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Nucleation-mode particle pool and large increases in N_{cn} and N_{ccn} observed over the northwestern Pacific Ocean in the spring of 2014

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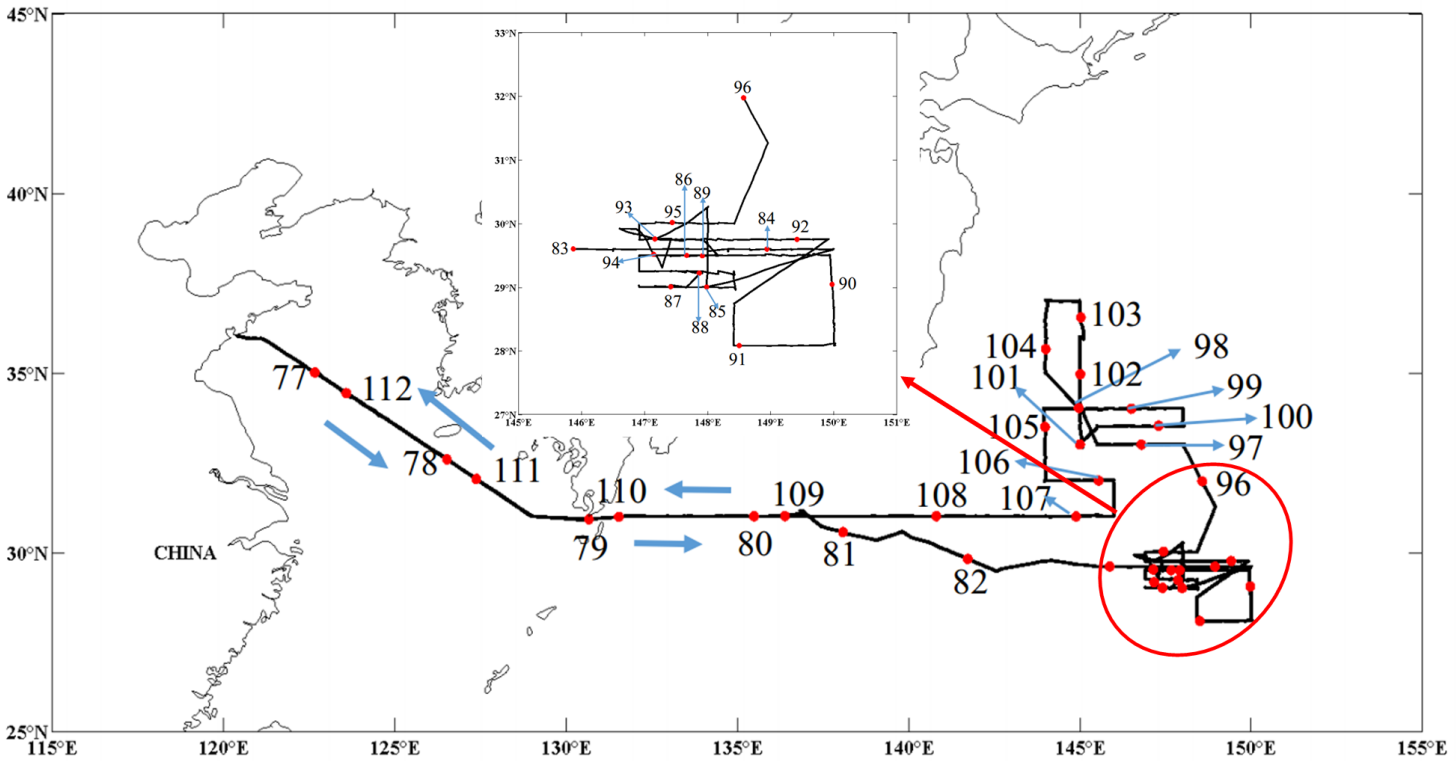

Figure S1 Cruise track of R/V *Dong Fang Hong 2* during DOY 77- 112 in 2014. Days of year are shown in corresponding position.

