Table S1. Mean absolute values and mean departures from climatology (2000–2021) for meteorological and cloud variables on CCN and INP perturbation days for each individual site. The first row for each variable gives the result pooled across all sites. For columns reporting differences between INP-day and CCN-day values, values in parentheses give the p value from Welch's two-sample t test for unequal variances, calculated between the corresponding distributions. For each event, the climatological mean was defined as the average value for the same day of year and hour of day, based on the reference period 2000–2021. Departure from climatology was then calculated as the difference between the event-day value and the corresponding climatological mean.

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Dew point temperature at 2 m (K)	263.23	272.95	−9.72 (10^{-105})	−2.42	−1.02	−1.39 (10^{-5})
Cherepovets	264.99	273.58	−8.59 (10^{-20})	−1.61	−0.89	−0.72 (0.322)
Fokino	266.03	272.09	−6.07 (10^{-12})	−2.66	−1.19	−1.47 (0.076)
Noranda	260.79	272.67	−11.88 (10^{-26})	−3.16	−2.32	−0.83 (0.267)
Regina	261.82	270.48	−8.66 (10^{-17})	−1.47	−0.46	−1.00 (0.306)
Temperature at 2 m (K)	266.60	276.83	−10.23 (10^{-98})	−2.56	−1.76	−0.80 (0.020)
Cherepovets	268.24	277.34	−9.10 (10^{-16})	−1.47	−1.05	−0.42 (0.555)
Fokino	268.99	274.91	−5.92 (10^{-8})	−2.44	−1.62	−0.82 (0.309)
Noranda	264.71	277.46	−12.74 (10^{-25})	−3.22	−3.40	0.18 (0.802)
Regina	264.96	274.58	−9.63 (10^{-18})	−2.52	−3.89	1.38 (0.174)
Boundary layer height (m)	704.66	847.66	−143.00 (10^{-7})	107.31	86.78	20.52 (0.288)
Cherepovets	661.35	843.18	−181.83 (10^{-3})	69.66	109.10	−39.45 (0.373)
Fokino	615.43	623.01	−7.58 (0.921)	53.86	−39.36	93.23 (0.079)
Noranda	838.13	983.13	−145.00 (10^{-3})	157.07	60.34	96.73 (10^{-3})
Regina	644.98	847.65	−202.67 (10^{-3})	132.12	54.79	77.33 (0.128)
Cloud base height (m)	510.43	596.28	−85.85 (0.062)	−387.81	−355.80	−32.01 (0.546)
Cherepovets	418.17	554.88	−136.71 (0.022)	−123.59	−135.35	11.75 (0.809)
Fokino	401.69	421.97	−20.28 (0.731)	−130.54	−246.56	116.02 (0.100)
Noranda	510.50	853.96	−343.46 (10^{-3})	−430.55	−505.82	75.26 (0.571)
Regina	755.10	661.50	93.60 (0.647)	−931.39	−1441.37	509.98 (0.012)
Convective available potential energy (J kg^{-1})	3.96	5.91	−1.95 (0.027)	−0.59	−19.92	19.33 (10^{-10})
