The Arctic Regional Reanalysis of the Copernicus Climate Change Service

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We will present status and plans for the Arctic regional reanalysis of the Copernicus Climate Change Service (C3S) project: C3S project 322 Lot 2. The project aims to produce an Arctic regional reanalysis over two subdomains of interest for climate change processes and economic activities. The reanalysis will cover the period 1997 - 2021 with a horizontal resolution of 2.5 km. Additionally, a proof-of-concept for a pan-Arctic reanalysis will be provided for a period of 1-year.

The system to be used is based on the HARMONIE-AROME Numerical Weather Prediction (NWP) system, with additions and configuration choices for reanalysis purposes with that system. Global reanalysis data from ERA5 will be used for lateral boundaries.

Development activities connected to the system includes work on the data assimilation setup, 3D-Var background error statistics and uncertainty estimation. The Arctic reanalysis will add value to the global reanalysis by providing higher-resolution and by using regional data not used there. The upper air assimilation will use conventional observations and, since there are gaps in the conventional observing system, will put emphasis of using satellite datasets which have good coverage in the Arctic. This will include important parts of the satellite observing system such as microwave and infrared radiances, atmospheric motion vectors, scatterometer winds and radio occultation data. Handling of "cold surfaces" in the surface scheme, such as snow, sea ice and glaciers, which are important in the Arctic, will also receive special attention with the aim to give a better representation than in the global reanalysis.

A main milestone will be the start of the reanalysis production, which is planned to take place in April 2019, and the reanalysis dataset will then be continuously updated to provide a complete 24 years' time series before the end of the project.