

# Investigating behaviour of charged particles (ions)

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July 31, 2024

## 1. Number concentrations

### 1.1 Statistical summary

The data of total charged particle number concentrations (0.8–42 nm) was divided into subsets of small (0.8–1.6 nm), intermediate (1.6–7.5 nm), large (7.5–22 nm).

	Mean	Median	Min - Max
Small negative particles	827.414573	795.184340	191.757918 - 4342.143601
Small positive particles	948.439478	914.831419	77.546723 - 5131.277780
Intermediate negative particles	89.398177	61.778435	5.936368 - 2567.038970
Intermediate positive particles	94.687042	34.889410	-162.192623 - 28058.007909
Large negative particles	2338.416049	675.154164	33.382587 - 96688.503003
Large positive particles	644.226926	432.037005	2.148323 - 19028.169008
Total negative particles	1040.703782	548.151784	89.739050 - 29380.797455
Total positive particles	578.882921	468.042937	70.484091 - 16799.728671

Table 1: Summary Statistics

## 1.2 The total number of ions distribution over diameter

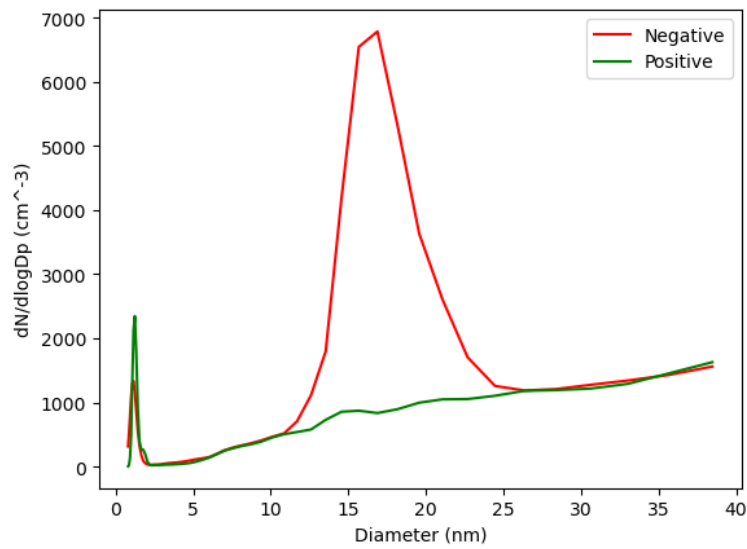
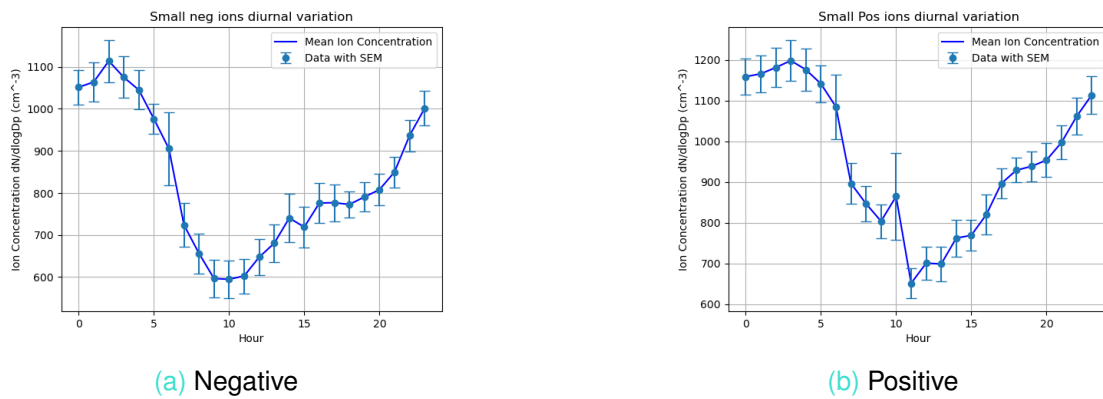


Figure 1: Number Concentration Distribution Over  $D_p$

## 2. Diurnal Cycles of Ions

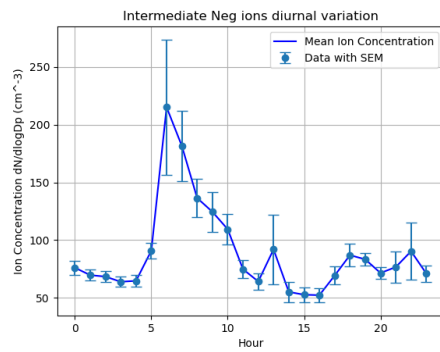
The data used for the analysis spans from March 16th to June 30th, 2024.