Cherepovets	5.20	6.98	−1.78 (0.274)	−0.97	−22.03	21.07 (10^{-6})
Fokino	3.94	9.20	−5.26 (0.499)	−0.99	−0.91	−0.07 (0.992)
Noranda	4.18	1.84	2.34 (10^{-4})	−0.45	−17.63	17.18 (10^{-4})
Regina	2.60	2.81	−0.20 (0.773)	0.07	−19.75	19.82 (0.044)

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Evaporation (m of water equivalent)	-2.98×10^{-5}	-7.91×10^{-5}	4.93×10^{-5} (10^{-38})	3.75×10^{-6}	1.52×10^{-5}	-1.14×10^{-5} (10^{-7})
Cherepovets	-3.74×10^{-5}	-8.08×10^{-5}	4.34×10^{-5} (10^{-6})	-1.64×10^{-6}	8.70×10^{-6}	-1.03×10^{-5} (10^{-3})
Fokino	-3.10×10^{-5}	-5.50×10^{-5}	2.41×10^{-5} (0.028)	4.03×10^{-6}	8.92×10^{-6}	-4.89×10^{-6} (0.462)
Noranda	-3.05×10^{-5}	-1.01×10^{-4}	7.09×10^{-5} (10^{-13})	2.70×10^{-6}	1.95×10^{-5}	-1.68×10^{-5} (10^{-4})
Regina	-2.09×10^{-5}	-6.17×10^{-5}	4.07×10^{-5} (10^{-8})	9.52×10^{-6}	4.57×10^{-5}	-3.62×10^{-5} (10^{-6})
Mean sea level pressure (hPa)	1023.87	1020.34	3.53 (10^{-7})	6.51	4.67	1.85 (10^{-3})
Cherepovets	1020.71	1019.25	1.46 (0.470)	5.81	4.02	1.79 (0.362)
Fokino	1025.82	1028.23	−2.41 (0.110)	7.74	9.88	−2.13 (0.133)
Noranda	1022.73	1020.44	2.29 (0.057)	5.67	4.44	1.23 (0.323)
Regina	1025.52	1022.18	3.34 (0.014)	6.72	5.78	0.93 (0.481)
Surface pressure (hPa)	985.57	994.17	−8.60 (10^{-8})	5.89	4.36	1.53 (0.021)
Cherepovets	1005.34	1004.40	0.94 (0.633)	5.63	3.93	1.71 (0.376)
Fokino	1001.34	1004.23	−2.89 (0.049)	7.35	9.53	−2.18 (0.118)
Noranda	983.21	982.75	0.46 (0.683)	4.99	3.92	1.07 (0.363)
Regina	950.35	949.62	0.73 (0.539)	5.49	4.66	0.83 (0.467)
Total precipitation (m)	1.29×10^{-5}	2.09×10^{-5}	-8.06×10^{-6} (10^{-5})	-6.21×10^{-5}	-7.41×10^{-5}	1.20×10^{-5} (0.011)
Cherepovets	1.92×10^{-5}	2.46×10^{-5}	-5.36×10^{-6} (0.257)	-5.36×10^{-5}	-7.03×10^{-5}	1.68×10^{-5} (10^{-3})
Fokino	1.34×10^{-5}	1.11×10^{-5}	2.34×10^{-6} (0.700)	-5.40×10^{-5}	-6.89×10^{-5}	1.49×10^{-5} (0.201)
Noranda	1.15×10^{-5}	9.98×10^{-6}	1.49×10^{-6} (0.696)	-9.19×10^{-5}	-1.40×10^{-4}	4.77×10^{-5} (10^{-3})
Regina	9.17×10^{-6}	1.69×10^{-5}	-7.73×10^{-6} (0.107)	-3.06×10^{-5}	-3.71×10^{-5}	6.43×10^{-6} (0.518)
Zero degree level (m)	75.88	1008.25	−932.37 (10^{-55})	−423.25	−289.55	−133.70 (10^{-3})
Cherepovets	107.79	982.31	−874.52 (10^{-26})	−278.98	−257.20	−21.78 (0.805)
Fokino	141.55	1460.36	−1318.81 (10^{-7})	−437.83	235.39	−673.22 (10^{-3})
