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Microphysical processes producing high ice water contents (HIWCs) in tropical convective clouds during the HAIC-HIWC field campaign: dominant role of secondary ice production

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**Fig. S1.** Scatter plots of (black) observed and (colorized) simulated ice number concentration ($N_i$, # m$^{-3}$) divided by ice water content (IWC, g m$^{-3}$) (denoted as $N_i$/IWC) as a function of vertical velocity ($w$, m s$^{-1}$) in regions with IWC $> 1$ g m$^{-3}$ at temperatures of (left column) $-10$ °C, (middle column) $-30$ °C, and (right column) $-45$ °C at $t = 60$ min in experiments (a1–a3) NoSIP1kmAC, (b1–b3) NoSIP250mAC, (c1–c3) NoSIP125mAC, and (d1–d4) NoSIP250m, respectively. The simulations at the three temperature levels are interpolated from the model outputs. The simulations with horizontal grid spacing $< 1$ km have been coarsened to 1 km for comparison by spatially averaging with a window size of 1 km $\times$ 1 km. The points are color-coded according to the magnitude of radar equivalent reflectivity factor (dBZ).
Fig. S2. As Fig. S1 but for experiments NoSIP1kmAC, NoSIP250mAC, NoSIP125mAC, and NoSIP250m for 100 \( \mu m < D_{\text{max}} < 12845 \, \mu m \), respectively.
01:00:00 (200 µm < $D_{\text{max}}$ < 12845 µm)

**Fig. S3.** As Fig. S1 but for experiments NoSIP1kmAC, NoSIP250mAC, NoSIP125mAC, and NoSIP250m for 200 µm < $D_{\text{max}}$ < 12845 µm, respectively.
**Fig. S4.** As Fig. S1 but for experiments HM250m, RFZB250m, IICB250m, and SIPs250m for $50 \mu m < D_{max} < 12845 \mu m$, respectively.
Fig. S5. As Fig. S1 but for experiments HM250m, RFZB250m, IICB250m, and SIPs250m for 100 µm < $D_{\text{max}}$ < 12845 µm, respectively.
**Fig. S6.** As Fig. S1 but for experiments HM250m, RFZB250m, IICB250m, and SIPs250m for 200 μm < $D_{\text{max}}$ < 12845 μm, respectively.