Supporting information for: Assessing the effects of giant aerosols in E3SMv2
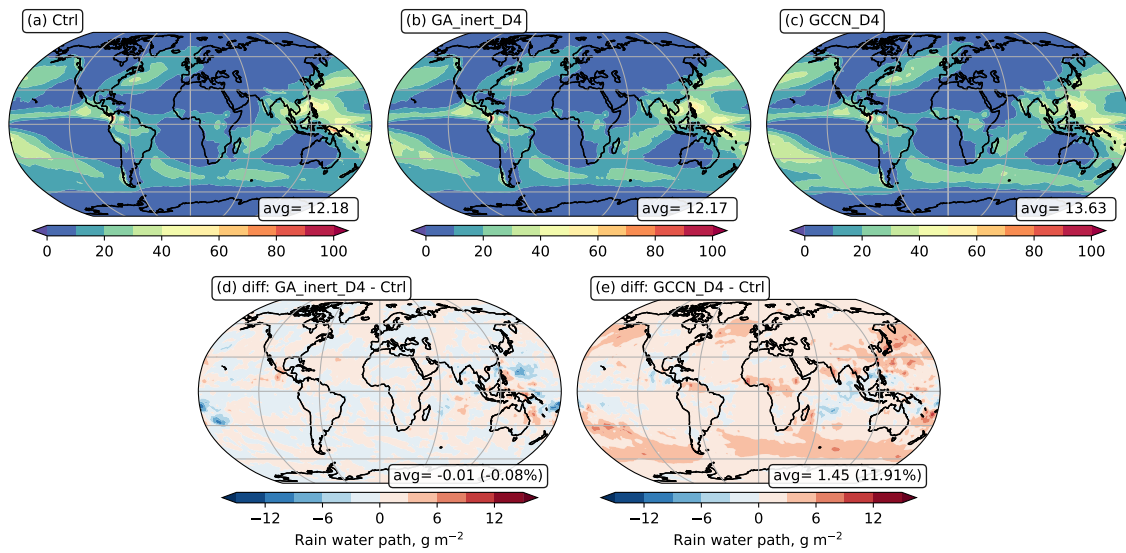
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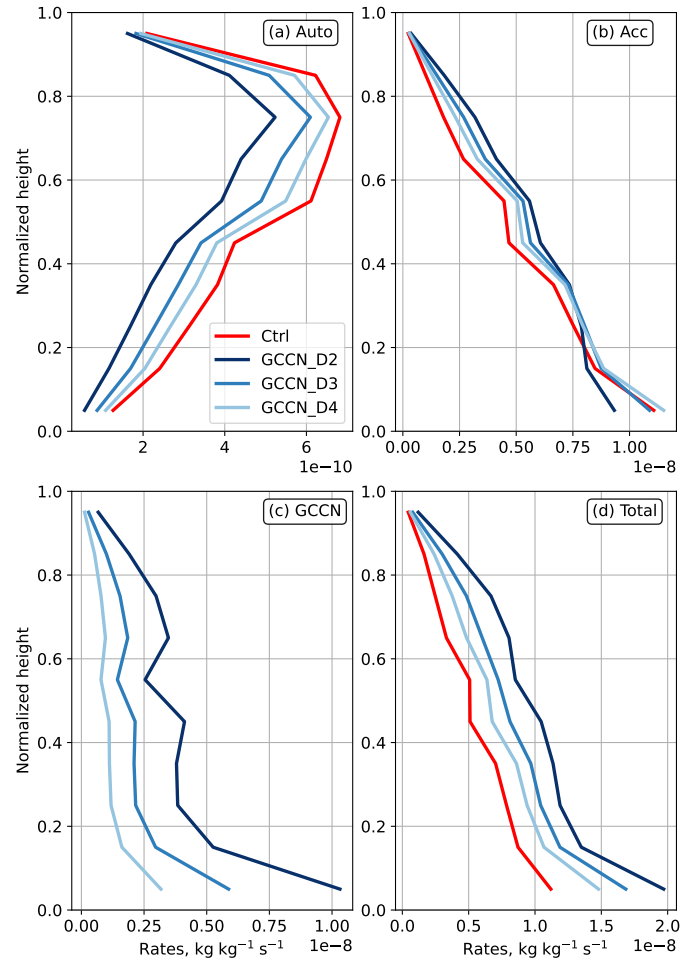
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Figure S1. Spatial distribution of rain water path in (a) Ctrl, (b) GA_inert_D4, and (c) GCCN_D4. (d) and (e) are for the differences between the cases. Values at the bottom right are for the global area weighted mean.

Figure S2. Profiles of (a) autoconversion, (b) accretion, (c) GCCN and (d) total rain rates in a normalized height (0 for cloud base and 1 for cloud top). Different colors are for different cases.
