



## **Raganello Creek (Calabria, Italy) flash flood on August 20, 2018: Preliminary results**

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Due to its particular position in the middle of the Mediterranean Sea and its complex and steep orography, the Calabrian peninsula (southern Italy) is frequently affected by severe precipitation events and is particularly prone to significant ground effects. In the early afternoon of August 20, 2018, a storm cell caused a flash flood that affected the small Raganello Creek, in the northern side of the region, causing 10 casualties at the outlet of the Raganello Gorges, where the extension of the catchment is about 100 km<sup>2</sup>. Though the regional monitoring network is rather dense, in the surroundings of the disaster site rain gauges were not able to measure the very intense and highly localized rainfall. However, the three-hour Surface Rainfall Total (SRT) provided by a single polarization Doppler radar of the Italian National Radar Network showed a storm cell with rain peaks of the order of 70-100 mm/hour in a small mountain area not covered by the monitoring network.

The objective of this work is to evaluate the ability of the state-of-the-art meteorological/hydrological modelling in simulating the Raganello Creek event using both one-way and fully-coupled approaches, by means of the WRF/WRF-Hydro modelling system.

The Advanced Research WRF (ARW) Model, version 3.9.1 is used with two one-way nested domains at the resolution of 10 km and 2 km respectively, while the resolution of the hydrological model, based on WRF-Hydro version 5.0, is 200 m. The initial and boundary conditions are provided by the ECMWF's Integrated Forecasting System (IFS), in its deterministic forecast version at 9 km resolution. Several WRF simulations have been carried out, before choosing the best configuration, to test the impact of the initial conditions, horizontal resolutions and parameterization schemes.

Results show that the model, particularly in its fully-coupled version, is able to predict reasonably well the occurrence of the event both in terms of rainfall, thus identifying the storm cell, and in terms of hydrological impact, reproducing timely what might have been (unfortunately, observed runoff is not available) the event hydrograph.