



Supplement of

Distinct effects of several ice production processes on thunderstorm electrification and lightning activity

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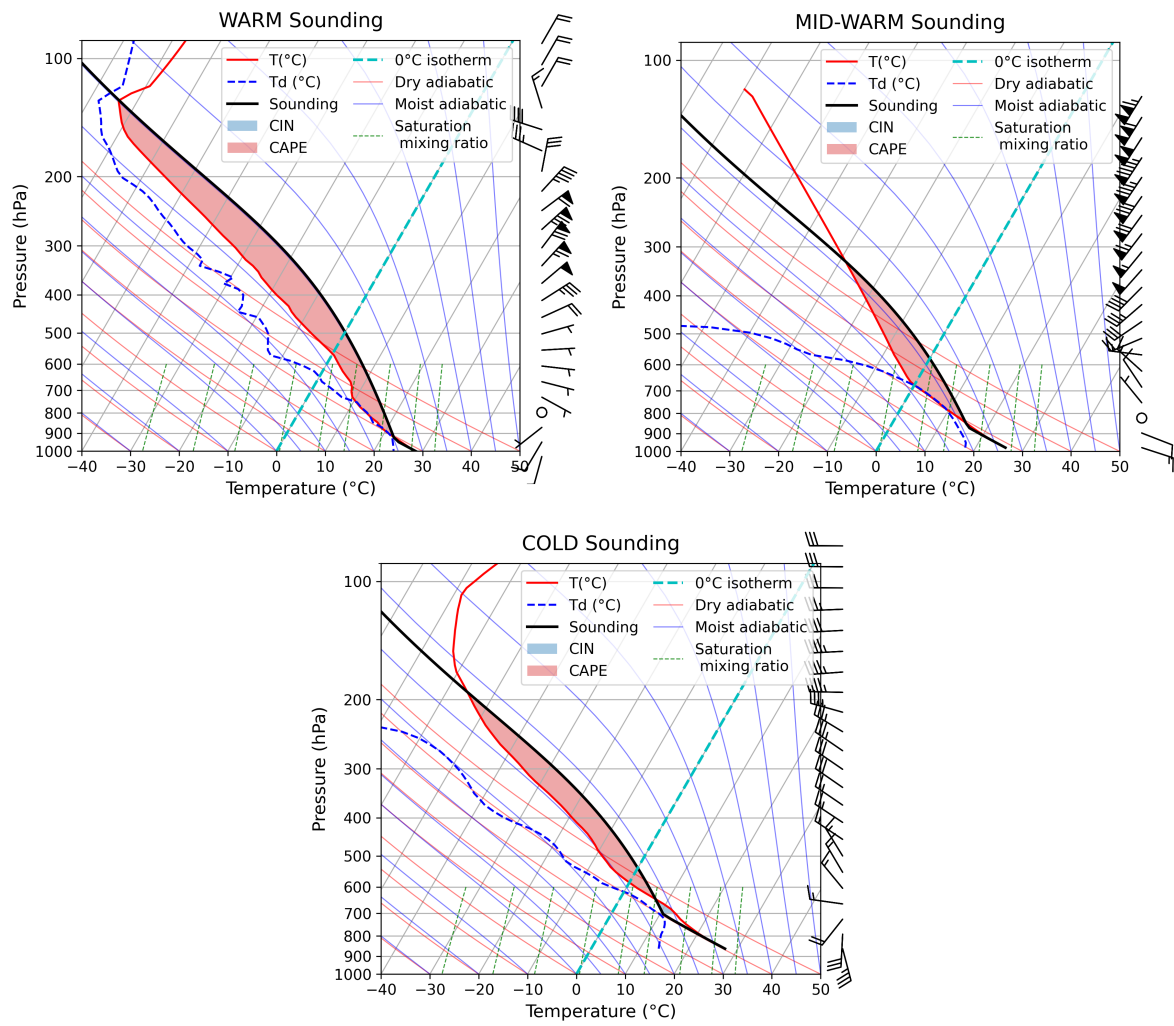


Figure S1. Soundings of each idealized storm.

