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Use of precipitation radar for improving estimates and forecasts of precipitation estimates and streamflow

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Good knowledge about real-time precipitation analyses and forecasts is very important for flood forecasting, inflow prediction, hydropower energy scheduling, energy trading and economic decision making. The RadPrO project aims to develop a state-of-the-art up-to-date NWP model and tools for fast access to real-time best estimate (analyses) and forecasts of precipitation. Also, the developed tools applied to radar and surface rain gauge observations back to 2012 will provide opportunities for calibration of hydrological models. Expected outcomes of the project are:
(i) Improved operational NWP model: In close collaboration with High Resolution Limited Area Model (HIRLAM) group, developing an up-to-date four dimensional and flow-dependent assimilation scheme capable of using half-hourly radar observations. This means the new scheme will use 48 radar scans per day instead of 8 currently.
(ii) Improved real-time analyses: Combined information from radar measurements, in-situ observations, and weather model output will be used to optimally estimate the last hour of precipitation. The output will be hourly estimates on a 1 km resolution grid for all of Norway. This process is repeated every hour giving the best possible real-time input for end-users.(iii) Improved historical analyses: The same technique described above will be applied to historical data back to 2012, which is the time period that HARMONIE-AROME output is available in MET Norway's archive. This will provide the best possible historical input for calibrating hydrological models.
(iv) Improved post-processed forecasts: Forecasts from the NWP model will at any point in time be 2 to 8 hours old. With frequently updated analyses, the NWP forecast output can therefore be statistically updated every hour such that end-users always have the best forecast estimates available.
(v) Consistency between analyses and forecasts: Traditionally the production of analysis and forecast products has been done independently, resulting in products with different meteorological characteristics. RadPrO will introduce the co-production of analyses and forecasts in such a way that their characteristics are much more similar. This is important to hydrological modeling where the data that models are calibrated against (analyses) are consistent with the data used in real-time prediction.
(vi) Systematic evaluation of forecasting performance: The performance of both precipitation and streamflow forecasts will be assessed, and criterions that focus on the specific end user needs will be used in the evaluation.

The presentation will give an overview over the work packages in the RadPro project, and present some preliminary evaluations on using radar precipitation products in hydrological modelling. Both the average performance and the performance of the hydrological models for specific events and catchments will be discussed.