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

Haebum Lee et al.

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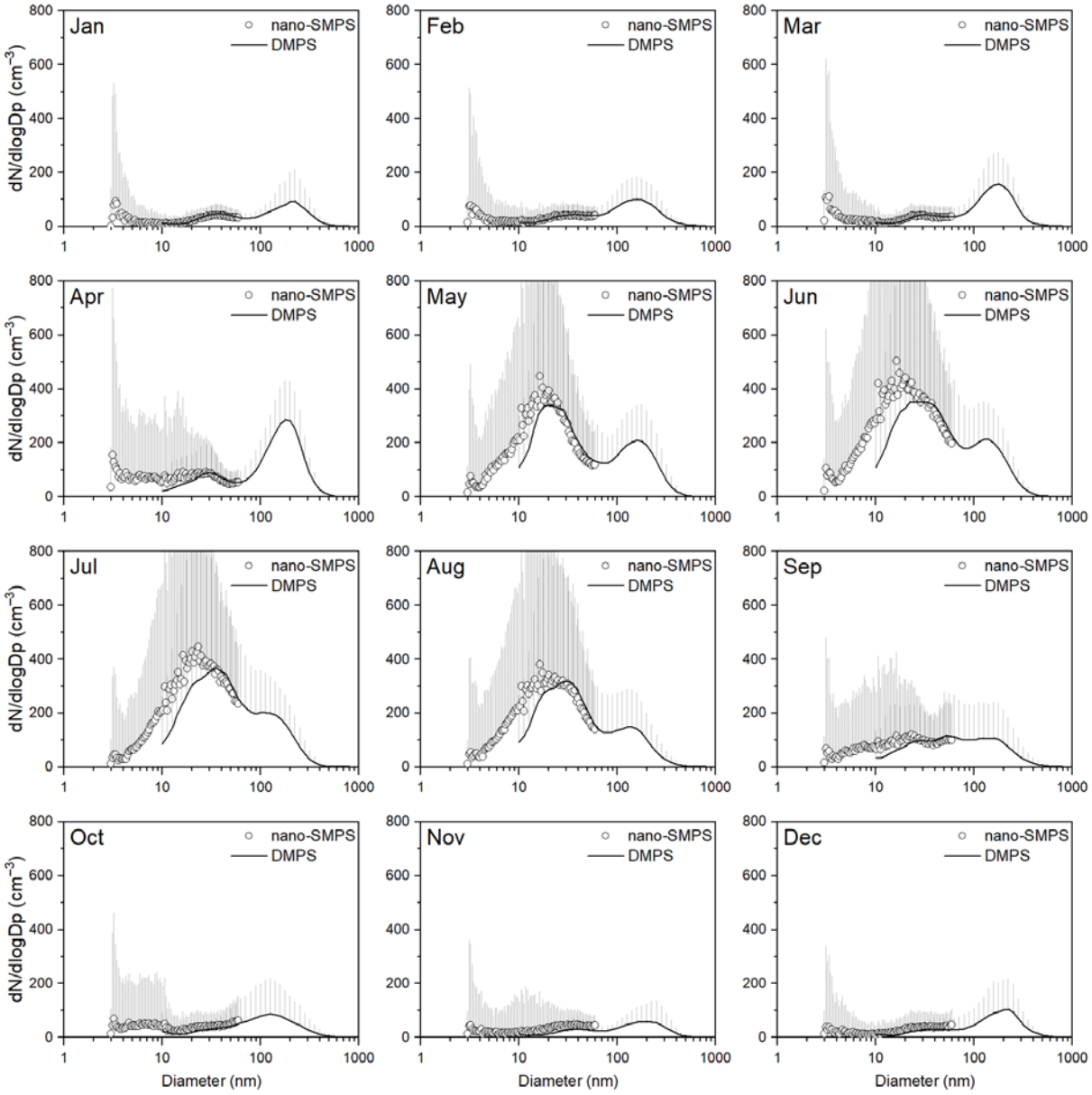


Figure S1. Comparison of monthly average size distributions obtained from the nano-SMPS (3–60 nm) and DMPS (10–810 nm) during the measurement period. The error bar indicates standard deviation.

