Contribution ID: **37** Type: **Interactive presentation**

Essentially Lagrangian simulation of clouds using the Moist Parcel-In-Cell (MPIC) model

Wednesday, 5 May 2021 16:00 (1h 45m)

The Moist Parcel-In-Cell (MPIC) model provides an essentially Lagrangian approach to moist convection. In this approach, parcels represent both the thermodynamic and the dynamical prognostic properties of the flow. The parcels have a finite volume and carry part of the circulation and thermodynamic attributes (liquid water potential temperature and total water content).

The representation of parcel properties is fully Lagrangian, but an efficient grid-based solver calculates parcel advection velocities. The Lagrangian approach of MPIC has a number of advantages: thermodynamic properties and their correlations are naturally conserved, and the amount of mixing between parcels can be explicitly controlled. MPIC has also been shown to parallelise well on several thousands of cores. We present results demonstrating the performance of MPIC relative to the Met Office's cloud model, MONC, for a convective cloud moving under the influence of condensation and evaporation.

We also discuss ideas for implementing precipitating microphysics and studying organisation in MPIC. For precipitation, we are planning to build on a framework developed in work by Langhans et al. (J. Atmos. Sci., 2015). For studying organisation, MPIC provides a different perspective from traditional models as it is both essentially Lagrangian and formulated in terms of vorticity.

Primary authors: BLYTH, Alan (University of Leeds); DRISCHEL, David (University of St Andrews); PARKER, Doug (University of Leeds); GIBB, Gordon (EPCC); FREY, Matthias (University of St Andrews); BOEING, Steven (University of Leeds)

Presenter: BOEING, Steven (University of Leeds)

Session Classification: Modelling and Parameterising Deep Convective Organisation

Track Classification: Modelling and Parameterising Deep Convective Organisation