

The role of spatial and temporal scales in defining the magnitude of flash flood events: analysis of the 9th October 2014 event in Genoa.

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On the 9th October, 2014 a strong event hit the central part of Liguria Region producing disastrous consequences to the city of Genoa. The Bisagno Creek flooded causing one death and lots of damage. The precipitation field responsible for the event had peculiar spatial and temporal characteristics that led to an unexpected flash flood. The temporal sequence of rainfall intensities and the particular severity of rainfall showers at small temporal scale, together with the size of the sub-basin hit by the most intense part of the rainfall were the unfortunate concurrent ingredients that led to an “almost perfect” flash flood. The peak flow was estimated to be a 100–200 years order return period.

The effects of the spatial and temporal scales of the precipitation pattern were investigated coupling a rainfall downscaling model with a hydrological model setting up an experiment that has a probabilistic approach. Supposing the correct estimate of the volume of precipitation at different spatial and temporal scales, the experiment provided the probability of generating events with similar effects in terms of streamflow. Furthermore, the study highlighted the importance of the goodness and reliability of the forecasted rainfall field, not only for the rainfall volume but also for the spatial and temporal pattern, in order to produce the observed ground effects in terms of streamflow.