Supplementary Material for A strong statistical link between aerosol indirect effects and the self-similarity of rainfall distributions

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1 Supplementary Figures

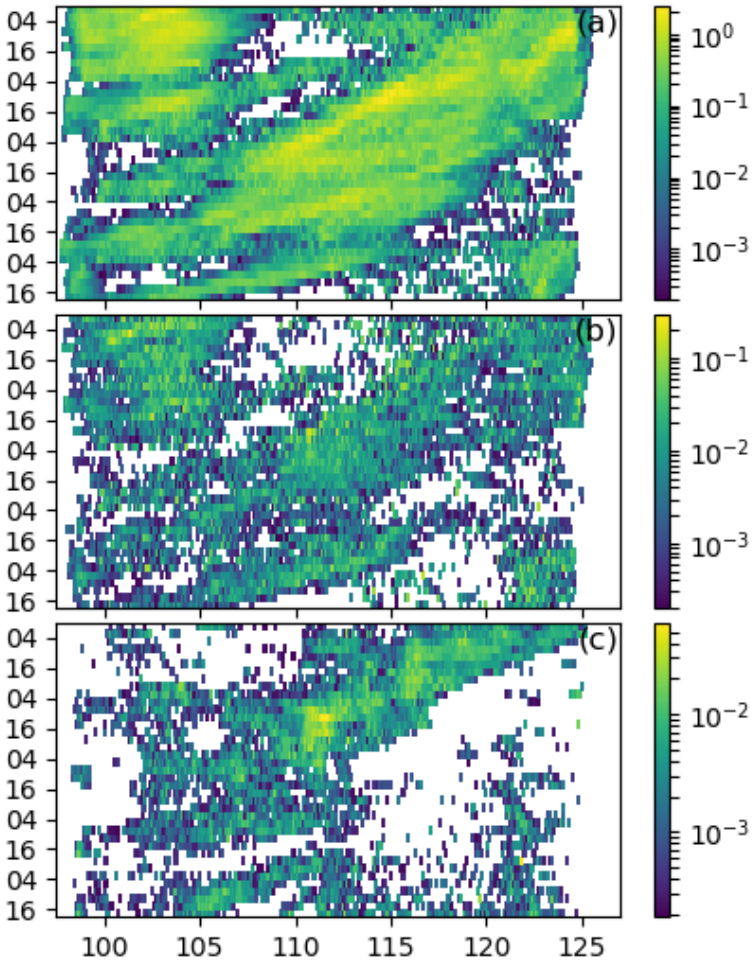

Figure S 1. Hovmuller plots of merionally averaged surface rainfall rate for the three cloud-area fraction regimes: (a) high-cloud dominated regime, $H > 0.8$, $M > 0.6$, $L > 0.1$; (b) transitional regime, $0.2 < H \leq 0.8$, $0.4 < M \leq 0.6$, $0.4 < L \leq 1.0$; (c) low-cloud dominated regime, $H < 0.2$,$M < 0.2$,$L > 0.9$.

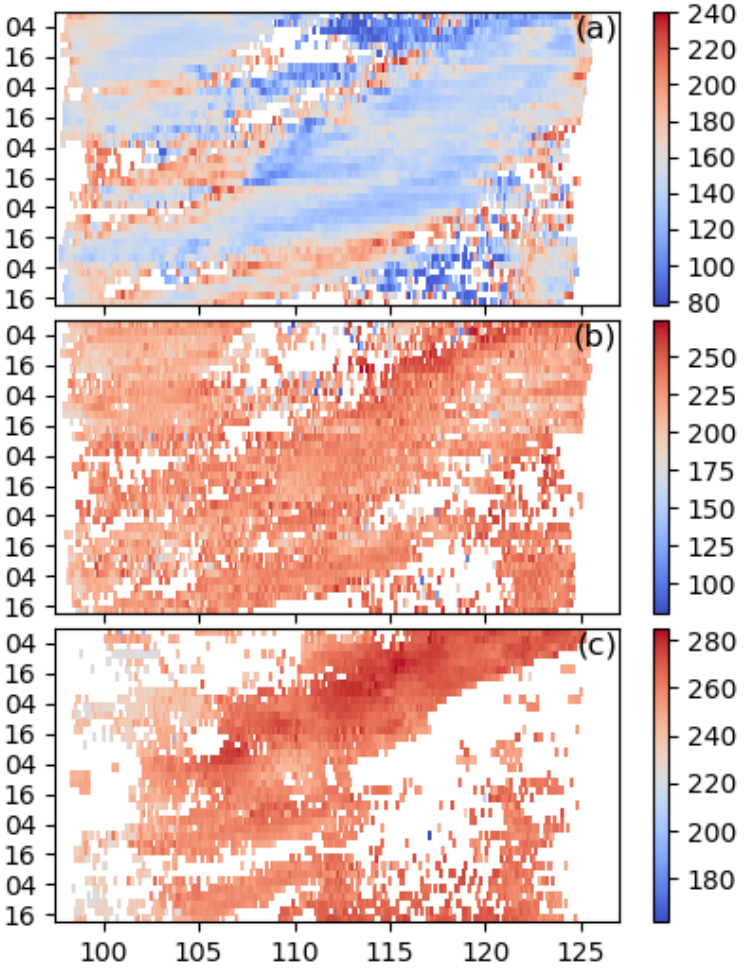

Figure S 2. As for Fig. 1, but for the top-of-atmosphere outgoing flux of longwave radiation.

