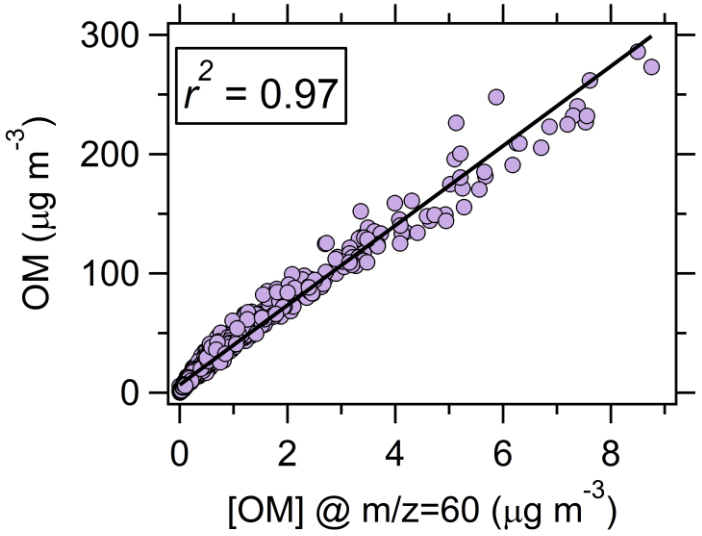


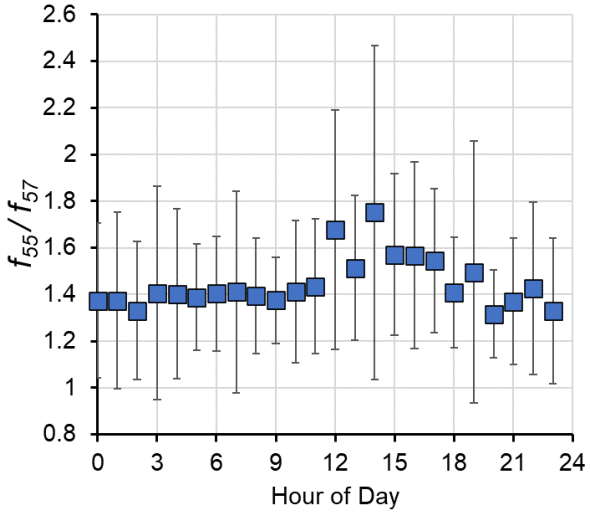

N
NE
E
SE
S
SW
W
NW
3
6
9
OA (μg m-3)
80
60
40
20
0
SO4 (μg m-3)
3
2
1
0
Cl (μg m-3)
0.6
0.4
0.2
0.0
BCff (μg m-3)
0.8
0.6
0.4
0.2
0.0
BCwb (μg m-3)
6
4
2
0
NO3 (μg m-3)
4
3
2
1
0

