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The role of citizen science to assess the spatiotemporal pattern of rainfall events in urban areas: a case study in the city of Genoa, Italy

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Short-duration and high-intensity rainfall events in the Mediterranean region, enhanced by climate change, produce floodings in cities characterized by a limited extension of the urban catchment area, a high percentage of impervious surfaces and the inefficiency of the urban drainage system. In the present work the historic center of the city of Genoa (Italy) was assumed as a case study. In this area, the spatial variability of intense rainfall events is significant, even across a limited portion of the territory as demonstrated by analysing five rainfall time series (12 years of data) recorded at high-resolution from authoritative rain gauges.

A specific rainfall event that produced floodings on August 27th - 28th, 2023, is analysed with particular focus on the synoptic and mesoscale analysis and assessing the contribution of citizen science rain gauge stations (provided by Acronet network, see e.g., Fedi et al., 2013) to detect the magnitude and spatial distribution of this event. The comparison between cumulated rain as recorded by the authoritative and citizen science networks shows that the convective nature of the phenomenon results in extremely diverse effects on the territory with very localized intense showers.

The introduction of citizen science observations allowed a better understanding of the spatiotemporal structure of the investigated rainfall event that caused flooding in the study area. In the future, a more structured use of this information, associated to appropriate validation procedures, can provide a fundamental contribution to risk management in densely urbanized areas such as the historic centers of many Mediterranean coastal cities.

Fedi, A., Ferrari, D., Lima, M., Pintus, F., Versace, C., Boni, G., (2013). The "ACRONET paradigm", an "open hardware" project. *Open Water Journal*, 2(1), 7.

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