Atmospheric
Chemistry
and Physics

Supplement of

Observations of particle number size distributions and new particle formation in six Indian locations

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Table S1. Parameters of the modes identified for the description of median particle number size distributions are shown in Figure 3. N, Dp and σ are the number concentration, geometric mean diameter and the standard deviation of the distribution.

|	Uni-modal			Bi-modal					
Site	N (cm^{-3})	Dp (nm)	σ	N$_1$ (cm^{-3})	Dp$_1$ (nm)	σ$_1$	N$_2$ (cm^{-3})	Dp$_2$ (nm)	σ$_2$
Annual									
RNC	2555	87.5	2.0	591	49.3	1.9	1963	101.8	1.9
DEL	9670	50.9	2.2	8237	44.9	2.0	1465	121.3	1.9
HYD	6401	63.4	2.5	2097	27.3	1.8	4186	90.0	1.9
MBL	3166	74.2	2.3	3104	72.9	2.2	48	197.3	1.2
MUK	2573	85.5	1.9	301	65.1	1.5	2276	90.5	1.9
TVM	3463	111.2	1.8	3379	109.6	1.8	85	330.8	1.3
Winter									
RNC	3205	94.6	1.9	876	53.0	1.9	2357	109.2	1.8
DEL	13555	68.7	2.3	12878	65.9	2.1	678	298.0	1.2
HYD	7314	61.1	2.3	3165	33.9	1.8	3990	95.2	1.8
MBL	3817	84.4	2.3	4877	100.2	2.6	789	319.4	0.6
MUK	3374	86.0	1.9	3344	85.5	1.9	28	256.0	1.2
TVM	4437	113.2	1.8	4266	110.6	1.8	169	320.0	1.3
Pre-Monsoon									
RNC	4012	81.2	2.0	2721	64.6	1.9	1280	118.7	1.7
DEL	7708	49.8	2.3	4622	35.8	1.9	3093	96.0	2.1
HYD	7726	82.0	2.2	1858	24.5	1.8	6007	98.7	1.8
MBL	3702	78.6	2.1	5034	100.5	2.4	1342	228.3	0.5
MUK	6488	91.1	1.8	1748	62.5	1.9	4760	101.4	1.7
TVM	3241	122.4	1.8	2933	115.3	1.7	282	313.0	1.3
Monsoon									
RNC	1774	78.4	2.0	85	58.3	1.3	1693	81.1	2.0
DEL	9336	40.2	2.2	5059	27.4	1.9	4194	66.8	1.9
HYD	3141	49.2	2.8	2844	45.4	2.5	210	196.9	1.4
MBL	2187	50.3	2.1	1960	47.8	2.3	255	58.9	1.4
MUK	1984	79.4	1.9	1765	73.9	1.7	223	199.5	1.5
TVM	2603	103.4	1.8	1565	93.5	2.1	1109	110.1	1.6
Post-Monsoon									
RNC	2072	102.0	2.0	441	52.0	1.8	1629	118.7	1.9
DEL	12152	60.6	2.2	11881	59.5	2.1	286	263.9	1.1
HYD	9949	58.7	2.5	9335	57.5	2.5	123	157.5	1.3
MBL	3277	88.5	2.4	2937	79.4	2.2	289	237.6	1.3
MUK	1782	93.7	1.9	1743	93.3	2.0	50	99.0	1.2
TVM	3176	117.5	1.8	3099	116.2	1.7	86	360.7	1.3

Table S2. Number of valid observation days, number of NPF days (percentage), number of non-event days (percentage), mean formation rates and mean growth of particles at all six sites in India. ± indicates standard deviation.

