



## **HYMACS, a hybrid mass flux convection scheme for use in non-hydrostatic NWP models**

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Modelling of convection is a challenging task in numerical weather prediction (NWP). On the one hand, a proper forecast is needed to predict severe weather events related to convection. On the other hand, the parameterization of convection may become problematic at small grid sizes as used in contemporary operational NWP models. Classical mass flux convection schemes assume grid sizes much larger than the scale of the convective circulation. Thus, the convective mass transport is closed in the local grid column and no net mass transport occurs on the grid scale.

In NWP models with grid sizes of a few kilometers, where convection is partially resolved, this approach leads to a conceptual problem. We therefore propose a hybrid mass flux convection scheme (HYMACS), in which only the small scale convective up- and downdrafts are parameterized, whereas the treatment of the larger scale environmental subsidence is left to the grid scale equations. Different to the classical schemes, HYMACS produces a net convective mass flux exerting pressure gradient forces to the grid scale model.

We will present real cases of different meteorological situations simulated with HYMACS. As the hosting model we choose the operational NWP model of the German Meteorological Service. The results will be compared to those of classical convection schemes and observational data. We will also discuss the influence of parameterization details in HYMACS and of the chosen grid size.