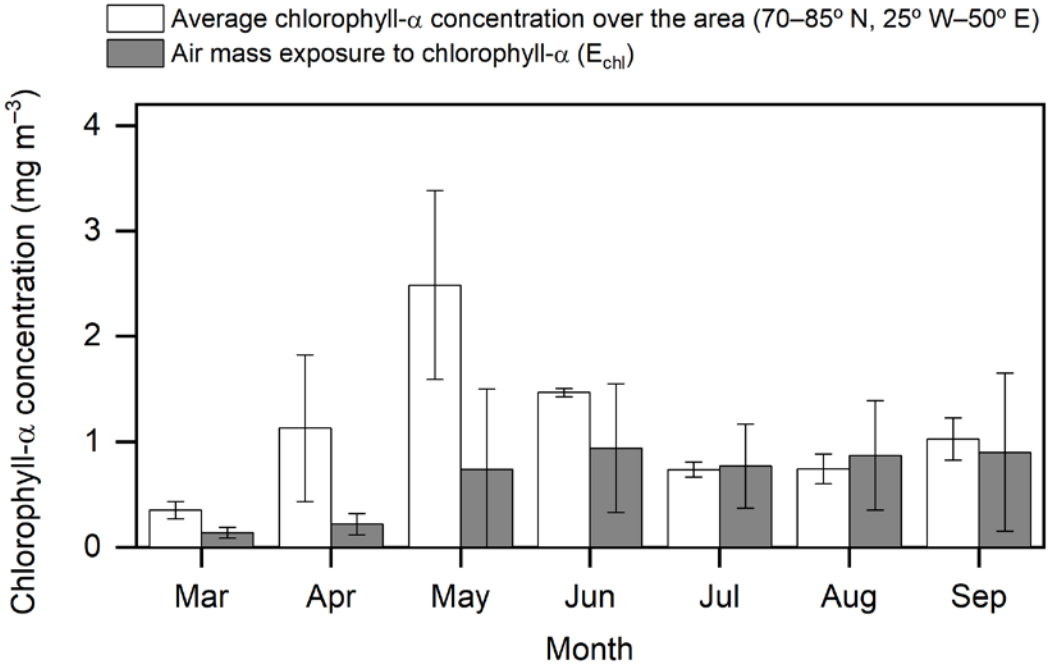


Figure S2. Monthly values of average chlorophyll-α concentration over the area (70–85º N, 25º W–50º E) and "air mass exposure to chlorophyll-α" (E_{chl}) calculated by Eq. (1) in Park et al. (2018) from March to September during the measurement period.