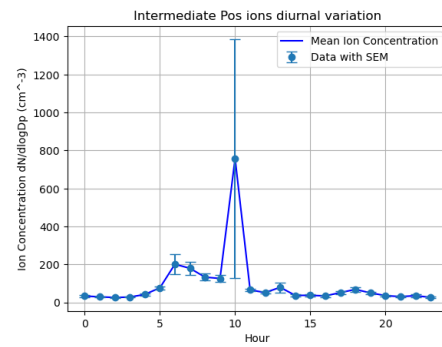
(a) Negative

(b) Positive

Figure 2: Small ions (0.8-1.6nm)

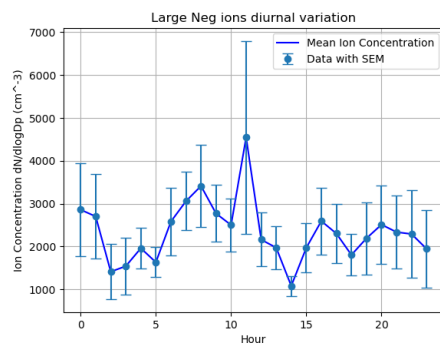


(a) Negative

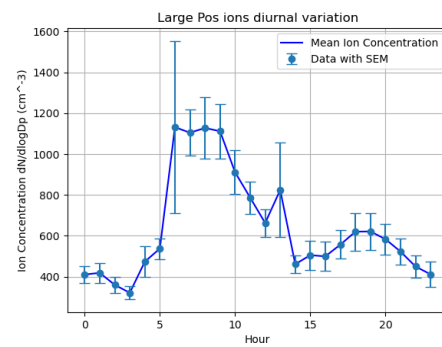


(b) Positive

Figure 3: Intermediate ions (1.6-7.5nm)



(a) Negative



(b) Positive

Figure 4: Large ions (7.5-22nm)

### 3. Correlation with select meteorological variables

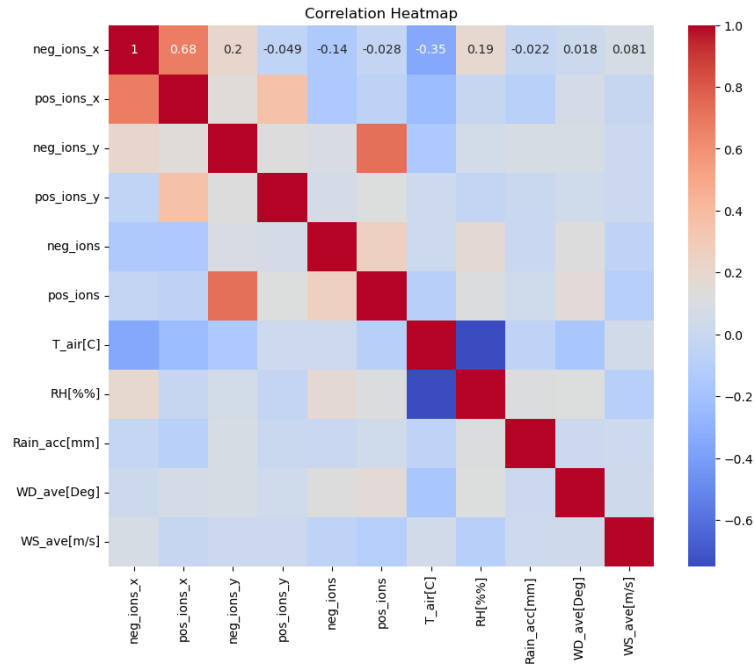


Figure 5: Correlation Heat Map

### 4. NPF Events

14 NPF-event days, 13 Undefined days, and 19 Non-event days.

#### 4.1 Meteorological Variables

Below are diurnal plots of temperature **6a**, relative humidity **6b**, and wind speed **6c** comparing the NPF-event days, the undefined days, and the non-event days.