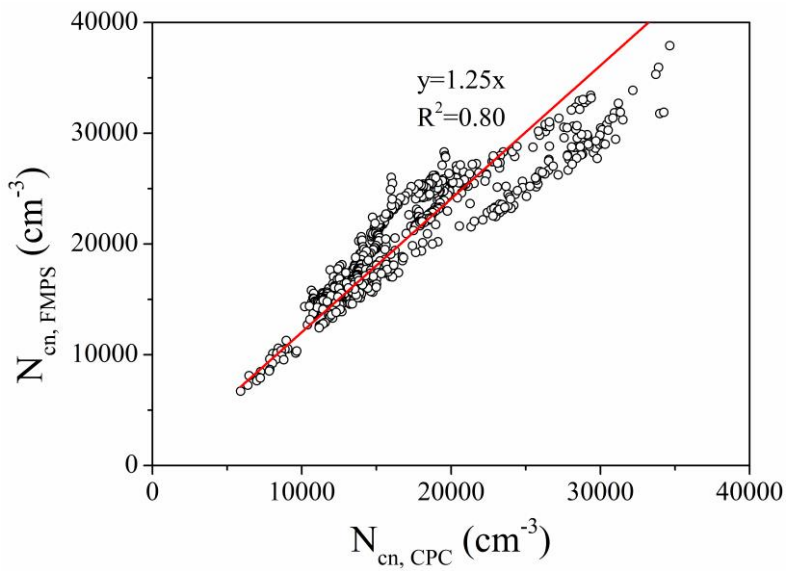

Figure S2 Comparison of N_{cn} measured by FMPS and CPC before the campaign in 2014.

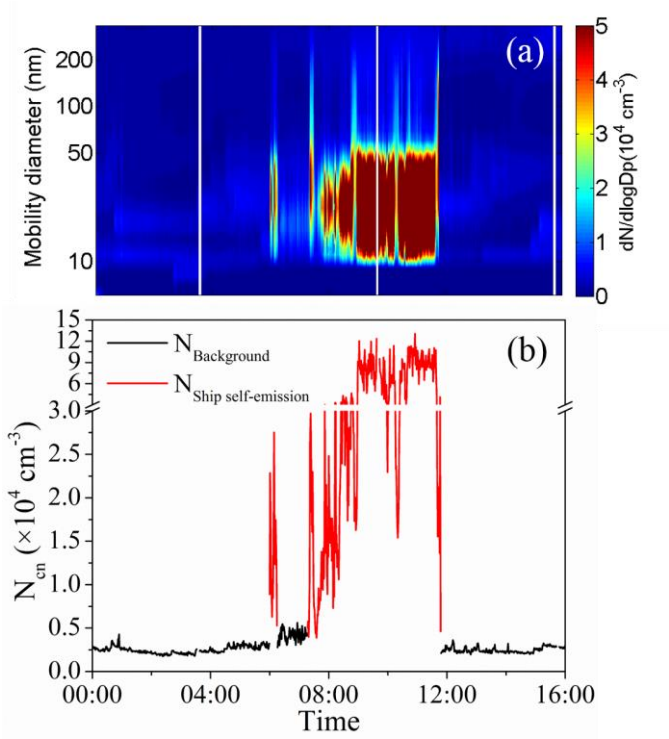

Figure S3 An example to screen out the signals from ship self-emissions (a: high particle number concentration signals in dark red suffer from the large interference of ship self-emissions; particle number size distributions show a constant dominant mode at 22±2 nm; b: red spikes are the signals mainly reflect the contribution from ship-emissions and the black baseline reflects the signals of marine background aerosols.

