Supplement

Figure S1: Radiosonde at 08:00 (BJT) on September 26th, 2017.

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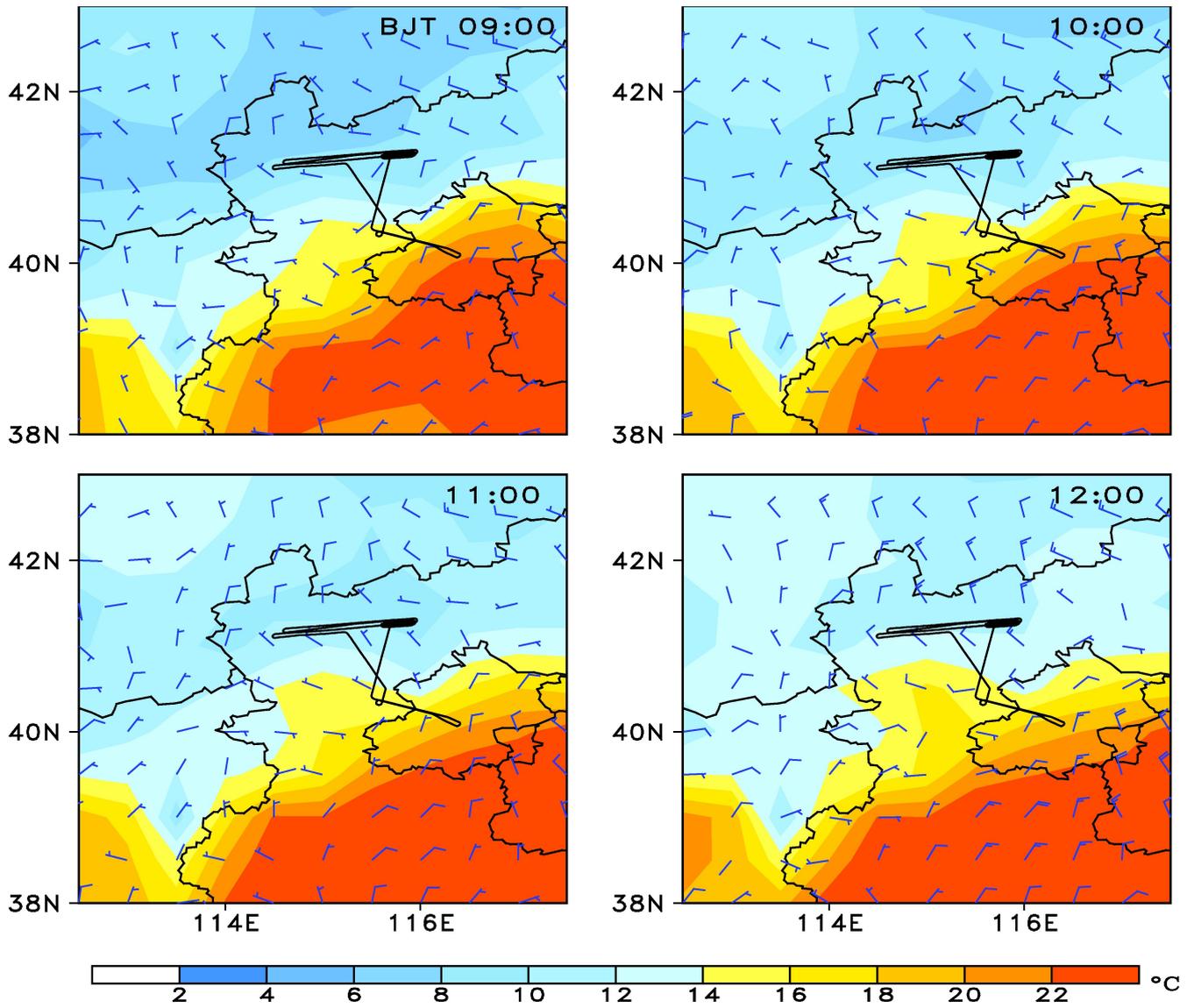
Figure S2: Flight tracks (black line) mapping on the wind field (blue wind shaft) and temperature field (color) observed by ground weather observation station at 09:00-12:00 (BJT) on September 26th, 2017.

