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Supplement of

Atmospheric new particle formation characteristics in the Arctic as measured at Mount Zeppelin, Svalbard, from 2016 to 2018

Haebum Lee et al.

Correspondence to: Kihong Park (kpark@gist.ac.kr) and Young Jun Yoon (yjyoon@kopri.re.kr)

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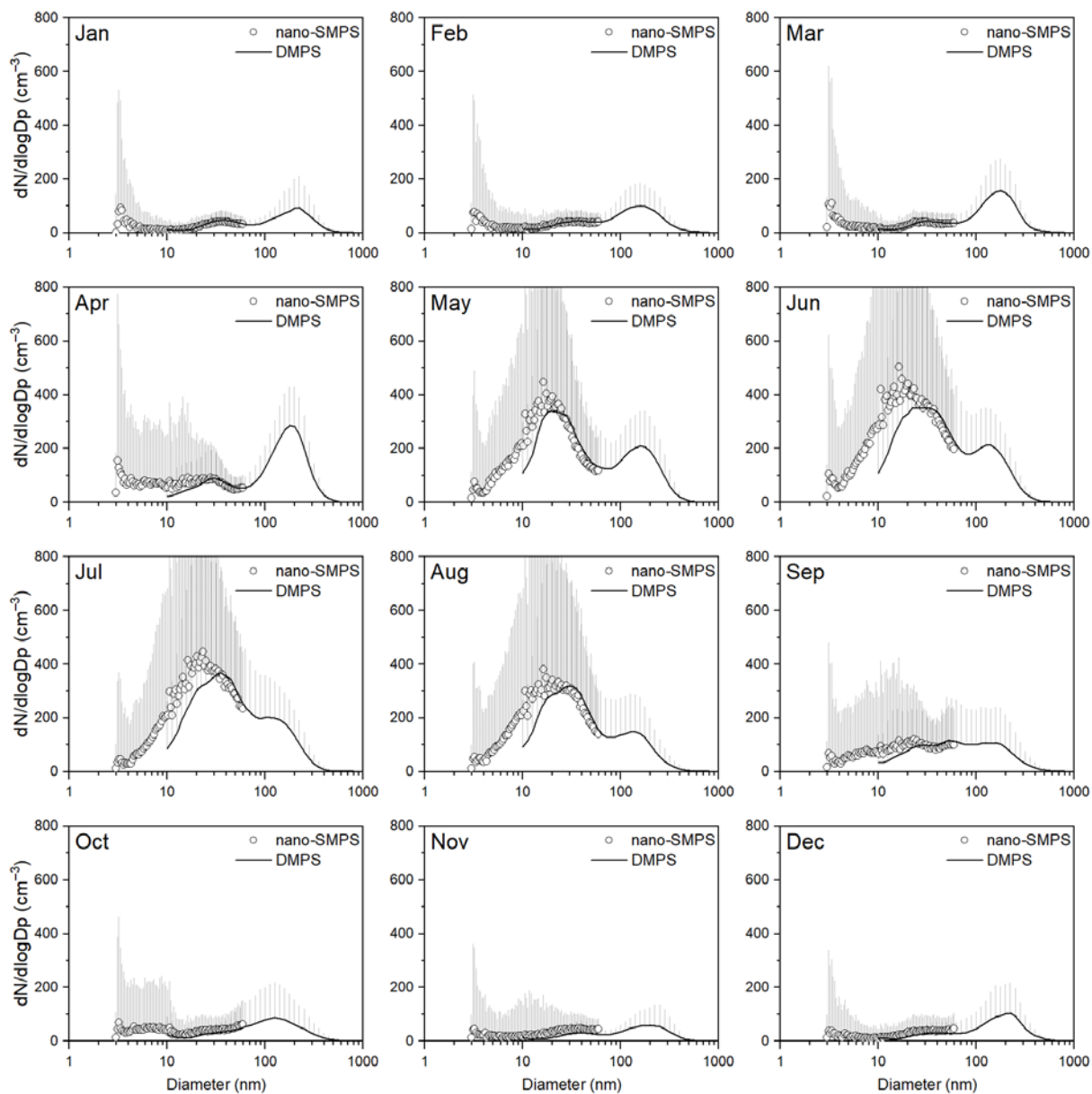


Figure S1. Comparison of monthly average size distributions obtained from the nano-SMPS (3–60 nm) and DMPS (10–810 nm) during the measurement period. The error bar indicates standard deviation.