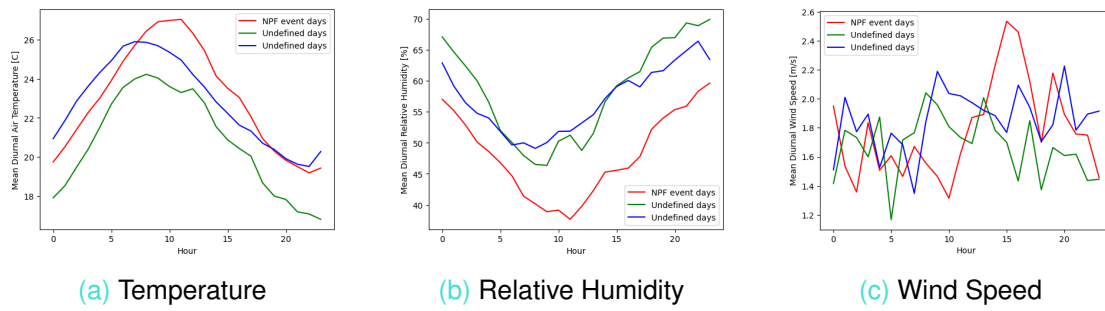


Figure 6: Diurnal Variations

## 4.2 Ions Variations by Size

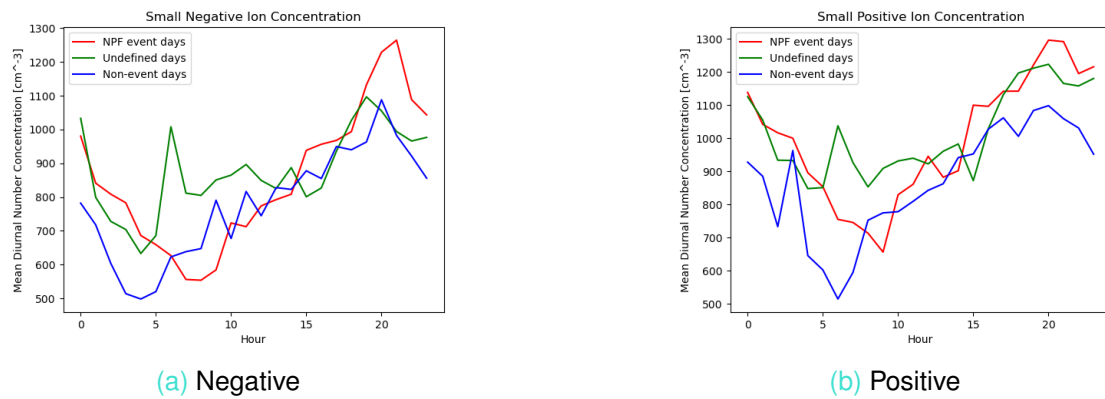


Figure 7: Small ions (0.8-1.6nm)

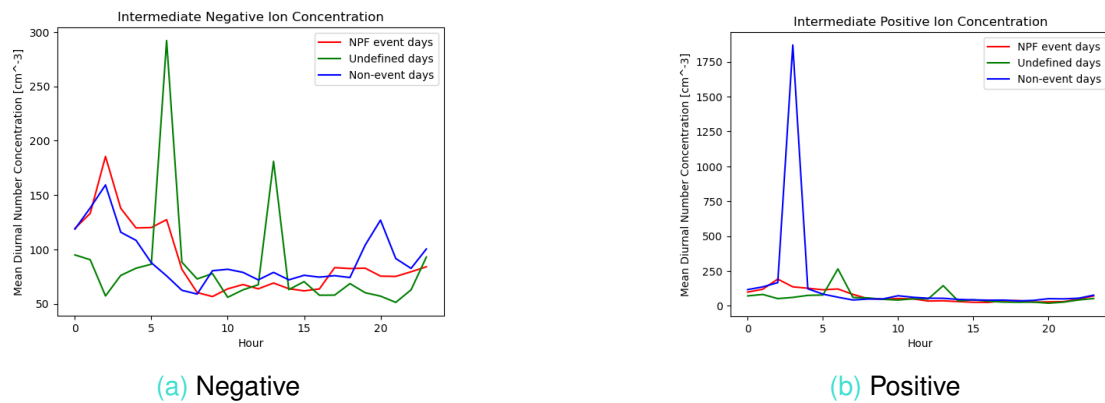


Figure 8: Intermediate ions (1.6-7.5nm)

