

# University of Warsaw Lagrangian Cloud Model (UWLCM)

Institute of Geophysics, Faculty of Physics, University of Warsaw

# UWLCM

- LES with Smagorinsky model for SGS turbulence
- Anelastic approximation
- Lagrangian particle-based microphysics scheme (Super-Droplet Method)

# Modeled domain

Domain size: 2 m x 2 m x 1 m.

Spatial resolution: 3.125 cm.

Time step: 0.02 s.

## Boundary conditions

- Top wall:  $T = -16$  °C, saturated with respect to ice,
- Bottom wall:  $T = 4$  °C, saturated with respect to liquid water,
- Side walls:  $T = -12$  °C, **RH with respect to ice 52 %.**

# CCN

At  $t = 300$  s, we begin CCN injection.

Monodisperse CCN (NaCl particles with hygroscopicity parameter  $\kappa = 1.28$  and dry diameter 125 nm) are **injected at a rate 11  $\text{cm}^{-3}/\text{min}$** . Each super-droplet represents 2 real droplets.

CCN are added uniformly in each grid cell.

# Ice

At  $t = 1000$  s, we begin ice injection.

Spherical ice particles with radius  $2 \mu\text{m}$  injected at rates 0.5, 1.5, 3, 5, 10, 15  $\text{cm}^{-3}/\text{min}$ . Each ice super-particle represents 1 ice particle.

Different fall velocity and relative humidity for ice than for droplets.

Ice particles are added uniformly in each grid cell.