

Development and applications of the latest GF parameterization in MPAS

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We will present latest implementations and results from simulations with a version of the GF convective parameterization. Latest inclusion in GF are the positive definite transport of chemical tracers, aerosol awareness, a special RRFS application of scale-awareness, and initial tests with a cold pool parameterization initially developed by Freitas et al (2024). Aerosol awareness in GF changes cloud water to rain conversion as well as the precipitation efficiency (possibly downdraft strength). Scale-awareness discusses the flaws of the scaling approach used by most convective parameterizations as well as proposes some fixes. Initial tests with cold pool parameterizations in GF will focus on impacts on momentum transport. Inclusions will be discussed and some initial results with the improved GF scheme using MPAS will be shown. We will also briefly describe the ongoing new development of the Community Convective Cloud parameterization (C3), based on GF, but expanded to include prognostic area fraction calculations (Bengtsson et al. 2022).