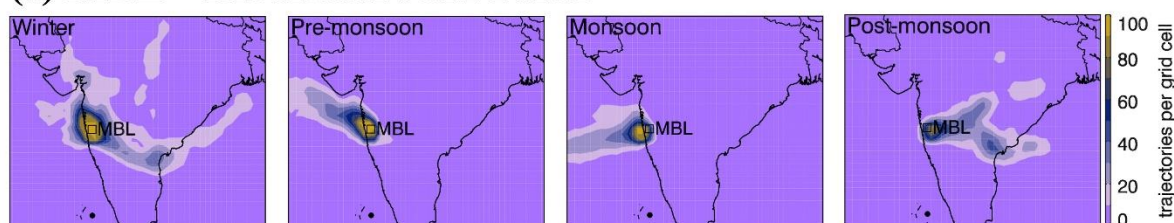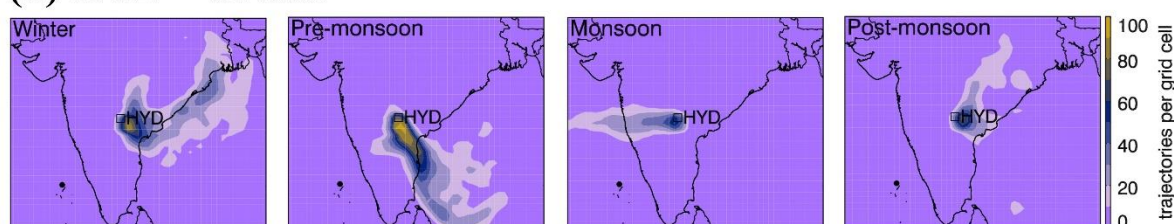| Site	valid observation days	NPF days	non-event days	J_{LDS} $(cm^{-1} s^{-1})$	$GR_{LDS-25\ nm}$ $(nm\ h^{-1})$
RNC	586	21 (3.9%)	493 (83.7%)	0.11±0.05	6.3±2.4
MUK	440	13 (2.9%)	321 (73.1%)	0.04±0.02	2.5±1.6
MBL	281	16 (5.9%)	188 (66.1%)	0.04±0.02	4.7±3.0
HYD	270	38 (16.3%)	124 (44.8%)	0.13±0.11	5.7±3.6
TVM	133	23 (16.6%)	55 (41.4%)	0.007±0.005	1.1±1.1
DEL	139	39 (28.1%)	30 (21.1%)	0.13±0.10	3.7±2.1

(a) RNC – Mountain background
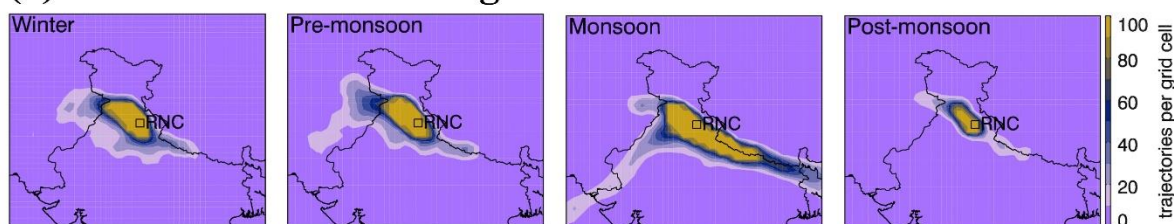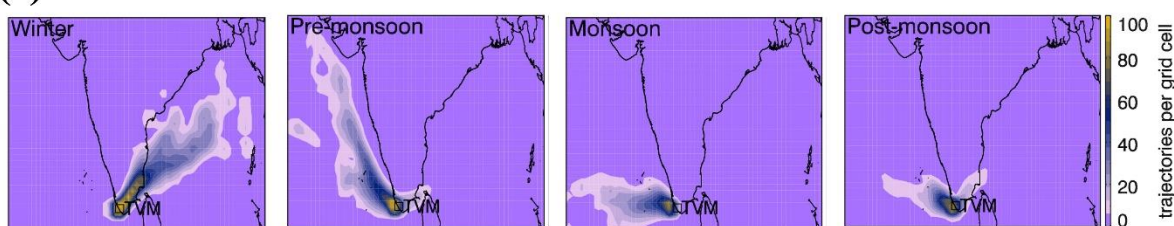

