Data assimilation for an operational nowcasting tool

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In the Basque Meteorology Agency (EUSKALMET), numerical weather prediction (NWP) models, adapted to the particular characteristics of the territory, are executed daily for many different purposes. In order to improve nowcasting and forecasting tasks, a WRFDA base data assimilation tool, was implemented. Assimilation of meteorological data combines the information provided by measured data with the information coming from numerical models, supplying the numerical representation more consistent with observations.

Working with continuous assimilation-forecast cycles of the assimilation system allows constant updating of limited area forecasts, improving nowcasting tasks, especially severe weather events. Nowadays, the tool is being executed routinely in operational basis. The assimilation system includes several datasets from different sources (surface and upper air data), available in the forecast domains: RAOB soundings, SYNOP, Buoy, METAR, Automatic weather stations and Radar. The Basque Country Weather Mesonet, managed by EUSKALMET, is a high-density network with more than 100 Automatic Weather Stations (AWS), representative of a territory of complex orography such as the Basque Country. Some observations registered in this network (ten-minute data) are included on the Data assimilation system. Euskalmet Radar is a METEOR 1500 Doppler Weather Radar with Dual polarization capabilities located on Kapildui mountain top (1174 m). Two volumetric scan are available each 10 minutes (range 300 km in reflectivity mode, range 150km in Doppler/Reflectivity mode). Reflectivity data is included in assimilation cycles.

The objective of this paper is to present the assimilation system included in the tool and to explain the results of some sensitivity experiments during high-impact weather events, to test the system’s skill nowcasting extreme weather events. We present different validation analysis based on punctual and areal approaches. With a special focus on the use of datasets from the Basque Country Automatic Weather Station Mesonetwork and the available radar data.