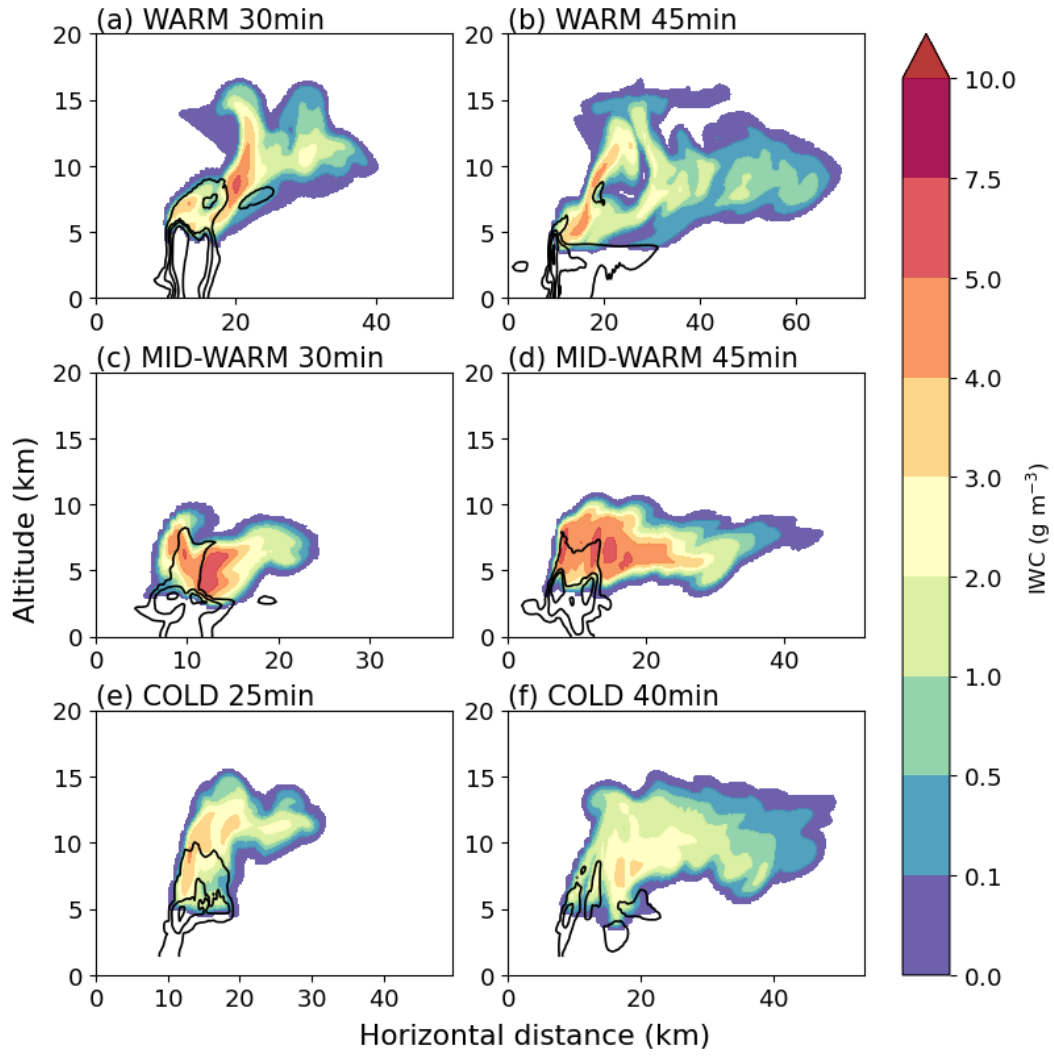


Figure S2. Vertical cross sections of ice water content (IWC in g m^{-3} ; in colors) and liquid water content (LWC in g m^{-3} ; black contours with isolines at 0.1, 1, 2.5 and 5 g m^{-3}) at the development stage (a, c, e) and at the mature stage (b, d, f) in the WARM (a, b), MID-WARM (c, d) and COLD (e, f) storms. These along-wind vertical cross sections are realized across the updraft core.