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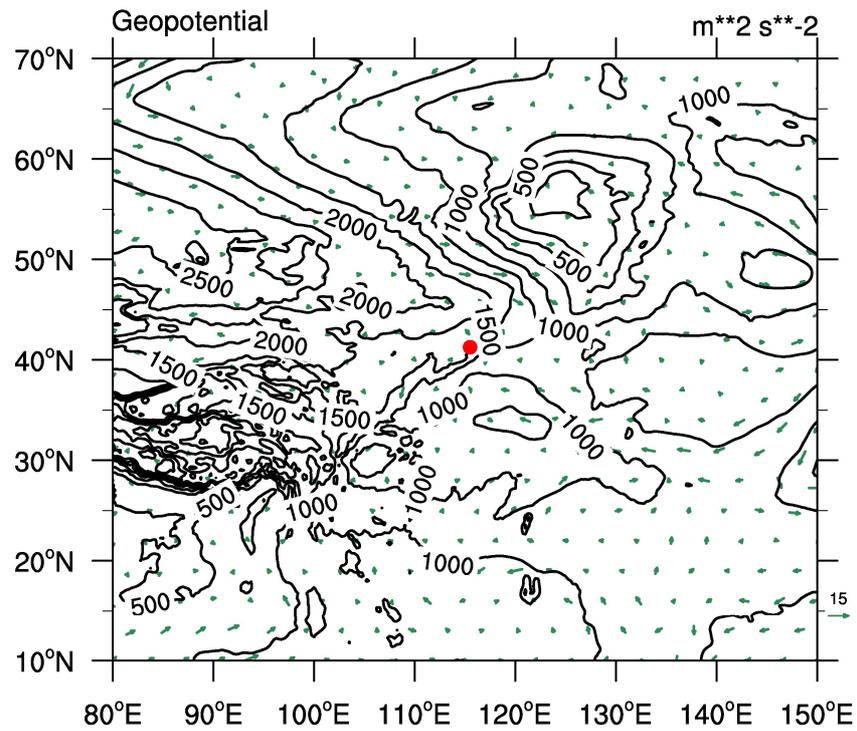
Figure S3: Geopotential height contour map at 1000 hPa at 09:00 (BJT) on September 26th, 2017. The experimental region is indicated by the red dot.
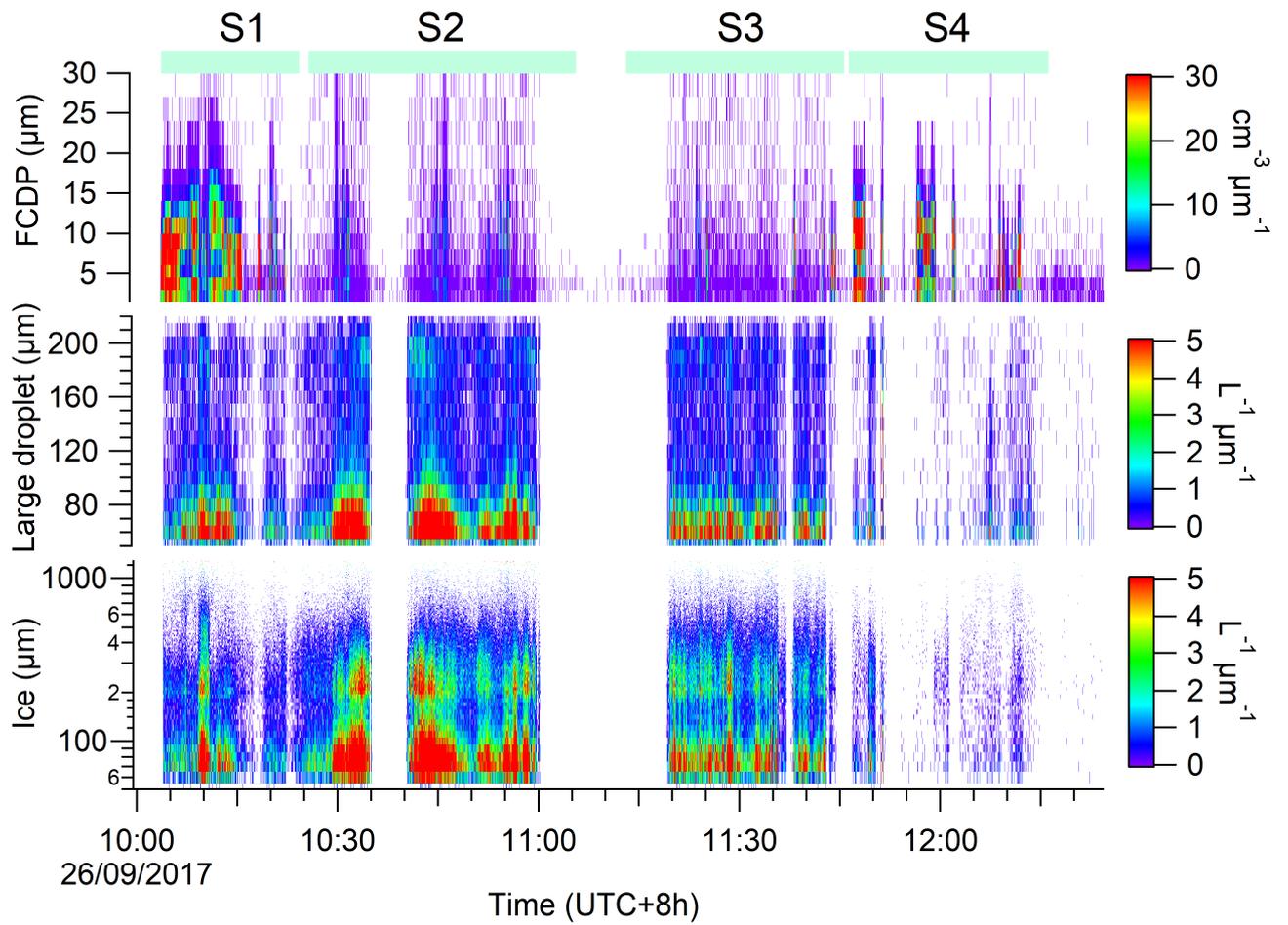