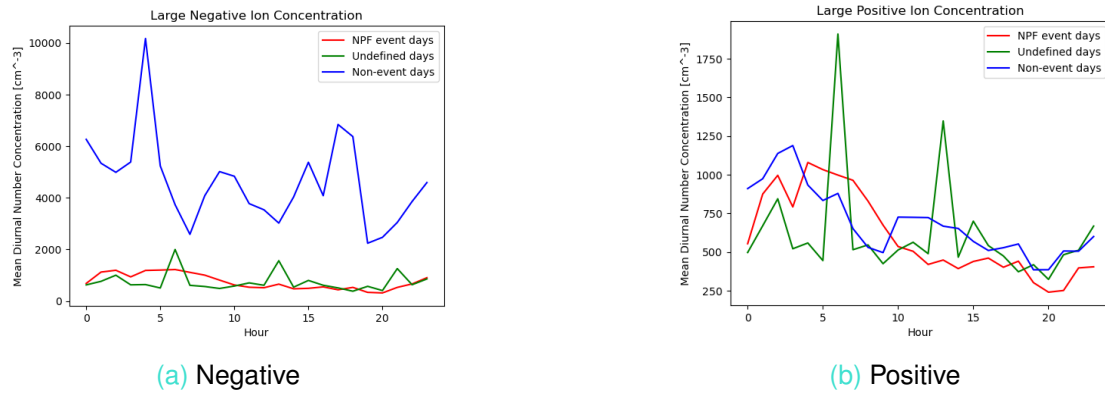


Figure 9: Large ions (7.5-22nm)

### 4.3 Possible Precursors

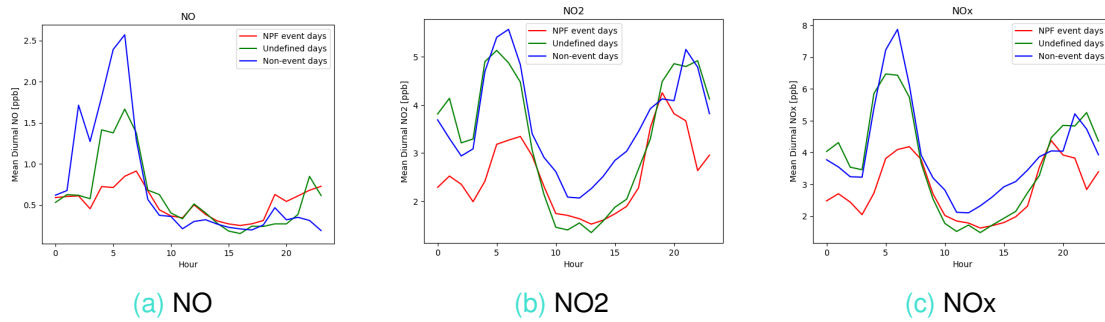


Figure 10: Diurnal Variations for NO

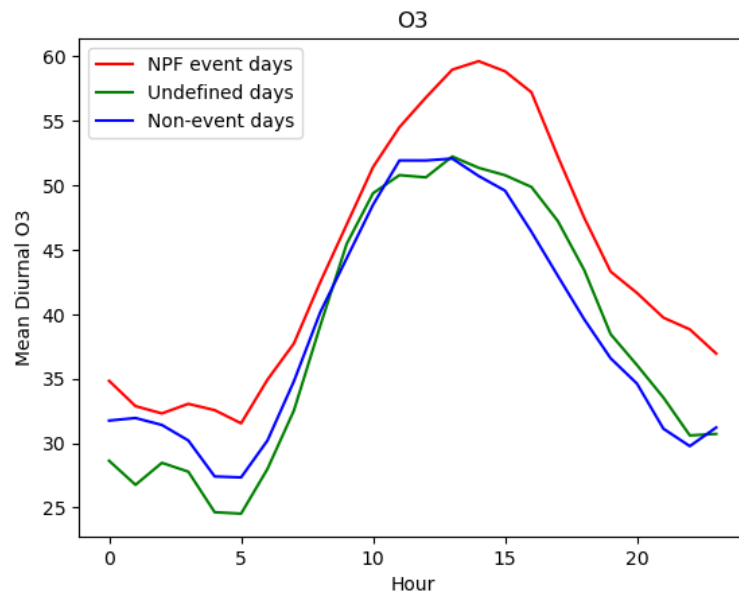


Figure 11: Ozone