

Supplementary materials

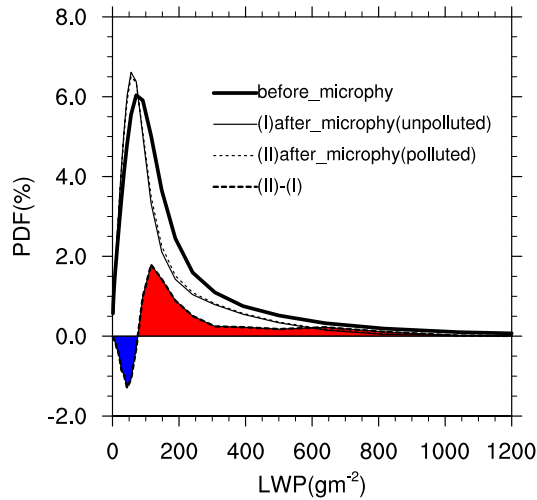


FIG. S1. The PDFs of LWP before and after microphysics. Two warm rain microphysics are calculated in each step, one with normal aerosol conditions (unpolluted) and the other with cloud number concentration increased by a factor of 100 (polluted). The “polluted” calculation is conducted in parallel with the “unpolluted” one in an offline way. The difference between the polluted and unpolluted calculations is shown in dashed line (scaled by 10), with positive and negative values are shaded red and blue, respectively.

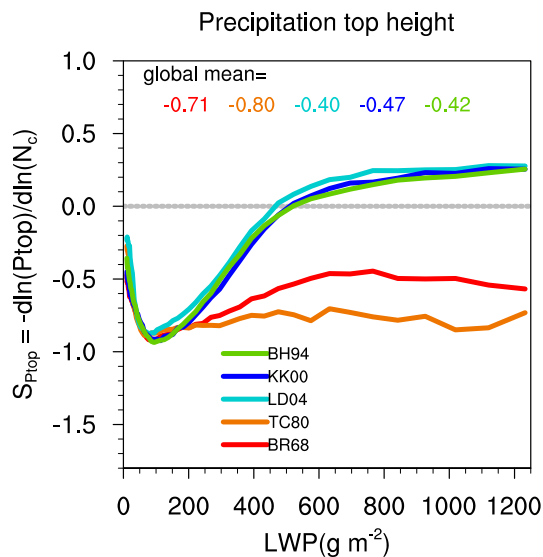


FIG. S2. Susceptibilities of precipitation top height ($S_{P_{top}}$) to cloud number concentration (CDNC) as a function of LWP for different autoconversion schemes. Precipitation top height is defined as the height of the top-most model layer with radar reflectivity > -15 dBZ at each grid point. Also shown are the sample size- and LWP-weighted global mean values which are colored as those of the corresponding lines. Negative $S_{P_{top}}$ suggests precipitation reaches higher altitude with increasing CDNC, and vice versa.