Noranda	12.89	1372.54	−1359.65 (10^{-10})	−452.78	−275.55	−177.23 (0.219)
Regina	60.29	621.34	−561.06 (10^{-6})	−470.35	−686.68	216.33 (0.046)
Geopotential at 500 hPa ($m^2\ s^{-2}$)	52988.75	54136.09	−1147.34 (10^{-33})	−20.99	125.88	−146.87 (0.110)
Cherepovets	52613.33	53943.40	−1330.06 (10^{-8})	46.68	90.01	−43.33 (0.847)
Fokino	53609.94	55089.59	−1479.66 (10^{-8})	321.54	967.16	−645.63 (10^{-3})
Noranda	52575.26	54622.39	−2047.13 (10^{-19})	−248.05	116.60	−364.64 (0.039)

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Regina	53088.31	54244.58	−1156.26 (10^{-11})	−192.80	−52.37	−140.43 (0.391)
Geopotential at 700 hPa ($m^2\ s^{-2}$)	28701.67	29274.52	−572.85 (10^{-18})	173.90	183.91	−10.01 (0.879)
Cherepovets	28484.36	29164.92	−680.56 (10^{-4})	205.93	164.08	41.85 (0.812)
Fokino	29142.25	30037.57	−895.31 (10^{-7})	386.56	814.50	−427.94 (0.013)
Noranda	28367.63	29421.53	−1053.90 (10^{-15})	18.04	100.00	−81.96 (0.479)
Regina	28800.99	29354.79	−553.80 (10^{-7})	100.57	83.17	17.39 (0.867)
Geopotential at 1000 hPa ($m^2\ s^{-2}$)	1805.27	1595.32	209.95 (10^{-4})	485.82	360.82	125.01 (0.017)
Cherepovets	1564.96	1510.81	54.15 (0.718)	434.81	311.72	123.09 (0.404)
Fokino	1965.45	2196.20	−230.76 (0.044)	580.70	761.15	−180.45 (0.097)
Noranda	1708.31	1610.53	97.79 (0.278)	416.27	338.23	78.04 (0.408)
Regina	1932.24	1737.85	194.39 (0.056)	506.65	449.13	57.53 (0.560)
Potential vorticity at 500 hPa ($K\ m^2\ kg^{-1}\ s^{-1}$)	6.18×10^{-7}	5.36×10^{-7}	8.16×10^{-8} (10^{-3})	5.49×10^{-8}	-3.82×10^{-8}	9.31×10^{-8} (10^{-3})
Cherepovets	6.08×10^{-7}	5.50×10^{-7}	5.83×10^{-8} (0.360)	6.42×10^{-8}	-2.99×10^{-8}	9.41×10^{-8} (0.131)
Fokino	5.66×10^{-7}	4.03×10^{-7}	1.64×10^{-7} (0.020)	6.40×10^{-8}	-1.03×10^{-7}	1.67×10^{-7} (0.011)
Noranda	6.61×10^{-7}	5.48×10^{-7}	1.13×10^{-7} (0.078)	1.96×10^{-8}	-5.23×10^{-8}	7.19×10^{-8} (0.256)
Regina	6.26×10^{-7}	5.13×10^{-7}	1.13×10^{-7} (0.130)	9.38×10^{-8}	-3.90×10^{-8}	1.33×10^{-7} (0.066)
Potential vorticity at 700 hPa ($K\ m^2\ kg^{-1}\ s^{-1}$)	6.18×10^{-7}	6.22×10^{-7}	-3.56×10^{-9} (0.870)	6.10×10^{-9}	-7.93×10^{-9}	1.40×10^{-8} (0.509)
Cherepovets	6.12×10^{-7}	6.17×10^{-7}	-5.05×10^{-9} (0.906)	7.84×10^{-9}	-2.77×10^{-8}	3.56×10^{-8} (0.398)
Fokino	5.28×10^{-7}	4.90×10^{-7}	3.80×10^{-8} (0.492)	-3.79×10^{-8}	-1.08×10^{-7}	6.99×10^{-8} (0.211)