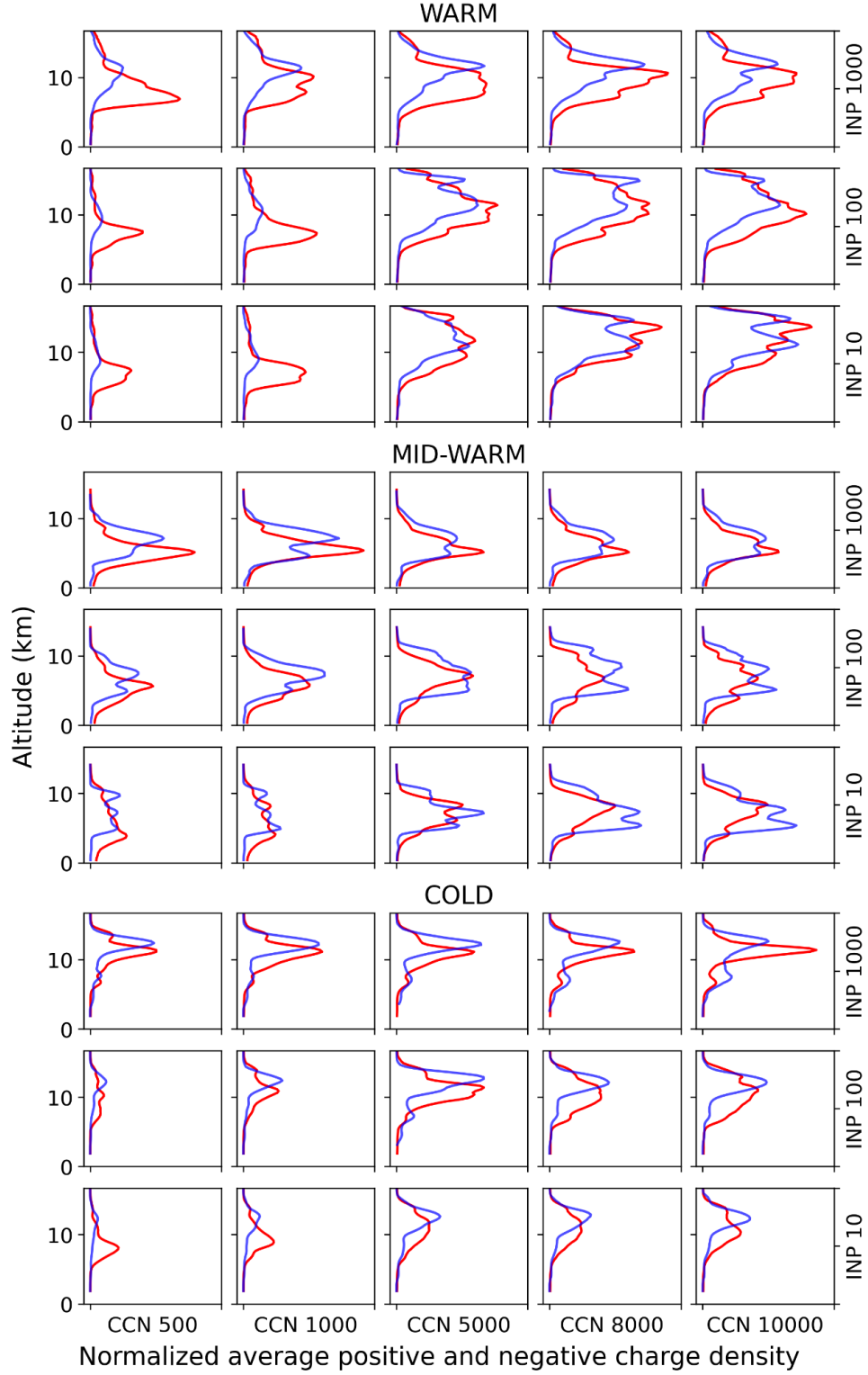


Figure S3. Normalized average positive and negative charge density over the whole cloud of the WARM, MID-WARM and COLD storms, for the first series of simulations, about the sensitivity to aerosol concentration. The first, second and third lines for each storm correspond to INP concentrations of 1000, 100 and 10 L⁻¹, respectively. The first, second, third, fourth and fifth columns correspond to CCN concentrations of 500, 1000, 5000, 8000 and 10,000 cm⁻³, respectively. The average positive and negative charge density are normalized with the maximum average positive and negative charge density for each of the three storms.