Figure S4: Particle size distribution spectrum of FCDP and 2D-S (ice and large droplet).

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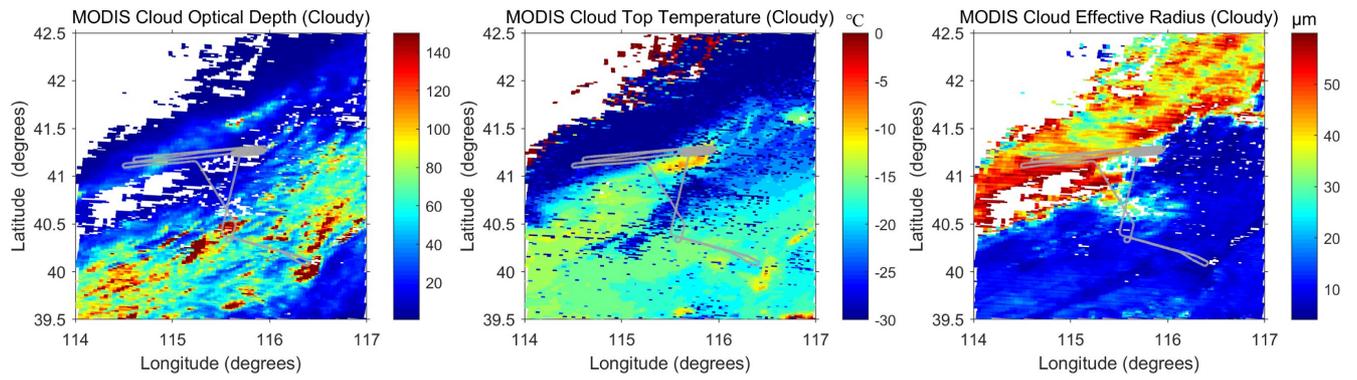
Figure S5: Cloud optical depth, cloud-top temperature and cloud effective radius from MODIS at 10:30 (UTC+8h) on September 26th, 2017, with flight track shown in grey line.