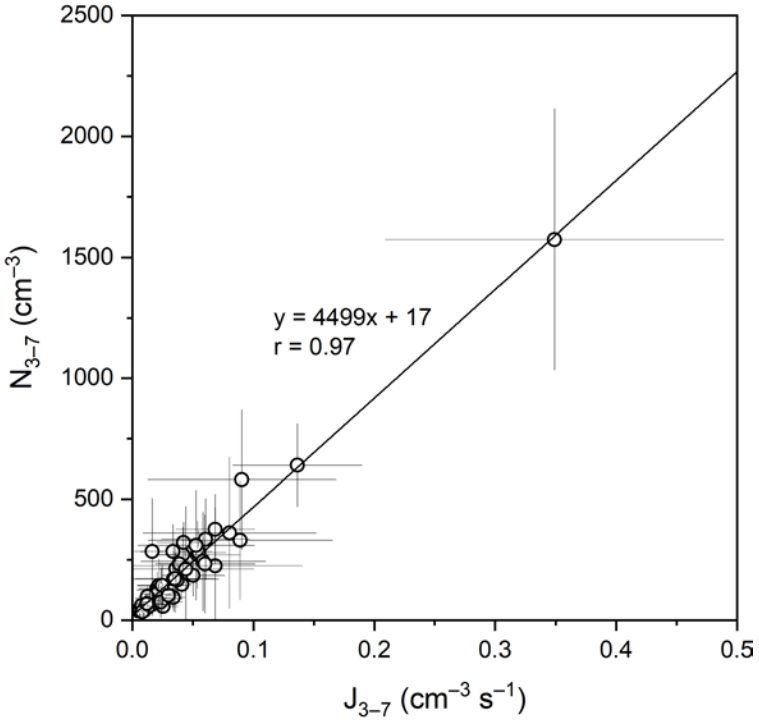
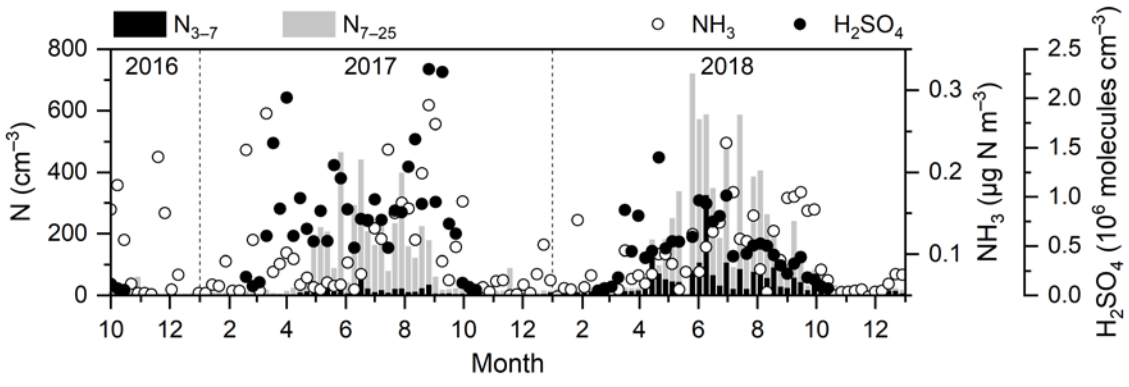
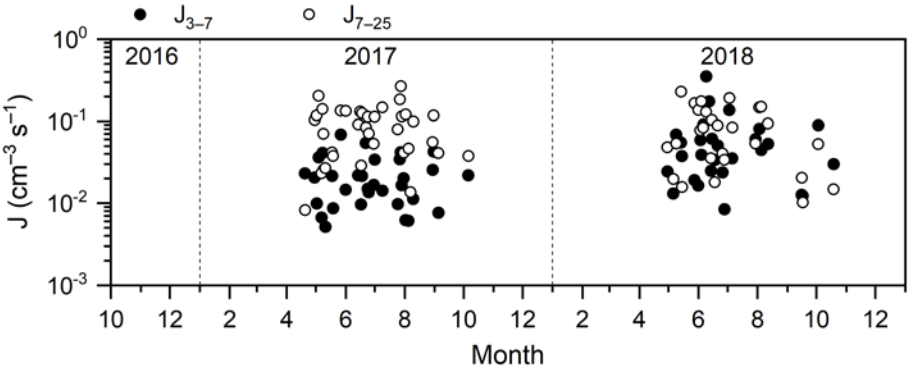


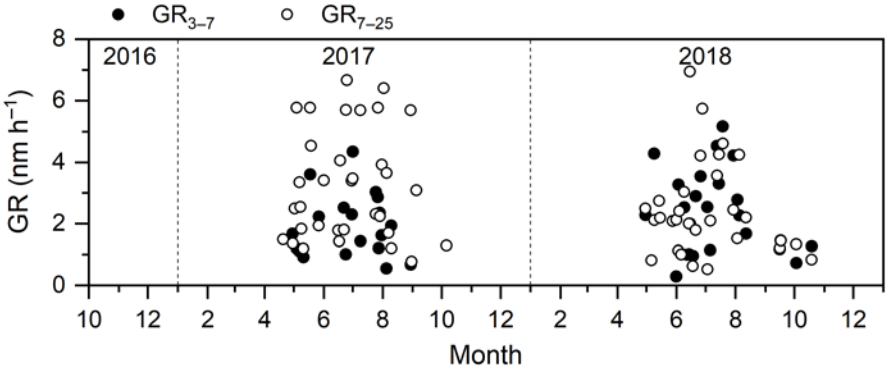
Figure S3. Relationship between $N_{3–7}$ and $J_{3–7}$ during NPF events with a liner regression line and a correction coefficient (r).



