ICMW2020 Pi Chamber: LES done with UWLCM

Piotr Dziekan University of Warsaw

University of Warsaw Lagrangian Cloud Model

- Anelastic LES
- MPDATA for Eulerian advection
- Smagorinsky SGS model for Eulerian fields
- Lagrangian particle-based microphysics (super-droplet method, Shima et al. 2009)
- Details: Dziekan et al. GMD 2019

Boundary conditions

- Arakawa-C grid
- Temperature and vapour content at walls set to predefined values every timestep.
 - Side wall 80% RH to get domain averaged S~3%
- Strong velocity absorber near walls
 - Tweaked to get TKE~5.5e-3 m²/s², in agreement with experiment (Thomas et al. 2019)



Aerosol source

- Aerosol injection starts after 10 min. spinup (total simulation time is 1.5h)
- Aerosols injected in the entire domain
- 1 super-droplet added per cell every 2s
- Injection rates [1 / (cc * min)]:
 6, 18, 60, 180, 300, 600
- Droplet concentrations [1/cc]: 4, 18, 120, 700, 1800, 6500

Results - time series



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Results - profiles at 1.5 h



----- N=4 ----- N=18 ----- N=120 ----- N=700 ----- N=1800 ----- N=6500

Results - DSD at 1.5 h