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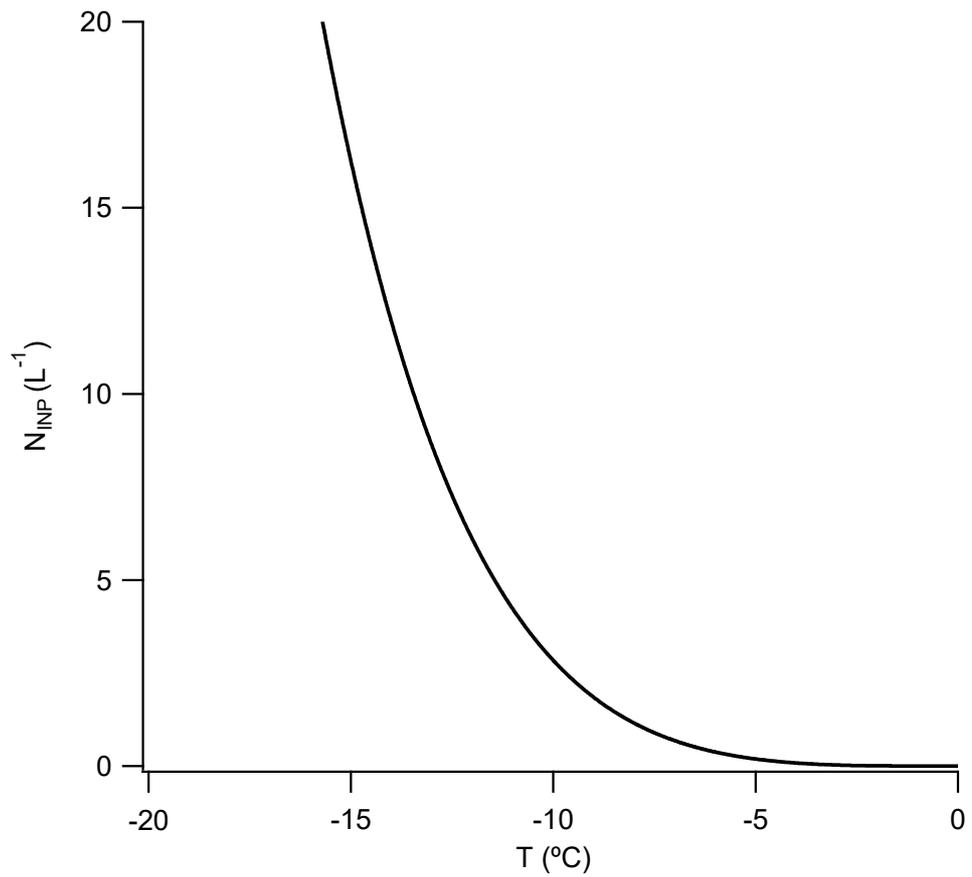
Figure S6: The number concentration of ice nucleating particles (N_{INP}) as a function of cloud temperature, taking into account a 10-fold error.
