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## Analysis of flooding events in the Pyrenees and adaptation measures

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Floods are the natural phenomenon that causes more victims worldwide and is probably the most devastating, widespread and frequent natural disaster in society. According to the IPCC, the frequency and magnitude of extreme flooding is likely to increase as a result of the water-holding capacity in a warmer atmosphere. An increase in flooding events requires the development of appropriate adaptation measures that are based on sound scientific knowledge and assessments based on the analysis of extreme flood events, in order to carry out hazard zoning and design of structural and non-structural measures to reduce risk levels.

Due to the above, different databases have been developed in Europe with documented information (affected areas and damage) and instrumental information (meteorological and hydrological records) that integrate the Geographic Information Systems (GIS), with the aim of providing an efficient way of representing the information and a useful tool for its analysis.

The PIRAGUA project addresses the characterization of the hydrological cycle in the Pyrenees region, which includes three countries, France (Nouvelle-Aquitaine and Occitanie), Spain (Basque Country, Navarre, Aragon, and Catalonia) and Andorra. This summary presents the main results for one of its objectives, which consists on the analysis of the impact of floods in the Pyrenees, especially on water resources, and the design of the most suitable adaptation strategies. In a first phase, a database of floods was developed, which includes meteorological data, caused impacts, affected areas and the classification of the event according to the impact (ordinary, extraordinary, and catastrophic) for all the Pyrenean massif covering the period 1981-2015, starting from different databases and information sources of each one of the regions. The results show that at the level of the massif there have been 181 flood events, of which 128 have affected Spain, 43 France and 46 Andorra. Of these, 34 have been cross-border and have affected more than one region. Similarly, trend analysis has shown an increase in flood events that have caused significant damage (extraordinary and catastrophic) due to an increase of such events in Aquitaine, Occitanie, Andorra and Catalonia.

On the other hand, all flood events have been characterized with pluviometric data from the daily rainfall gridded dataset generated by SAFRAN. This has made it possible to carry out a statistical analysis and identify the precipitation thresholds associated with the different types of floods.

Similarly, SAFRAN has been used to corroborate the flood events in the database and identify possible flooding episodes not included in the historical records. These results and the identification of the municipalities that have historically been most frequently affected by flood events are a starting point for the analysis and creation of more efficient adaptation measures.