

Insights in the rainfall dynamics preceding and during the 29 October 2024 Valencia floods using rainfall observations from personal weather stations.

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On 29 October 2024 torrential rainfall exceeding locally 300 mm within less than 24 h, triggered devastating flash floods in the province of Valencia in Spain. Rainfall sums equivalent to more than half a year's total precipitation occurred within just a few hours. In this region, more than 200 low-cost weather observation devices, referred to as personal weather stations (PWSs), are located. The network density of PWSs in this region is seven times higher than that of the Spanish Meteorological Agency (AEMET), being able to provide more detailed insights in the rainfall dynamics. Another advantage is that rainfall observations from PWSs have a high temporal resolution (~5-min) and are available near real-time for everyone.

In this study we used rainfall observations from PWSs to get local insights into the rainfall event of October 29. Several PWSs measured already more than 180 mm of rainfall in parts of the Magro catchment (1661 km²) in the morning, consequently generating a flash flood in the upstream parts of this rapidly responding catchment. Areal rainfall maps, based on interpolating the PWS data, indicated daily catchment averaged rainfall sums exceeding 150 mm d-1 across an area of more than 2500 km². Daily rainfall sums recorded by the PWSs showed a slight underestimation of the rainfall with a bias of 4% and a high correlation ($r = 0.94$) when compared to reported rainfall from AEMET.

This presentation shows the relevance of utilizing PWSs for near real-time rainfall monitoring and potentially flood early warning systems.

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Yes

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