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AROME-Arctic: New operational NWP model for the Arctic region

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In the frame of the EU-funded project ACCESS (Arctic Climate Change, Economy and Society), MET Norway aimed 1) to describe the present monitoring and forecasting capabilities in the Arctic; and 2) to identify the key factors limiting the forecasting capabilities and to give recommendations on key areas to improve the forecasting capabilities in the Arctic.

We have observed that the NWP forecast quality is lower in the Arctic than in the regions further south. Earlier research indicated that one of the factors behind this is the composition of the observing system in the Arctic, in particular the scarceness of conventional observations. To further assess possible strategies for alleviating the situation and propose scenarios for a future Arctic observing system, we have performed a set of experiments to gain a more detailed insight in the contribution of the components of the present observing system in a regional state-of-the-art non-hydrostatic NWP model using the AROME physics (Seity et al, 2011) at 2.5 km horizontal resolution – AROME-Arctic.

Our observing system experiment studies showed that conventional observations (Synop, Buoys) can play an important role in correcting the surface state of the model, but prove that the present upper-air conventional (Radiosondes, Aircraft) observations in the area are too scarce to have a significant effect on forecasts. We demonstrate that satellite sounding data play an important role in improving forecast quality. This is the case with satellite temperature sounding data (AMSU-A, IASI), as well as with the satellite moisture sounding data (AMSU-B/MHS, IASI). With these sets of observations, the AROME-Arctic clearly performs better in forecasting extreme events, like for example polar lows. For more details see presentation by Randriamampianina et al. in this session.

The encouraging performance of AROME-Arctic lead us to implement it with more observations and improved settings into daily runs with the objective to substitute our actual operational Arctic mesoscale HIRLAM (High Resolution Limited Area Model) NWP model.

This presentation will discuss in detail the operational implementation of the AROME-Arctic model together with post-processing methods. Aimed services in the Arctic region covered by the model, such as online weather forecasting (yr.no) and tracking of polar lows (barentswatch.no), is also included.