International Summer School
Orvieto-Todi

Fourth Edition

“NATURAL HAZARDS AND CULTURAL HERITAGE” PRESERVATION STRATEGIES

19 - 26 July 2026

TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Role of Climatic and Hydrometeorological Data in Flood Risk Management in Italy

General Overview and Selected Case Studies

Prof. Fernando Nardi

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Flood Risk in Italy

Flood Risk in Italy

- Italy is a multi-hazard flood-risk laboratory where climate, hydrology, geomorphology, cities and heritage intersect.

Flood Risk in Italy

ISPRA Agency report

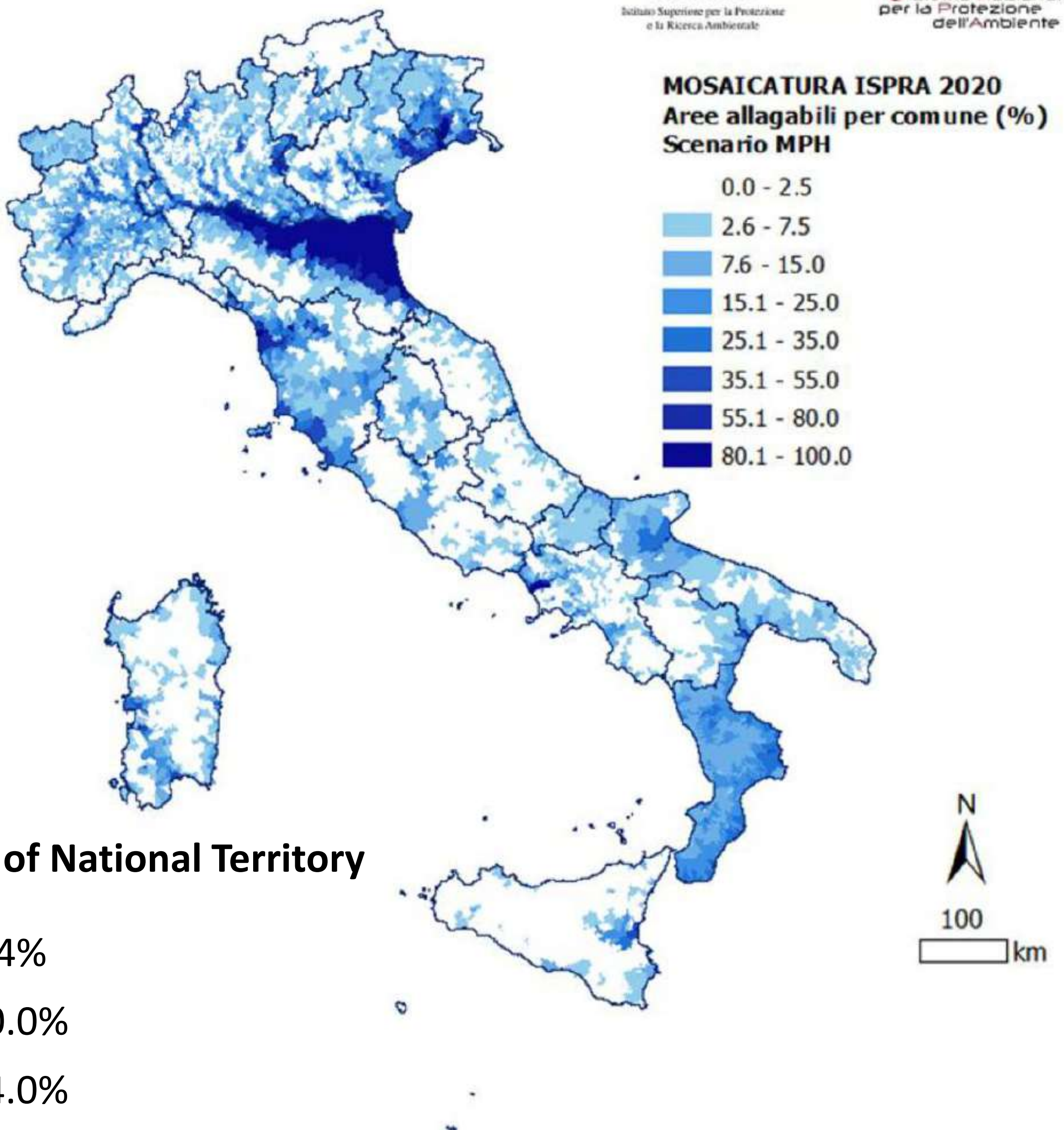
Over 7 million residents in flood-prone areas (HPH, MPH and LPH) hazard classes: ~30% of national territory exposed (Ispra report, 2021)

Significant exposure of cultural heritage and industrial assets

Trend 2015–2021: incremental risk awareness and map coverage

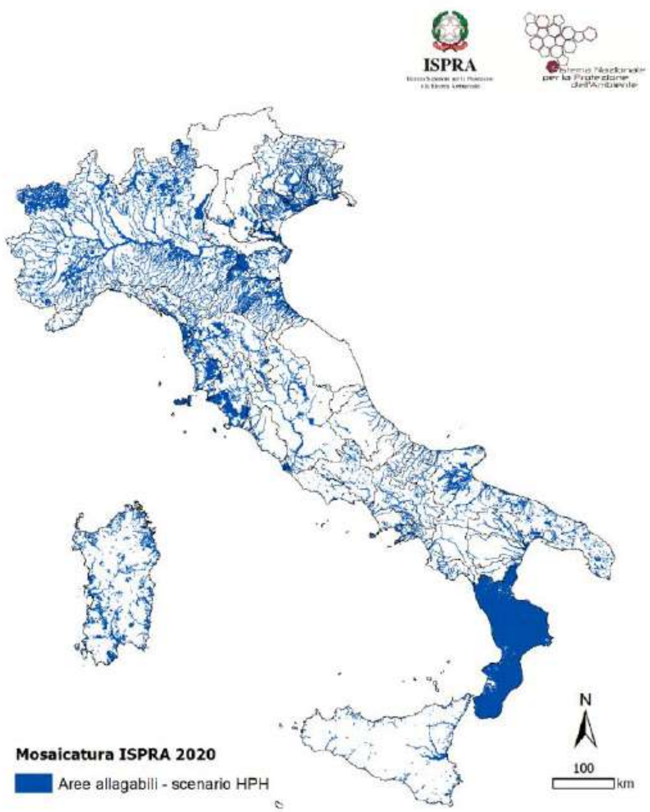
Hazard Level	Potentially Floodable Area (km²)	% of National Territory
High probability (HPH)	16,223.9	5.4%
Medium probability (MPH)	30,195.6	10.0%
Low probability (LPH)	42,375.7	14.0%

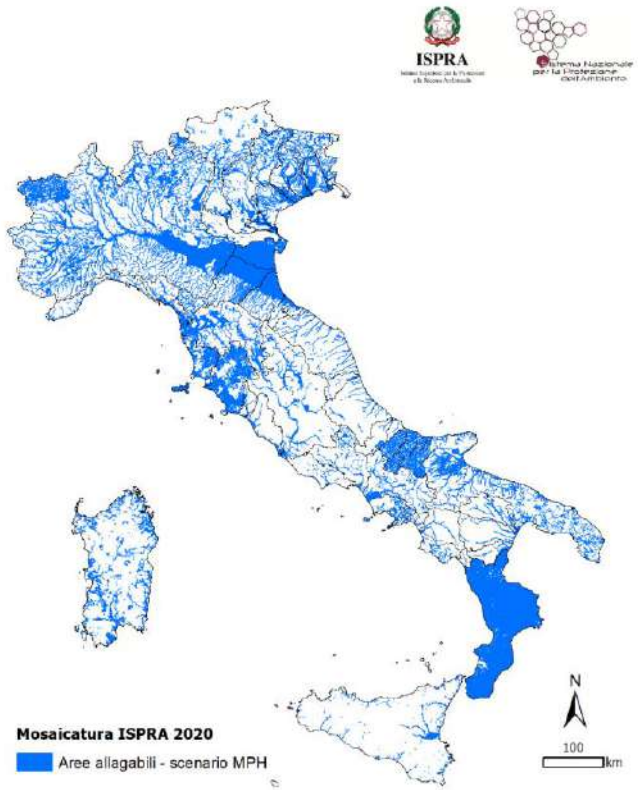
ISPRA
Sistema Nazionale per la Protezione dell'Ambiente

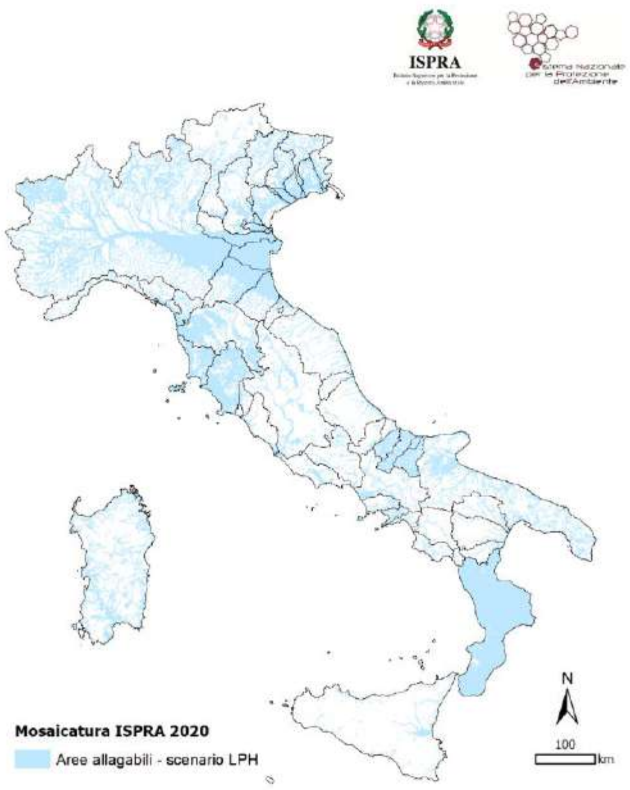


Flood risk in Italy

ISPRA Agency report (2024)







Hazard Level	Flooding zone (km²)	% of Italy area
High probability (HPH)	16,223.9	5.4%
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Flood risk in Italy

ISPRA Idrogeo platform

ISPRA flood mapping includes hazard and risk indicators

Differentiates areas at low (P1), medium (P2), and high (P3) risk

Integration with population and asset datasets

https://idrogeo.isprambiente.it/

Flood risk in Italy

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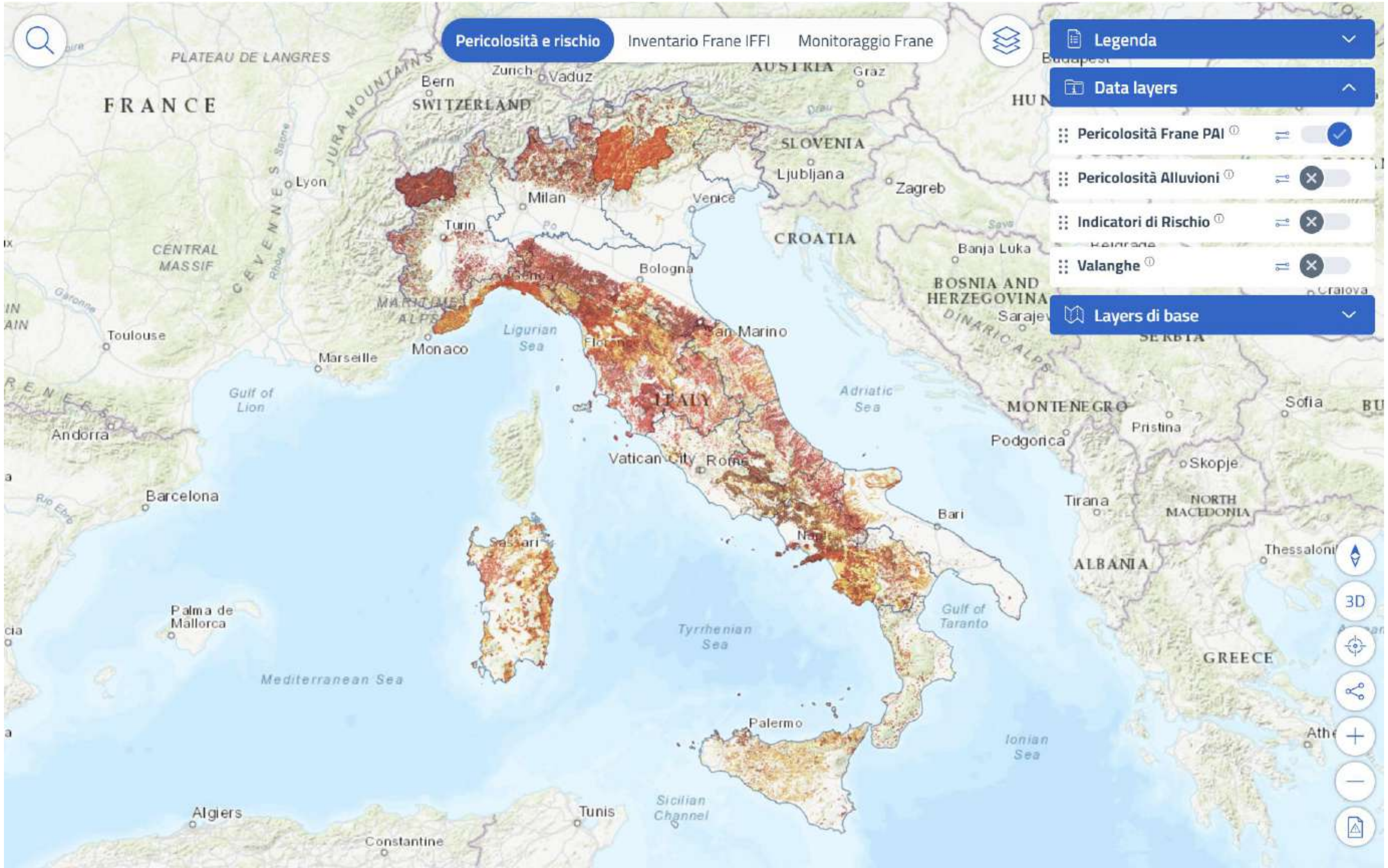

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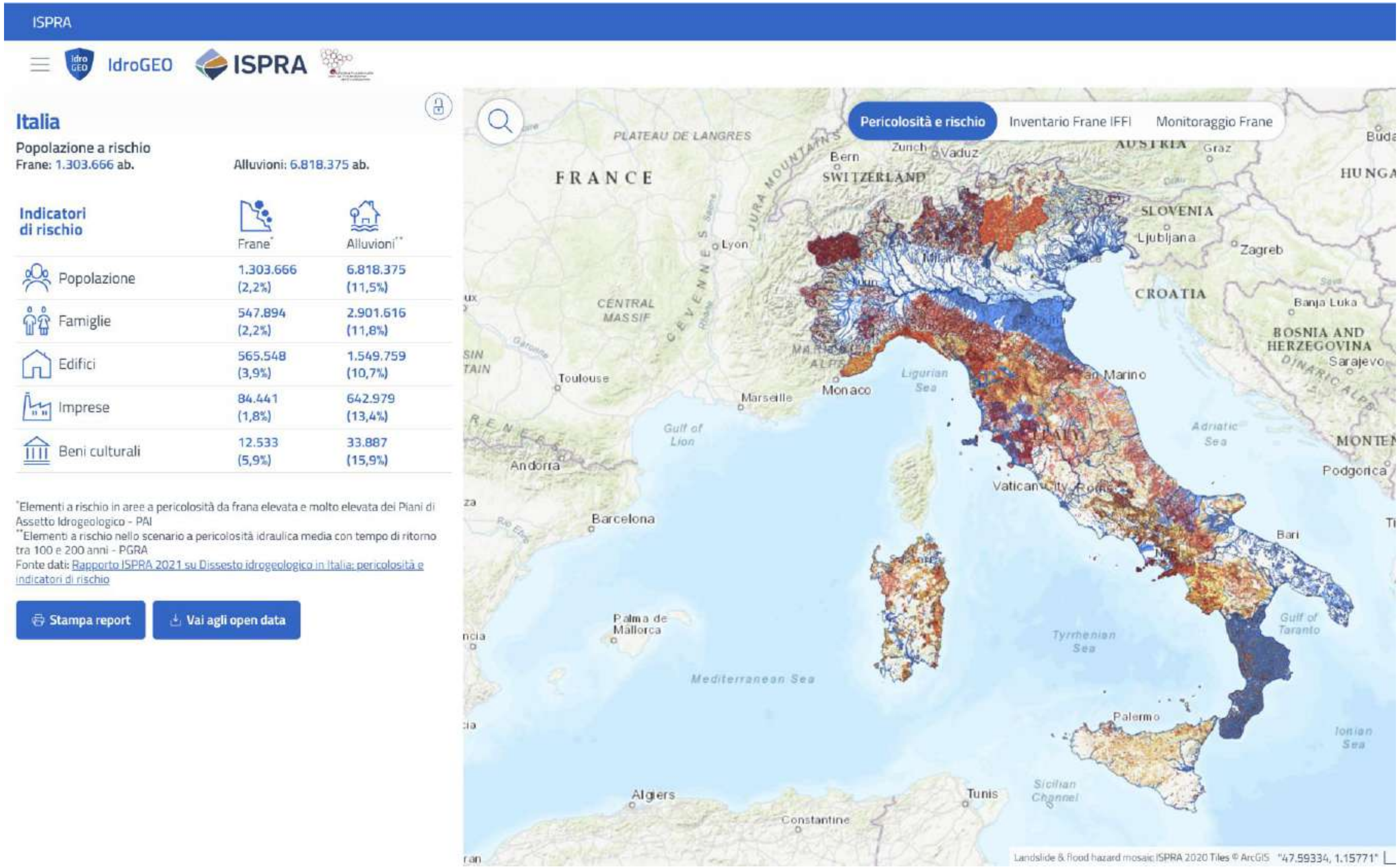

