## ECOMIP: A new atmospheric model intercomparison project with

## validation data from EarthCARE and the ORCESTRA field campaign

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Abtract

EarthCARE offers exciting new opportunities for evaluating and improving the representation of clouds, aerosols, precipitation and radiation in atmospheric models at the scale of individual storms. We propose the EarthCARE-ORCHESTRA Model Intercomparison Project (ECOMIP), targeting the period of the ORCESTRA field campaign from Aug. 9 to Sep. 29, 2024. The experimental design is as follows:

- Evaluation of models with EarthCARE data both in observation space using satellite simulators (including radar reflectivity, Doppler velocity and the lidar Mie and Rayleigh channels) and in model space comparing to observed radiative fluxes and retrievals of quantities such as water content, particle size and precipitation rate.
- · Types of experiments:
  - 2-day simulations initialized on each day from Aug. 9 to Sep. 29, 2024 (with some days selected for special focus) to be compared directly to observations on the second day of each simulation
  - Free run through 2-months from Aug. to Sep. 2024 to be evaluated statistically,e.g. using contoured frequency by altitude diagrams (CFADs)

 $\cdot$  Model data will be extracted in a "curtain" underneath EarthCARE, as well as in

a 3D domain in the central Atlantic where the ORCESTRA campaign took place. Currently, we are coordinating about 10 groups that are interested in participating in this MIP. We encourage participants from more groups, including global stormresolving models (resolution better than 5 km), global weather and air-quality models, regional km-scale models and conventional climate models.

In this talk, we present a preliminary analysis using the 3.5 km-mesh simulation by NICAM (Nonhydrostatic Icosahedral Atmospheric Model) with the EarthCARE/CPR observation for a case on Aug. 18, 2025, by comparing cross sections along the satellite tracks and CFADs of radar reflectivity and Doppler velocities. We will discuss how to evaluate vertical mass transport by the CPR Doppler velocity data.