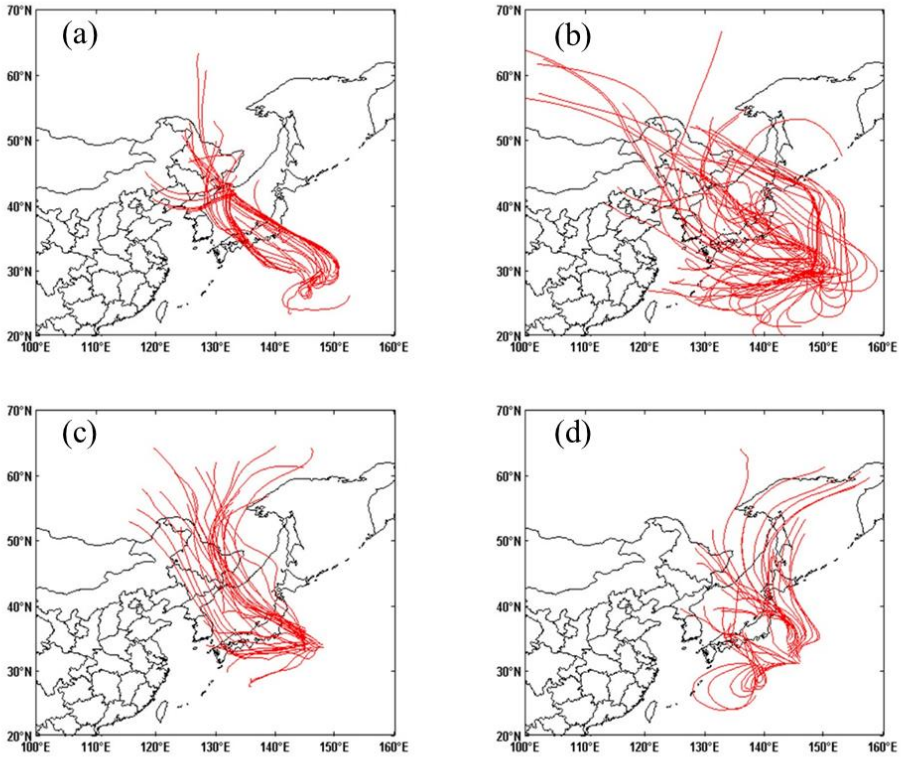

Figure S4 72-hour air mass backward trajectories over the NWPO at 1000 m for Period 1 (a), Period 2 (b), Period 3 (c), and Period 4 (d).

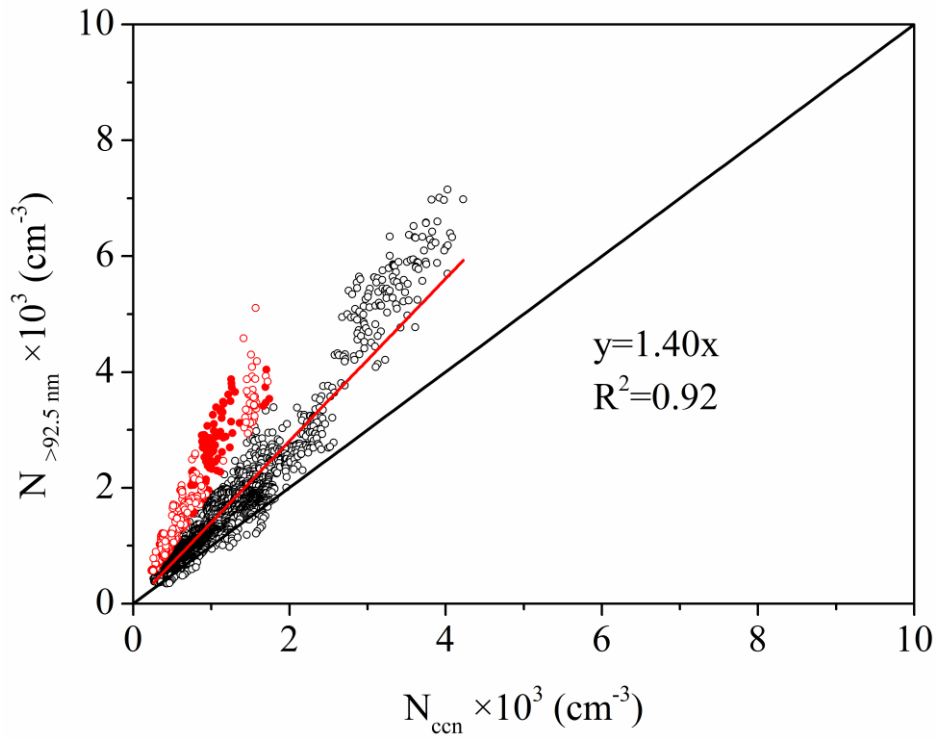

Figure S5 Scatterplots of N_{ccn} at SS of 0.2% versus $N_{>92.5\ nm}$. (Biomass burning aerosol and dust aerosol are shown in full red cycles with empty red cycles representing suspected either biomass burning or dust aerosol; the black line represents the 1:1 relationship, and the red line shows the best fit using the data shown as empty black cycles.)