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Recent flood events

Marche 2022 flood

Rainfall event excessing 1000 return time
100-400 mm of rain in just 24 hours (15–16 September)

Failure of river level real time monitoring
Large distribution of landslides and debris-mud flows

STAZIONE	BACINO	Cumulate evento 15-16 settembre 2022				TR (ANNI)			
		max 3H	max6H	max12H	max24H	3H	6H	12H	24H
Cantiano	Biscubio	256.6	384	419	419	>1000	>1000	>1000	>1000
Monte Acuto	Cesano	248.4	343	384.2	384.4	>1000	>1000	>1000	>1000
Arcevia	Misa	94.8	117.8	128.8	129.2	>1000	>1000	910	200
Barbara	Misa	111.4	121.2	127	127.2	>1000	>1000	>1000	140
Colle	Misa	162.4	186.4	204	204	>1000	>1000	>1000	>1000
Sassoferrato	Sentino	62.8	99.8	99.8	100.4	130	600	120	30
Colleponi	Sentino	68	122	122.2	122.6	230	>1000	750	150
Monte San Vicino	Musone-Esino	108.2	120	192.8	193.6	>1000	750	>1000	>1000
Cingoli	Musone	160.4	184.6	247.2	247.6	>1000	>1000	>1000	>1000



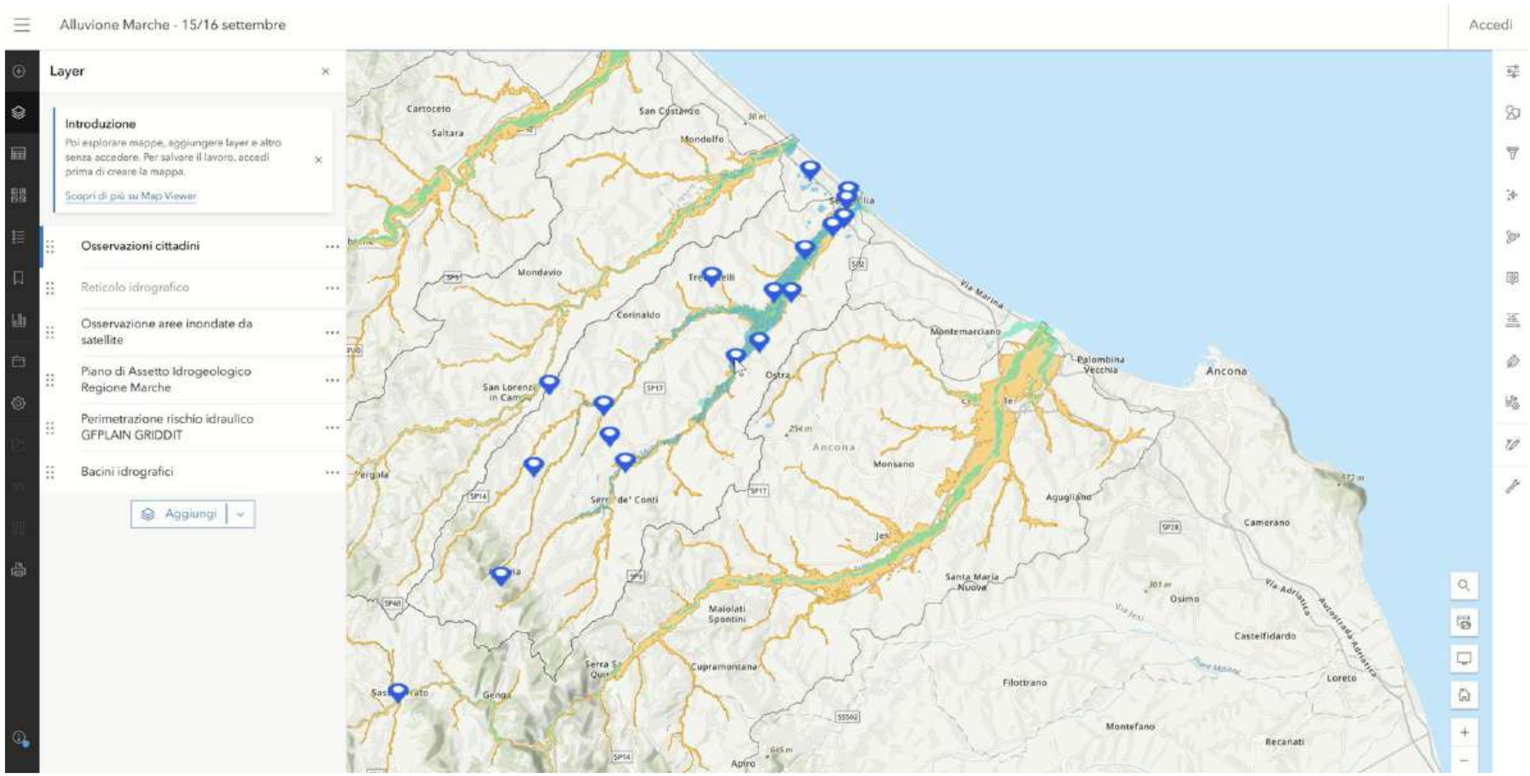
Recent flood events

Marche 2022 flood

Rainfall driven land instability impacted uphill areas and propagated downstream

Design flood hydrographs characterizing the flood hazard and risk zoning significantly underestimated impacts

Distributed mud flows associated to intense rainfall with bulking factors supporting 100-300% increased flood volumes



Recent flood events

Emilia Romagna 2023 flood

The rainfall event between 1–17 May 2023 delivered: 500+ mm of cumulative rainfall in 14 days over several catchments.
180–220 mm of rain in just 36 hours (16–17 May) over the central Apennines.

Over 20 river breaches occurred, primarily in the Reno, Savio, Lamone, Montone and Ronco river basins.
The flood resulted in: 23 fatalities and over 36,000 people evacuated.

Damage to 13,000+ residential buildings and 450+ public infrastructure assets.
The total area affected exceeded 400,000 hectares, with farmland damage particularly extensive in the lowlands. Hydraulic infrastructure (e.g. levees, canals) was overwhelmed or undersized, designed for 2–30 year return periods, whereas observed intensities corresponded to 50–100+ year events.



Recent flood events

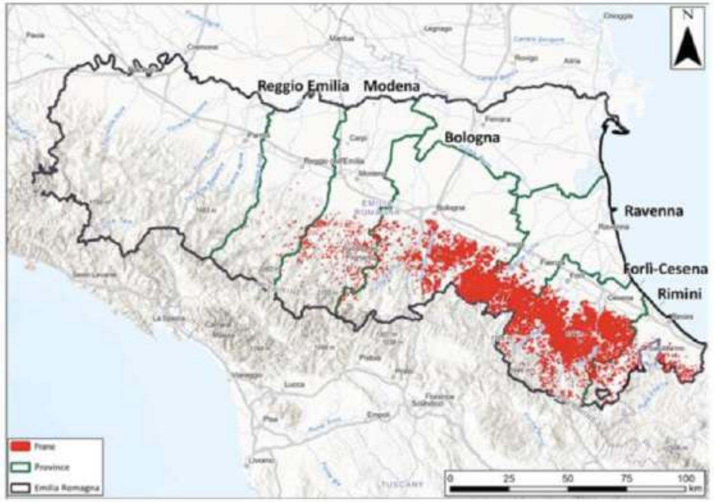
Emilia Romagna 2023 flood

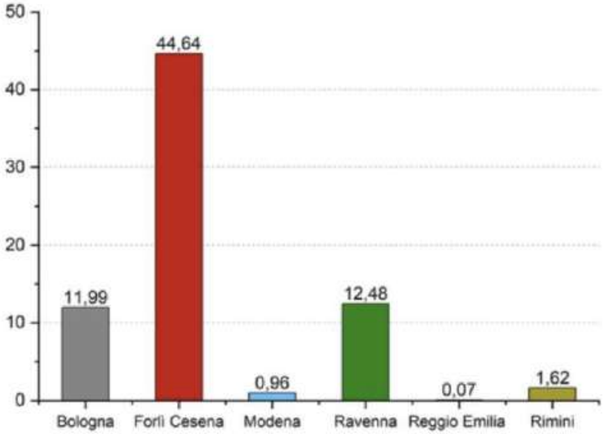
65598 landslides determining 72,71 km2 of land instability (mudflows) associated to intense rainfall events

78,5% of landslides occurred in areas outside the available flood-landslide zoning

Wood and debris flows were a factor in flood post-event analyses

Severe flood-landslide impacts on buildings, railways, roads, rural areas and distributed disruptions





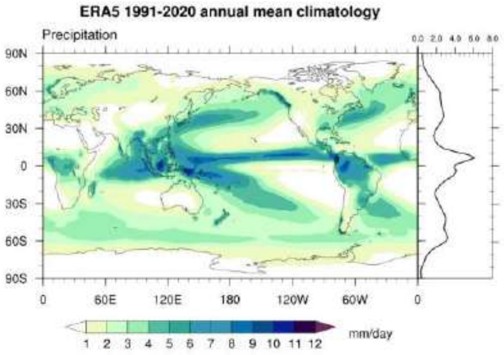
- 65.598 frane mappate
- 72,21 km^2 di area in frana totale
- 115 comuni coinvolti su 330 (34,8%)

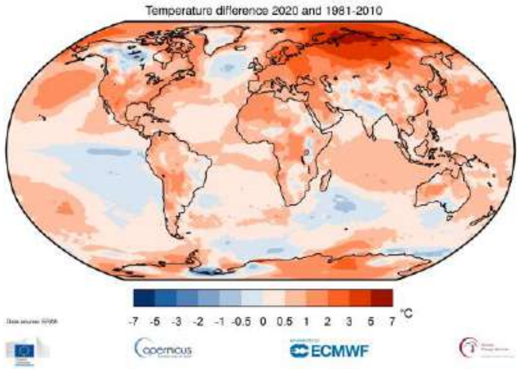
- 6 province su 9 coinvolte
- Provincia più colpita: Forlì-Cesena

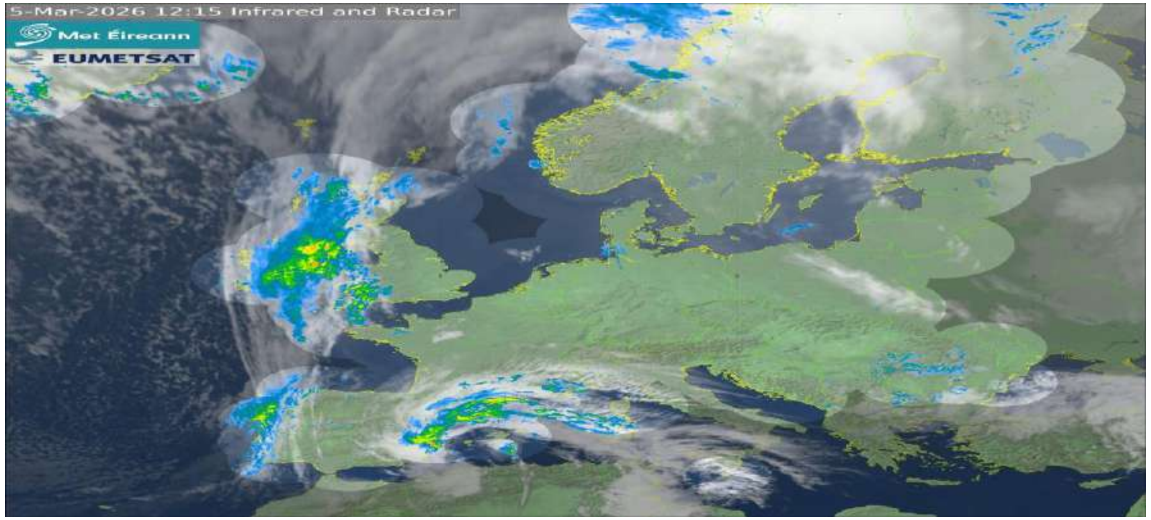
Source: https://www.regione.emilia-romagna.it/alluvione/rapporto-della-commissione-tecnico-scientifica

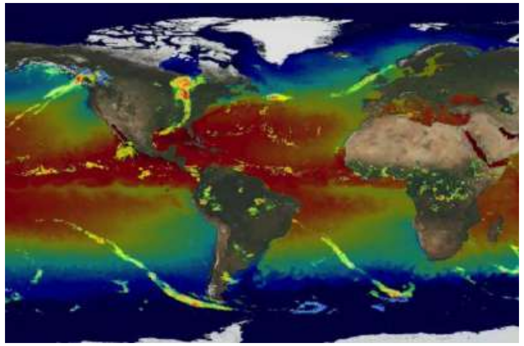
Climatic data: monitoring from space to ground

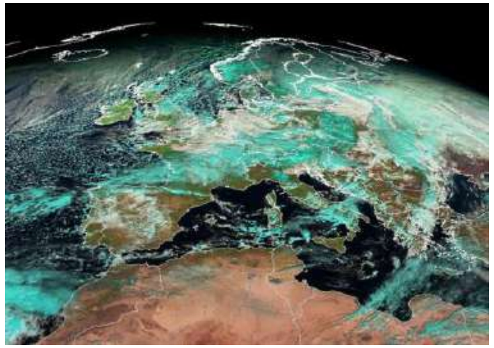
- ERA5 / Copernicus Climate Reanalysis (ECMWF)
- NASA GPM – Global Precipitation Measurement
- EUMETSAT Meteosat
- NASA SMAP – Soil Moisture
- Copernicus Climate Change Service
- WMO Global Observing System





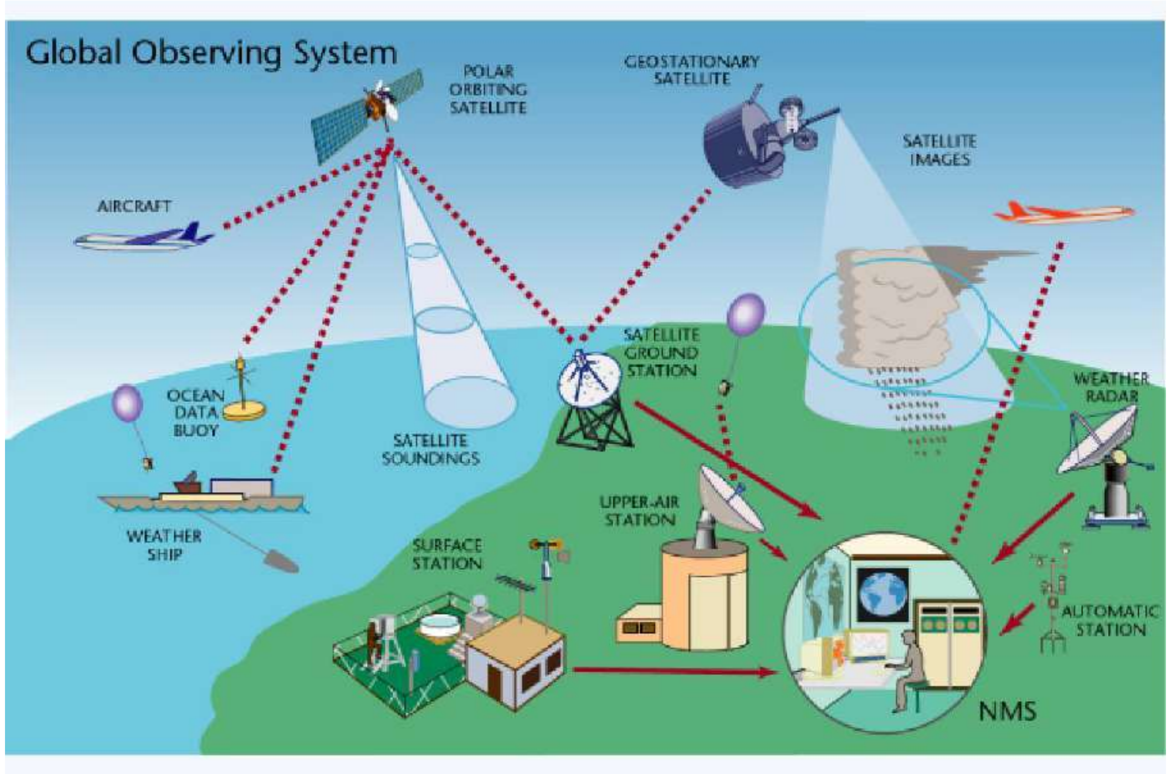






Climatic data: monitoring from space to ground

- WMO multi-source distributed real time observation system



Climate Variable	Major Programme
Temperature	ERA5 / Copernicus
Precipitation	GPM (NASA/JAXA)
Soil Moisture	SMAP (NASA)
Clouds & Storms	Meteosat (EUMETSAT)
Snow	Copernicus, MODIS
Evapotranspiration	MODIS, Copernicus

