



*Supplement of*

## **Oxidation pathways and emission sources of atmospheric particulate nitrate in Seoul: based on $\delta^{15}\text{N}$ and $\Delta^{17}\text{O}$ measurements**

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Table S1. The number of stable isotope ratios.

Period (year-month)	Number
18-May	2
18-Jun	3
18-Jul	6
18-Aug	2
18-Dec	2
19-Jan	5
19-Feb	5
19-Mar	6
Total number	31

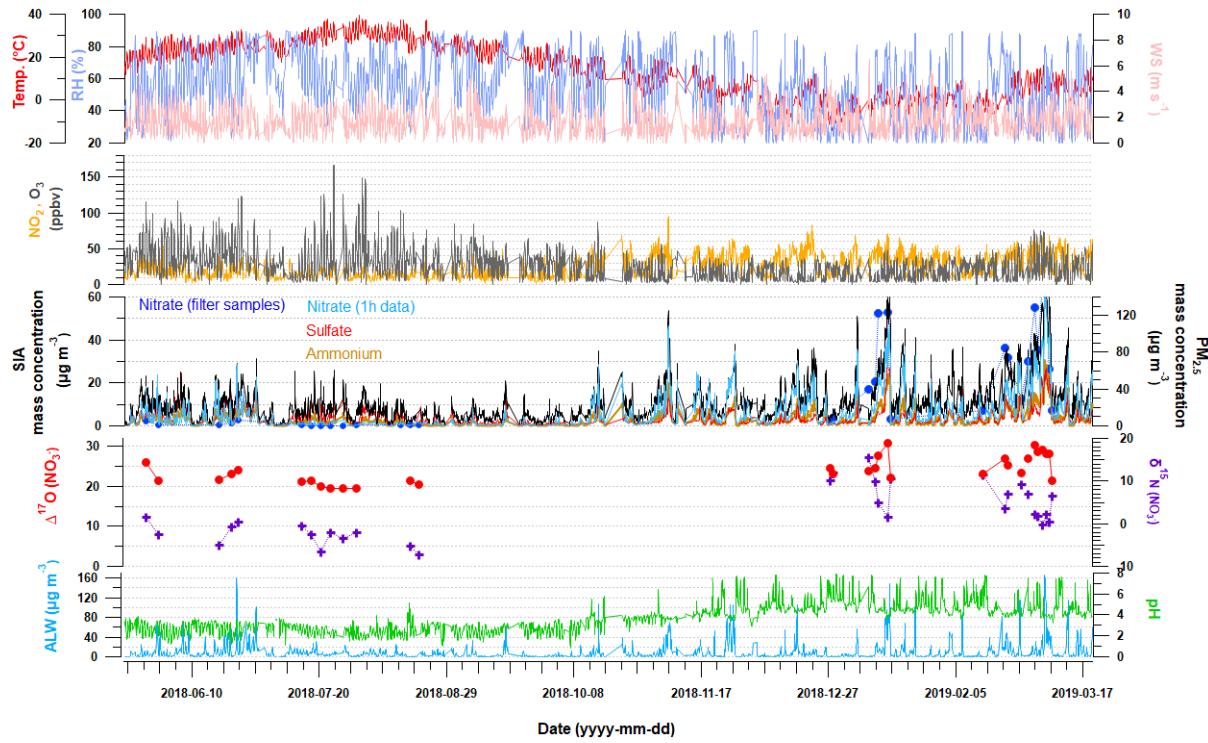
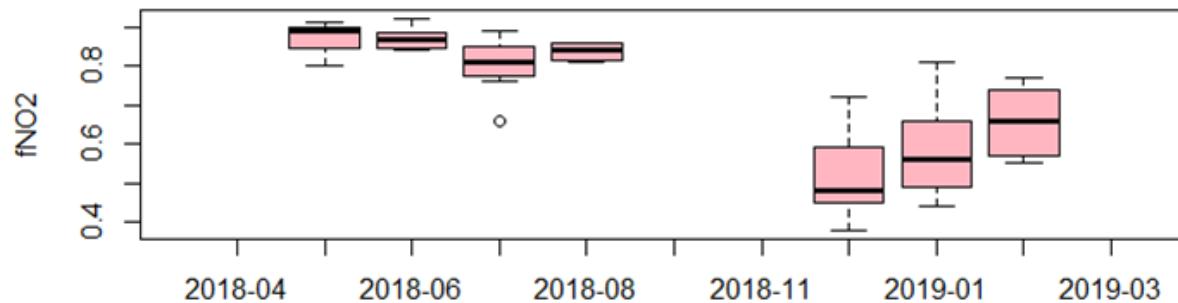


Figure S1. Time-series of measured parameters, including meteorological parameters (air temperature, relative humidity, and wind speed), gaseous precursors ( $\text{NO}_2$  and  $\text{O}_3$ ),  $\text{PM}_{2.5}$  mass and SIA ( $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ , and  $\text{NH}_4^+$ ) concentrations, triple oxygen and nitrogen stable isotope ratios, and calculated ALW content and aerosol pH. All is 1h-averaged data, except stable isotope ratios and  $\text{NO}_3^-$  concentration, which are filter-based measurements.