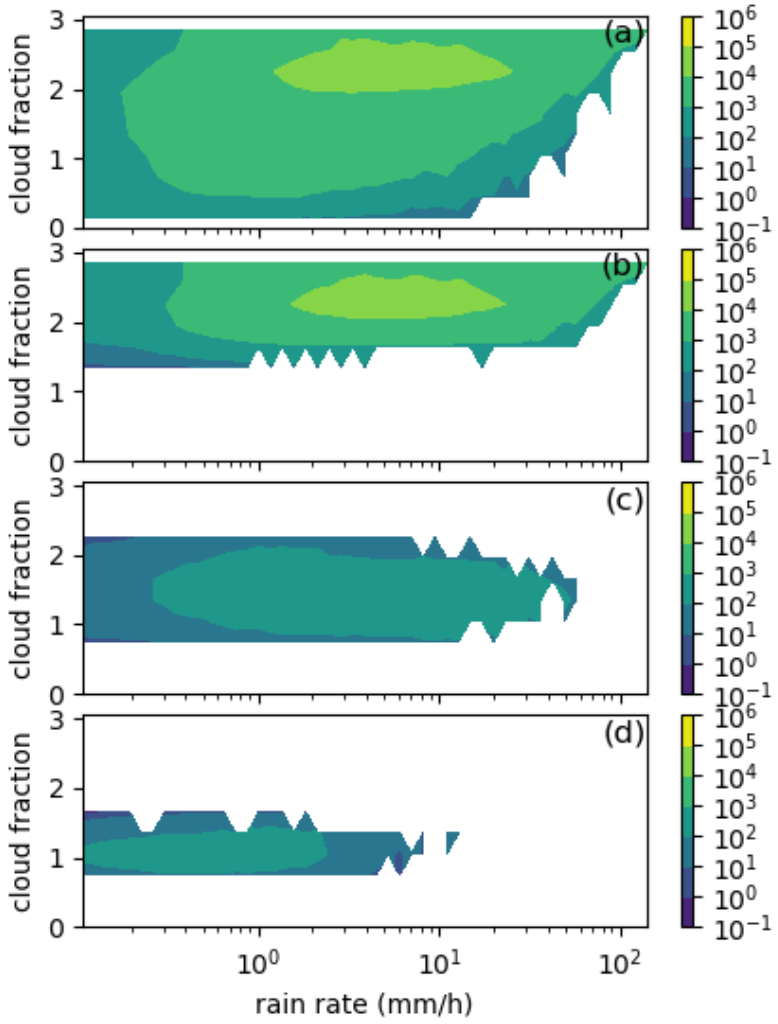

Figure S 3. (a) The joint histogram of total cloud fraction and rainfall rate (all points). (b-d) Joint histograms of total cloud fraction and rainfall rate in the three cloud-area fraction regimes: (b) high-cloud dominated; (c) transitional; (d) low-cloud dominated.