Earth Observation for Flood Monitoring

Advantages

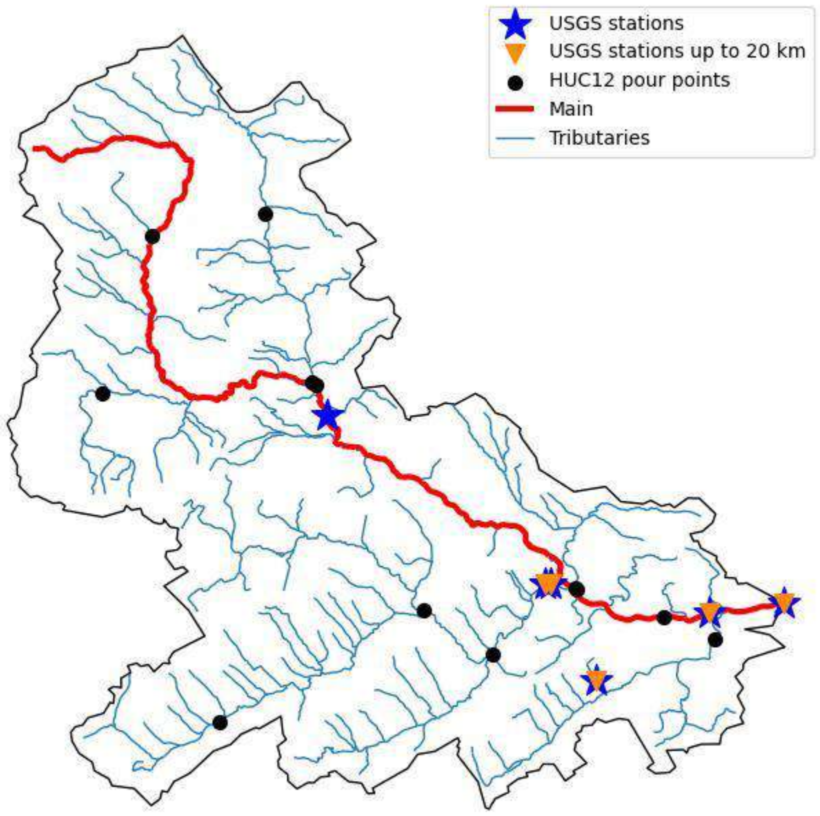
Large spatial coverage (regional to global)
Monitoring of ungauged and remote basins
Near real-time observations for emergency response
Synoptic view of entire river basins and floodplains
Historical archives for long-term trend analysis
Rapid flood extent mapping over large areas
Multi-variable observations (rainfall, soil moisture, snow, land cover, water extent)
Consistent and repeatable measurements across countries
Essential input for hydrological and hydraulic models
Supports climate change impact assessments
Radar (SAR) observations enable day-and-night monitoring and penetrate cloud cover
Cost-effective for monitoring large territories compared with dense ground networks

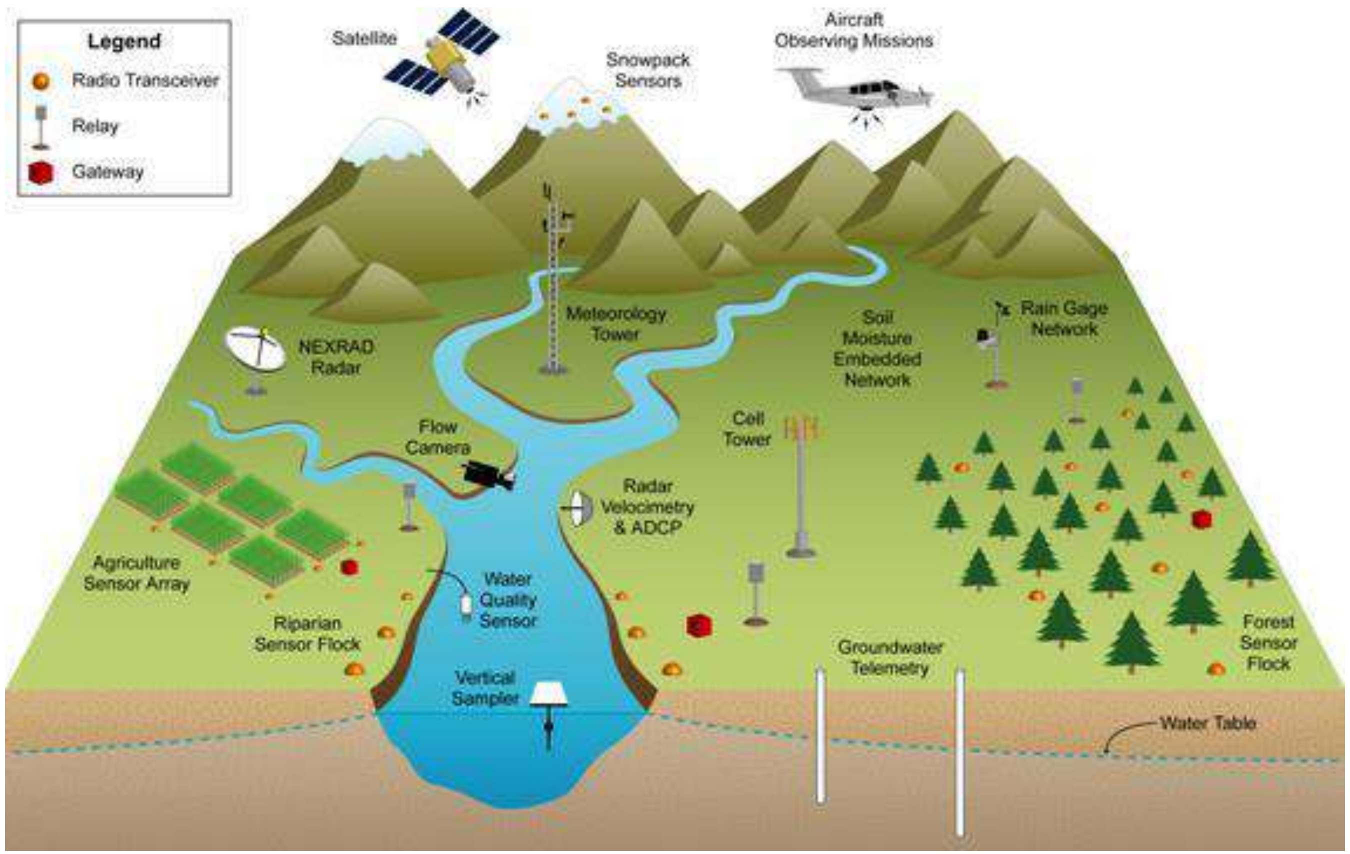
Earth Observation for Flood Monitoring

Limitations

Trade-off between spatial and temporal resolution
Optical sensors affected by cloud cover, especially during storms
Revisit time may miss rapidly evolving flash floods
Many variables are indirect estimates, requiring retrieval algorithms
Limited capability to directly measure river discharge
Accuracy depends on sensor type, terrain and vegetation
Lower performance in narrow valleys, urban canyons and densely vegetated areas
High-resolution commercial imagery may be costly
Requires preprocessing, calibration and validation
Cannot fully replace in situ observations
Data latency may limit operational use for some applications
Uncertainty propagation into hydrological models if not properly assimilated

River basin hydrologic monitoring





Instrumented watershed with monitoring nodes

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Hydrologic on-field monitoring for Floods

Advantages

Direct measurement of local hydrological conditions
High temporal resolution, often near real time
High accuracy when properly installed and calibrated
Essential for flood forecasting and warning thresholds
Supports calibration and validation of hydrological models
Provides long-term time series at fixed locations
Can measure water level, discharge, rainfall, soil moisture or groundwater
Relatively simple data interpretation
Useful for detecting rapid local changes
Can be integrated with telemetry and automatic alerts
Lower data-processing requirements than remote sensing
Strong operational value at critical bridges, rivers and urban drainage points

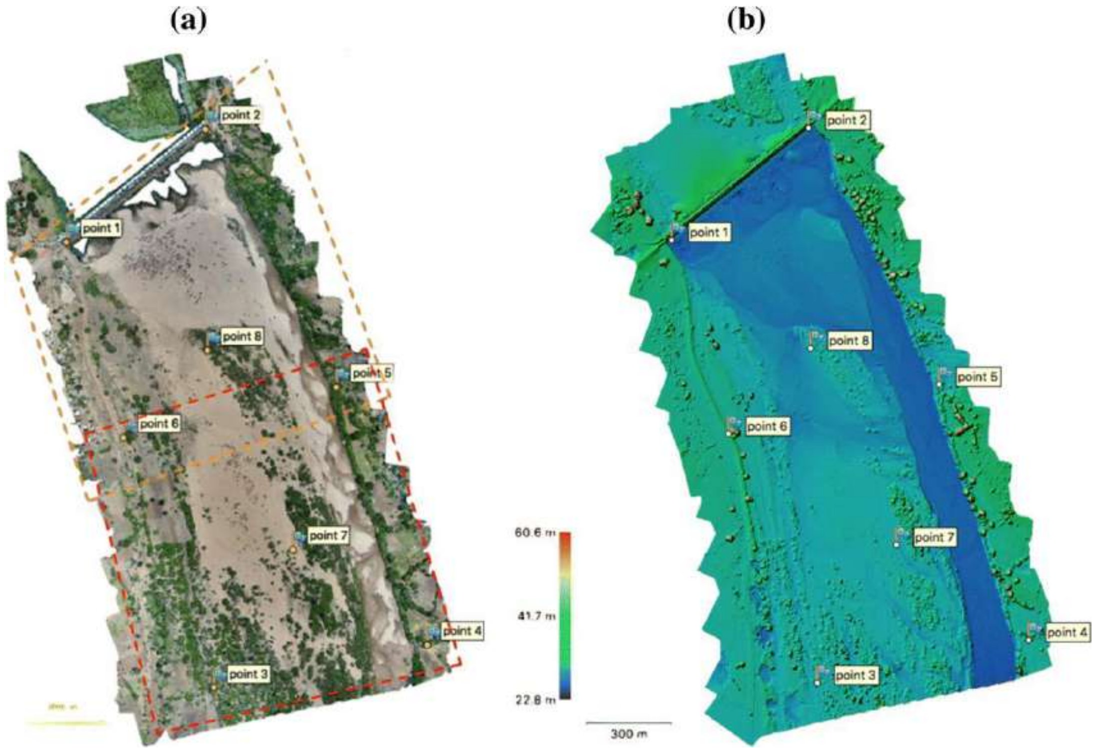
Hydrologic on-field monitoring for Floods

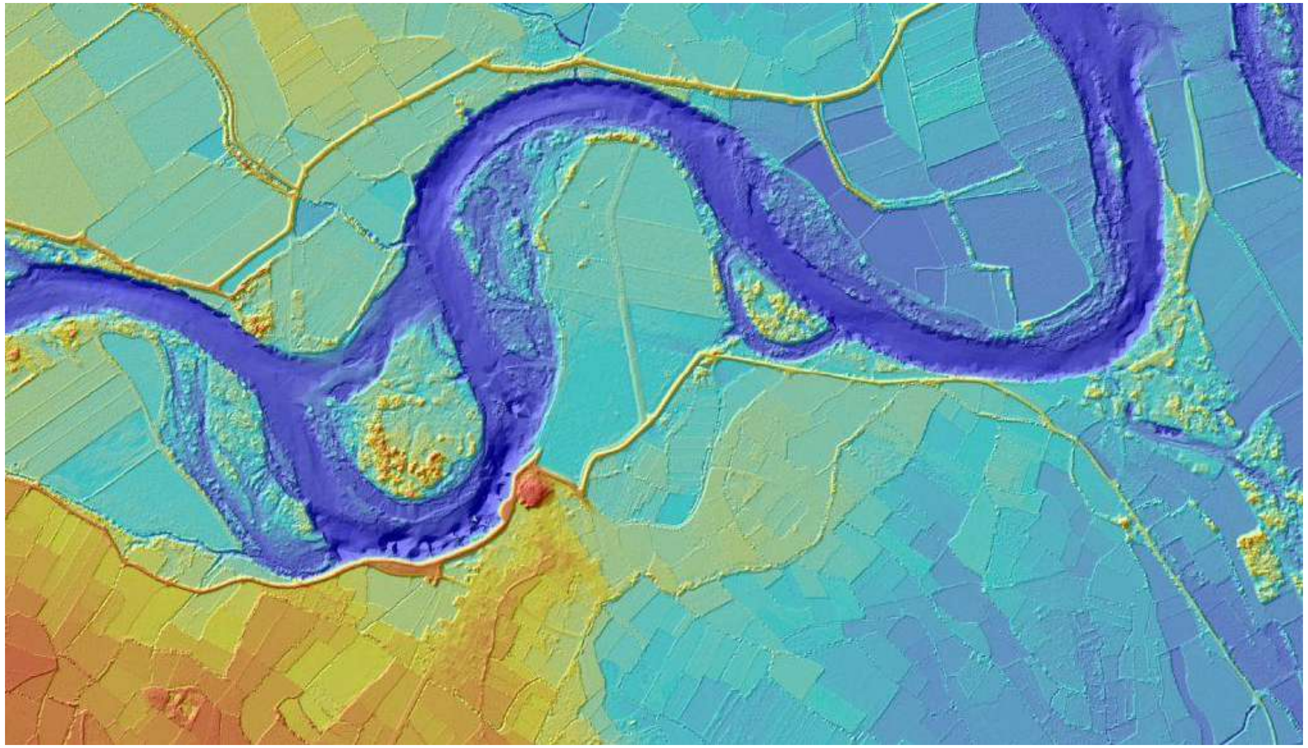
Limitations

Represents only one local point
Limited spatial representativeness
May miss upstream, downstream or lateral variability
Dense networks are expensive to install and maintain
Vulnerable to sensor failure, vandalism and flood damage
Requires regular calibration and field inspection
Measurements can be affected by sediment, debris, vegetation or ice
Rating curves may become unreliable after channel changes
Communication or power failures can interrupt real-time data
Poor coverage in remote or inaccessible areas
Difficult to capture the full spatial extent of a flood
Strong dependence on network density and station location
Cannot alone describe basin-wide rainfall or inundation patterns

