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Rapid Refresh Nowcasting with the Harmonie-Arome model

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There has been recently an increasing interest in the high-frequency short-range weather forecast by the wind and solar energy sectors, as well as aviation worldwide. In the wind and solar energy community, the ramp prediction in which the power rapidly increases and decreases over a short period of time has a high value as it is both a cost and reliability concern. The prediction of near-future meteorological information for aviation is also important for the terminal and en-route environment. MET Norway in collaboration with METCOOP has developed a numerical weather prediction (NWP) based rapid refresh nowcasting with the Harmonie-Arome model to provide more timely and more accurate weather forecasts for up to 6 hours ahead in time. The nowcasting model is primarily based on MEPS, an ensemble meso-scale operational NWP model with collaboration between Norway, Sweden, and Finland. It issues forecasts four times per day with a lead time of 66 hours, at a horizontal grid spacing of 2.5 km, with 65 vertical levels where 10 levels are below 100 meter. The nowcasting tool is updated every hour with no cycling, uses the first guess and the lateral boundary from MEPS, and its assimilation window is -30/+15 minutes. It is shown that the nowcasting perform better than the forecast model mainly because it is more frequent, 2-7 hours more timely, and assimilates fresher observations. Finally, the verification is carried out against the wind speed observations at 100 meter from a wind mast in the nowcasting domain. The results show that for this wind mast the better performance of the rapidly updated nowcasting tool is seen in the wind change forecasts for the 2 hours ahead.