



## **Hindcast high-resolution simulation of the most catastrophic rainfall event in Genoa City (7-8 October 1970): hydro-meteorological and geomorphological analysis**

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Liguria region is historically affected by severe hydro-meteorological events often resulting in dramatic death tolls and large socio-economic impacts. On 7-8 October 1970, Genoa, region capital city, was struck by the most catastrophic flood event of its history. On the evening of 7 October pre-frontal storms affected the western side of the city (Voltri, Prà and Pegli municipalities), while on 8 October 1970 an anticyclone block generated recurring convective systems that hit Genoa city and above all the Bisagno Valley. The heavy rainfall continued more than 24 h with highs at Bolzaneto rain gauge (Polcevera Valley, northwest of Genoa city center) where over 950 mm of rainfall in 24 hours was measured. Over the city center and the Bisagno Valley, 400 mm in 24 h was recorded. The Bisagno stream channels overflowed, submerging the city center. The 1970 event in Genoa City was also the most dramatic in terms of damage: 44 fatalities occurred and over 2000 individuals were evacuated.

This study hindcasts the meteorological evolution of this event at high spatial resolution (1.5 km) and temporal one (1 hour) using the Weather and Research Forecasting (WRF) model by downscaling the ERA5 climatology developed by European Center for Medium-Range Weather Forecast (ECMWF). The weather hindcast scenario is compared with available meteorological observations as well as with recorded geomorphological impacts on Genoa city center and municipalities.