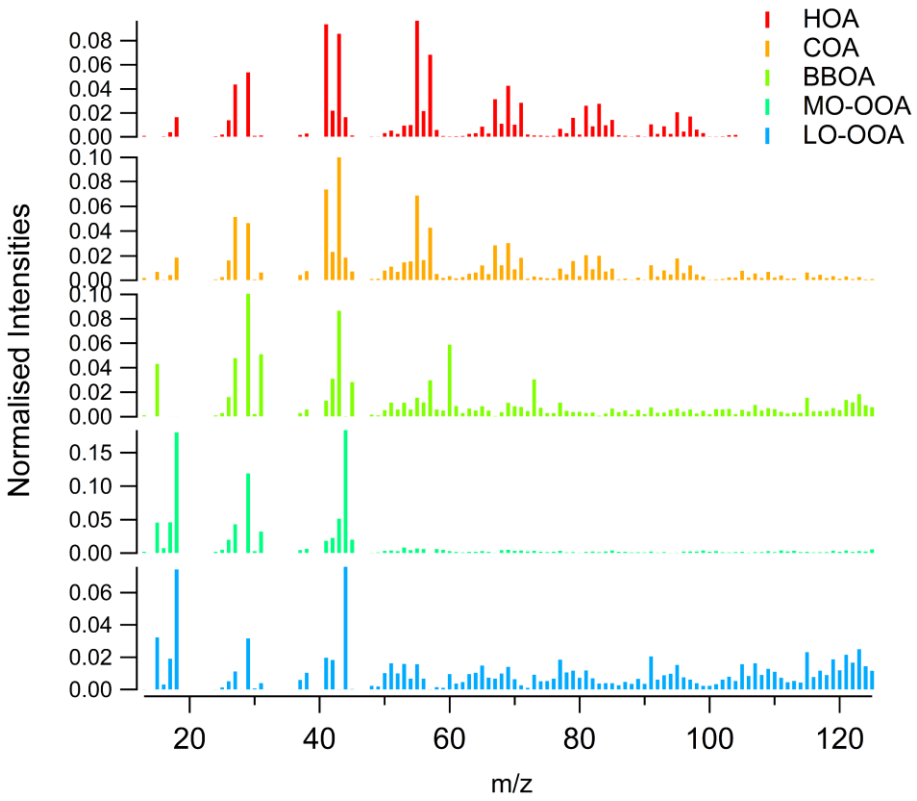

0.036
0.032
0.028
0.024
0.020
0.016
0.012
0.008
0.004
f_{60}
9.Dec
13.Dec
17.Dec
21.Dec
25.Dec
29.Dec
2.Jan
6.Jan
10.Jan
Date

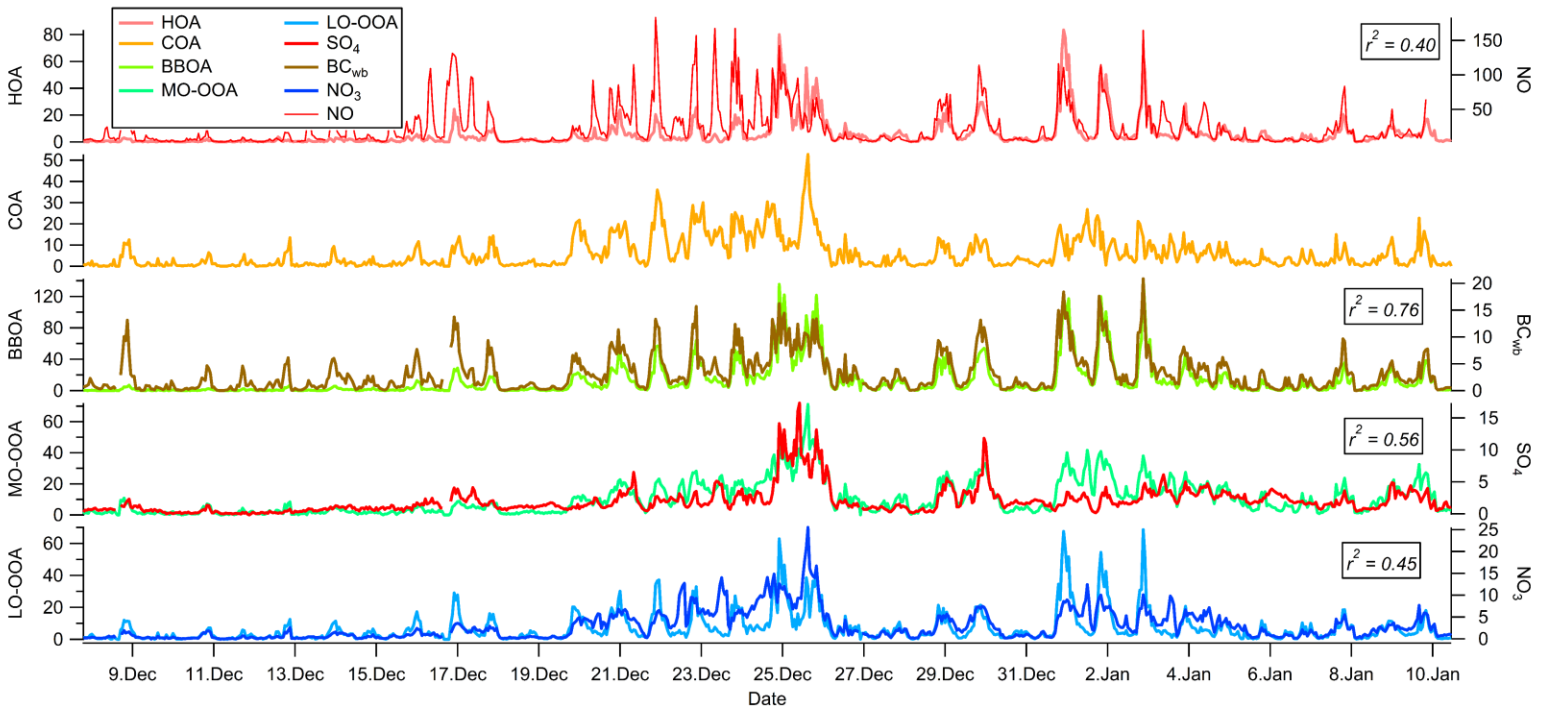

0.06
0.05
0.04
0.03
0.02
0.01
0.00
f_{55}
0.01
0.02
0.03
0.04
f_{57}
Hour of Day
20
10
0
f55 vs f57
Fit_COAPMF
Fit_Cooking Sources
Fit_HOAPMF
Fit_Traffic Sources