Advances on topographic surveying and geomatics

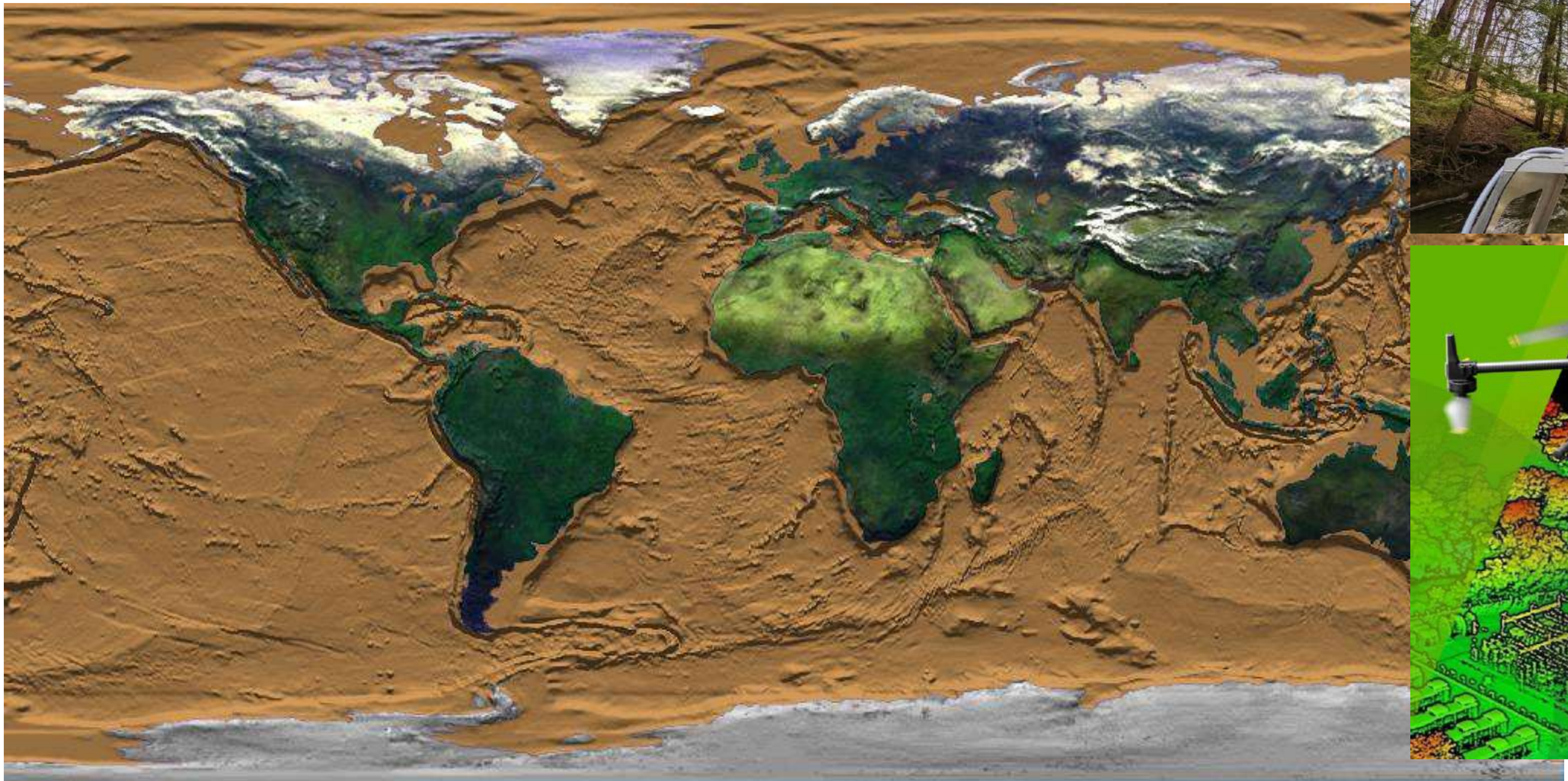
- technologies have transformed flood-risk modelling over the last decade: UAV photogrammetry, airborne LiDAR, mobile laser scanning, multibeam bathymetry, and high-resolution digital terrain models

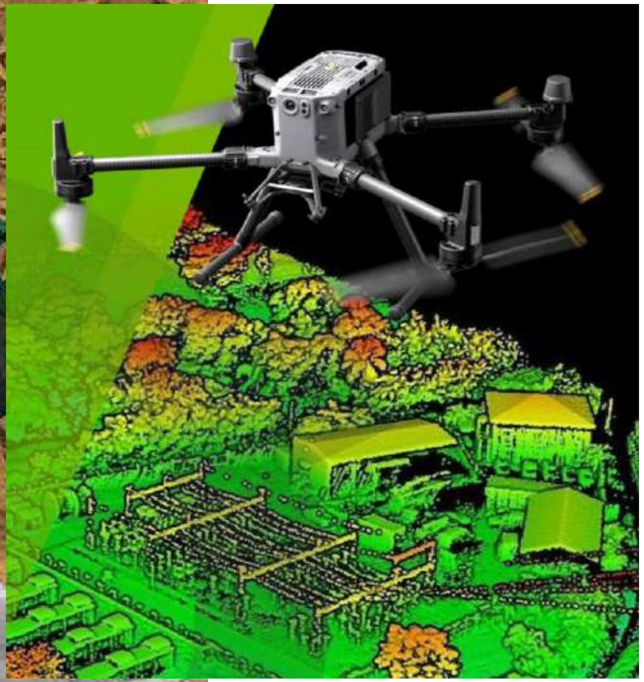




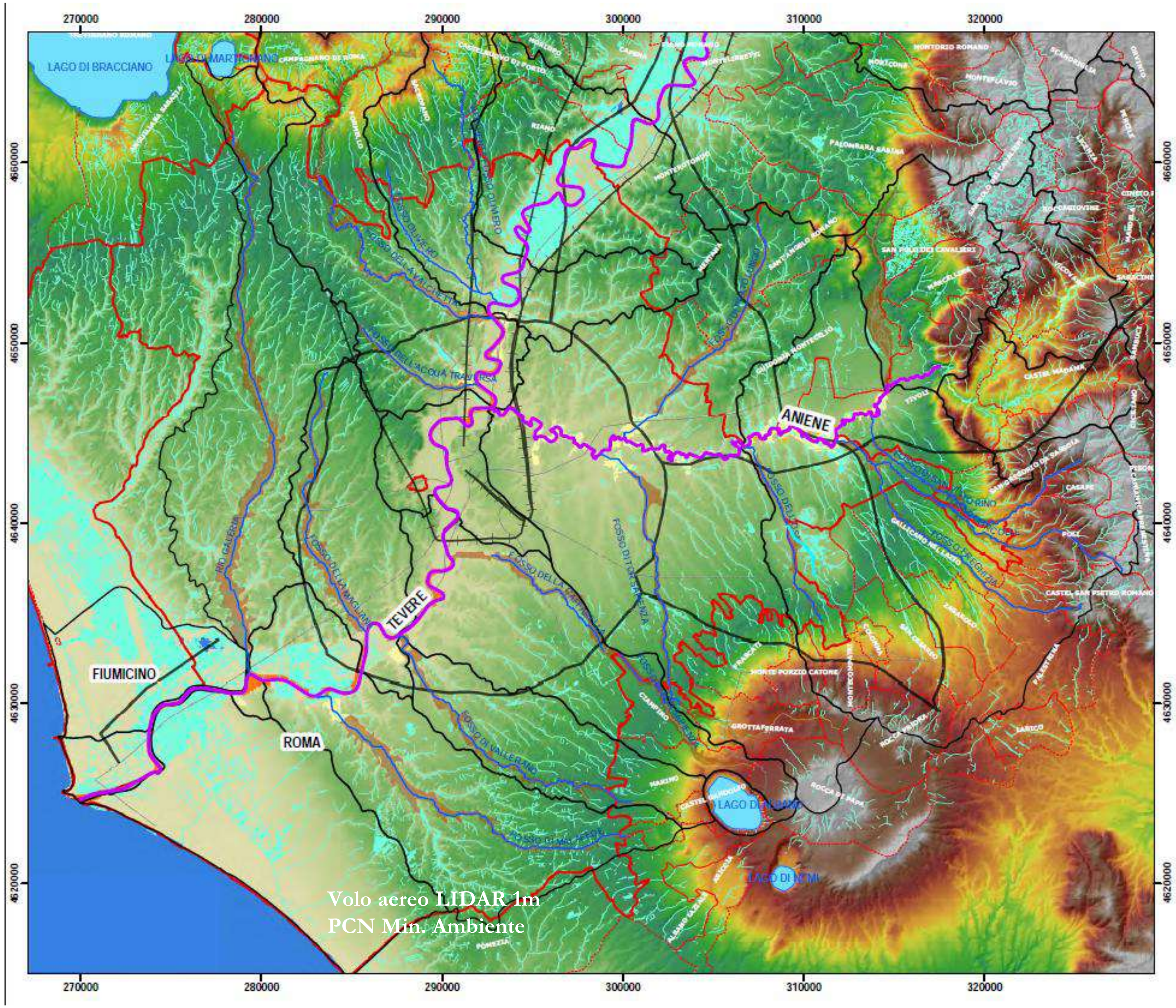
Advances on topographic surveying and geomatics

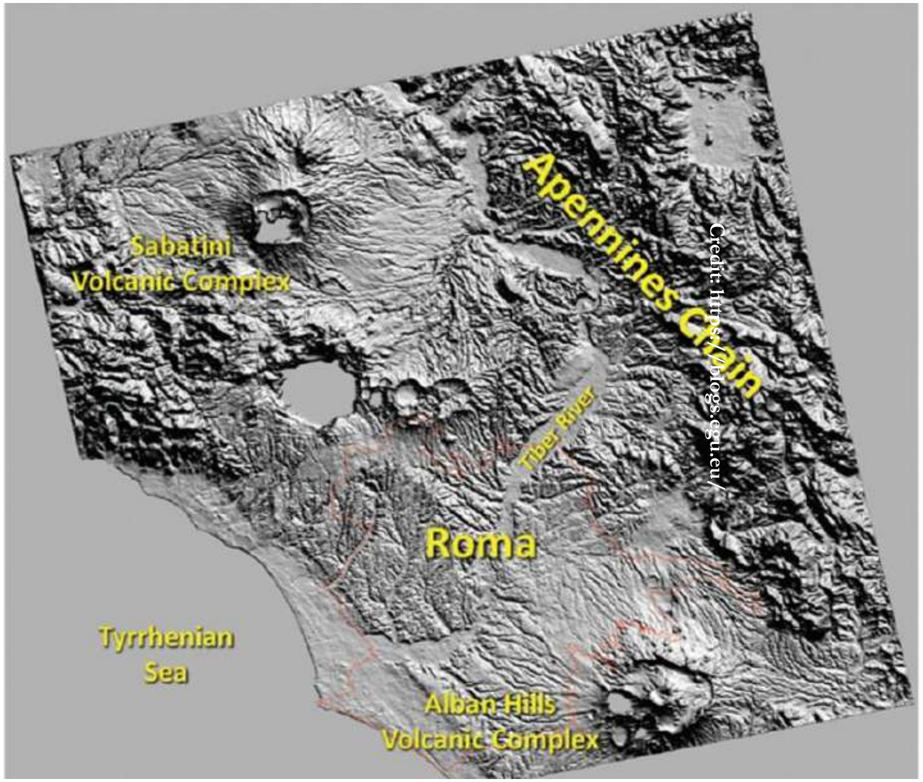
- From global to local scale





Tiber river: Rome flooding ecosystem





Digital Topographic Data
Heterogeneous Hydrological and Hydraulic Studies
Evidence of Flood Events and Hydraulic Criticalities

Tiber river: Rome flooding ecosystem

Ponte Nomentano
dicembre 2008

Esondazione f. Aniene (dicembre 2008)
(Tivoli, Corcolle, Lunghezza, Salone, …)

Fiume Almone (Marrana Caffarella)
(Via Appia, 2008)

Ponte Milvio (2010)

Flooding 2005, 2008, 2010, 2011, …

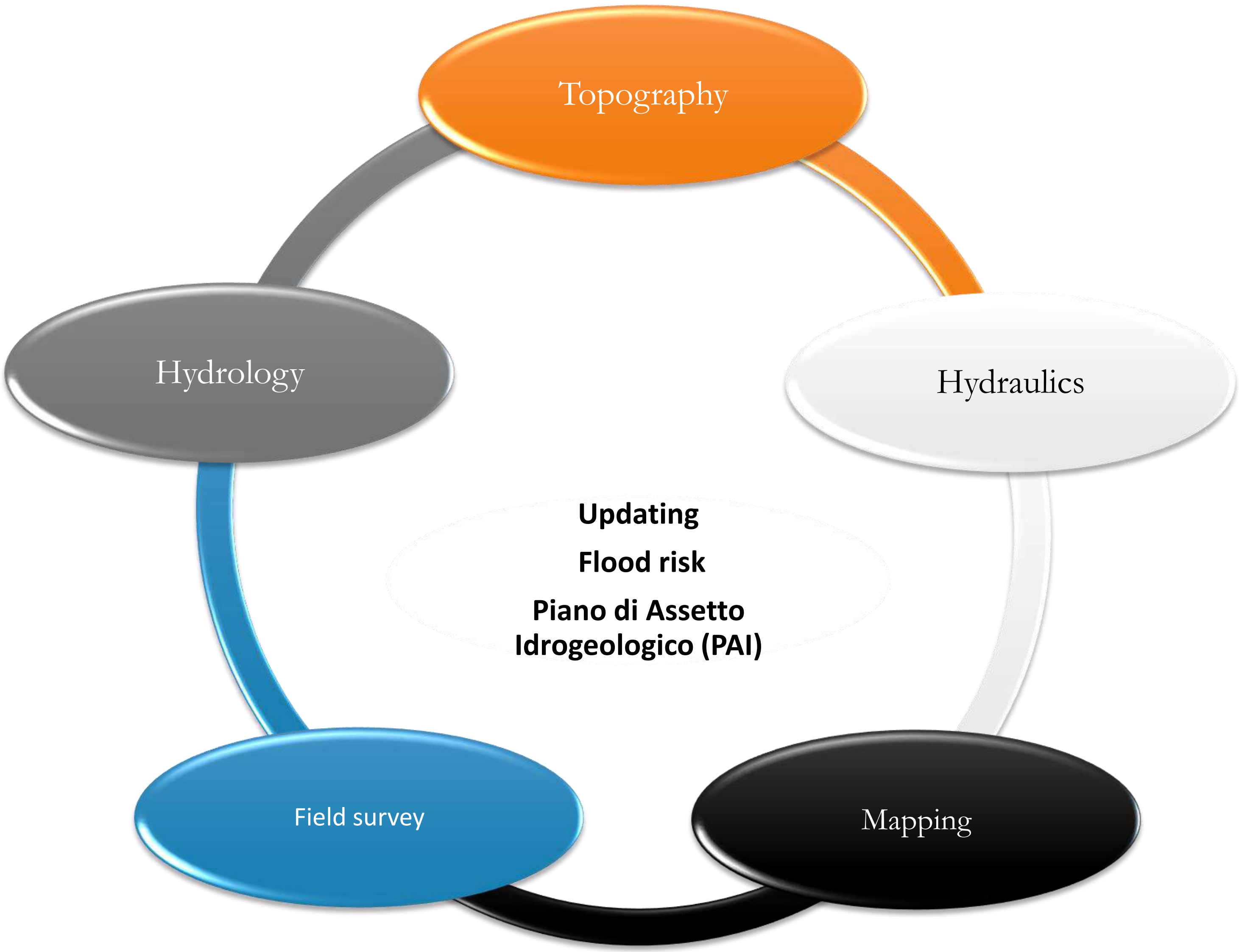
Flood risk modelling guidelines and components