a)



b)

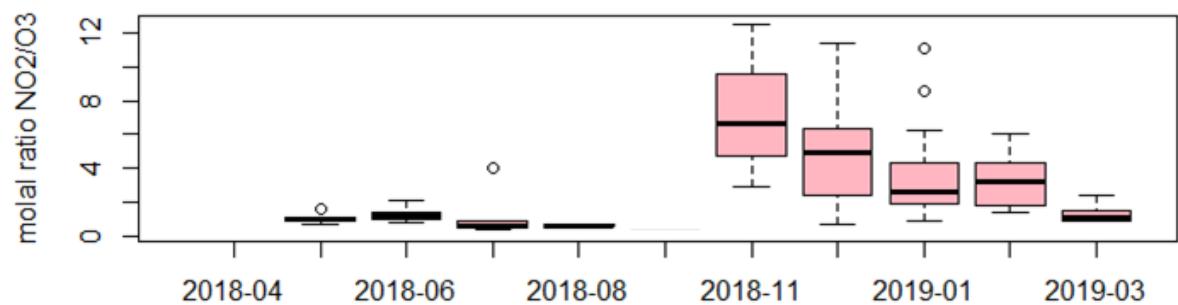
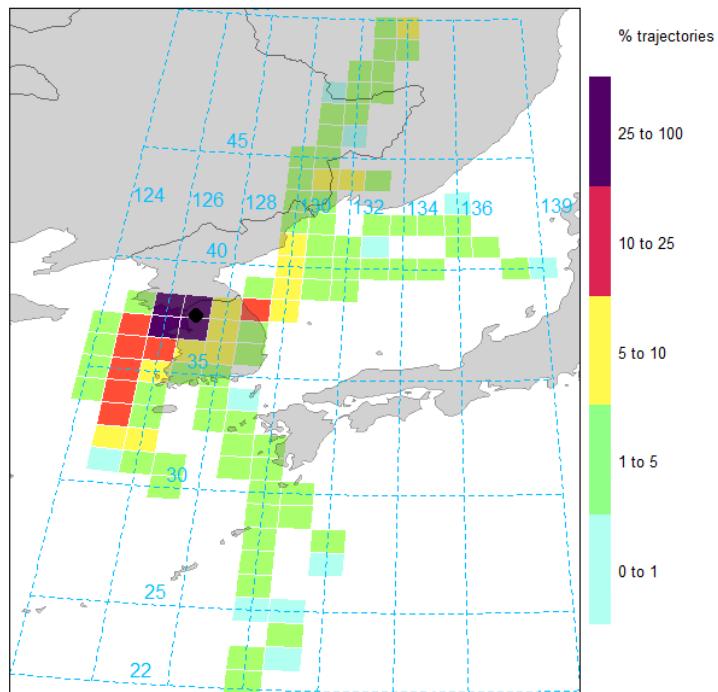


Figure S2. Monthly variations in (a)  $f_{\text{NO}_2}$  and (b) molar ratio of  $\text{NO}_2/\text{O}_3$  for the measurement periods of May-August 2018 and December 2018-March 2019.

a)



b)

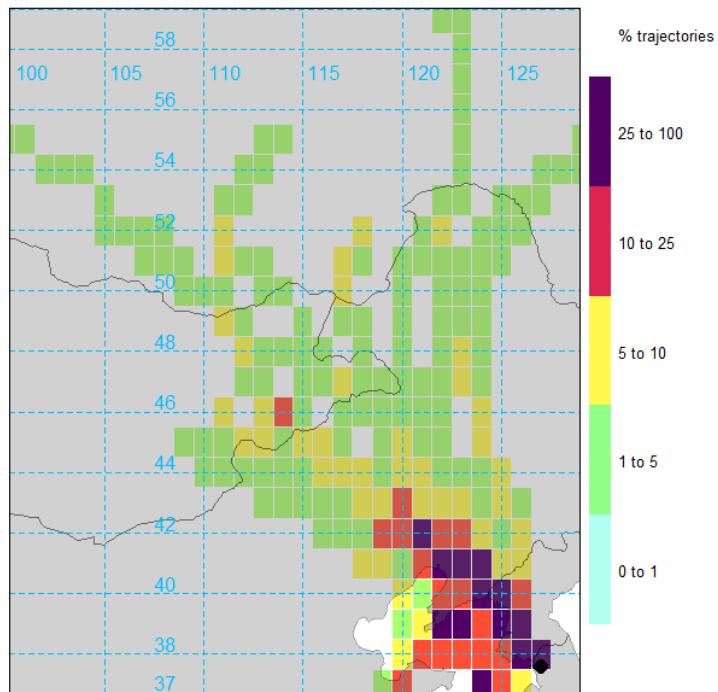


Figure S3. Frequency of air mass backward trajectories with (a)  $\delta^{15}\text{N} (\text{NO}_3^-)$  lower than 20<sup>th</sup> percentile and (b)  $\delta^{15}\text{N} (\text{NO}_3^-)$  higher than 80<sup>th</sup> percentile.