SOUTH EAST EUROPE
Transnational Cooperation Programme

Danube FLOODRISK

Programme co-funded by the EUROPEAN UNION

Work Package 3 – Act.3.1
Harmonisation and joint definition of requirements
National Requirements in Italy for flood hazard maps and flood risk maps

Italian Requirements, Methods and Data

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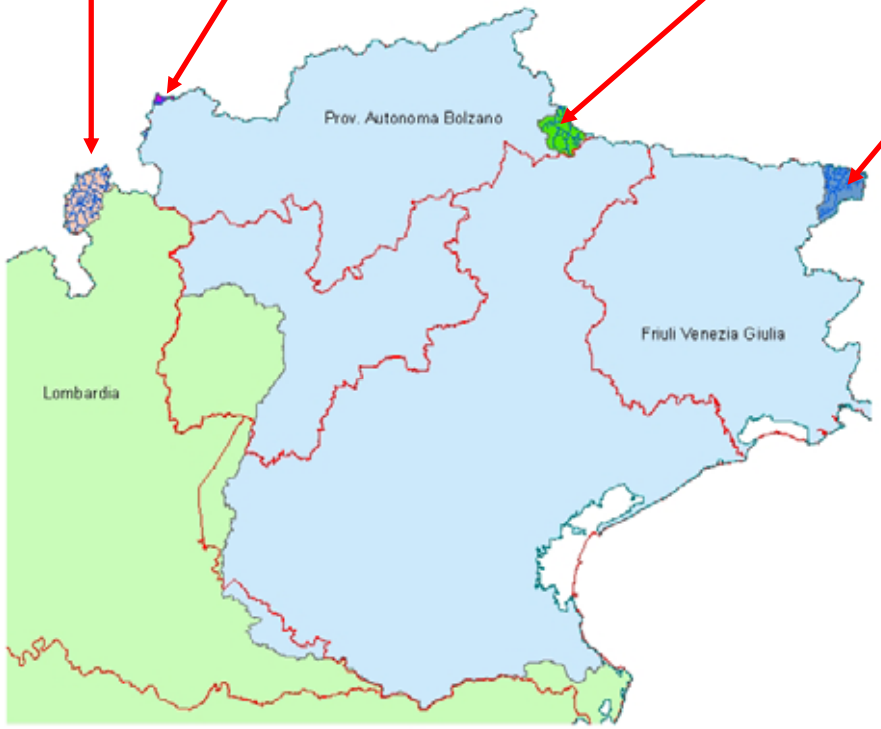
Project meeting - VENICE 13-14 September - Sala Goldoni Centro Don Orione Artigianelli

