Use of satellite observations for weather radar quality control improvement

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In this work we present a weather radar validation and quality control method based on the use of EUMETSAT Nowcasting Satellite Application Facility (NWC-SAF) products derived from Meteosat Second Generation observations. Firstly, we compare the radar data with the parallax corrected precipitating clouds and the cloud type products. This is an essential step to ensure collocation of weather radar and satellite pixels. Then, radar echoes are characterized according to six different cloud types and four different rain thresholds. The method is demonstrated with a temporal and a spatial analysis of results over one year of observation through the Creu del Vent C-band Doppler radar of the Meteorological Service of Catalonia (NE Spain).

We present a precipitation distribution observed by the radar according to the cloud type and the precipitating threshold. This allows us to evaluate the radar capacities of precipitation detection in certain areas and under a wide range of conditions. Finally, we analyze the results, strengths and limitations of the methodology by means of the five verification indices FAR, HKS, ACC, BIAS and POD. The method provides promising results, it is well suited for operational application and can be easily implemented in other weather radar data production chains.