

Project: 1086

Project title: High-resolution modelling around supersites for cloud and precipitation observations

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Report period: 2021-05-01 to 2022-04-30

During the reporting period we focused on 4 topics, which are still ongoing work. Respective publications are in preparation, but not yet submitted or published. We would like to continue the started work and analysis during the upcoming period.

Simulations for the analysis of measurement campaigns

Typical airborne campaigns cover a time periods of 4 to 6 weeks, but typically only 10-20 days are selected for flights and measurements. Our aim is to investigate how strongly this subsampling is influencing the results and conclusions taken from such campaigns. To investigate this subsampling, we started to simulate the whole time period for 3 campaigns (ACLOUD 2017, AFLUX 2019 and MOSAIC-ACA 2020). All campaigns took place in a region close to Svalbard. During this reporting period, we managed to finish the simulations for the ACLOUD campaign. More simulations are planned for the next period.

Instrument simulator for comparison

In order to compare model output with modern measurements, it is important to bring both into the same parameter space. For this an instrument simulator can be used, which uses the model output and calculates observable quantities. During the reporting period, we performed several simulations to compare observed and simulated water vapor in the Arctic region. As the computational demands for those instrument simulations are higher than expected, a separate proposal will be submitted to continue these calculations. A respective publication is in preparation.

Simulations for three arctic supersites

We started to perform high-resolution simulations (600 - 50 m) around three arctic supersites (Ny-Ålesund (Svalbard), Utqiagvik (Alaska), Polarstern (Ship, central arctic)) to evaluate the ICON-LEM simulations under these three different conditions and to identify differences and common features and processes. The analysis is ongoing and a publication will be prepared during the next year.

Forecast simulations for HALO-(AC)³

In March/April 2022 the HALO-(AC)³ campaign took part in the arctic region with three aircrafts (2 in Svalbard, 1 in Kiruna (Sweden)). We performed continuous high-resolution (2 km and 600 m) forecasts to support the flight planning and provide first simulations for quick comparisons. These forecasts were especially important to provide information on air mass transport for lagrangian flight pattern and on the evolution of small scale features. An analysis on these simulations and their prediction skill is ongoing. Computing time for more specific simulations will be requested for the upcoming time period.