Italy in River Danube Basin

- Spöl + Stiller Bach + Drava + Slizza ~ 700 km^2



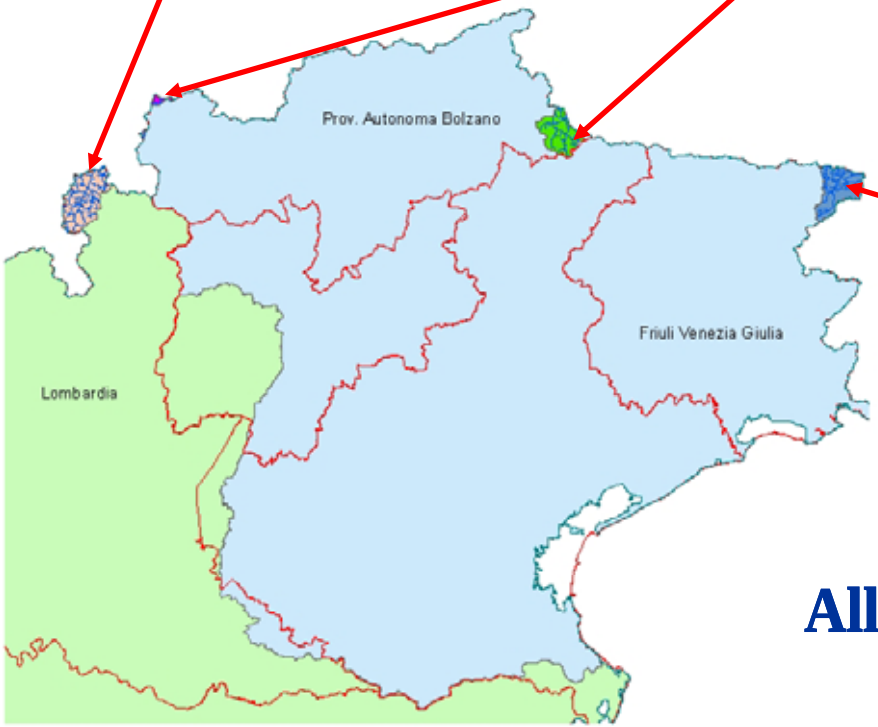
about 0.1 % of the Danube basin

Mountain areas of tributaries of 2nd, 3th order

Authorities on River Danube Basin Italian Territories

Lombardy Region

Autonomous Province of Bozen



Autonomous Region of Friuli Venezia Giulia

All Regional River Basin Authority

Italian flood risk management

- In Italy since 1989 flood risk is managed by River Basin Authorities (Law 183/1989). The aim of RBAs is the Basin Plan

- Since 1998 started a national flood mapping program as a specific part of Basin Plan performed by RBAs (Law DPCM 29.9.98 which defined general criteria and procedures to obtain hydrogeological land planning)

Italian approach to flood risk

- The Italian approach generally follows the well known Varnes equation, where the risk is obtained by the product of an hazard and the expected damage expressed as a function of the event intensity through a "vulnerability" " factor

- Risk = Hazard x Damage

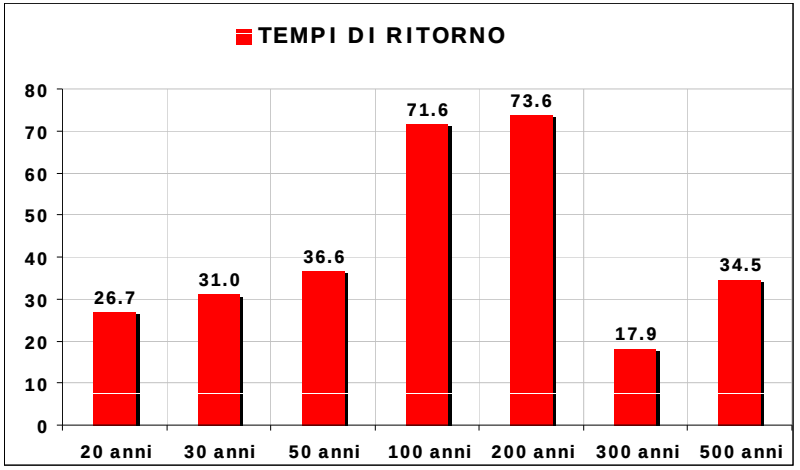
Italian flood mapping

- Flood extent and water level is computed as a first step for a number of frequency scenarios, generally three-four, from frequent to catastrophic events.
- The "return period" is the reference parameter and generally ranges stepwise from 20-50 to 500 years, standing upon the local conditions.
- Italian laws allows to combine historical records with model results.
- Less critical areas are often mapped via past inundation data while urban and industrial areas or infrastructures at risk are mapped through mathematical modeling.

Flood scenarios

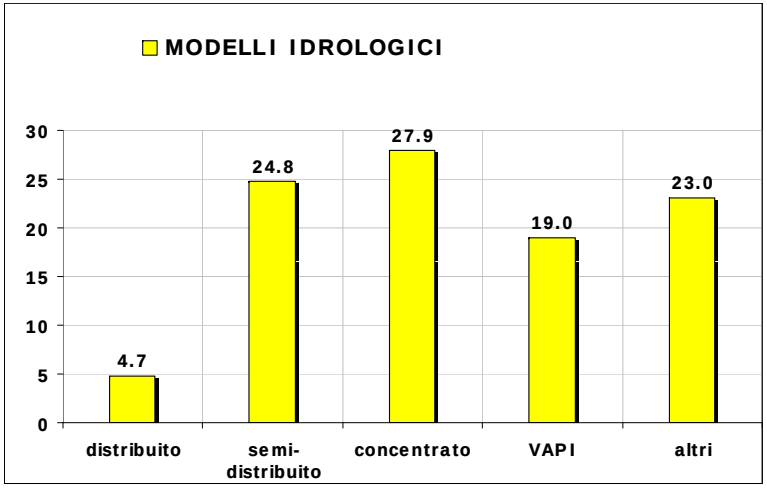
- Frequently occurring flood events (HIGH PROBABILITY, return period 30 - 50 years);
- Less frequently occurring flood events (MEDIUM PROBABILITY, return period 100-200 years);
- Extreme flood events (LOW PROBABILITY, return period 300-500 years).

