Project: **1100** Project title: **Climate model PArameterizations informed by RAdar** Principal investigator: **Johannes Quaas** Report period: **2020-11-01 to 2021-08-31** Text: maximum of two pages including figures.

The work consists of the two research axes in the sub-project on the GCM parameterisations PARA, which focused on the ICON-A GCM; and the sub-project on ground-based radar observations vs. ICON-NWP in the PICNICC sub-project.

In both axes, the evaluation of the simulations with observational data plays a large role. Unfortunately, in the reporting period, the modelling studies were hampered severely by trouble in making observations and model results consistent. For this reason, the planned works are not yet performed but are expected to be conducted in the remainder of the year.

The GCM work on PARA progressed further in particular in terms of the evaluation using observational data. A large effort was necessary to make the satellite-retrieved and the simulated ice number and mass consistent. The work focused thus mainly on the observational data and examined simulation output from simulations already conducted in the past reporting period. In particular sensitivity studies assessed which aspects of the scatterers (excluding, one-by-one, deep convective clouds, various precipitation hydrometeors, and combinations thereof) were consistent, and which not, with the retrievals. Fig. 1 shows the final meaningful result. The fact that the comparison to the observations was much more complicated than anticipated led to shifts in the planned work programme. The planned assessment of precipitation melting and evaporation is still ongoing and subject of the work planned for the remainder of 2021.

References

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Figures



Fig. 1. Ice water content (IWC, g kg⁻¹) from model output. Top: total ice water content, bottom: ice water content excluding the clouds and precipitation that are not visible to the radar-lidar retrievals.