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Differential characterization of air ions in boreal forest of Finland and a megacity of eastern China

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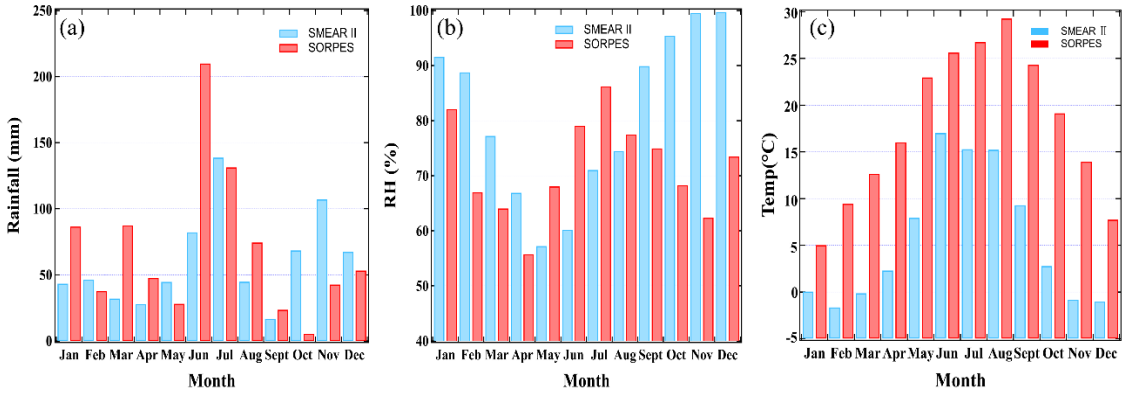

Figure S1. Monthly accumulated rainfall (a), average relative humidity (b) average temperature (c) at SMEAR II (blue bar) and SORPES (red bar) from June 2019 to August 2020.

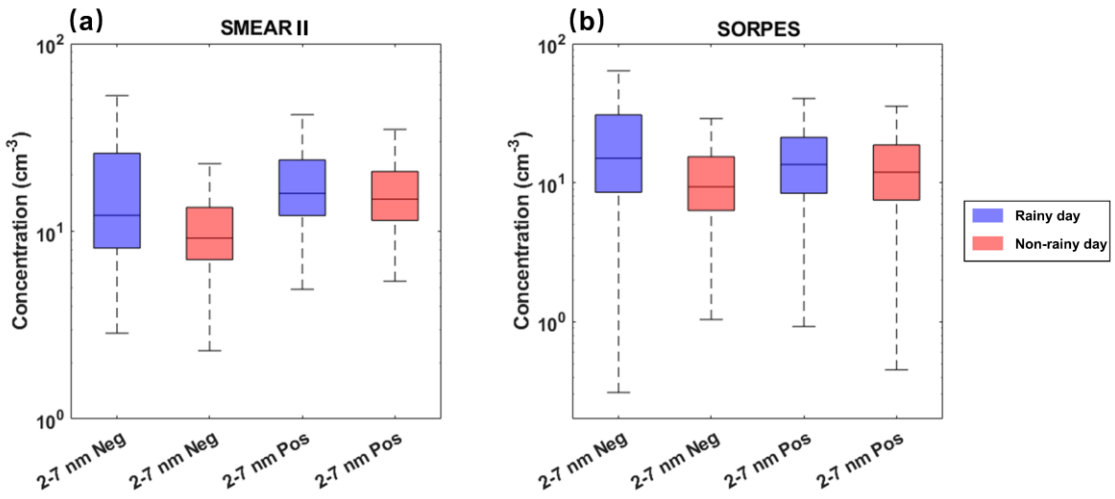

Figure S2. Intermediate ion concentrations of both negative (Neg) and positive (Pos) polarities on rainy (red box) and non-rainy days (blue box) at SMEAR II (a) and SORPES (b) from June 2019 to August 2020. Non-rainy days with new particle formation events were excluded.

