

A review of early warning systems for Civil Protection in Sardinia

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Urban floods have received increasing attention from the scientific community mostly because they can potentially produce damages to people, properties and economic activities. Beside structural measures, early warning procedures are essential to reduce residual risk. In Italy, such procedures are managed by the Department of Civil Protection and combine quantitative precipitation forecasts with a set of rainfall thresholds which in turns are related to different levels of expected damages.

The reference thresholds are usually established through the analysis of long-term rainfall records and their effects in terms of produced damages. Then, for sake of simplicity, these thresholds are given as a function of return periods and rainfall duration.

In this study, we revised the rainfall thresholds systems of the of Sardinia Region (Italy). Using historical rainfall data and exploiting textual info from local journals from the 2010-2020 period we studied the interlinks between climatic forcings and induced damages (in terms of areal extension and severity). In particular, we argued on theoretical distributions of false alarms (FA) and missed alarms (MA), fitting on real observations. Rainfall thresholds have been then determined by minimization of an objective function defined by a weighted combination of the FA and MA functions.