



Combining open channel and sewer system network modelling to develop the Hydraulic Risk Management Plan for Brescia (Northern Italy)

Giovanna Grossi, Francesca Berteni, Arianna Dada, and Paolo Leoni
Università degli studi di Brescia, DICATAM, Brescia, Italy (giovanna.grossi@unibs.it)

Flood risk management is one of priorities set by the European Union to protect population and assets. In a very recent report of the European Environment Agency dealing with urban adaptation to climate change (EEA, 2020), extreme weather events (heatwaves, heavy precipitation, flooding and droughts) are expected to cause the most pronounced impacts in European cities, besides vector-borne diseases. Italian regions are tackling flood risk management also by setting regulations on the runoff production in urban areas.

According to a recent regulation approved by Regione Lombardia municipalities are requested to prepare the Hydraulic Risk Management Plan, including measures to ensure compliance with the principle of the 'hydraulic' and 'hydrological' invariance for the urban area, in which runoff volumes generated by an intense meteoric event must remain unchanged or at least must be limited. The idea arises from the need to manage the rainwater drainage in urban contexts, where the existing sewerage system has been designed based on an inadequate return time period.

The planning activity requires a modelling framework accounting for both the open channel network (mainly addressing irrigation demand) and the sewer pipe network. While separate hydraulic models might help the management provided by separate authorities, an integrated model is ensuring a complete representation of the system hydrodynamics. This type of model is characterized by a much more complex structure which requires greater data accuracy for the construction and calibration of the model in order to obtain realistic results.

Some critical issues are being presented for Brescia, a town located in Northern Italy, at the foothills of the Alps. Potential flood risk is linked to the dense historical irrigation and drainage channels network that cross the urban area from north to south and the old city centre. Critical areas are those hosting the post-war urban development where the waterways have been uncovered and covered in a chaotic and uncontrolled way, in some cases even under houses and other buildings.