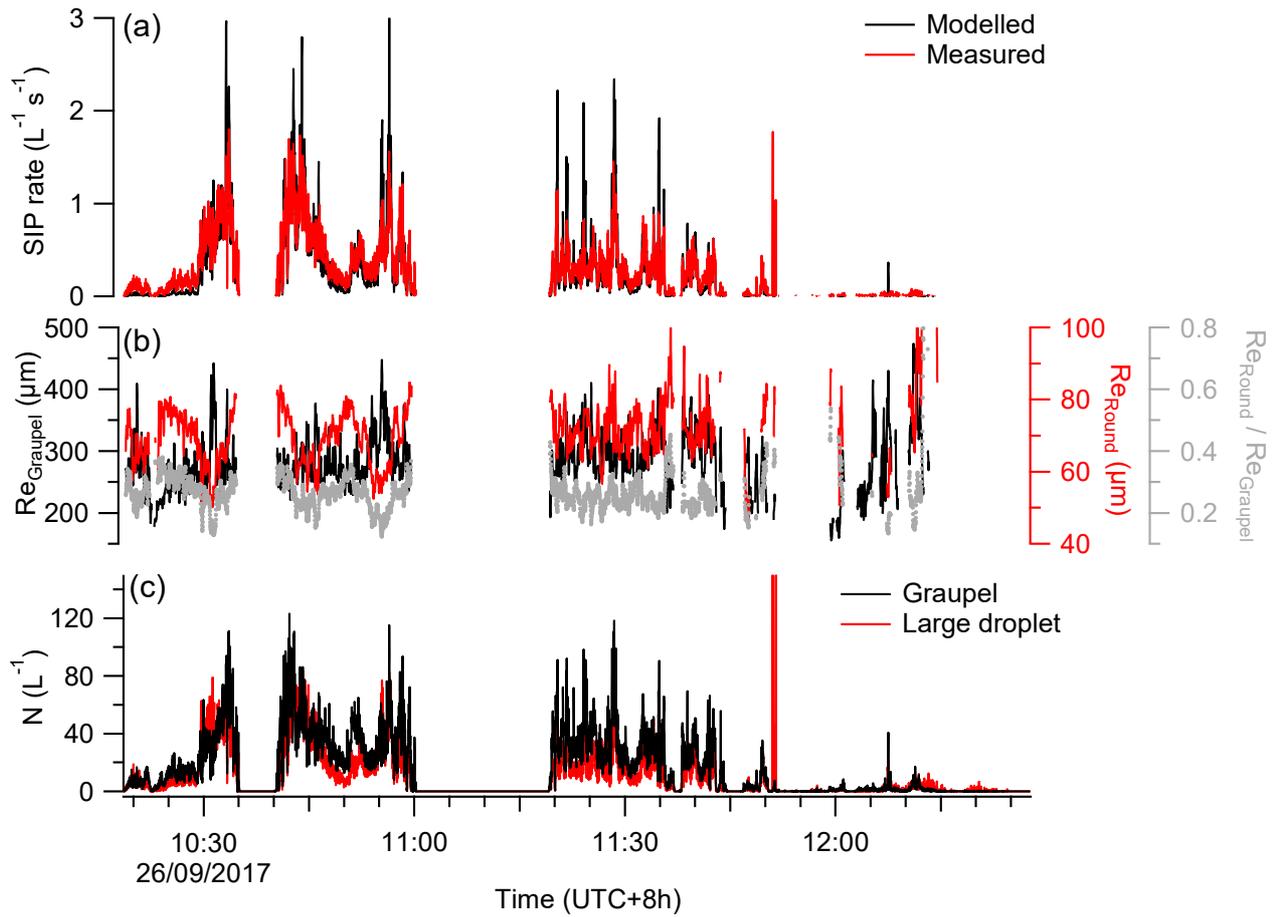
Figure S7: Time series of modelled and measured secondary ice production (SIP) rate. (a) The modelled and measured SIP rate, (b) Effective radius of graupel ($Re_{Graupel}$) and large droplet (Re_{Round}), and the ratio between its (Re_{Round} / $Re_{Graupel}$), (c) Number concentrations (*N*) of graupel and large droplet.