Noranda	7.04×10^{-7}	6.85×10^{-7}	1.83×10^{-8} (0.704)	2.20×10^{-8}	3.93×10^{-8}	-1.73×10^{-8} (0.722)
Regina	6.11×10^{-7}	6.47×10^{-7}	-3.59×10^{-8} (0.514)	4.20×10^{-8}	9.08×10^{-8}	-4.88×10^{-8} (0.383)
Potential vorticity at 1000 hPa ($K\ m^2\ kg^{-1}\ s^{-1}$)	-6.25×10^{-7}	-4.59×10^{-7}	-1.66×10^{-7} (10^{-3})	-4.06×10^{-7}	-2.53×10^{-7}	-1.52×10^{-7} (10^{-3})
Cherepovets	-7.82×10^{-8}	-2.40×10^{-7}	1.61×10^{-7} (0.273)	-5.33×10^{-7}	-3.28×10^{-7}	-2.04×10^{-7} (0.125)
Fokino	-1.49×10^{-7}	-2.54×10^{-7}	1.06×10^{-7} (0.244)	-2.36×10^{-7}	-7.48×10^{-8}	-1.61×10^{-7} (0.041)
Noranda	-1.10×10^{-6}	-1.23×10^{-6}	1.23×10^{-7} (0.273)	-5.46×10^{-7}	-2.53×10^{-7}	-2.94×10^{-7} (10^{-3})
Regina	-9.63×10^{-7}	-9.56×10^{-7}	-7.73×10^{-9} (0.954)	-3.13×10^{-7}	3.56×10^{-8}	-3.48×10^{-7} (0.011)
Relative humidity at 500 hPa (%)	42.35	39.49	2.86 (0.137)	−18.02	−17.37	−0.65 (0.738)
Cherepovets	45.98	39.81	6.17 (0.132)	−16.95	−18.17	1.21 (0.757)
Fokino	37.20	32.74	4.47 (0.345)	−21.72	−23.48	1.76 (0.721)

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Noranda	44.40	35.68	8.73 (0.061)	−15.46	−17.60	2.14 (0.651)
Regina	43.40	44.14	−0.75 (0.871)	−17.80	−10.62	−7.18 (0.127)
Relative humidity at 700 hPa (%)	40.11	36.46	3.64 (0.039)	−17.54	−20.38	2.84 (0.114)
Cherepovets	43.47	37.44	6.03 (0.131)	−18.45	−21.05	2.61 (0.516)
Fokino	32.13	29.08	3.04 (0.458)	−23.05	−24.89	1.85 (0.664)
Noranda	43.84	27.61	16.23 (10^{-4})	−15.29	−26.36	11.08 (10^{-3})
Regina	42.68	42.59	0.09 (0.983)	−12.59	−9.87	−2.72 (0.537)
Relative humidity at 1000 hPa (%)	73.92	72.75	1.17 (0.280)	−2.98	−1.33	−1.64 (0.028)
Cherepovets	80.32	75.10	5.22 (0.046)	−2.12	−2.74	0.62 (0.643)
Fokino	78.85	80.12	−1.27 (0.667)	−4.25	0.43	−4.68 (0.027)
Noranda	66.67	61.76	4.90 (10^{-3})	−4.96	−3.11	−1.85 (0.266)
Regina	73.75	67.71	6.04 (0.012)	1.52	6.35	−4.83 (0.020)
Temperature at 500 hPa (K)	243.91	249.28	−5.37 (10^{-41})	−1.72	−0.59	−1.12 (10^{-3})
Cherepovets	241.92	248.40	−6.48 (10^{-16})	−1.38	−0.72	−0.66 (0.309)
Fokino	245.17	250.59	−5.42 (10^{-9})	−0.60	1.09	−1.68 (0.034)
Noranda	243.72	253.13	−9.41 (10^{-18})	−2.32	0.18	−2.50 (10^{-3})
Regina	244.04	249.67	−5.64 (10^{-9})	−2.59	−1.35	−1.24 (0.165)
Temperature at 700 hPa (K)	258.41	264.75	−6.34 (10^{-55})	−2.11	−0.52	−1.59 (10^{-5})