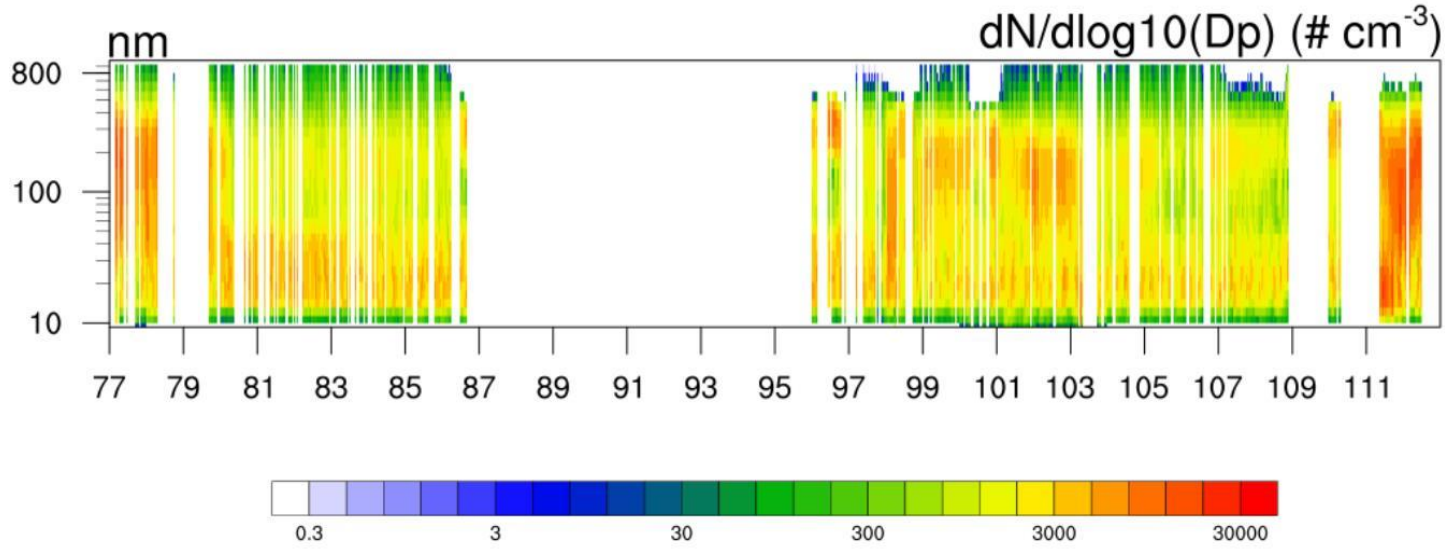

Figure S6 Temporal variations of number size distribution of aerosol particles over NWPO during DOY 77-112.