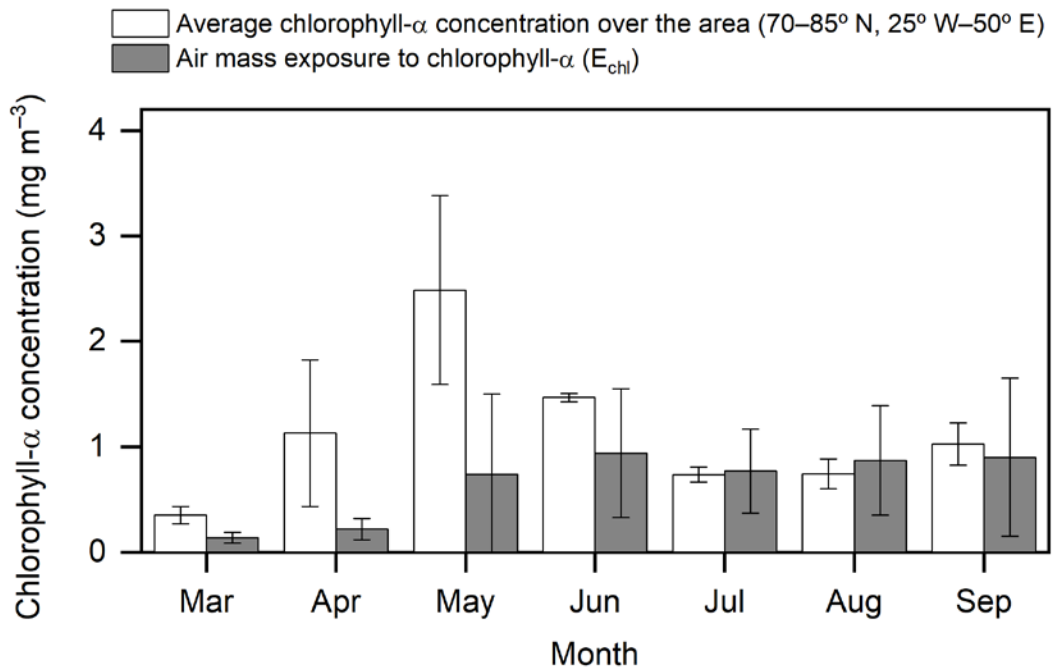


Figure S2. Monthly values of average chlorophyll- α concentration over the area (70–85° N, 25° W–50° E) and “air mass exposure to chlorophyll- α ” (E_{chl}) calculated by Eq. (1) in Park et al. (2018) from March to September during the measurement period.