ISPRA investigated the variability of flood mapping performed by RBAs in Italy



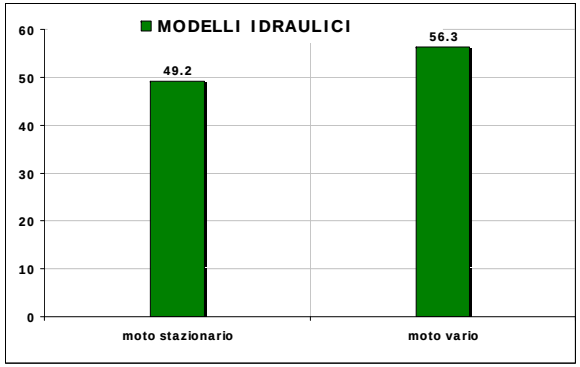
Hydrological Model

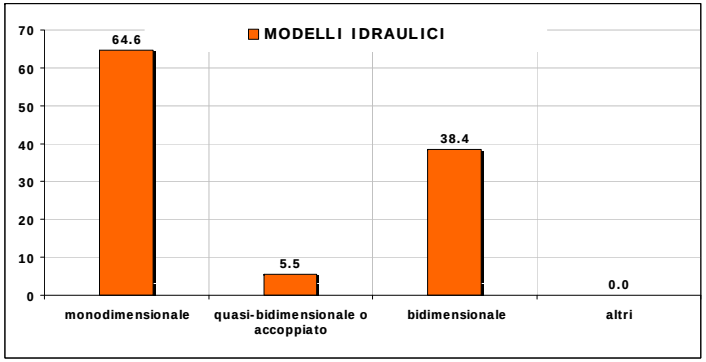
- Generally a rainfall-runoff model is combined with an hydraulic model for the flood routing.
- Lumped and Distributed Hydrological model



Hydraulic Models

- Steady flow schemes are sometimes used in floodplains where the inundation water flow can be assumed as reasonably monodimensional.
- More often unsteady flow models are used, combined with e.g. broad crested weir hydraulic schemes to describe the levee overtopping process.
- Inundation processes, following the complexity level of the local situation, are described starting with quasi-static schemes up to complete three dimensional flow finite elements models, where topography and exposure show a major complexity.



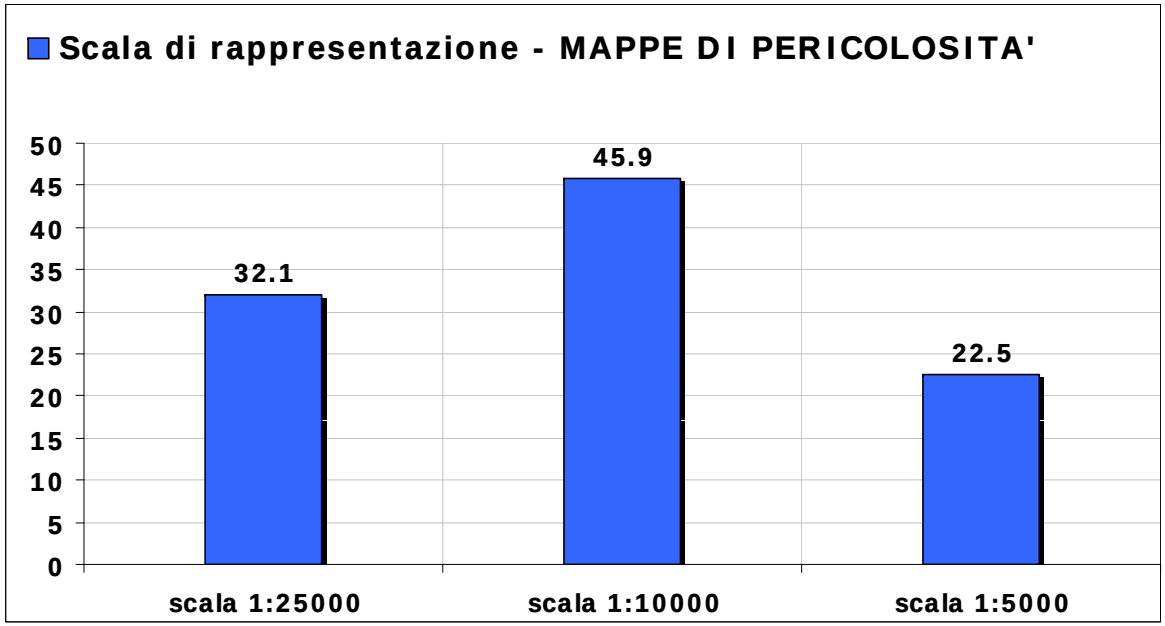


Classes of Hazard

- This activity leads to maps usually subdivided into four classes of hazard, "moderate", "medium", "high" and "very high", usually numbered from 1 to 4, each referring to a single return period.
- An iso-frequency hypothesis is often assumed to assess the frequency of the discharge at a station to be the same of the forcing rainfall event on the upstream watershed.