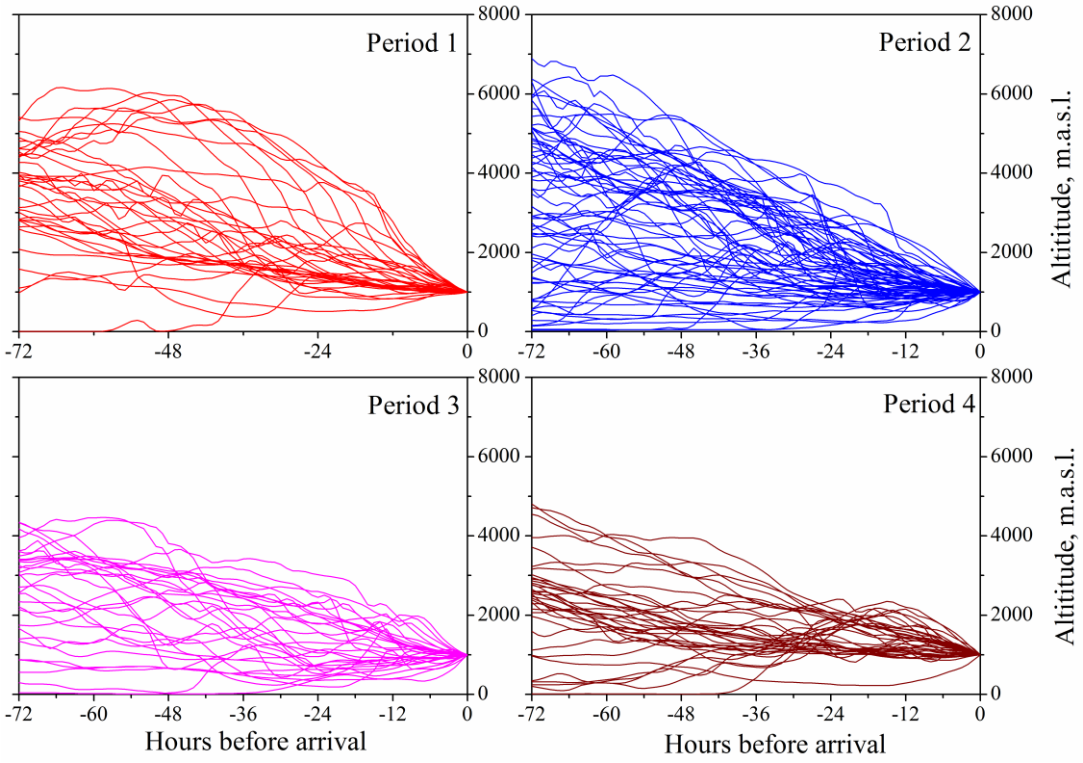

Figure S7 Vertical backward air mass trajectory in different periods.

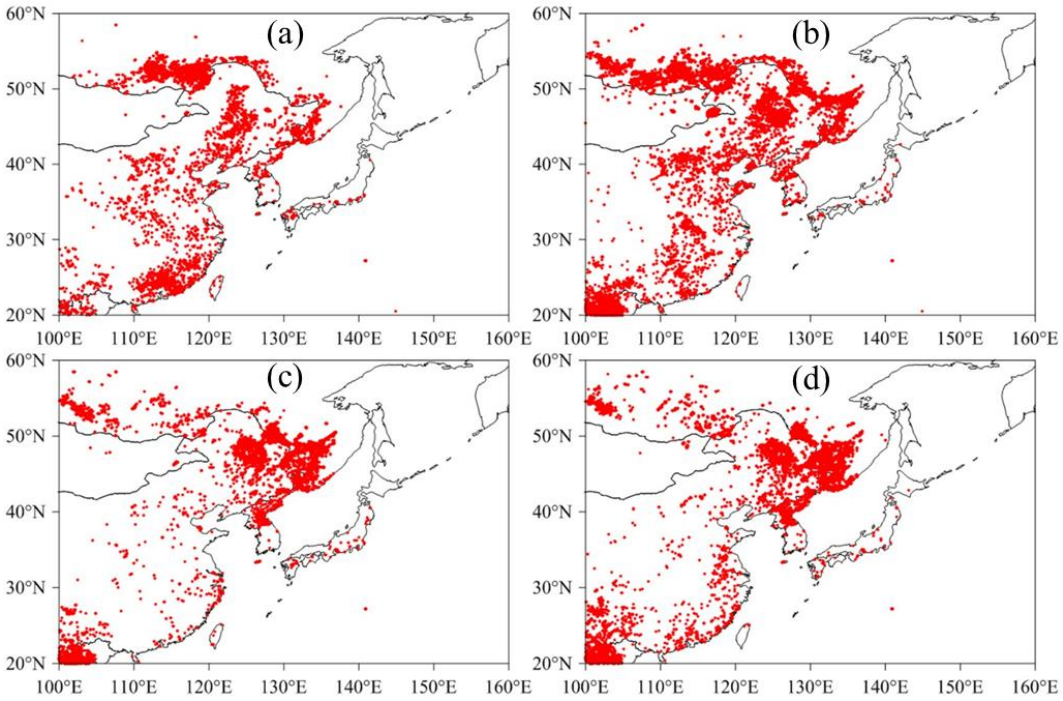

Figure S8 Fire spots from FIRMS in East China, Siberia, and Russian Far East for Period 1 (a), Period 2 (b), Period 3 (c), and Period 4 (d).