Cherepovets	257.22	264.00	−6.78 (10^{-15})	−1.73	−0.65	−1.09 (0.141)
Fokino	261.00	267.24	−6.24 (10^{-9})	−0.48	2.05	−2.54 (10^{-3})
Noranda	256.84	267.76	−10.92 (10^{-20})	−2.97	0.21	−3.18 (10^{-4})
Regina	258.28	264.75	−6.47 (10^{-12})	−3.35	−1.65	−1.69 (0.069)
Temperature at 1000 hPa (K)	266.98	276.66	−9.68 (10^{-93})	−3.02	−1.85	−1.17 (10^{-4})
Cherepovets	267.68	276.69	−9.02 (10^{-16})	−1.93	−1.15	−0.78 (0.233)
Fokino	268.57	274.58	−6.01 (10^{-8})	−2.80	−1.88	−0.92 (0.231)
Noranda	265.09	277.69	−12.60 (10^{-25})	−3.59	−3.40	−0.19 (0.786)
Regina	267.25	276.48	−9.23 (10^{-17})	−3.26	−3.89	0.63 (0.521)
Vertical velocity at 500 hPa (Pa s^{-1})	0.09	0.09	−0.00 (0.810)	0.09	0.09	−0.00 (0.750)
Cherepovets	0.10	0.09	0.02 (0.372)	0.11	0.09	0.02 (0.232)

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Fokino	0.07	0.05	0.01 (0.462)	0.06	0.07	−0.00 (0.797)
Noranda	0.10	0.13	−0.03 (0.400)	0.11	0.12	−0.02 (0.618)
Regina	0.10	0.11	−0.01 (0.665)	0.07	0.08	−0.01 (0.716)
Vertical velocity at 700 hPa (Pa s^{-1})	0.07	0.07	0.00 (0.717)	0.08	0.08	5.39×10^{-4} (0.949)
Cherepovets	0.07	0.06	0.00 (0.800)	0.08	0.08	0.00 (0.783)
Fokino	0.07	0.05	0.02 (0.244)	0.06	0.05	0.01 (0.547)
Noranda	0.08	0.10	−0.02 (0.327)	0.11	0.12	−0.01 (0.756)
Regina	0.08	0.10	−0.02 (0.222)	0.05	0.06	−0.01 (0.552)
Vertical velocity at 1000 hPa (Pa s^{-1})	−0.01	0.01	−0.02 (10^{-14})	0.01	0.02	−0.02 (10^{-12})
Cherepovets	0.01	0.02	−0.01 (0.067)	0.03	0.03	−0.00 (0.417)
Fokino	0.00	7.50×10^{-4}	0.00 (0.773)	0.01	0.01	0.00 (0.472)
Noranda	−0.00	−0.00	2.76×10^{-4} (0.906)	0.01	0.01	−0.00 (0.629)
Regina	−0.04	−0.02	−0.02 (10^{-3})	−0.01	0.00	−0.02 (0.017)
Vorticity at 500 hPa (s^{-1})	9.57×10^{-6}	5.13×10^{-7}	9.06×10^{-6} (0.036)	2.58×10^{-6}	-3.61×10^{-6}	6.19×10^{-6} (0.149)
Cherepovets	6.15×10^{-6}	8.22×10^{-7}	5.33×10^{-6} (0.589)	2.11×10^{-6}	-2.85×10^{-6}	4.96×10^{-6} (0.610)
Fokino	8.06×10^{-6}	-2.11×10^{-5}	2.91×10^{-5} (0.011)	4.73×10^{-6}	-2.10×10^{-5}	2.58×10^{-5} (0.020)
Noranda	1.26×10^{-5}	6.00×10^{-6}	6.61×10^{-6} (0.418)	-2.01×10^{-6}	-1.90×10^{-6}	-1.04×10^{-7} (0.989)
Regina	9.45×10^{-6}	3.48×10^{-6}	5.97×10^{-6} (0.559)	7.57×10^{-6}	-1.31×10^{-6}	8.88×10^{-6} (0.376)
Vorticity at 700 hPa (s^{-1})	1.07×10^{-6}	-2.64×10^{-6}	3.71×10^{-6} (0.123)	-2.22×10^{-6}	-5.07×10^{-6}	2.85×10^{-6} (0.228)