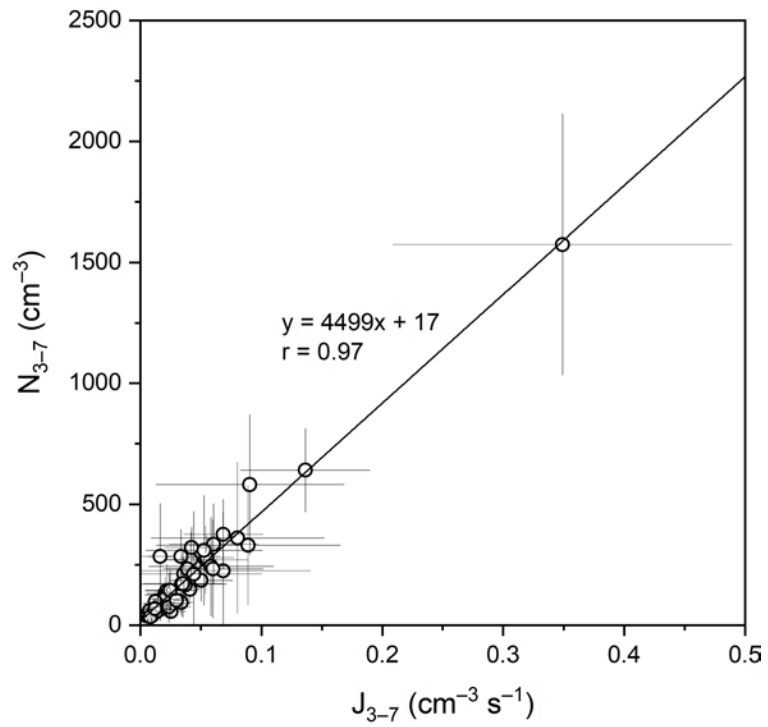
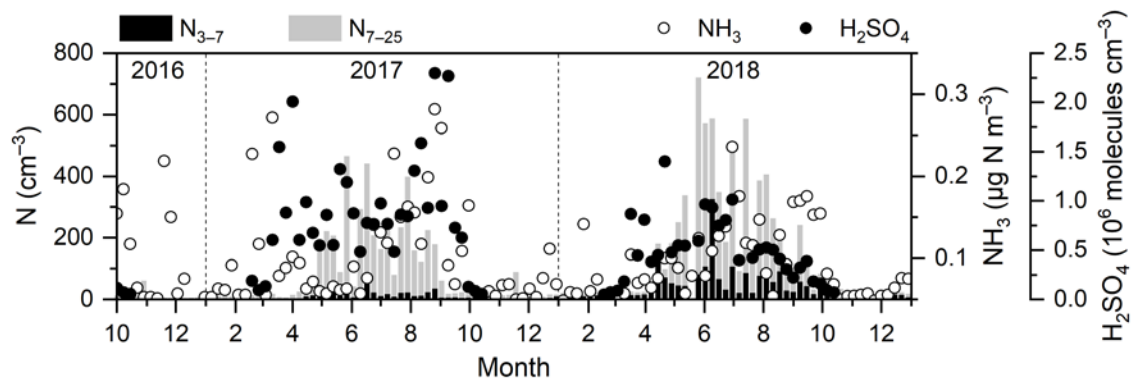
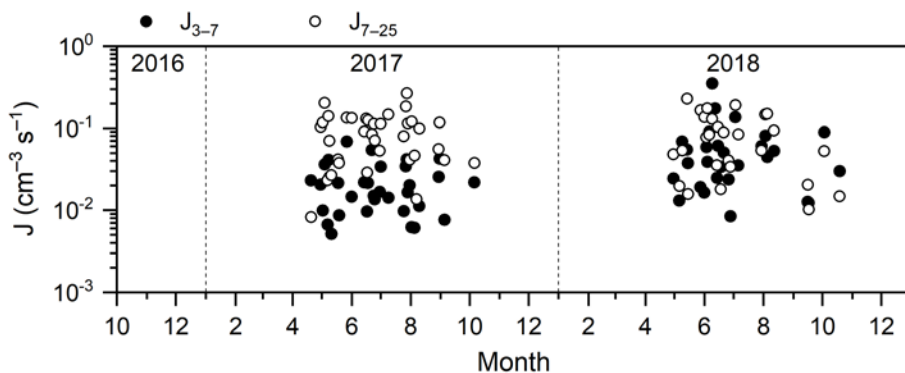


