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# Sensitivities of a super-parameterization to its grid and microphysics configuration: Results from single-column and GCM studies

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Super-parameterization (SP) is a cloud-resolving component of the CSU Multiscale-Modeling Framework (MMF) based on the NCAR Community Atmosphere Model (CAM). The SP explicitly resolves individual deep clouds and meso-scale cloud systems; however, cloud microphysics is still highly parameterized. It is demonstrated that the radiative fluxes and consequently global climate simulated by the MMF are quite sensitive to bulk microphysics parameters from some "socially accepted" range as well as to the SP grid resolution and domain size. Since it is computationally prohibitive to explore a full range of MMF sensitivities to microphysics and SP grid configuration, sensitivities of a stand-along SP have been explored using prescribed large-scale advective tendencies and surface characteristics similar to the so-called single-column modeling approach. The forcing data was derived from multi-month ARM and TOGA COARE observations. The results of several MMF experiments illustrating the uncertainty range of simulated global climate states that are due to SP grid configuration and uncertainty in the bulk microphysics will also be presented.