Topography

Hydrology

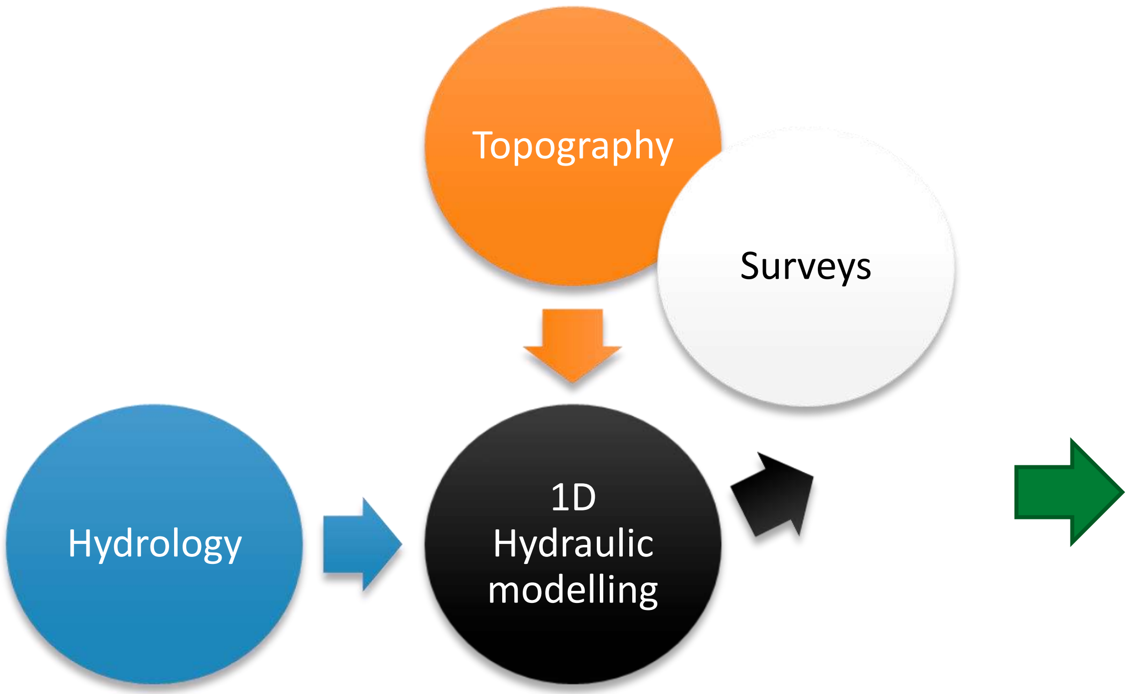
Hydraulics

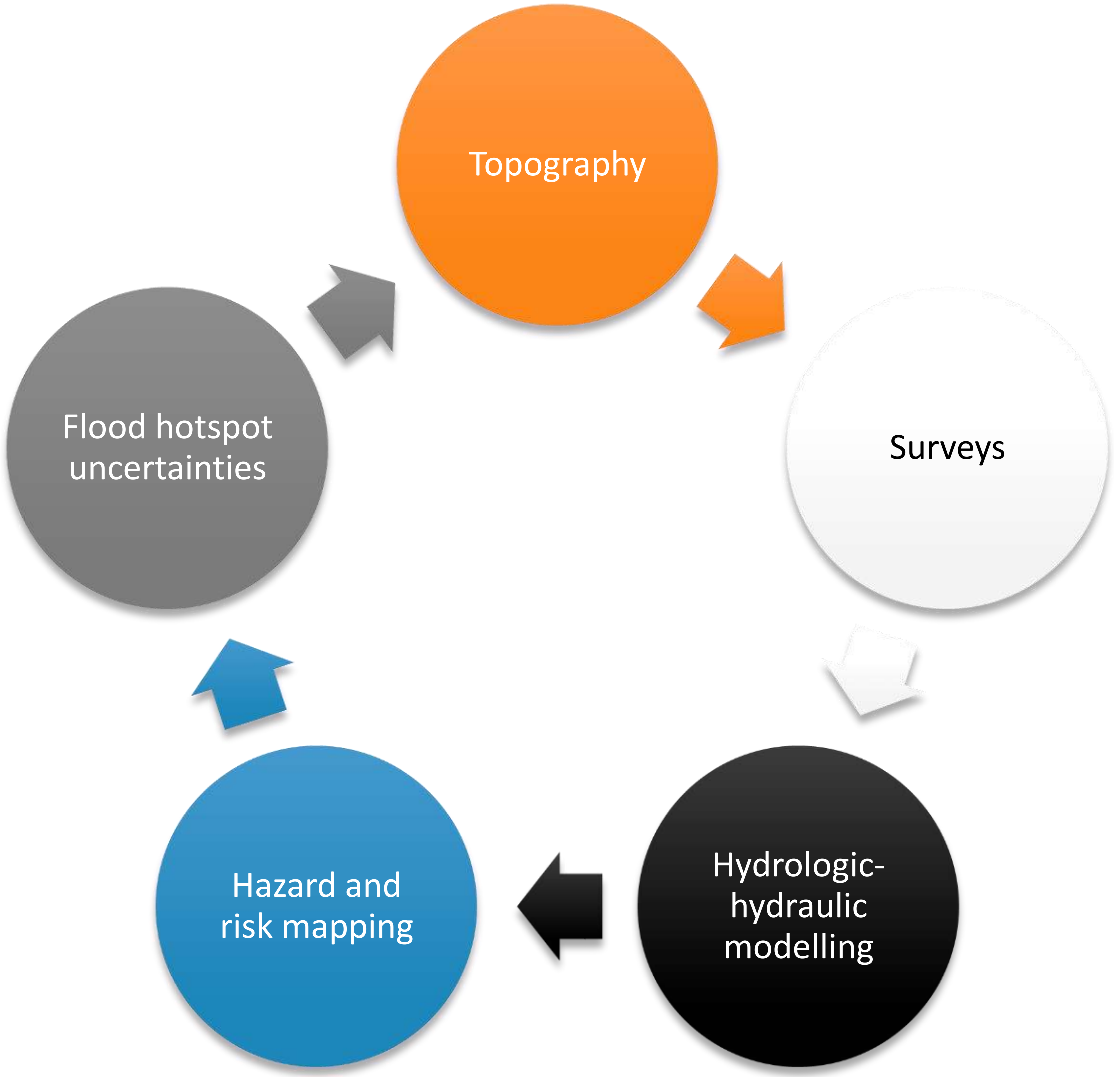
Mapping



Topography

Innovation in Topographic Survey Methods and Procedures



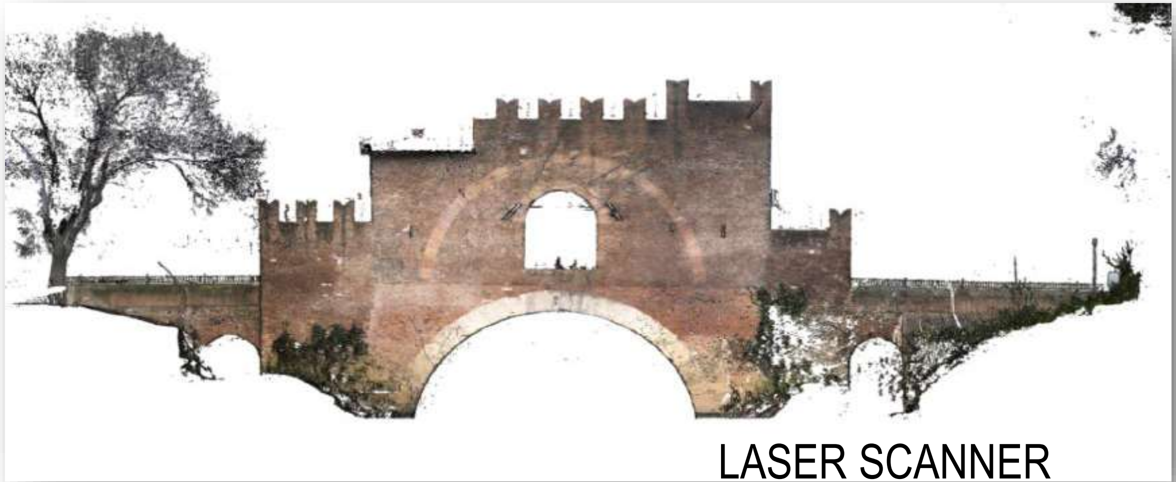


Three Teams of Specialized Surveyors
River Cross-Section Surveys (Bathymetric and GNSS/GPS Surveys)
Remote Sensing Surveys (LiDAR, Laser Scanning, and UAV/Drone Surveys)

30–40% Reduction in Topographic Survey Time and Costs

Topography

Innovation in Topographic Survey Methods and Procedures



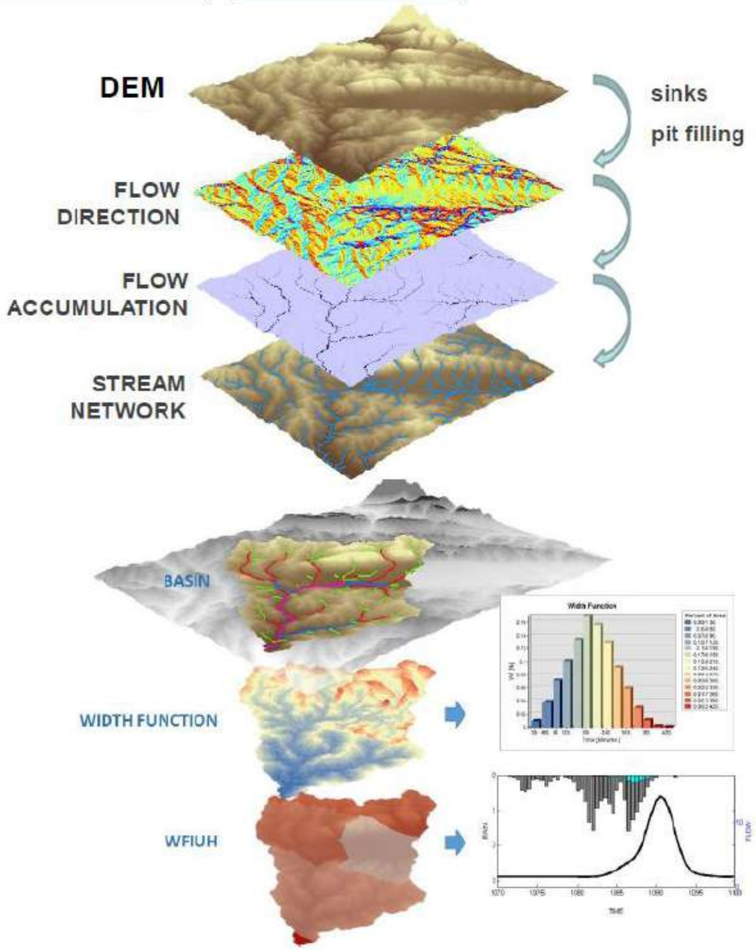
Hydrology

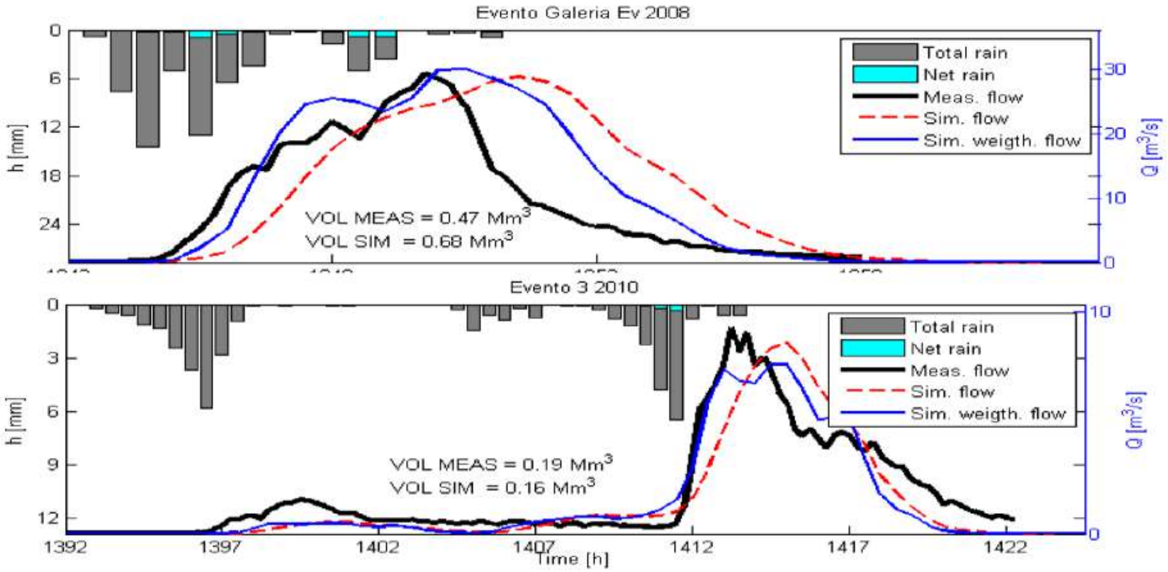
Definition of Design Flood Hydrographs for Return Periods (50-, 100-, 200-, and 500-Year):

Tiber River at Castel Giubileo

Aniene River Upstream of Rome

Ungauged Tributaries of the Secondary Drainage Network





EBA4SUB

Estimation of Flood Hydrographs for Small Ungauged Catchments

Flood routing

Simulation of Flood Wave Propagation under Different Return Periods (50-, 100-, 200-, and 500-Year)

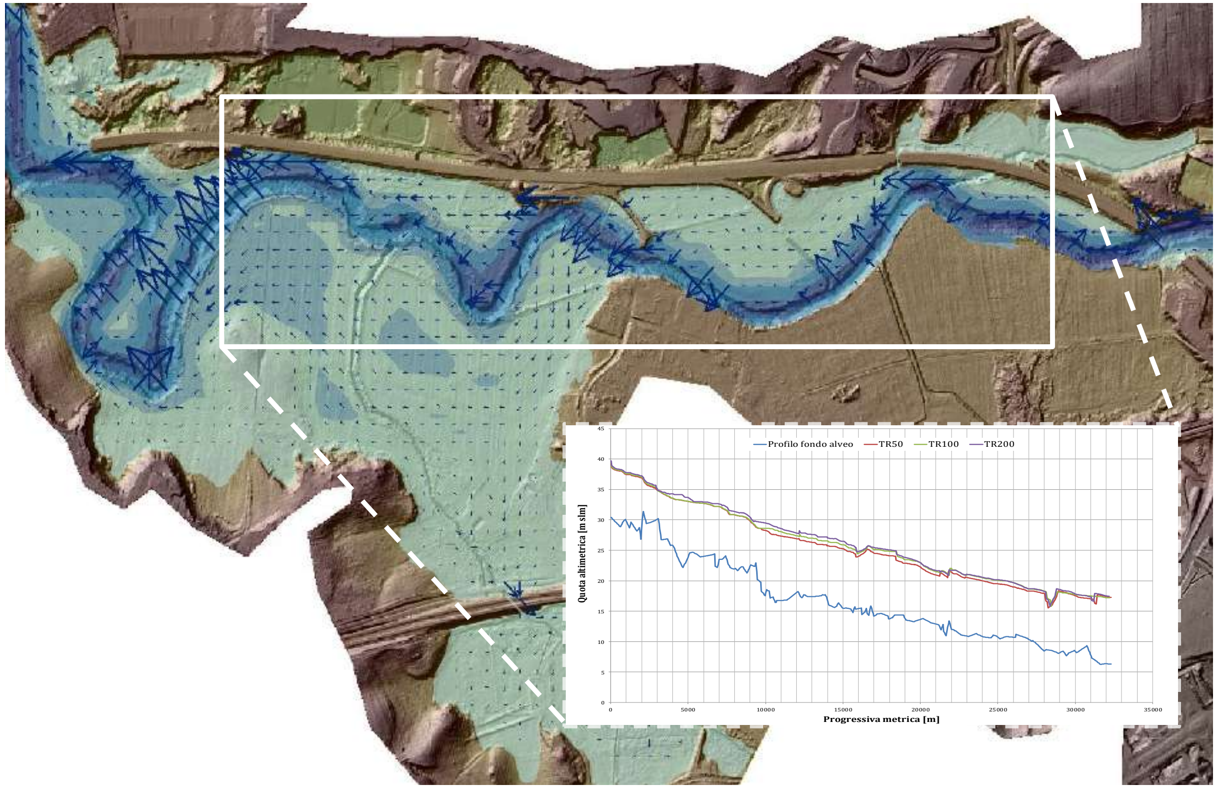
Considering Multiple Scenarios:

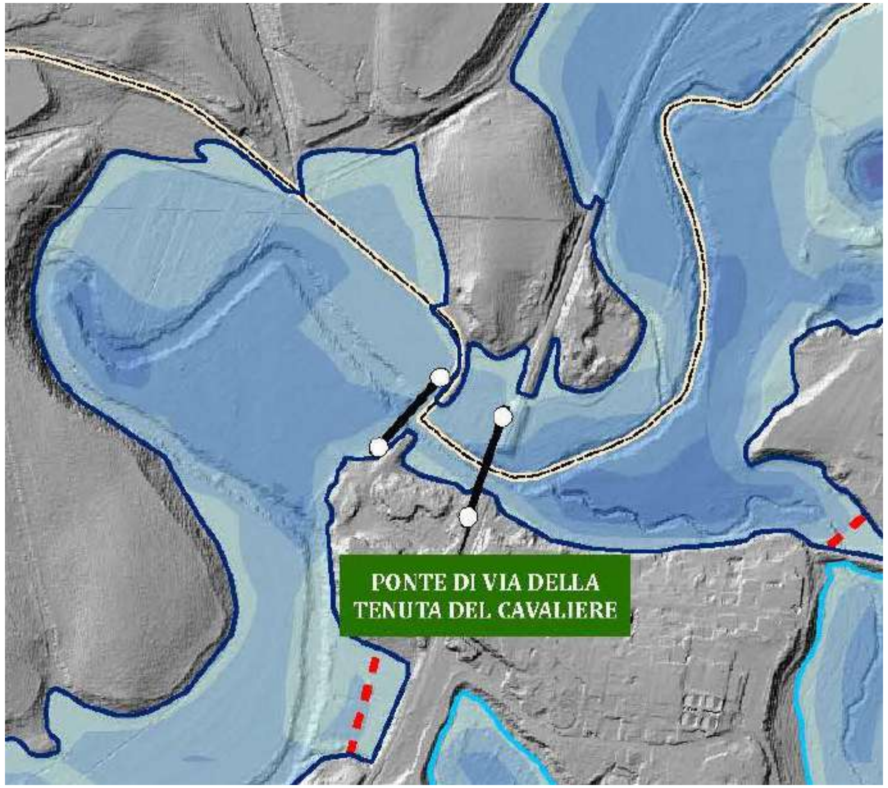
Levee Overtopping and Breach

Backwater Effects at Confluences

Hydraulic Constraints at River Crossings

Two-Dimensional (2D) Hydraulic Modeling

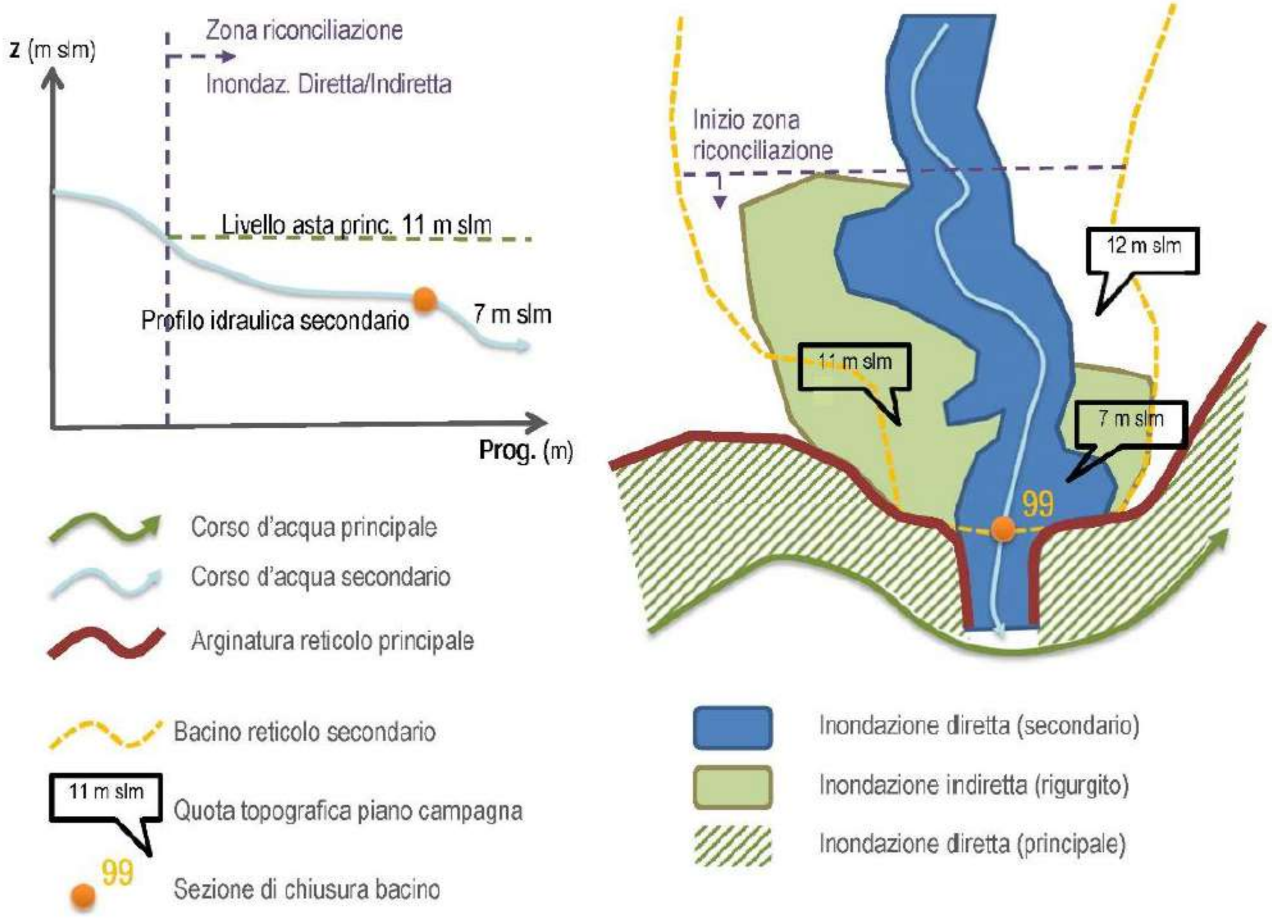




Conservative Estimation of Maximum Water Levels, Flow Depths, and Flow Velocities to Support Flood Hazard Mapping (PAI) at Every Cross-Section, Computational Cell, Confluence, and Hydraulic Structure.

Flood routing

Simulation of Flood Wave Propagation for 50-, 100-, 200-, and 500-Year Return Periods Under Multiple Hydraulic Scenarios



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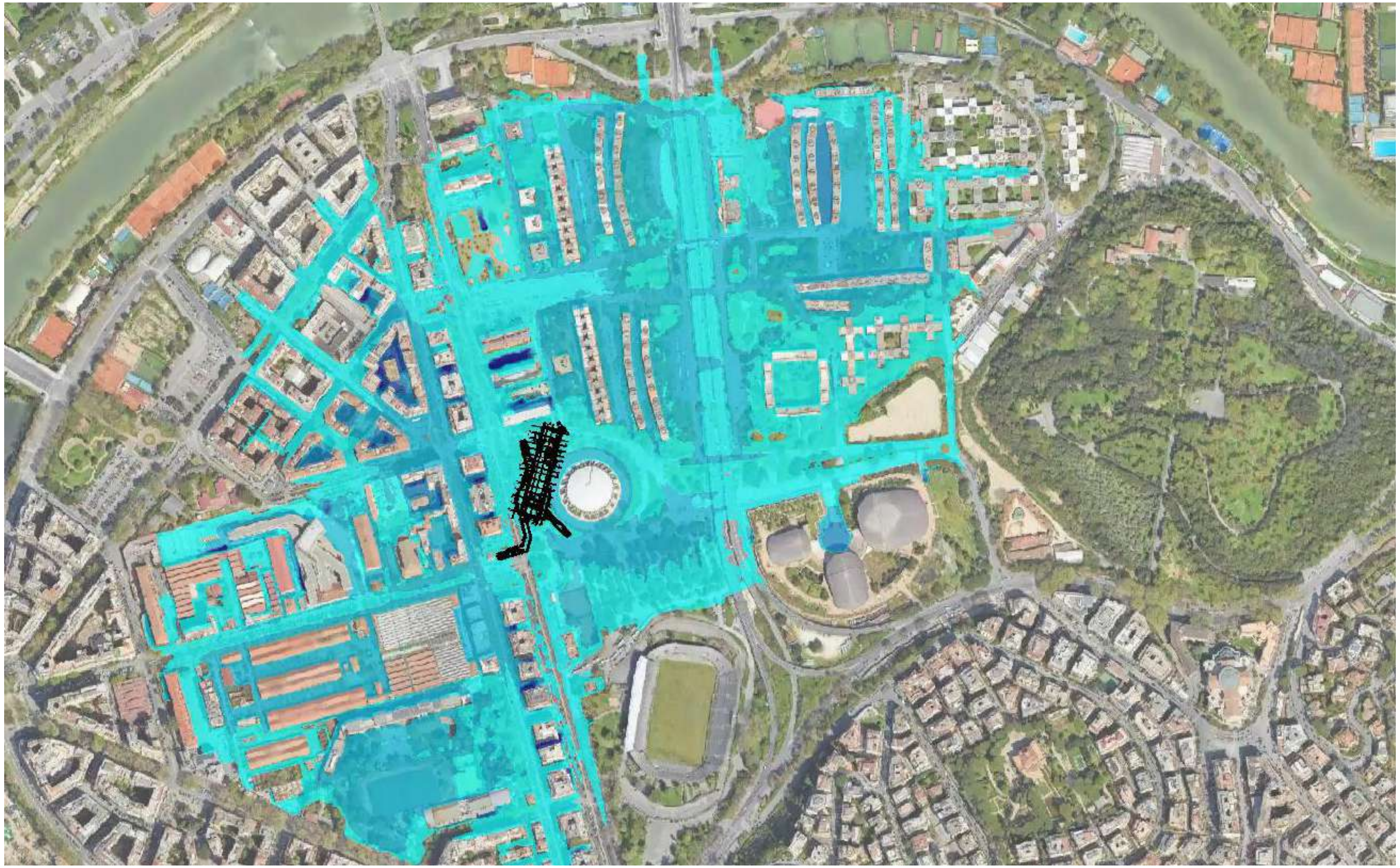
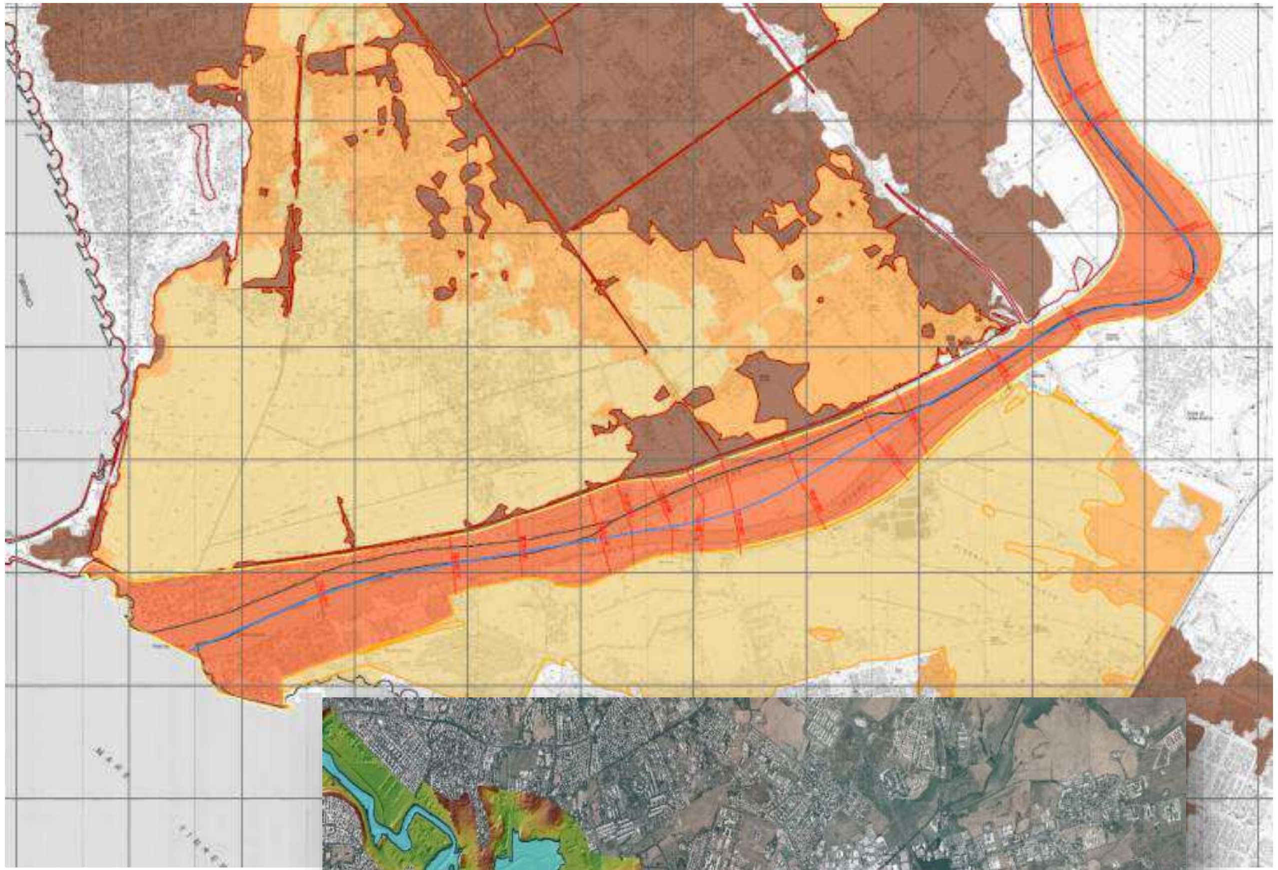
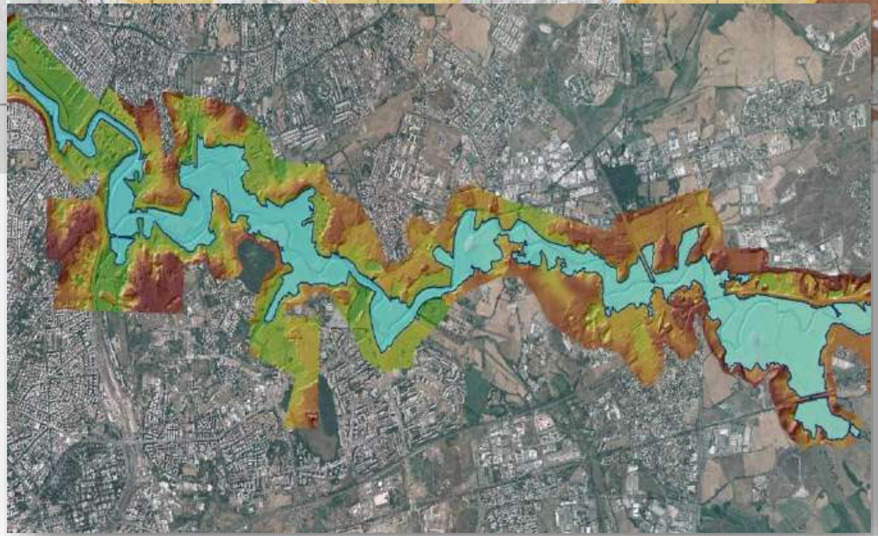
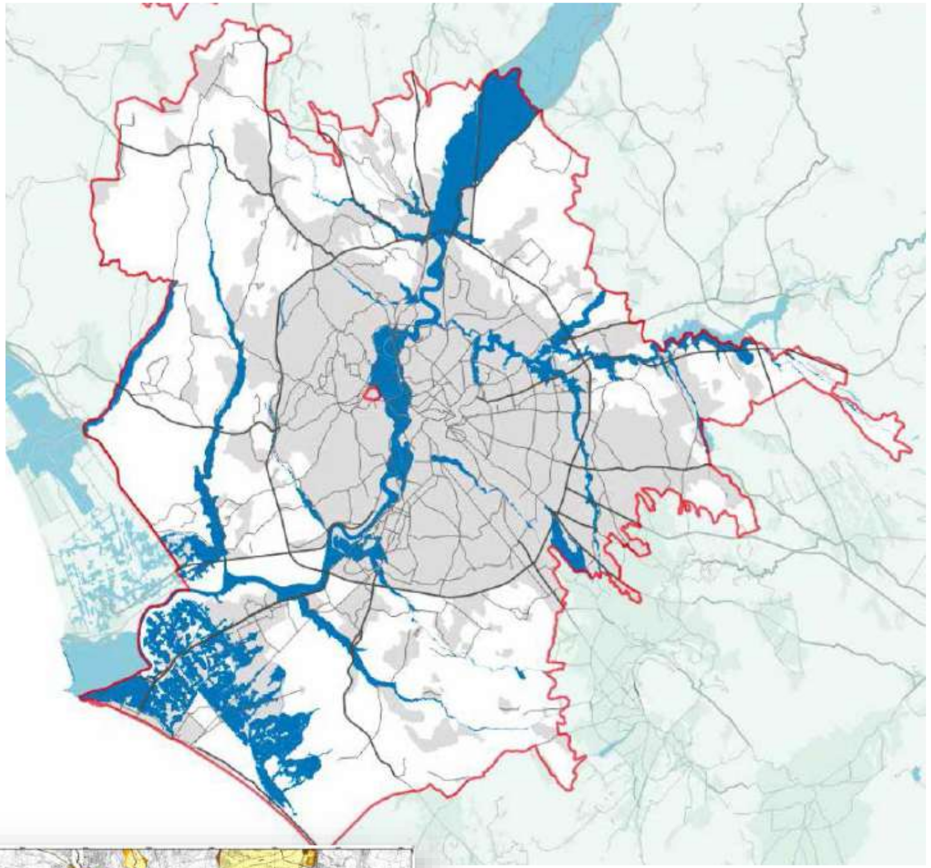