Cherepovets	3.13×10^{-7}	-2.76×10^{-6}	3.07×10^{-6} (0.538)	-3.42×10^{-6}	-4.73×10^{-6}	1.31×10^{-6} (0.785)
Fokino	-5.94×10^{-6}	-2.40×10^{-5}	1.81×10^{-5} (0.010)	-6.76×10^{-6}	-2.30×10^{-5}	1.63×10^{-5} (0.019)
Noranda	8.47×10^{-6}	7.12×10^{-6}	1.35×10^{-6} (0.807)	2.04×10^{-6}	-8.56×10^{-8}	2.13×10^{-6} (0.714)
Regina	-5.83×10^{-7}	-1.40×10^{-6}	8.19×10^{-7} (0.890)	-1.78×10^{-6}	-3.34×10^{-6}	1.56×10^{-6} (0.791)
Vorticity at 1000 hPa (s^{-1})	-6.14×10^{-6}	-2.60×10^{-6}	-3.54×10^{-6} (0.013)	-6.90×10^{-6}	-1.04×10^{-5}	3.48×10^{-6} (0.016)
Cherepovets	-4.53×10^{-6}	-1.55×10^{-6}	-2.99×10^{-6} (0.481)	-1.82×10^{-5}	-1.42×10^{-5}	-4.02×10^{-6} (0.308)
Fokino	-3.97×10^{-6}	-2.13×10^{-6}	-1.84×10^{-6} (0.611)	-1.15×10^{-6}	-4.83×10^{-7}	-6.64×10^{-7} (0.843)
Noranda	-3.38×10^{-6}	-2.89×10^{-6}	-4.88×10^{-7} (0.686)	-2.97×10^{-6}	-2.83×10^{-6}	-1.45×10^{-7} (0.912)
Regina	-1.53×10^{-5}	-7.74×10^{-6}	-7.56×10^{-6} (0.013)	-1.27×10^{-5}	-2.73×10^{-6}	-9.94×10^{-6} (10^{-3})
Wind velocity at 10 m (m s^{-1})	3.33	3.78	−0.44 (10^{-4})	−0.65	−0.38	−0.26 (0.020)

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Cherepovets	3.45	4.07	−0.62 (0.025)	−0.73	−0.17	−0.56 (0.039)
Fokino	3.31	2.59	0.72 (0.013)	−0.98	−1.67	0.69 (0.026)
Noranda	3.15	2.75	0.40 (0.073)	−0.38	−0.86	0.47 (0.035)
Regina	3.57	3.75	−0.17 (0.580)	−0.54	−0.47	−0.07 (0.811)
Neutral wind velocity at 10 m (m s^{-1})	3.41	3.86	−0.45 (10^{-4})	−0.62	−0.36	−0.25 (0.025)
Cherepovets	3.50	4.14	−0.63 (0.022)	−0.69	−0.16	−0.54 (0.045)
Fokino	3.41	2.73	0.68 (0.016)	−0.94	−1.61	0.67 (0.027)
Noranda	3.19	2.82	0.37 (0.095)	−0.36	−0.83	0.47 (0.036)
Regina	3.71	3.93	−0.22 (0.481)	−0.50	−0.44	−0.05 (0.857)
Wind velocity at 500 hPa (m s^{-1})	15.84	15.46	0.38 (0.551)	−2.53	−1.28	−1.24 (0.043)
Cherepovets	13.20	15.42	−2.22 (0.058)	−2.67	−0.70	−1.97 (0.087)
Fokino	13.66	11.41	2.25 (0.091)	−2.94	−5.21	2.26 (0.115)
Noranda	18.03	17.84	0.19 (0.904)	−2.64	−1.26	−1.38 (0.379)
Regina	17.50	15.31	2.18 (0.146)	−1.60	−2.48	0.88 (0.562)
Wind velocity at 700 hPa (m s^{-1})	9.90	10.18	−0.28 (0.448)	−2.69	−1.50	−1.19 (10^{-4})
Cherepovets	8.65	10.53	−1.88 (10^{-3})	−2.87	−0.93	−1.95 (10^{-3})
Fokino	8.66	7.95	0.71 (0.404)	−3.17	−4.01	0.84 (0.337)
Noranda	10.93	10.13	0.80 (0.337)	−2.70	−2.66	−0.03 (0.967)
