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Wind gust thresholds related to social impact in Catalonia: analysis by regions based on 10 years of report requests (2006-2015)

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Social impact studies under the HYMEX project determined that requests connected to insurance claims that are received in meteorological services are a good proxy indicator of the social impact of severe weather events. In the Meteorological Service of Catalonia (SMC), during the period 2006-2015, an average of 4362 requests per year were received. These requests and their associated meteorological values allow the investigation of when damage begins happening. This is a key factor in issues like the accuracy of warning thresholds. In this study, the wind gust values related to report requests have been analysed to gain knowledge of which of them have an impact.

In total, 10211 gust speed values have been analysed, related to requests received during the studied period. The median for all Catalonia is 81.4 km/h, and about 2/3 of the requests have associated values between 60 km/h and 100 km/h. In Catalonia, until August 2017, the warning threshold was 90 km/h. Consequently, these first global results confirm that it was too high. On the other hand, the results by county indicate remarkable differences between areas.

A cluster analysis has been carried out for grouping areas with a similar response regarding the first gust speeds that cause an important damage. As a result, three groups have been suggested: the first one corresponds to the areas which have the lowest gust speeds, and also correspond, in general, to populated areas. The second group is constituted by counties with medium speeds and counties with high speeds at high altitudes, which are very sparsely populated. The third one corresponds to populated counties where high values of gust speed take place.

For each group, the values of percentiles 25, 50 and 75 have been extracted and their rounded values have been proposed as different levels of thresholds (L1, L2 and L3). The L1 for each group is 65 km/h, 75 km/h and 80 km/h, respectively.

Finally, using the events occurred during 2016, the proposed thresholds have been evaluated and contrasted with the current ones valid in the operational warning system of the SMC. Two basic criteria have been taken into account: 1) they shouldn't be too high, so that a high number of requests should be matched with the exceedance of the threshold, and 2) they shouldn't be too low, so that the overcome of the threshold has, as a consequence, some impact in requests. As an example, the L1 (65 km/h) for the county where the city of Barcelona is located, was exceeded 8 days, and all 8 days had at least one request, which suggests that the L1 is not too low for this county.