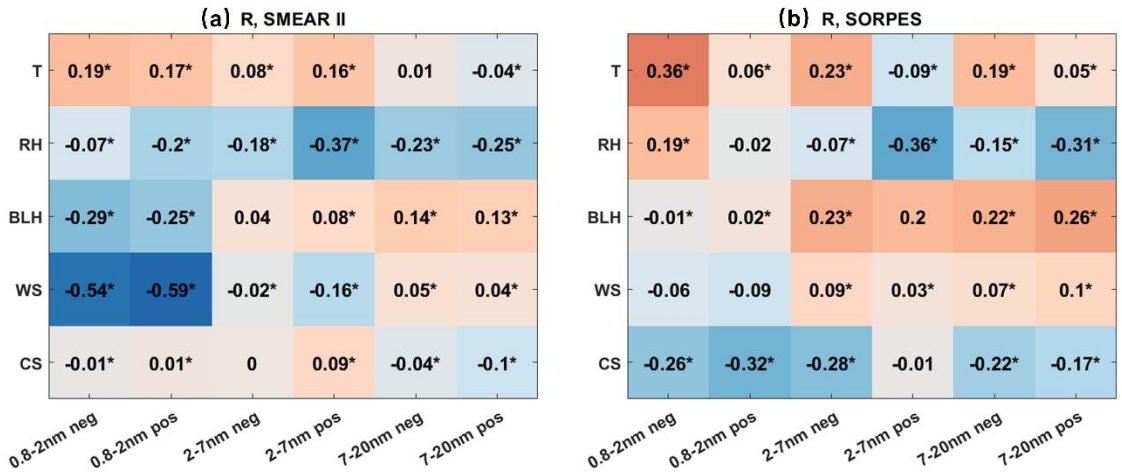

Figure S3. Pearson correlation coefficients between ion concentrations of both negative (neg) and positive (pos) polarities across three size ranges (0.8-2 nm cluster ions, 2-7 nm intermediate ions, 7-20 large ions) and air temperature (T), relative humidity (RH), boundary layer height (BLH), wind speed (WS), and condensation sink (CS) at SMEAR II (a) and SORPES (b). Asterisks indicate statistically significant correlations.

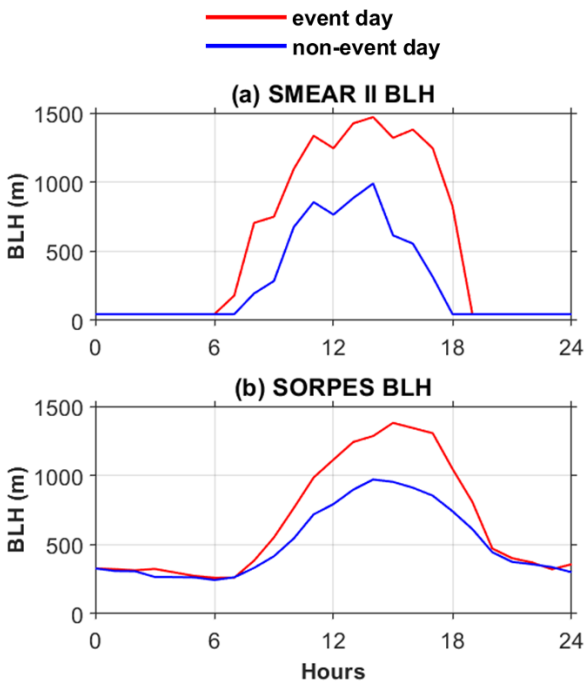

Figure S4. Diurnal cycles for boundary layer height (BLH) at SMEAR II (a) and SORPES (b) during NPF event and non-event days.

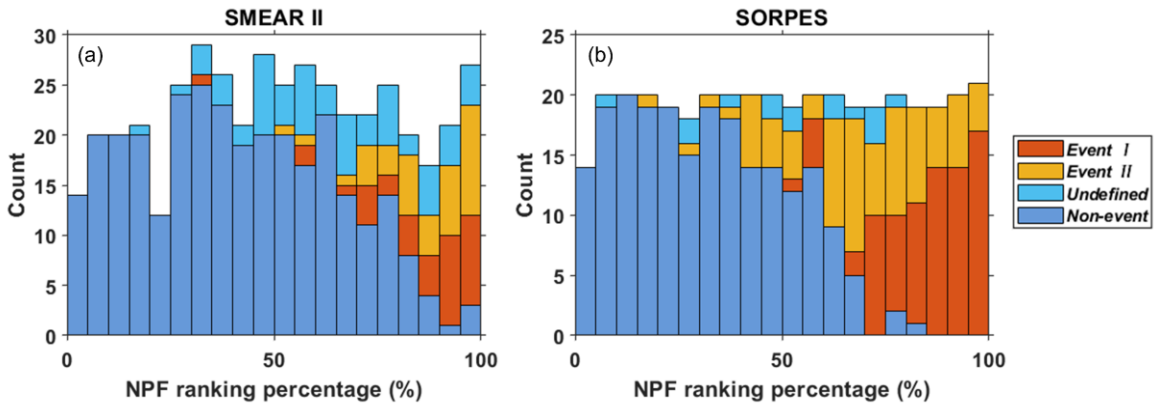

Figure S5. Comparison between NPF ranking and traditional classification at SMEAR II (a) and SORPES (b). This histogram displays the percentile NPF rankings divided into 5% bins and color-coded based on the classification: Blue (non-event), light blue (undefined), yellow (event II), and orange (event I).