Regina	11.02	9.46	1.55 (0.097)	−1.83	−2.23	0.40 (0.669)
Wind velocity at 1000 hPa (m s^{-1})	3.19	4.06	−0.87 (10^{-11})	−0.42	−0.18	−0.24 (0.035)
Cherepovets	4.20	4.63	−0.44 (0.171)	−0.41	0.04	−0.46 (0.152)
Fokino	3.47	2.84	0.64 (0.036)	−0.63	−1.21	0.58 (0.063)
Noranda	2.42	2.17	0.26 (0.133)	−0.25	−0.65	0.40 (0.018)
Regina	3.25	3.40	−0.15 (0.583)	−0.41	−0.43	0.01 (0.960)
Wind direction at 10 m (°)	228.18	233.52	−5.34 (0.529)	21.85	28.52	−6.67 (0.416)
Cherepovets	196.12	226.19	−30.06 (0.109)	1.54	25.09	−23.55 (0.193)
Fokino	189.91	240.04	−50.13 (0.051)	−6.30	42.52	−48.82 (0.043)
Noranda	258.13	263.45	−5.32 (0.779)	46.16	48.53	−2.36 (0.898)
Regina	259.74	240.48	19.26 (0.287)	38.50	21.79	16.71 (0.336)

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Neutral wind direction at 10 m (°)	228.19	233.53	−5.34 (0.528)	21.85	28.51	−6.66 (0.417)
Cherepovets	196.20	226.19	−29.99 (0.110)	1.61	25.07	−23.46 (0.194)
Fokino	189.90	240.08	−50.18 (0.051)	−6.30	42.55	−48.85 (0.043)
Noranda	258.13	263.46	−5.33 (0.779)	46.16	48.55	−2.39 (0.896)
Regina	259.71	240.49	19.22 (0.288)	38.48	21.81	16.67 (0.338)
Wind direction at 500 hPa (°)	233.56	229.61	3.95 (0.651)	−12.98	−10.12	−2.86 (0.725)
Cherepovets	194.54	215.96	−21.42 (0.252)	−36.19	−16.33	−19.86 (0.247)
Fokino	186.83	239.61	−52.78 (0.070)	−41.19	4.08	−45.27 (0.103)
Noranda	265.13	260.34	4.79 (0.770)	9.92	7.84	2.09 (0.893)
Regina	280.40	265.35	15.05 (0.325)	8.53	−1.49	10.02 (0.499)
Wind direction at 700 hPa (°)	234.97	215.33	19.64 (0.031)	−4.97	−18.63	13.66 (0.108)
Cherepovets	182.70	202.85	−20.15 (0.301)	−38.98	−24.09	−14.90 (0.426)
Fokino	193.13	206.04	−12.92 (0.670)	−32.34	−22.48	−9.86 (0.734)
Noranda	265.67	233.98	31.69 (0.110)	20.82	−10.04	30.86 (0.111)
Regina	287.02	264.24	22.78 (0.163)	19.30	2.27	17.03 (0.275)
Wind direction at 1000 hPa (°)	226.50	230.53	−4.03 (0.637)	20.68	25.62	−4.94 (0.551)
Cherepovets	192.50	221.76	−29.26 (0.116)	−0.32	21.01	−21.32 (0.233)
Fokino	190.56	240.96	−50.39 (0.049)	−5.59	43.11	−48.70 (0.042)
Noranda	254.61	263.17	−8.56 (0.654)	43.35	47.81	−4.46 (0.811)
Regina	259.35	240.48	18.87 (0.296)	37.97	21.31	16.66 (0.338)
Lower tropospheric stability (K)	18.44	15.87	2.56 (10^{-9})	0.71	1.55	−0.84 (0.022)
Cherepovets	16.99	15.35	1.64 (0.109)	−0.02	0.64	−0.66 (0.434)
Fokino	20.14	21.35	−1.22 (0.314)	2.48	4.65	−2.17 (0.016)
