



Verification of heavy rain warning in Catalonia

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Catalonia, situated in the northeast of Iberian Peninsula, is characterised by high variability in storms. Heavy rainfall is registered quite often, almost in all the territory and in a wide period, almost from March to November. The SMC is responsible of issuing weather warnings since 2001, these warnings account for the peril in the 42 Catalan counties. The Catalan Civil Protection Centre determines the vulnerabilities in each situation for each municipality. The SMC is working to verify the weather warnings issued to determine the accuracy of the forecast. As a first step, statistics such as POD, FAR and CSI were calculated. However, this information was uncompleted. A further step was to write a verification report. Nowadays, an objective verification system is underway. The main objective of the new rainfall warning verification system is to provide a score for each county and day. First obstacle to overcome is observation. The SMC has 187 automatic weather stations (AWS). However, due to the storm dimensions, the probability to register the intensity is very low. Moreover, in some counties, mainly far from cities, the density of AWS is low. To minimize these problems a group of stations is associated to a county: the ones that belong to it and the ones that are closed to it with similar climatology. The score to evaluate the forecast accuracy is estimated considering how far or close is forecasted the value of rain intensity from the observations. Its range is from -6 to 6 (highest negative values account for false alarm and highest positive ones for missed, values between -3 and 3 are hits or quasi-hits). The score matrix is built as follows: rows correspond to different interval of rainfall and columns are warning levels (from 1 to 6 levels). So, a value is obtained for each day. Another source of data to estimate rain intensity is the rainfall derived from 30-minutes radar products calibrated with AWS. Some interesting results have been obtained. The 1/6 warning level seems to be more similar to a “watch” rather than a “warning”. It is employed too often when in fact a 2/6 could be a better forecast. Another result is that the afternoon update has lower scores in general. Also, it has found that the distribution of the scores by counties shows an overuse of yellow warnings around the area affected by heavy rain.