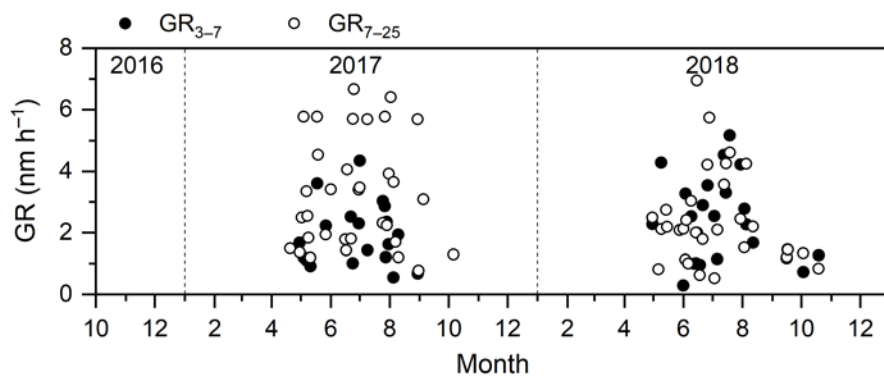
Figure S3. Relationship between N_{3-7} and J_{3-7} during NPF events with a linear regression line and a correlation coefficient (r).



(a)

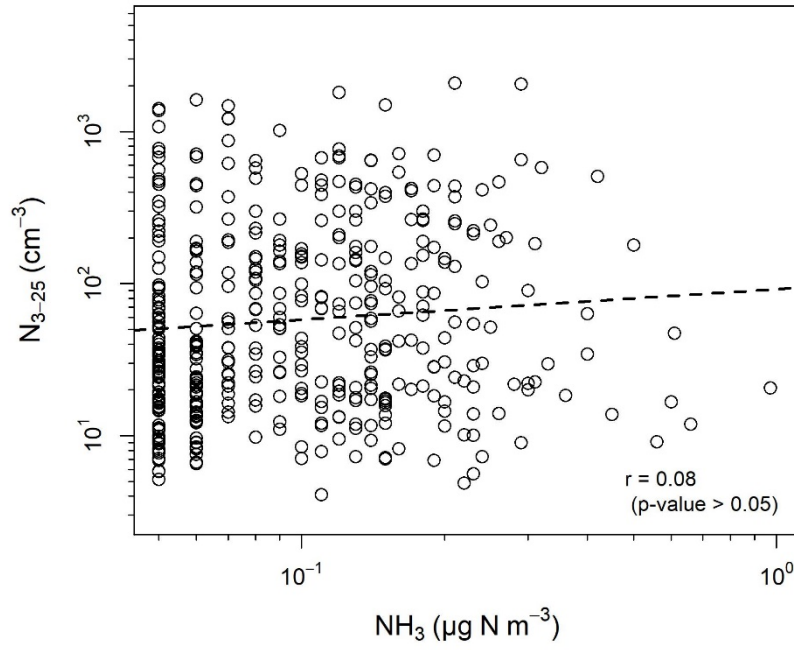


(b)