Noranda	18.42	17.67	0.75 (0.411)	0.35	3.98	−3.62 (10^{-6})
Regina	17.17	14.50	2.66 (10^{-3})	−0.69	2.52	−3.21 (10^{-4})
Cloud water path (g m^{-2})	168.95	157.89	11.07 (0.240)	−148.02	−80.99	−67.03 (10^{-8})
Cherepovets	185.29	167.20	18.09 (0.378)	−156.97	−89.28	−67.69 (0.026)
Fokino	187.62	180.07	7.55 (0.790)	−143.33	−95.16	−48.17 (0.124)
Noranda	132.64	106.75	25.88 (0.013)	−129.25	−75.83	−53.42 (10^{-4})

Meteorological variable	Mean value on INP perturbation days (a)	Mean value on CCN perturbation days (b)	a − b	Mean departure from climatology on INP perturbation days (c)	Mean departure from climatology on CCN perturbation days (d)	c − d
Regina	191.26	149.18	42.08 (0.114)	−180.08	−40.25	−139.83 (10^{-4})
Cloud top temperature (K)	256.58	263.45	−6.87 (10^{-40})	4.88	6.12	−1.24 (10^{-3})
Cherepovets	257.31	264.31	−7.00 (10^{-14})	4.12	6.09	−1.97 (0.018)
Fokino	258.47	264.74	−6.27 (10^{-7})	4.77	8.68	−3.91 (10^{-3})
Noranda	254.89	262.74	−7.85 (10^{-8})	4.57	6.48	−1.90 (0.134)
Regina	256.07	259.27	−3.20 (0.014)	6.16	4.84	1.32 (0.327)
Cloud top pressure (hPa)	722.11	755.56	−33.45 (10^{-6})	64.66	87.32	−22.66 (10^{-3})
Cherepovets	770.22	772.14	−1.92 (0.885)	80.47	89.31	−8.83 (0.536)
Fokino	726.42	731.83	−5.41 (0.798)	49.69	70.74	−21.05 (0.318)
Noranda	709.56	719.16	−9.60 (0.579)	68.26	103.01	−34.74 (0.064)
Regina	697.60	716.34	−18.75 (0.255)	67.47	70.95	−3.49 (0.851)
Cloud optical thickness	26.63	22.66	3.97 (10^{-3})	−12.83	−8.56	−4.28 (10^{-3})
Cherepovets	30.24	24.43	5.80 (0.039)	−15.92	−10.23	−5.69 (0.125)
Fokino	34.08	29.98	4.10 (0.364)	−11.70	−8.24	−3.46 (0.435)
Noranda	16.02	12.32	3.70 (10^{-3})	−14.76	−8.33	−6.44 (10^{-4})
Regina	31.09	20.23	10.86 (10^{-3})	−9.01	−0.99	−8.01 (0.046)
Cloud fraction (%)	96	95	1 (0.401)	15	17	−2 (0.020)
Cherepovets	94	95	−1 (0.452)	14	14	0 (0.954)
Fokino	96	99	−3 (10^{-3})	10	14	−3 (0.044)
Noranda	97	94	3 (0.024)	17	19	−2 (0.256)
Regina	94	96	−2 (0.323)	19	30	−12 (10^{-5})
Cloud droplet effective radius (μm)	10.61	11.70	−1.09 (10^{-6})	−2.63	−1.19	−1.44 (10^{-10})
Cherepovets	9.89	11.60	−1.72 (10^{-6})	−2.82	−1.05	−1.77 (10^{-5})
Fokino	8.63	9.40	−0.77 (0.067)	−3.36	−2.28	−1.08 (0.015)
Noranda	13.30	13.92	−0.62 (0.265)	−0.55	−0.17	−0.38 (0.503)
Regina	9.48	11.19	−1.71 (10^{-4})	−4.93	−2.28	−2.64 (10^{-7})