(b) MUK – Mountain background
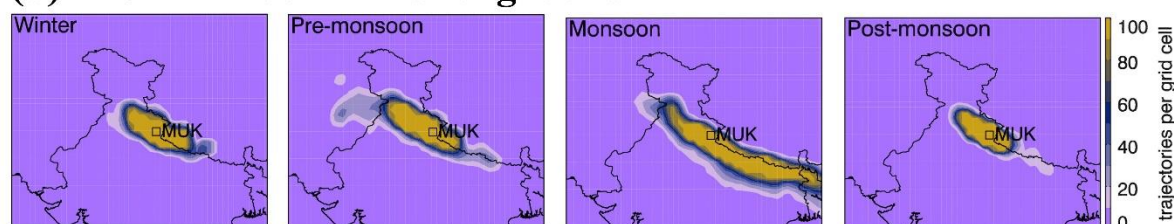
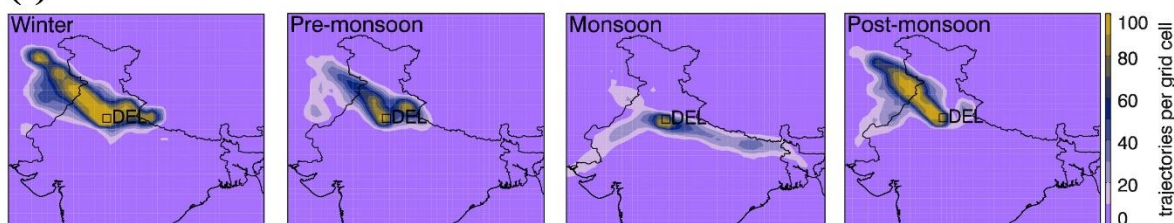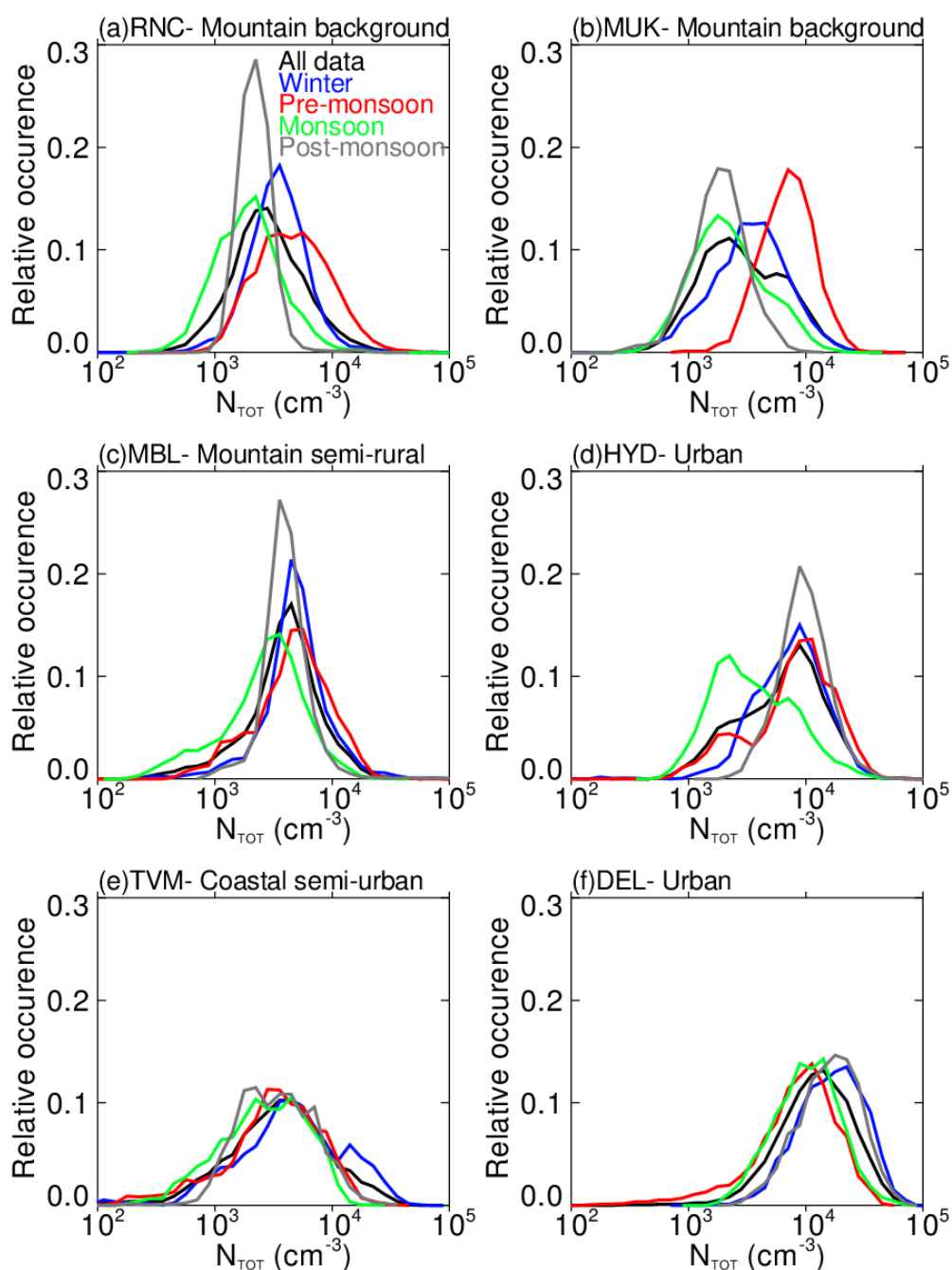**(c) MBL – Mountain semi-rural**

(d) HYD – Urban

(e) TVM – Coastal Semi-urban

(f) DEL – Urban

Figure S1. HYSPLIT calculated 72-hour backward air mass back trajectory density starting at 500 m above the ground for (a) Ranichauri, (b) Mukteshwar, (c) Mahabaleshwar, (d) Hyderabad, (e) Thiruvananthapuram and (f) Delhi.

Figure S2. Histogram of the relative occurrence of total particle number concentrations at the sites. The concentration bins are logarithmically spaced in the x-axis, and the y-axis shows the relative occurrence of values in each bin compared to the total number of valid observations. The black, blue, red, green, and grey lines indicate all data, winter (DJF), pre-monsoon (MAM), monsoon (JJAS), and post-monsoon (ON), respectively. n indicates the number of 10 minutes averaged valid data points. Note that measurements are from different time periods for each site (see Table 1).