Toward Lagrangian simulations of EUREC4A/ATOMIC cloud regimes

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We discuss the design of Lagrangian simulations based on the EUREC4A and ATOMIC field campaigns. The simulations are informed by both the extensive campaign observations and reanalysis data (using an ensemble of trajectories), with modifications to improve the upstream boundary layer state. The aim is to provide a realistic representation of the atmosphere to study the evolution of cloud regimes, and explore the requirements for and limits of idealised models.

New tools are developed to produce simulation input based on conventions developed in the DEPHY and HIGH-TUNE projects. The case studies are coordinated with a concurrent grey-zone modelling study and target mesoscale regimes with different modes of organisation (e.g. cloud size, cloud spacing, cold pools and detrainment regions). We will discuss sensitivity experiments and possibilities for further extensions of the case design, like including SST heterogeneities, and aim to show a few initial results from large-eddy simulation.