Microphysical sensitivities in global storm-resolving simulations (SRMs)

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In global SRMs that resolve convection explicitly instead of parameterizing it, microphysical processes are now fundamentally linked to their controlling factors, i.e., the circulation. While in conventional climate models the convective parameterization is one of the main sources of uncertainties (and a popular tuning parameter), this role might be passed on to the microphysical parameterization in global SRMs. In this study, we use a global SRM with a one-moment microphysics parameterization and do several sensitivity runs, where in each run we vary one parameter of the microphysics scheme in its range of uncertainty. First results indicate that microphysical sensitivities in global SRMs are substantial and resemble inter-model differences such as in the DYAMOND ensemble. Among the parameters tested, the scheme is particularly sensitive to the ice fall speed and the width of the raindrop size distribution, which both cause several 10s W/m2 variation in radiative fluxes.