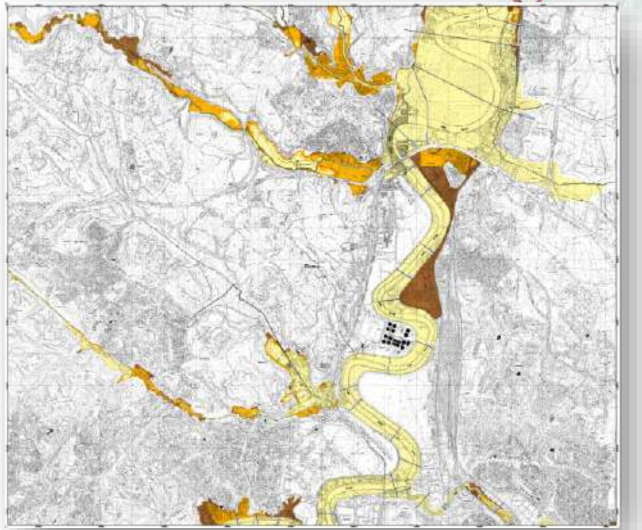
Flood routing

Flood routing

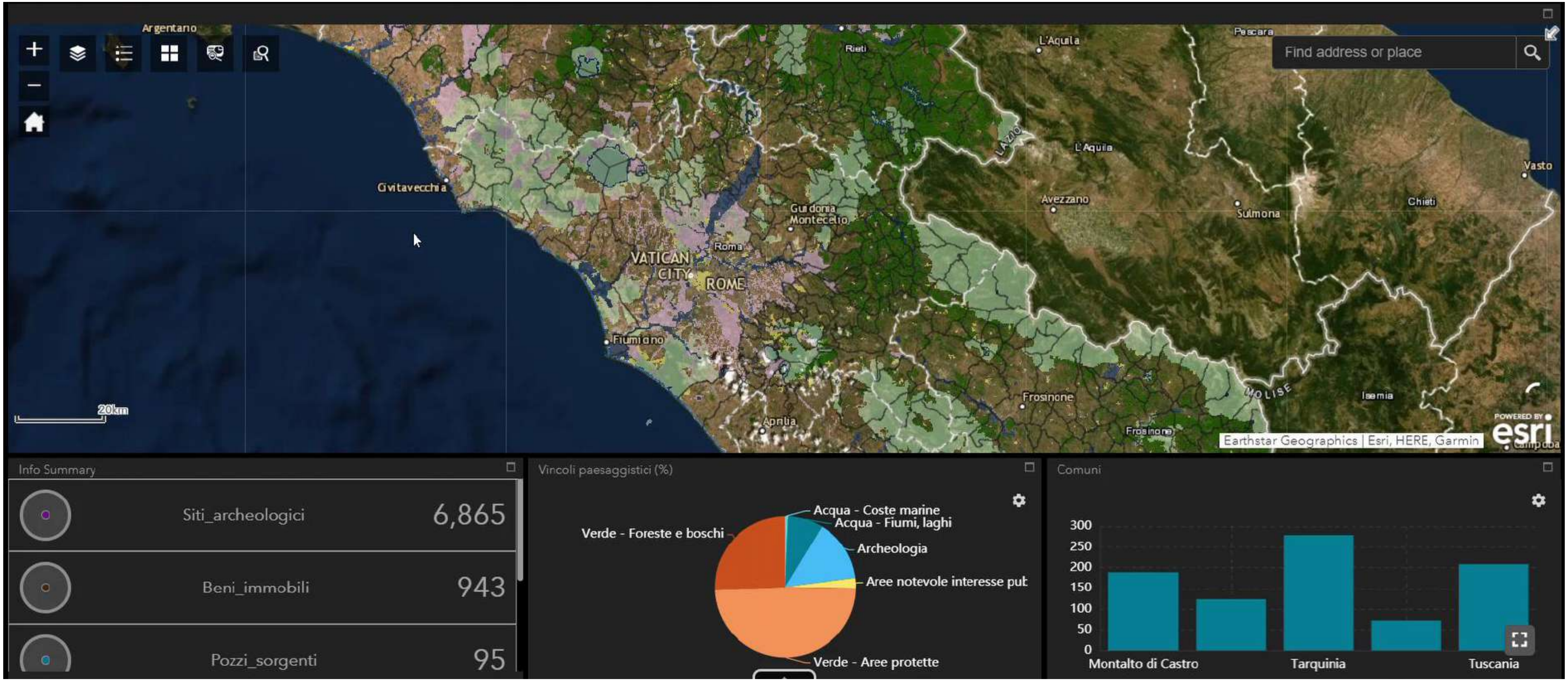








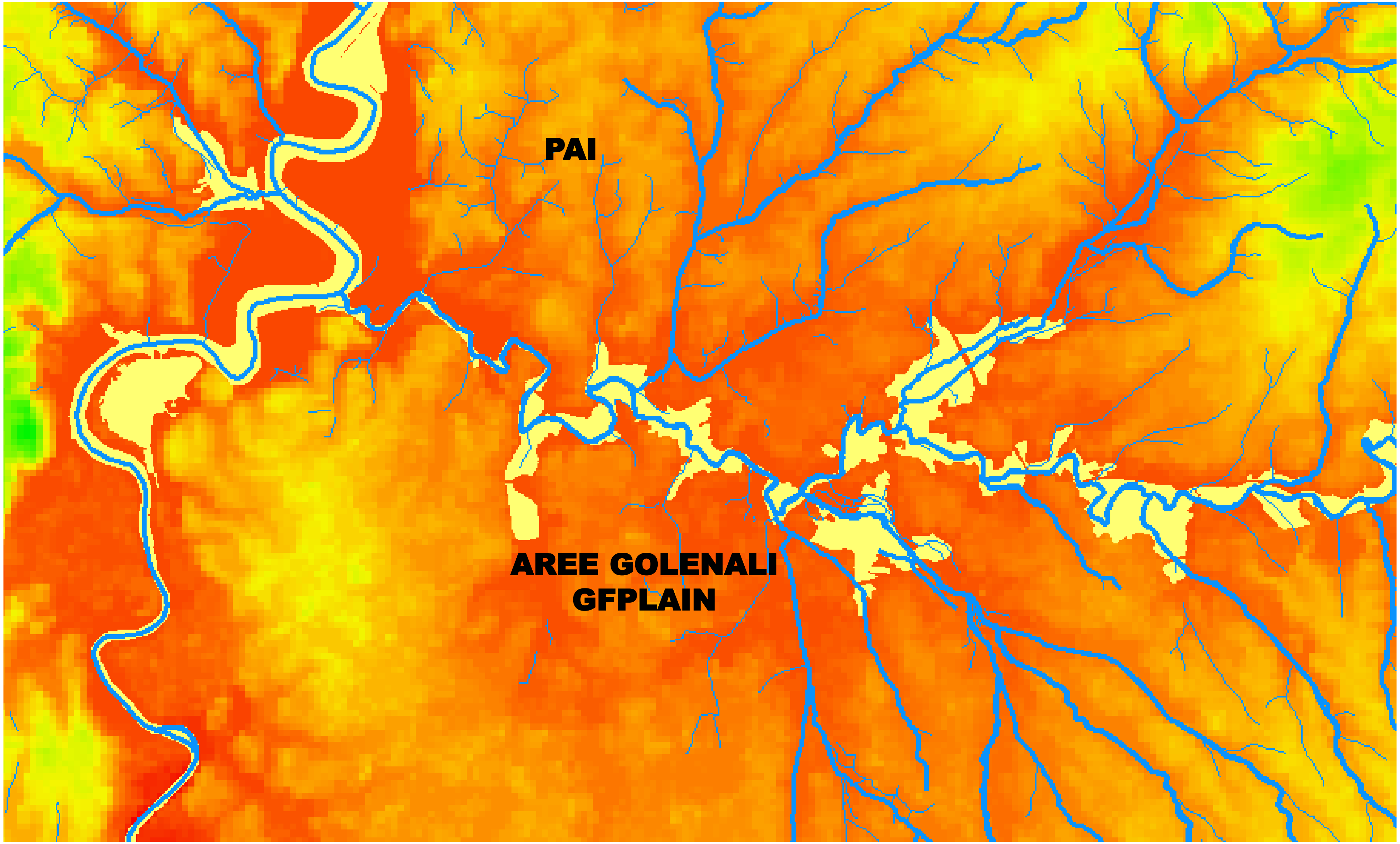
Mapping



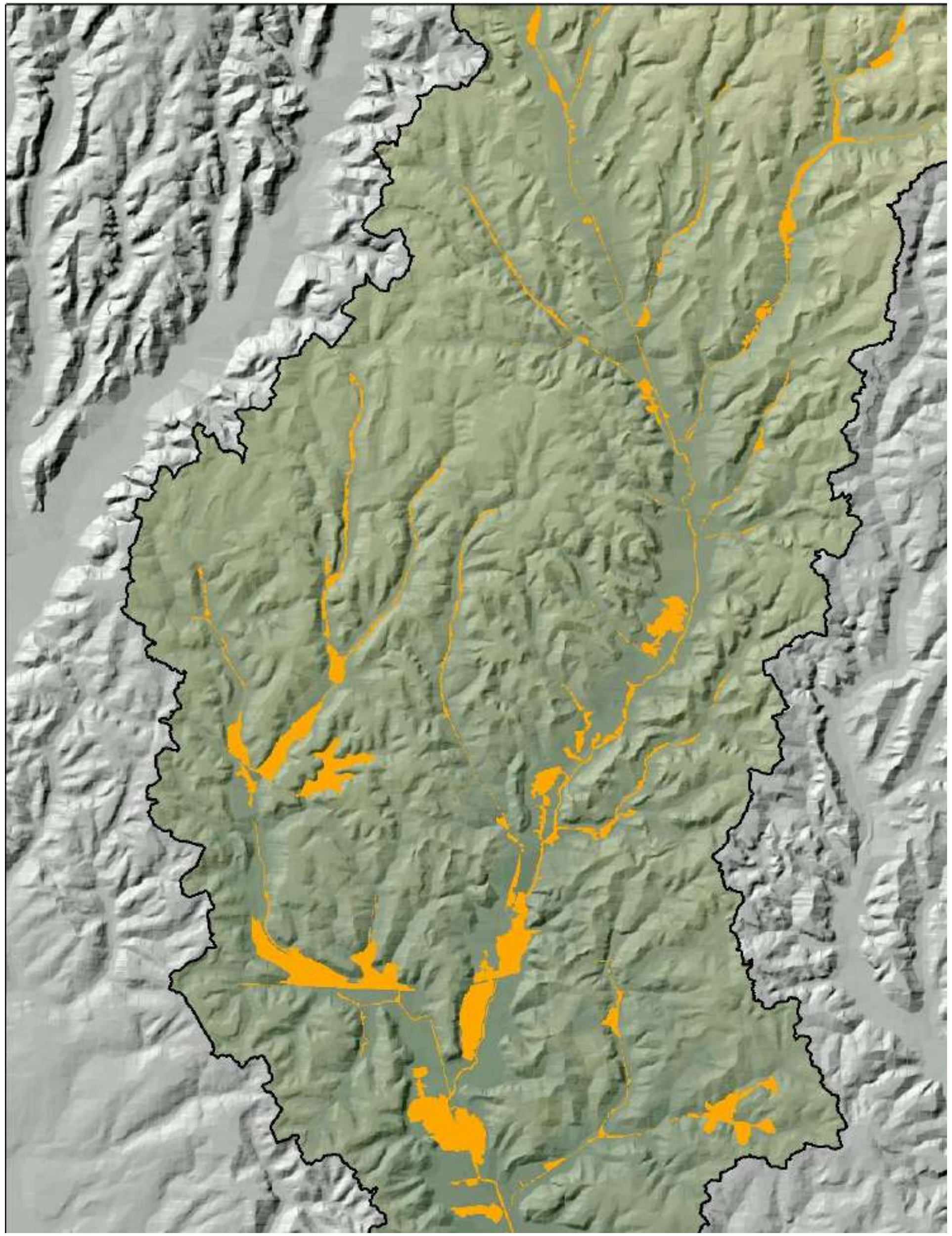
Hydrogeological Hazards, Regional Landscape Plan (PTPR), and Archaeological Sites/Areas at Risk