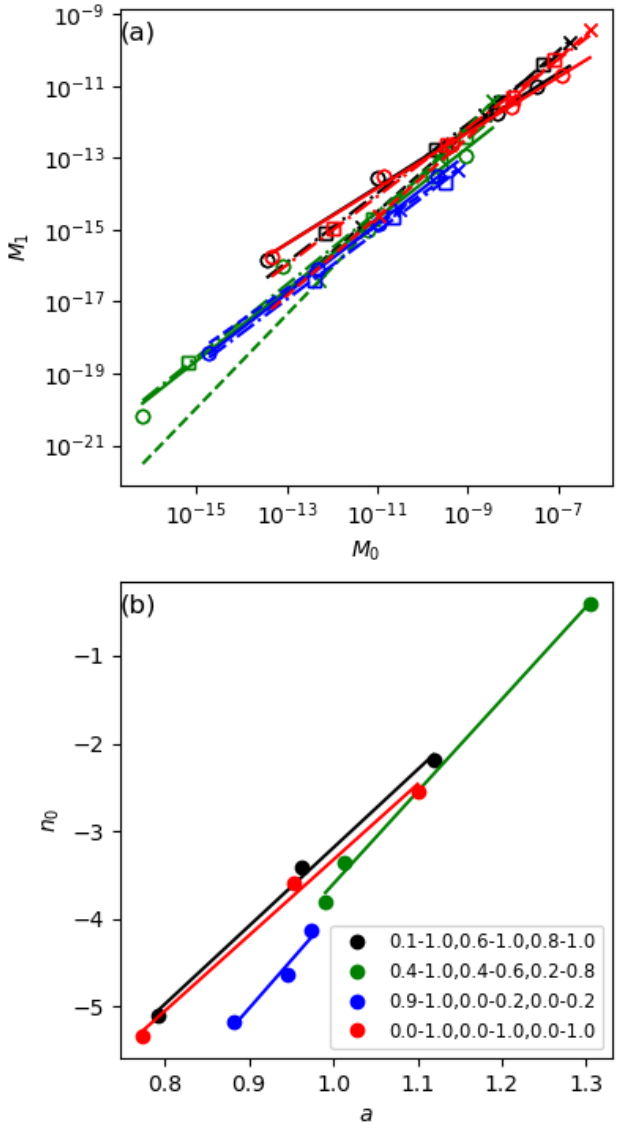

Figure S 4. (a) The relationships between CDNC-conditioned rainfall frequency, M_1, and amount, M_1, for each aerosol-concentration experiment (symbols) and their empirical fits to power laws of the form $M_1 = xM_0^y$ (lines). The symbols and line-styles correspond to each experiment, according to the convention established in the main text (*aero*+:circles/solid, *aero*○:squares/dot-dashed, *aero*−:crosses/dashed). The colors correspond to the cloud-area fraction regimes (with red being for all regimes). (b) The relationships between the fit parameters, a, n_0, which determine the log-linear relationships between the pre-factors, x, and exponents, y, in the $M_1 - M_0$–power laws for each cloud regime (colors).

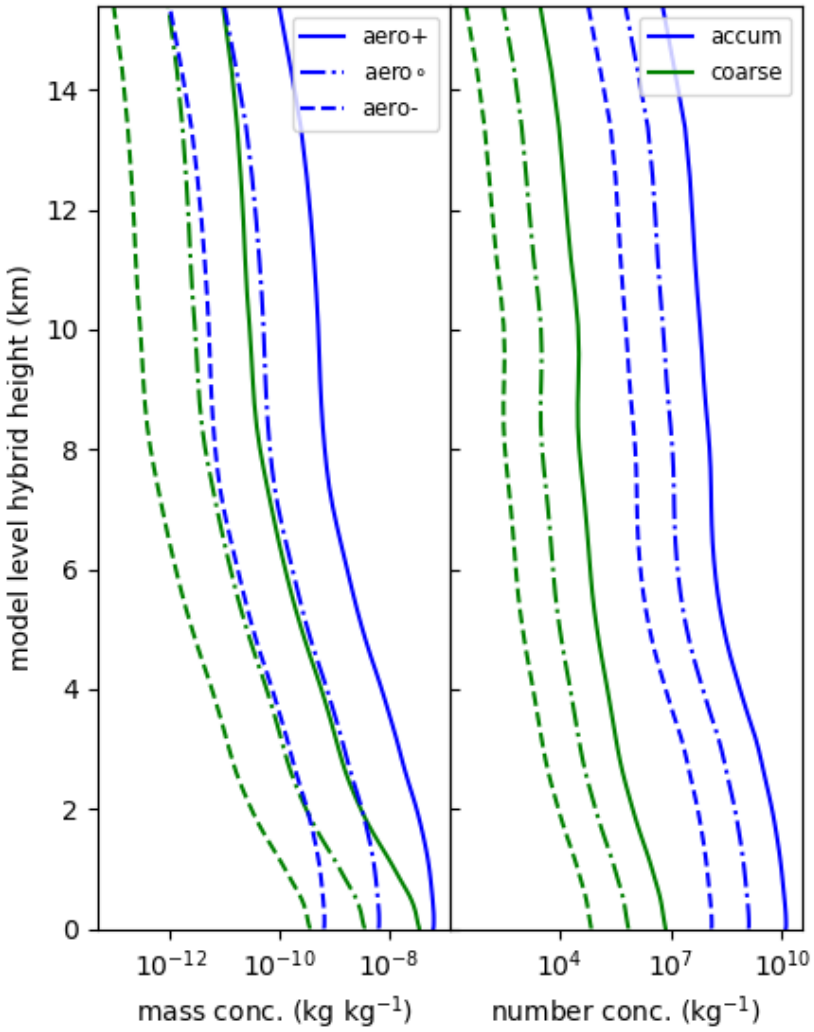

Figure S 5. The vertical profiles of accumulation-mode (green) and coarse-mode (blue) aerosol mass (left) and number (right) concentrations that where used to initialise the aerosols in the three AC experiments (line styles).