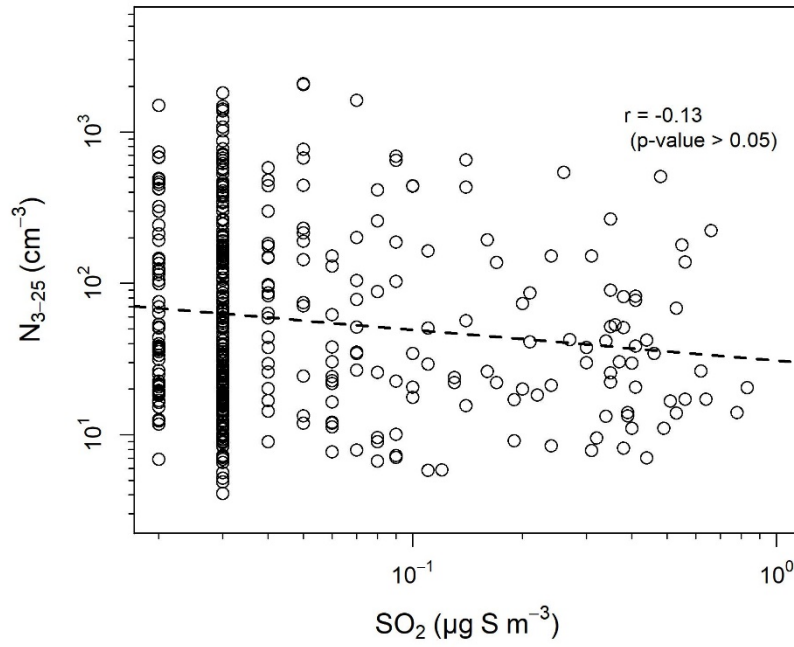


(c)

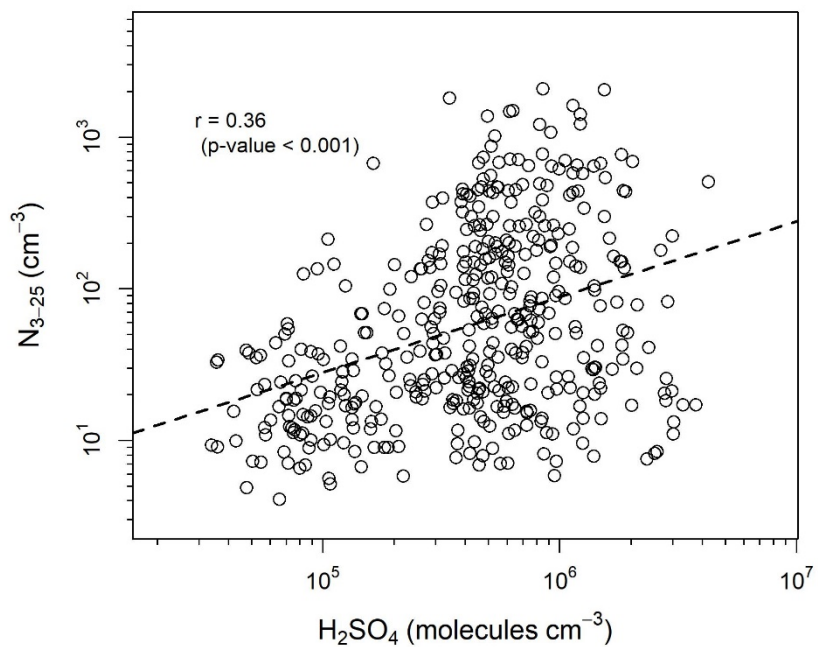
Figure S4. Time series of (a) weekly N_{3-7} , N_{7-25} , NH_3 , and H_2SO_4 , (b) daily GR and (c) daily J in different modes (J_{3-7} , J_{7-25} , GR_{3-7} , and GR_{7-25}) during the measurement period.



(a)



(b)



(c)

Figure S5. Correlations of daily N_{3-25} versus (a) daily NH_3 , (b) daily SO_2 , and (c) daily H_2SO_4 concentrations during the measurement period. The dashed line represents a linear regression line with a correlation coefficient (r).