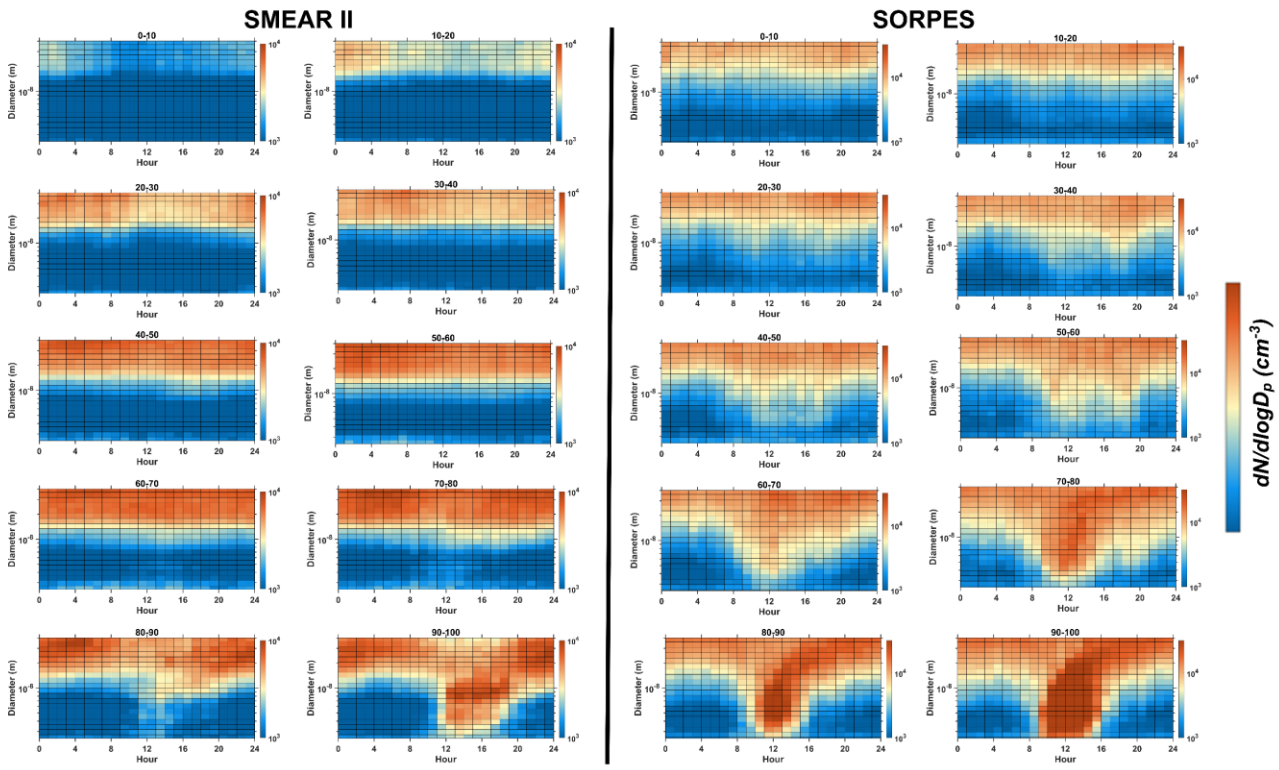

Figure S6. Daily median number particle size distribution grouped into 10% intervals based on the $\Delta N_{2.5\text{-}5}$ ranks. The diameter limits (y-axis) in the surface plots are 2.5 and 42 nm and are used to illustrate the shape of the potential NPF events in each interval.

Table S1. Instruments used in this study.

	SMEAR II	SORPES
Measurement	Instruments	Instruments
Air ions	NAIS 0.8-42 nm	NAIS 0.8-42 nm
Aerosol particles	NAIS 2.5-42 nm	NAIS 2.5-42 nm
	DMPS 3-1000 nm	SMPS 4-500 nm; APS 500nm- 20μm
Meteorological parameters (Air temperature, relative humidity, wind speed, wind direction, and precipitation)	PT-100 sensor, Rotronic MP102H RH sensor, ultrasonic anemometer, ARG-100 tipping bucket counter	GRWS100, Campbell, USA
Boundary layer height	Doppler lidar data	Ceilometer, Vaisala