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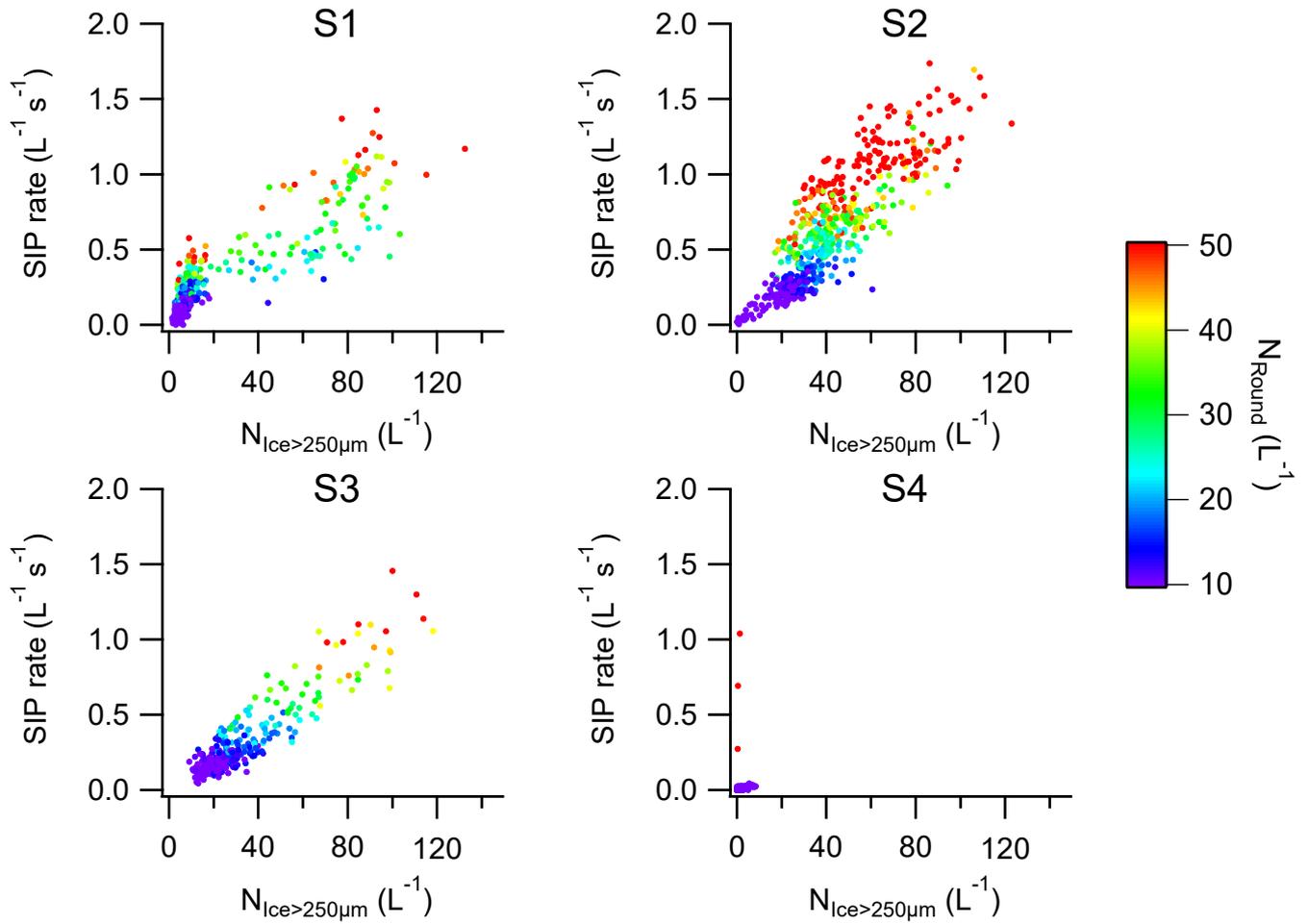
80   **Figure S8: The number concentration of ice with diameter > 250 µm ($N_{Ice>250µm}$) as a function of the measured SIP rate at different stages, colored by N_{Round}.**