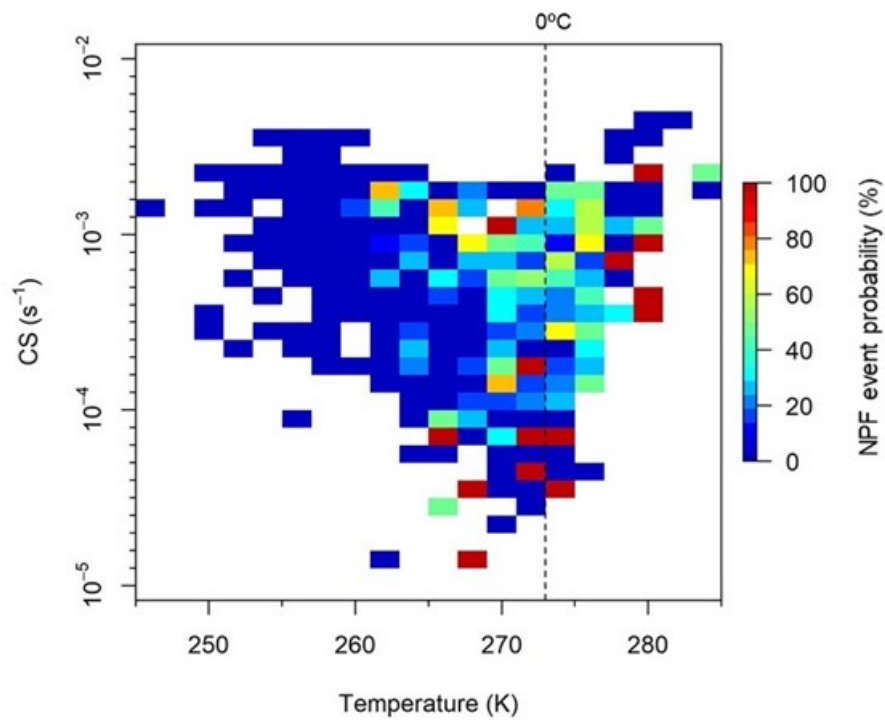


Figure S6. NPF event probability distribution with daily CS and temperature. The cell size was 2 K (temperature) and the ratio of 1.26 between two consecutive CS values.

Table S1. Average concentrations of ionic species (Na^+ , Mg^{2+} , K^+ , NH_4^+ , NO_3^- , SO_4^{2-} , and Cl^-) in particulate matter and gaseous species (NH_3 , SO_2 , and H_2SO_4) in different seasons during the measurement period.

| | Unit | Spring | Summer | Fall | Winter |
|-------------------------|----------------------------------|-----------------|-----------------|-----------------|-----------------|
| Na^+ | $\mu\text{g m}^{-3}$ | 0.27 ± 0.38 | 0.18 ± 0.28 | 0.22 ± 0.28 | 0.31 ± 0.33 |
| Mg^{2+} | $\mu\text{g m}^{-3}$ | 0.04 ± 0.08 | 0.02 ± 0.04 | 0.03 ± 0.04 | 0.05 ± 0.05 |
| K^+ | $\mu\text{g m}^{-3}$ | 0.05 ± 0.07 | 0.03 ± 0.02 | 0.03 ± 0.02 | 0.03 ± 0.02 |
| NH_4^+ | $\mu\text{g N m}^{-3}$ | 0.04 ± 0.05 | 0.02 ± 0.03 | 0.02 ± 0.03 | 0.02 ± 0.02 |
| NO_3^- | $\mu\text{g N m}^{-3}$ | 0.02 ± 0.02 | 0.02 ± 0.02 | 0.02 ± 0.04 | 0.02 ± 0.02 |
| SO_4^{2-} | $\mu\text{g S m}^{-3}$ | 0.19 ± 0.18 | 0.08 ± 0.10 | 0.08 ± 0.09 | 0.11 ± 0.20 |
| Cl^- | $\mu\text{g m}^{-3}$ | 0.39 ± 0.63 | 0.24 ± 0.43 | 0.35 ± 0.50 | 0.52 ± 0.59 |
| NH_3 | $\mu\text{g N m}^{-3}$ | 0.13 ± 0.60 | 0.16 ± 0.22 | 0.10 ± 0.10 | 0.08 ± 0.07 |
| SO_2 | $\mu\text{g S m}^{-3}$ | 0.09 ± 0.22 | 0.08 ± 0.11 | 0.08 ± 0.13 | 0.09 ± 0.27 |
| H_2SO_4 | $10^5 \text{ molecules cm}^{-3}$ | 7.43 ± 8.16 | 8.59 ± 8.64 | 5.52 ± 8.91 | 0.95 ± 0.69 |