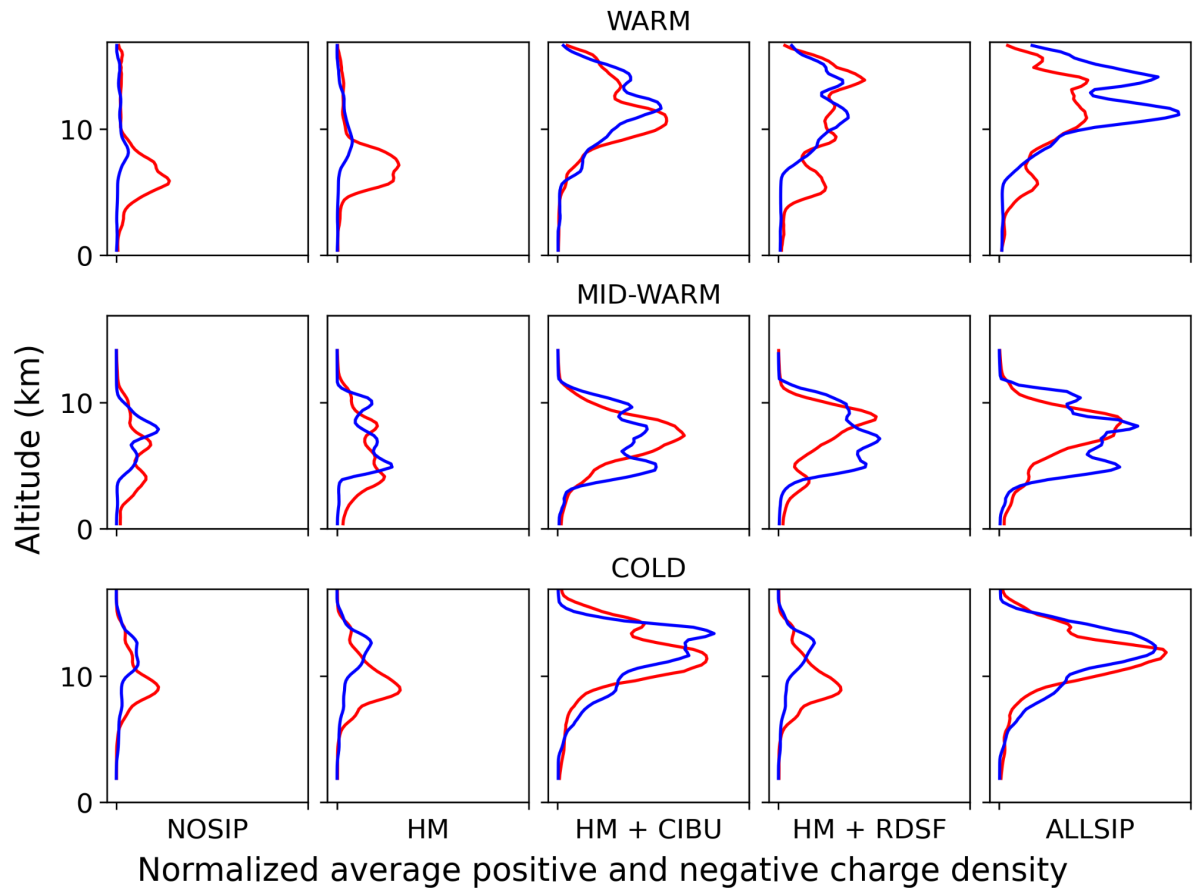


Figure S4. Same as Fig. S3, but for the second series of simulations, about the sensitivity to SIP processes.