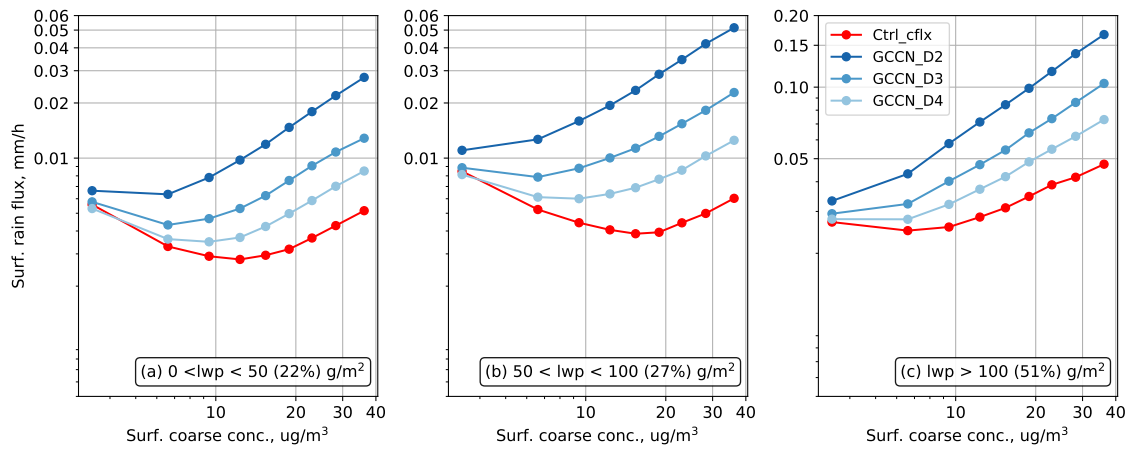
Figure S3. Correlation between surface coarse mode concentration and surface rain fluxes at three different LWP levels over Southern ocean regions: (a) $0 < \text{LWP} < 50 \text{ g m}^{-2}$, (b) $50 < \text{LWP} < 100 \text{ g m}^{-2}$, and (c) $\text{LWP} > 100 \text{ g m}^{-2}$. Different colors represent different cases and the dots represent the mean value in each tenth quantile bin of surface coarse mode concentration. Percentage in the legend are for the sample ratio in the corresponding LWP ranges.
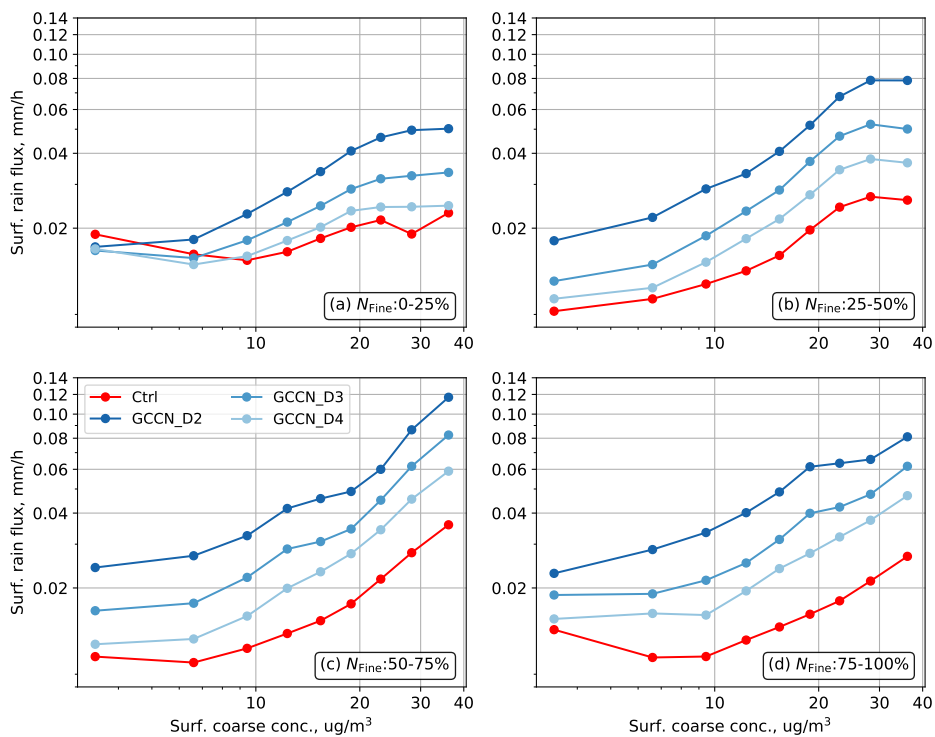
Figure S4. Correlation between surface coarse mode concentration and surface rain fluxes at four different fine mode surface concentration quantiles over southern ocean regions: (a) $0 < N_{fine} <= 25\%$, (b) $25 < N_{fine} <= 25\%$, (c) $50 < N_{fine} < 75\%$ and (d) $75 < N_{fine} < 100\%$. Colors are for different cases and the dots represent the mean value in each tenth quantile bin of surface coarse mode concentration.