(a)

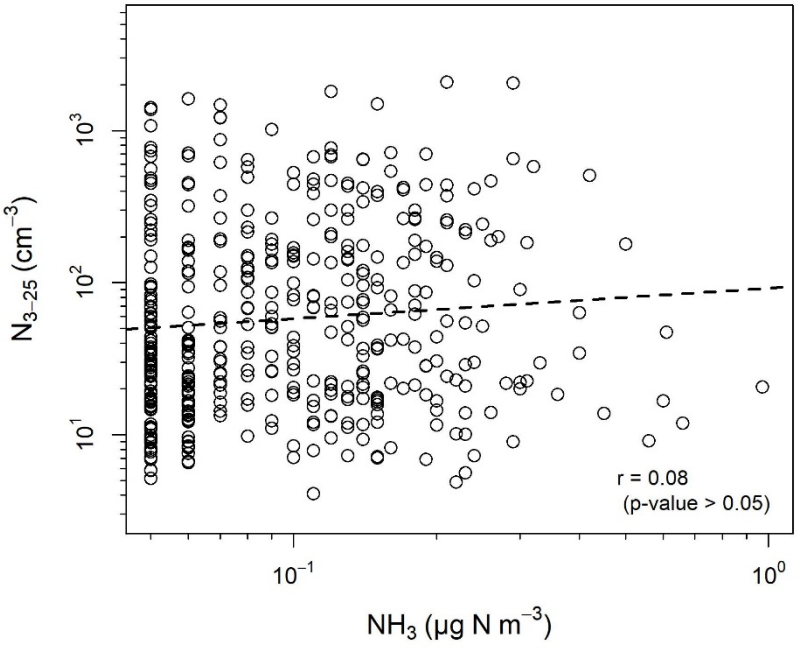


(b)

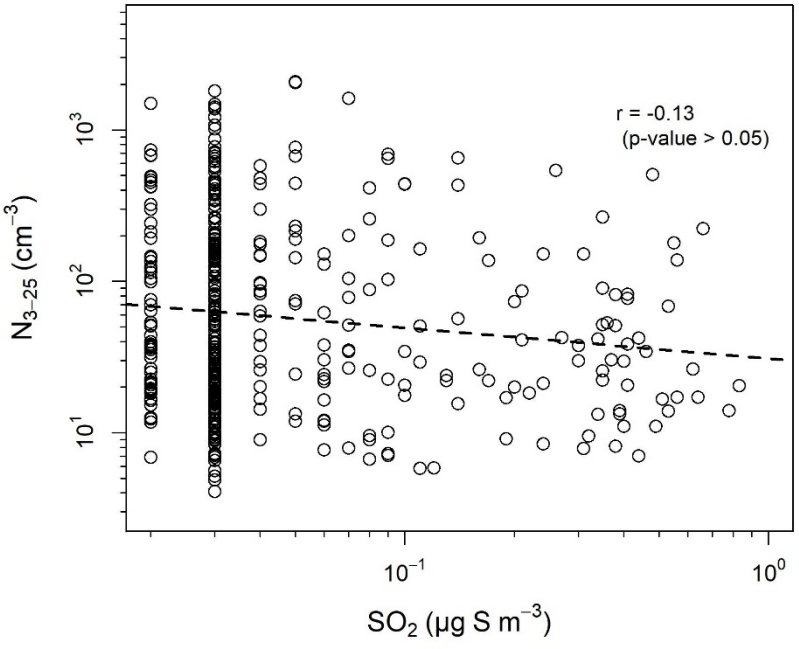


(c)

