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Considerations about gust wind thresholds related to social impact: study of different regions in Catalonia

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Severe weather events can cause several damages on a territory and its population, affecting urban infrastructure and housing, among others. In particular, wind is one of the most important phenomena which cause remarkable economic losses.

Since 2008, different studies conducted by the Social Impact Research Group, in the frame of HYMEX project, determined that requests related to damage claims which are received in Meteorological Services are a good proxy indicator of social impact. However, the strong wind studies took into account a unique threshold, which proved to be insufficient. It was found that it was necessary to define a threshold for each area, according to its vulnerability and exposure.

Therefore, the aim of this study is to define, for each county in Catalonia, thresholds of gust wind speed for which a remarkable social impact is observed. To accomplish this, the database of requests received in the Meteorological Service of Catalonia (SMC) between 2011 and 2015 has been used. For each request, the most representative automatic weather stations are associated.

Statistical treatments of the gust wind data recorded by these stations have been carried out in order to determine which values are related to social impact. As an example, one of the first results shows that in a populated area like Barcelona, the average gust is approximately 70 km/h. On the contrary, in other less populated counties and usually more exposed to strong winds, the mean is over 85 km/h. Besides, the relation between gusts and requests has been analyzed to detect significant slope changes. In general, it has been detected an increase of requests at certain gust wind values.

These results, which vary depending on the region's vulnerability and exposure, could be used to establish new thresholds for Civil Protection alarms. Therefore, a higher accuracy by region will be reached.