Cartography

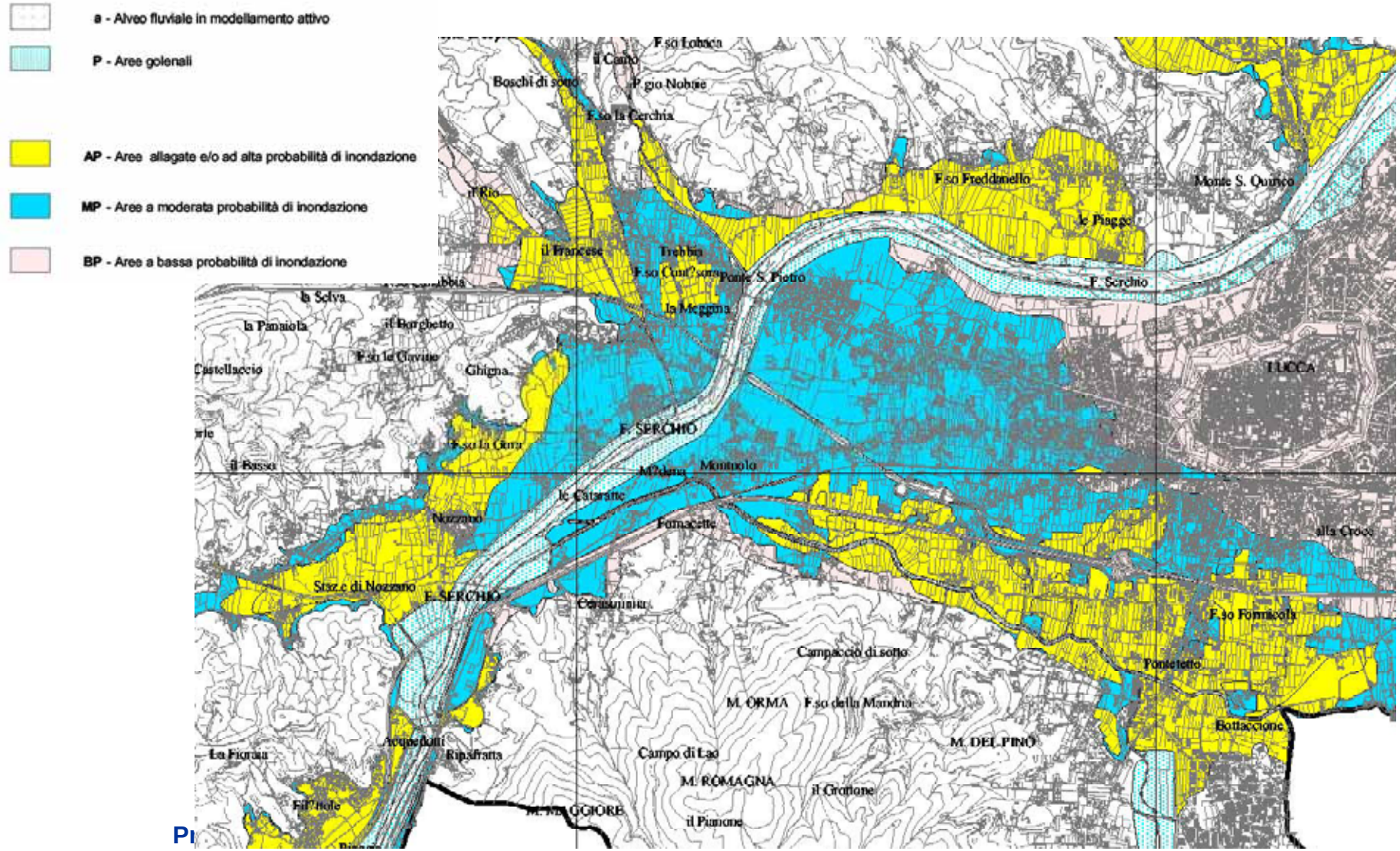
- Basin planning scale is generally assumed to be 1:10000. This is the scale generally used for regional mapping.



Conclusions

- In Italy there are no specific requirements for flood mapping
- This leads to a non perfect homogeneity in methods and results
- This is mainly due to the peculiar characteristics of Italian territory which shows quite different local situations

Example of inundation map



- Thanks for your attention