



Analysis of the intensity of rainfall events in Barcelona during 2011 and their social impact

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Since 2008, the Social Impact Research group has carried out several studies on the social impact of weather events using the requests received in Meteorological Services as a proxy indicator. First, a cumulative index (CI) was established, taking into account the following factors: maximum precipitation in 24 h, population affected by rainfall exceeding 60 mm, length of the event and coincidence with a strong wind event. The events with a higher number of requests should have a greater CI. Then, the following studies were aimed at improving the CI, as other factors had stood out as crucial. Because hazards are often magnified by urbanization, a lower threshold was suggested for municipalities exceeding 10,000 inh/km². On the other hand, some factors that were included in the CI proved to be less significant, such as the length of the events and the coincidence with a strong wind event. Therefore, their importance was reduced, and a better adjustment was achieved.

The present study aims to improve the CI, focusing on the precipitation intensity. In order to achieve a better knowledge of the influence of this specific factor, only the rain events occurred during the year 2011 in the city of Barcelona have been analysed. Therefore, we can consider no changes in the population density or the urbanization during this period. The first results confirm that the threshold of 60 mm is too high for densely populated areas, as the rain event that had the biggest number of requests in Barcelona did not reach that threshold. Thus, the threshold of 40 mm in 24 h has been taken into account to select rain events. Applying this criteria there were eight events in 2011 in Barcelona. For these events, intensity as precipitation in 30 minutes has been considered. The first preliminary results show that the rainfall intensity needs to be included in the CI, as there is a clear correlation between that factor and the number of requests. Accordingly, this new factor is added to the index, using IDF curves for building categories of rainfall intensity. After that, a better adjustment of the CI should be achieved.

Future work will be aimed at applying the CI to more events and checking its accuracy. As it has been concluded in previous studies, it is necessary to define areas which have different responses to the same meteorological hazard. Hence, some of the CI factors will depend on the affected area. A major challenge is to optimize emergency management in collaboration with civil protection department.