A unified framework for the assessment of multiple source urban flash flood hazard: the case study of Monza, Italy

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Objectives of the first part of NEWFRAME

- Flood maps due to overflows from rivers and urbain drainage systems with different return periods (T from 10 to 200 years)
- Water levels and velocities in flood events

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Case study

Reasons for the choice of Monza

➢ Complex and representative case study
➢ Exposition to twofold floods

Monza by the river Lambro and its channel Lambretto
Lambro has a catchment of 1,350 km² and is a tributary of the river Po
Overflows from the river Lambro mainly in October and November

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The two typologies of flood are asynchronous

They can be analysed in a decoupled way
Data collection

Cross sections and hydrographs from AdbPo projects

Orthophotos, DTMs, soil use maps from Geoportals

Historical series of rainfall from ARPA

Data concerning the elements of the urban drainage system from Brianzacque

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Flood due to overflows from the river: some results

Simulation of the historical flood in the year 2002 (return period of about 70 years)

Reconstructed hydrograph at the entrance of the city

Flood levels in the territory of Monza
Flood due to overflows from the river: some results

Results about flood levels in the city for three different hydrographs for the river Lambro at the entrance of the city

T=10, 100 and 200 years
$T_r = 10 \text{ years}$

$T_r = 100 \text{ years}$

$T_r = 200 \text{ years}$
Flood due to overflows from the urban drainage system: some results

Results about flood levels in the city for three different hyetographs in the city

$T=10, 100$ and $200$ years
$Tr = 10 \text{ years}$

$Tr = 100 \text{ years}$

$Tr = 200 \text{ years}$
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Conclusions

Two modelling chains were set up

- Hazard maps were constructed for three return periods
- Flooding due to river overflows is larger and more hazardous
- Input to the second part of the project, related to risk assessment