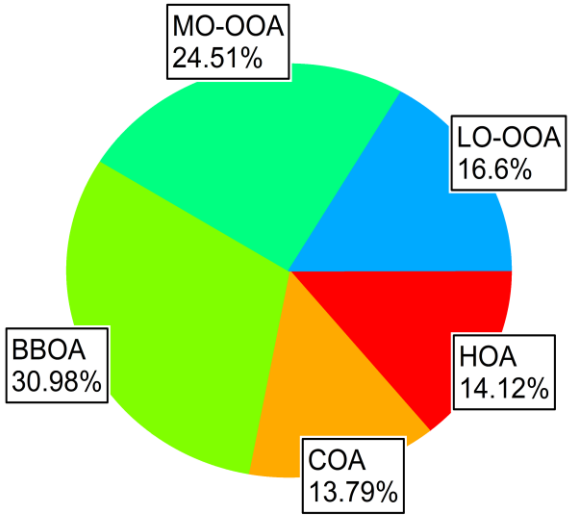

0.25
0.20
0.15
0.10
0.05
0.00
f_{44}
0.00
0.01
0.02
0.03
0.04
f_{60}
OM (μg m^{-3})
300
200
100
0


r^2 = 0.97
300
200
100
0
OM (μg m^{-3})
0
2
4
6
8
[OM] @ m/z=60 (μg m^{-3})


2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
f_{55} / f_{57}
0
3
6
9
12
15
18
21
24
Hour of Day