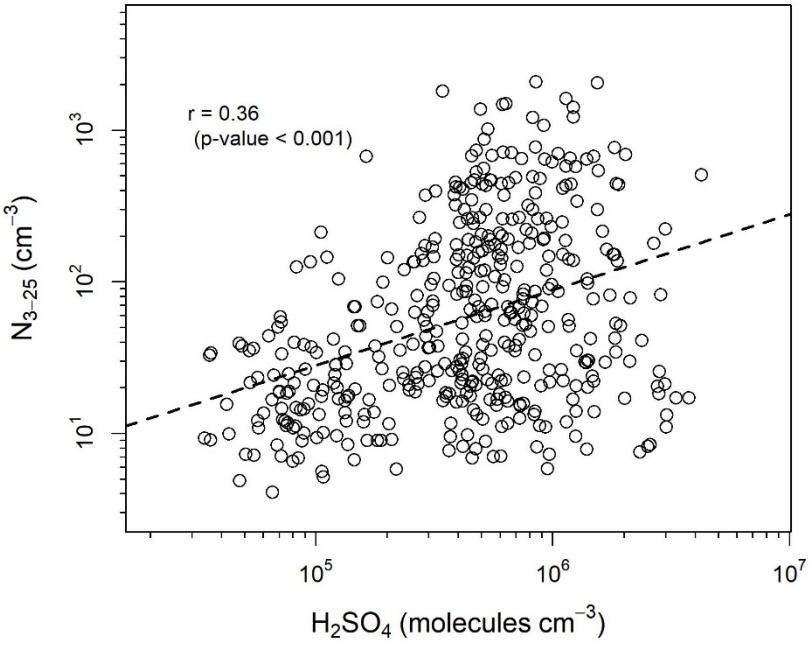
Figure S4. Time series of (a) weekly $N_{3–7}$, $N_{7–25}$, NH_3, and H_2SO_4, (b) daily GR and (c) daily J in different modes ($J_{3–7}$, $J_{7–25}$, $GR_{3–7}$, and $GR_{7–25}$) during the measurement period.


N_{3-25} (cm^{-3})
10^1
10^2
10^3
10^{-1}
10^0
NH_3 (µg N m^{-3})
r = 0.08
(p-value > 0.05)

(a)


N_{3-25} (cm^{-3})
10^1
10^2
10^3
10^{-1}
10^0
SO_2 (µg S m^{-3})
r = -0.13
(p-value > 0.05)

(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).

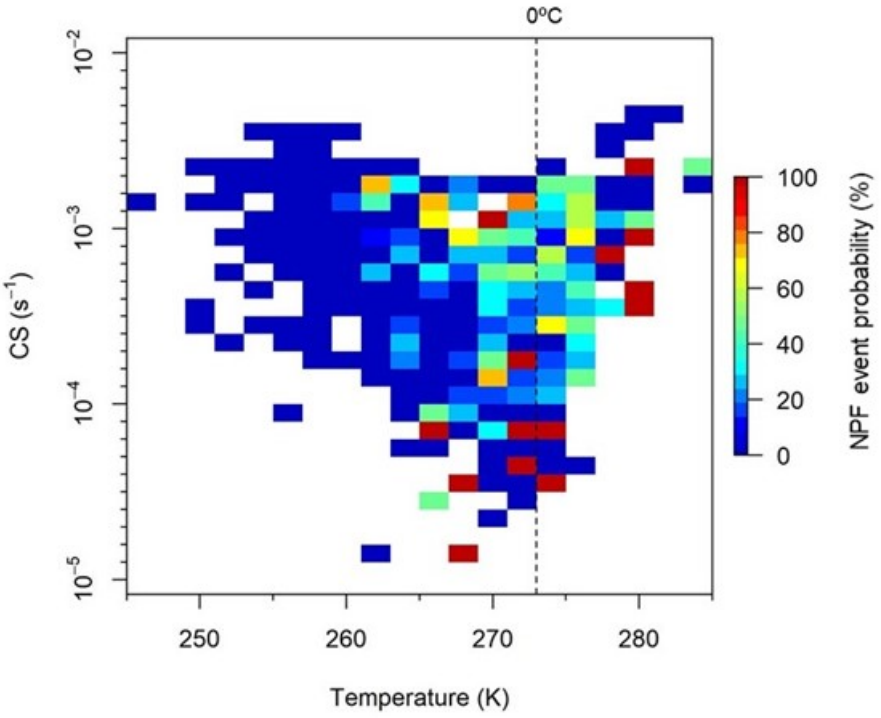


Figure S6. NPF event probability distribution with daily CS and temperature. The cell size was 2 K (temperature) and the ratio of 1.26 between two consecutive CS values.

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