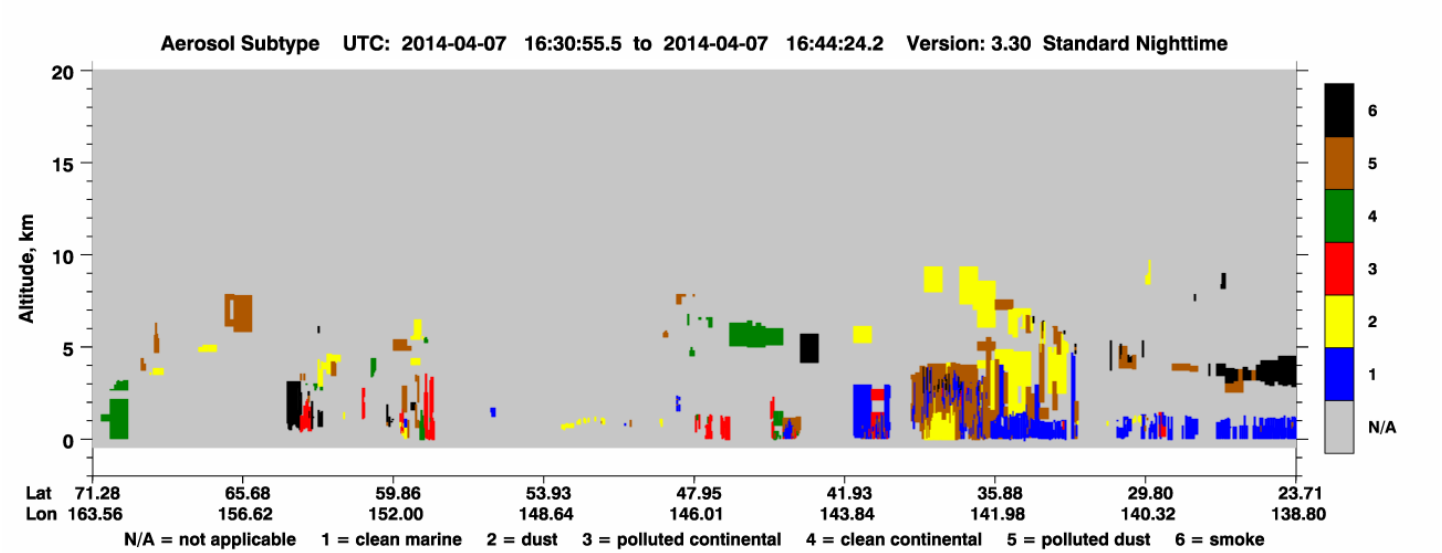

Figure S9 Vertical profiles of the aerosol subtypes captured by CALIPSO during dust event.

Table S1 Concentrations of CN and CCN and AR during DOY 77-80 and DOY 109-112, 2014.

Sampling periods	DOY 77-80	DOY 109-112	DOY 77-80 and DOY 109-112
CN($\times 10^3$)[a]	1.9-19.2, 5.2 ±2.4[b]	2.4-13.4, 7.2 ±3.1	1.9-19.2, 5.8 ±2.8
CCN($\times 10^3$), SS =0.2%	0.23-4.2, 1.5 ±1.0	0.64-4.0, 2.1 ±0.99	0.23-4.2, 1.7 ±1.0
CCN($\times 10^3$), SS =0.4%	0.34-7.5, 2.7 ±1.9	1.1-7.5, 4.2 ±2.0	0.34-7.5, 3.3 ±2.0
AR, 0.2%SS	0.07-0.53, 0.29 ±0.11	0.21-0.53, 0.32 ±0.06	0.07-0.53, 0.30 ±0.09
AR, 0.4%SS	0.11-0.92, 0.50 ±0.19	0.29-0.88, 0.61 ±0.13	0.11-0.92, 0.53 ±0.18

[a] Unit the $\times 10^3 cm^{-3}$

[b] Range and mean ± standard deviation