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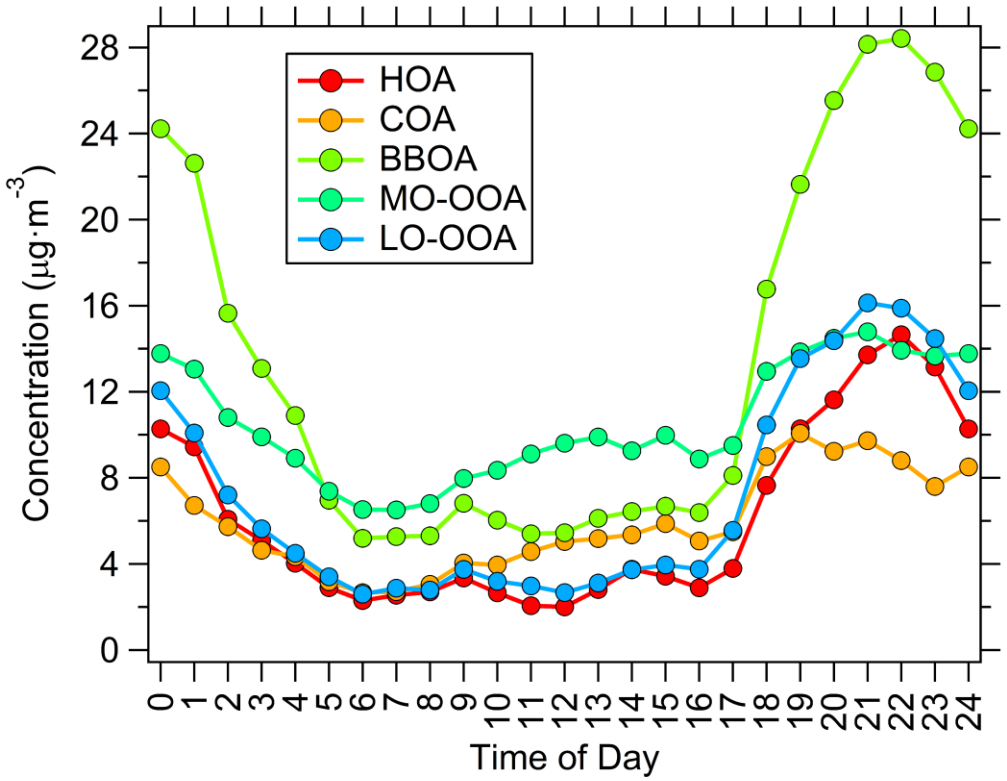
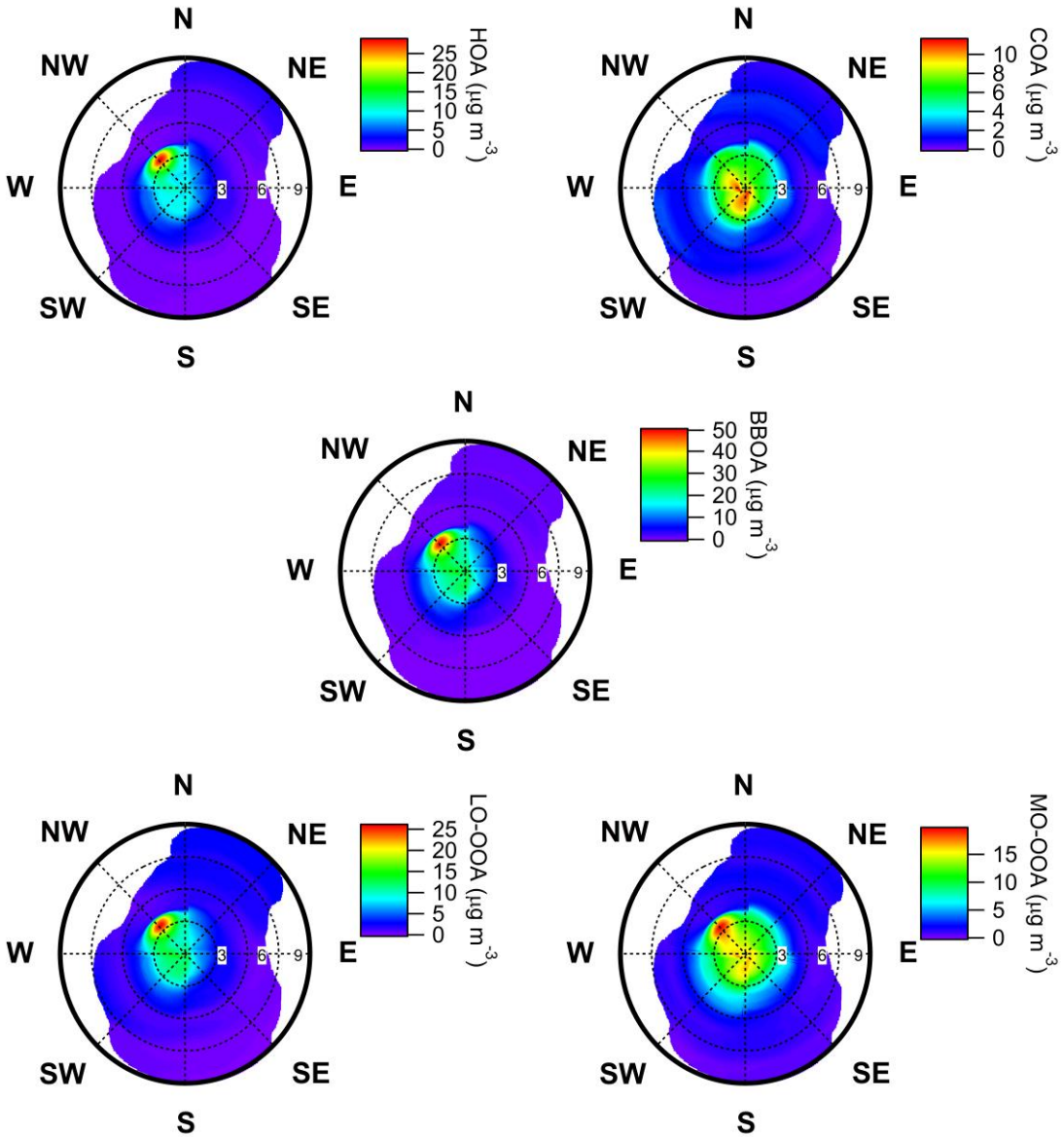

HOA
COA
BBOA
MO-OOA
LO-OOA
Concentration (μg·m-3)
Time of Day


N
NE
E
SE
S
SW
W
NW
HOA (μg m-3)
COA (μg m-3)
BBOA (μg m-3)
LO-OOA (μg m-3)
MO-OOA (μg m-3)