

Project: 1086

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

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Report period: 2025-05-01 to 2026-04-30

Mixed-phase clouds at Ny-Ålesund

We performed several sensitivity studies for the influence of CCN and IN assumptions on the evolution and representation of mixed-phase clouds at Ny-Ålesund (Svalbard). For this study the existing dataset was sorted for different cloud types, seasons as well as polluted and clean days. Additionally, also the assumptions of background CCN and IN have been scaled to represent clean, average and polluted situations. The evaluation is still ongoing and we need to perform some more simulations to complement the study and variety of different situations.

Mixed-phase clouds and sea-ice interaction during ship campaign

Some first prototype simulations have been performed, but due to several reasons - personal, technical issues as well as priority of other projects (e.g. the CCN / IN sensitivity study), we didn't get as far as we hoped for these simulations. Still, the comparison will be very interesting and would allow us to investigate the persistence of mixed-phase clouds as well as Arctic haze in detail. For this reason, we would like to continue the effort in the upcoming year.

Local wind systems and their influence on urban heat islands in the Rhinearea

The hiring process of an interested student focusing on urban heat islands in the rhinearea got unfortunately delayed. None the less, we are looking forward to the remaining two month being the beginning of another summer period and hopefully bringing some interesting case studies. We will also use the remaining time to simulate previous heat periods e.g. in July 2022 to compare with existing datasets as detailed observations and bulding resolving simulations on m-resolution.

Additional simulations

This project additionally supported some simulations for older and recent airborne campaigns by making use of the newly developed ComIn plugin that allows to apply the instrument simulator PAMTRA during the ICON simulation. By this output with a very high time frequency can be created along e.g. flight- or shiptracks which enables a comparison to observational data on similar timesteps. Additionally it allows an estimate of the variability along a flight track which gives the possibility to put the obsevatonal snapshots into a broader context.

Furthermore a new region was explored by intensive evaluation of simulations around the Lindenberg measurement sites. These simulations and evaluation were preparing further studies within the c3sar researchgroup and will - in the future - be moved to the corresponding research project / proposal.