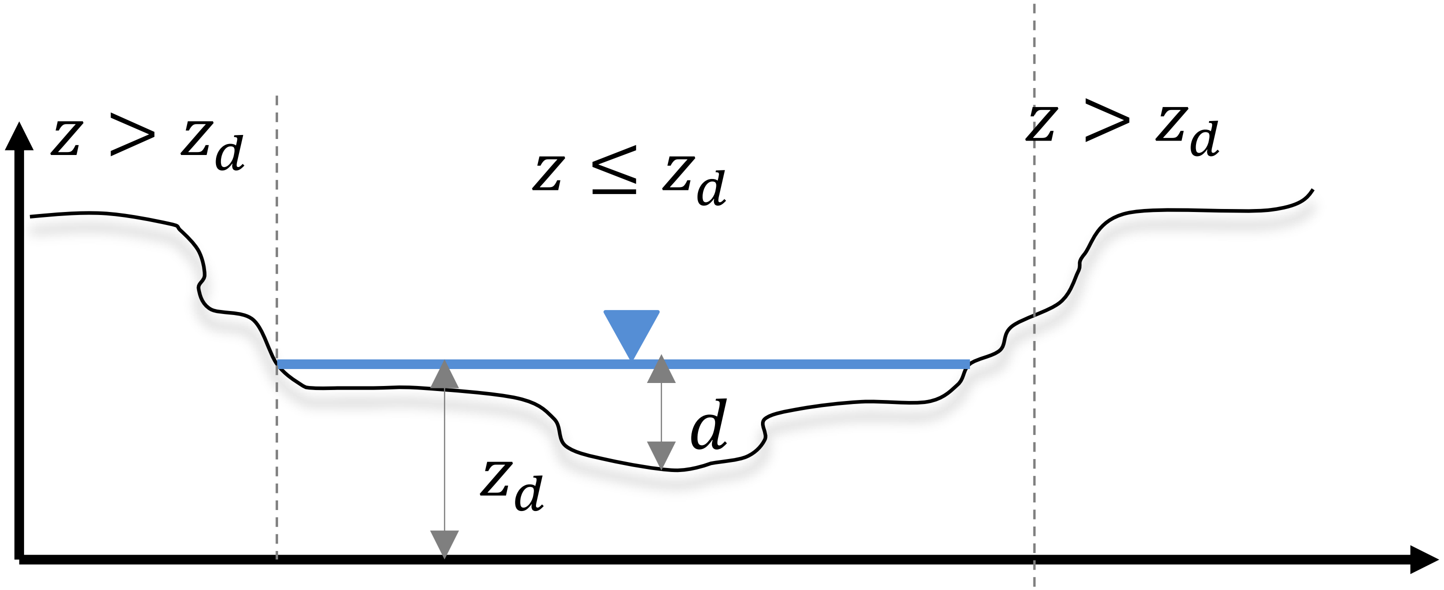
WEBGIS

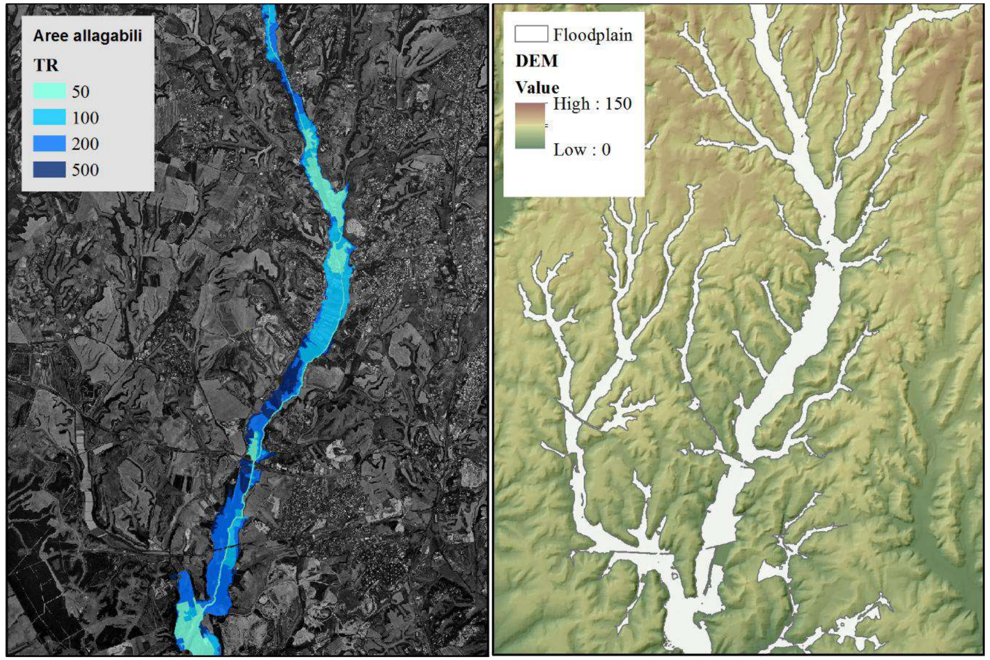
Geomorphological Floodplain Modelling



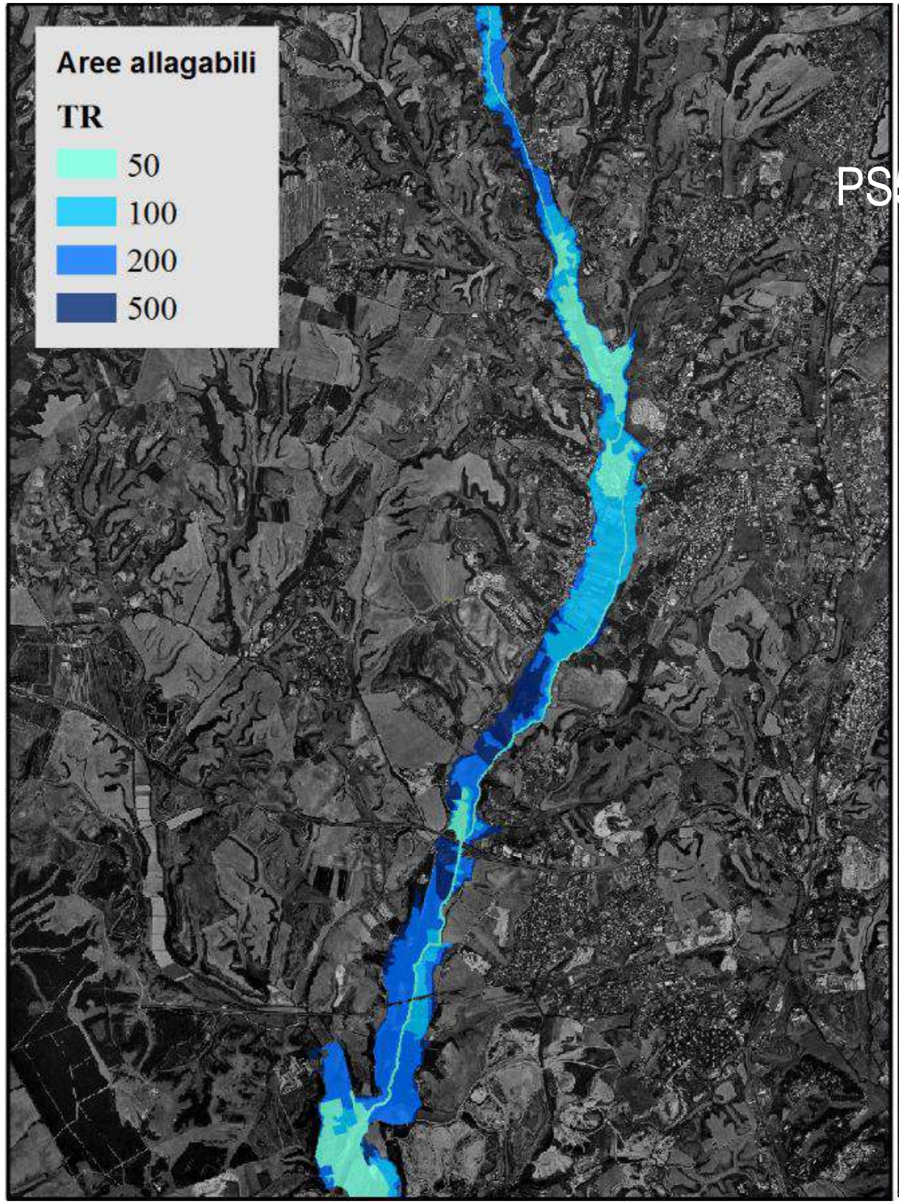
GFPLAIN model







Geomorphological Floodplain Modelling



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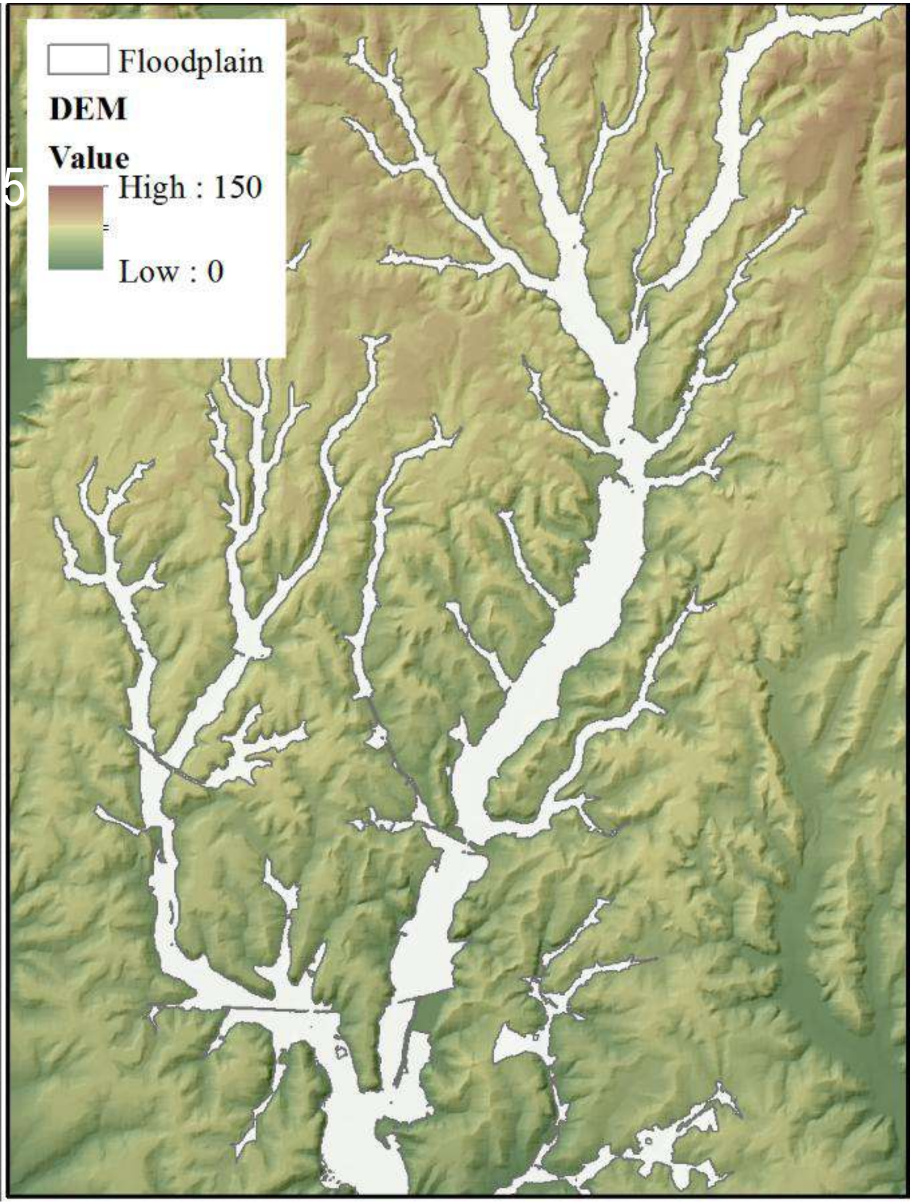
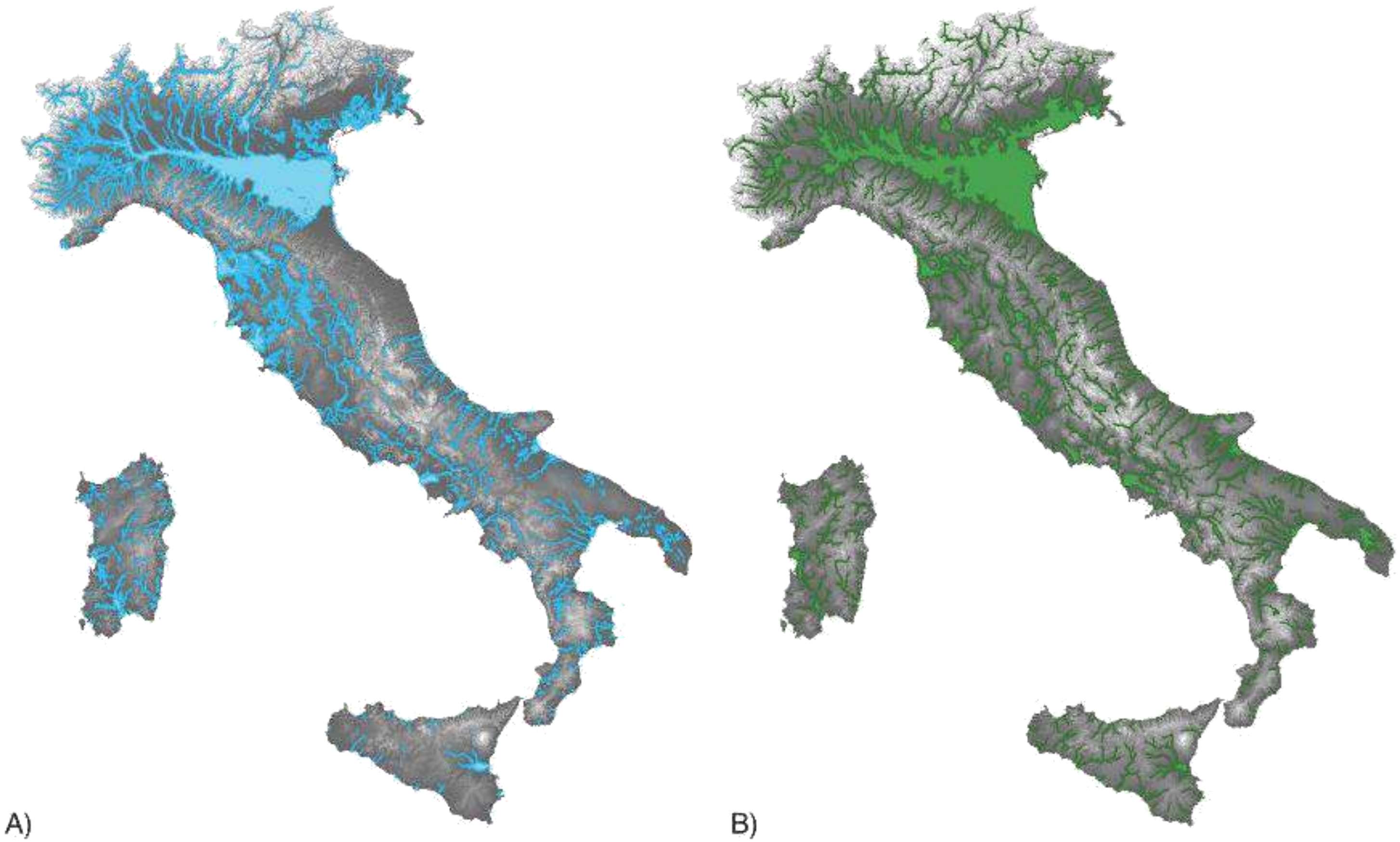
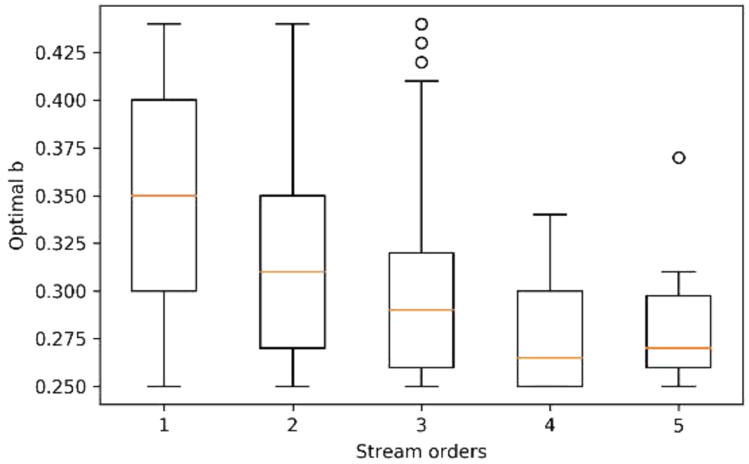


Geomorphological Floodplain Modelling





nature > scientific data > data descriptors > article

SCIENTIFIC DATA

Data Descriptor | Open Access | Published: 15 January 2019

GFPLAIN250m, a global high-resolution dataset of Earth's floodplains

F. Nardi, A. Annis, G. Di Baldassarre, E. R. Vivoni & S. Grimaldi

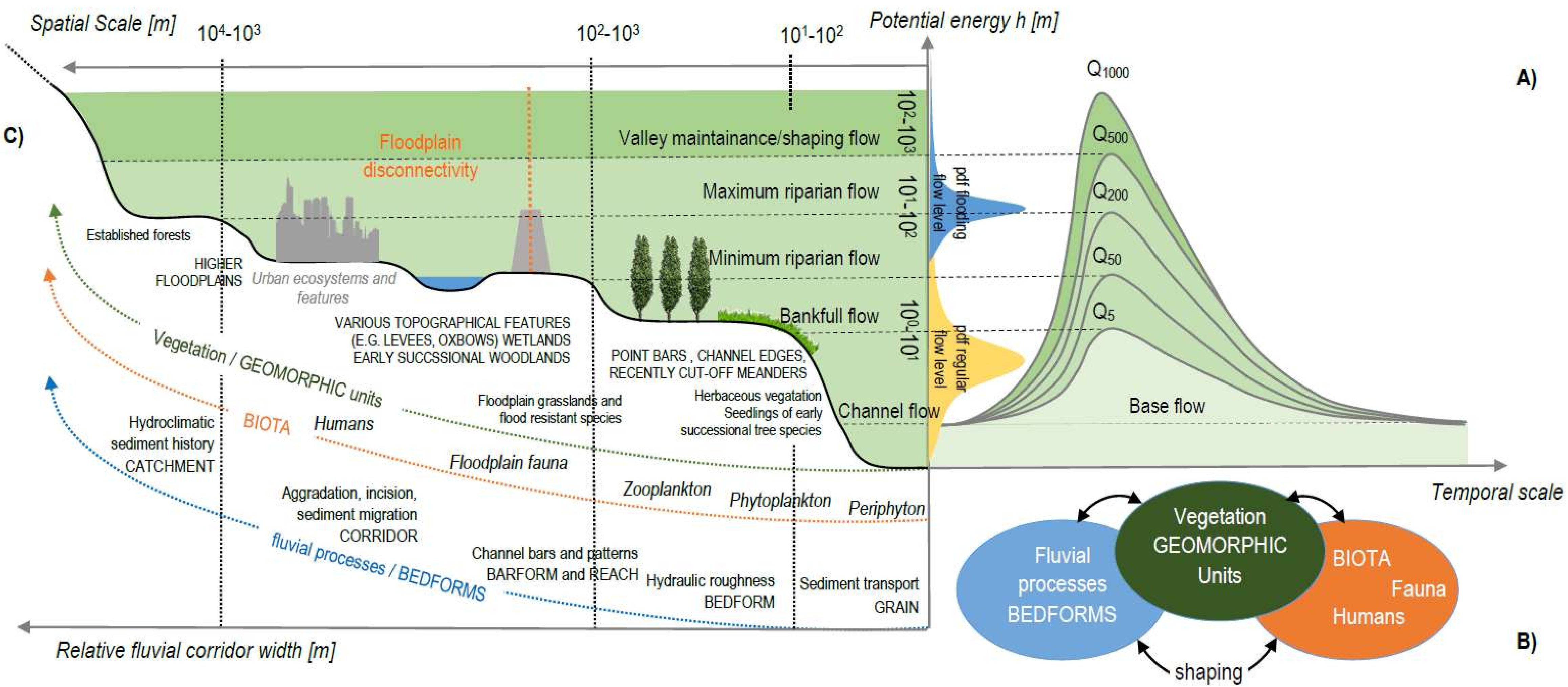
Scientific Data **6**, Article number: 180309 (2019) | Cite this article

Abstract

Identifying floodplain boundaries is of paramount importance for earth, environmental and socioeconomic studies addressing riverine risk and resource management. However, to date, a global floodplain delineation using a homogeneous procedure has not been constructed. In this

GFPLAIN250m (Nardi et al., *Scientific data* 2019)

Geomorphological Floodplain Modelling



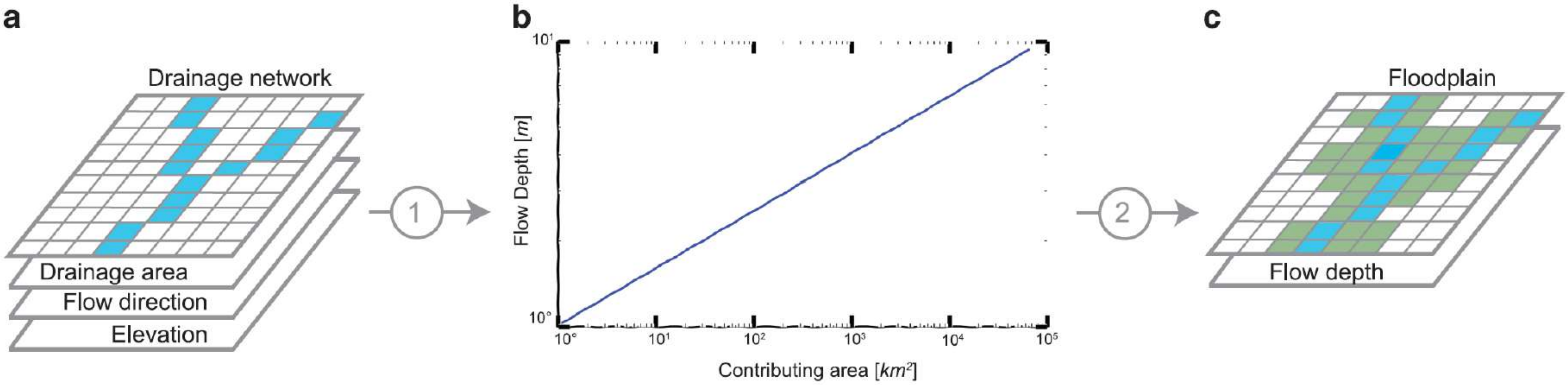
GFPLAIN250m (Nardi et al., *Scientific data* 2019)

GFPLAIN algorithm

GFPLAIN algorithm is a **fast and easy to use python script** supporting **continental floodplain zoning in minutes**

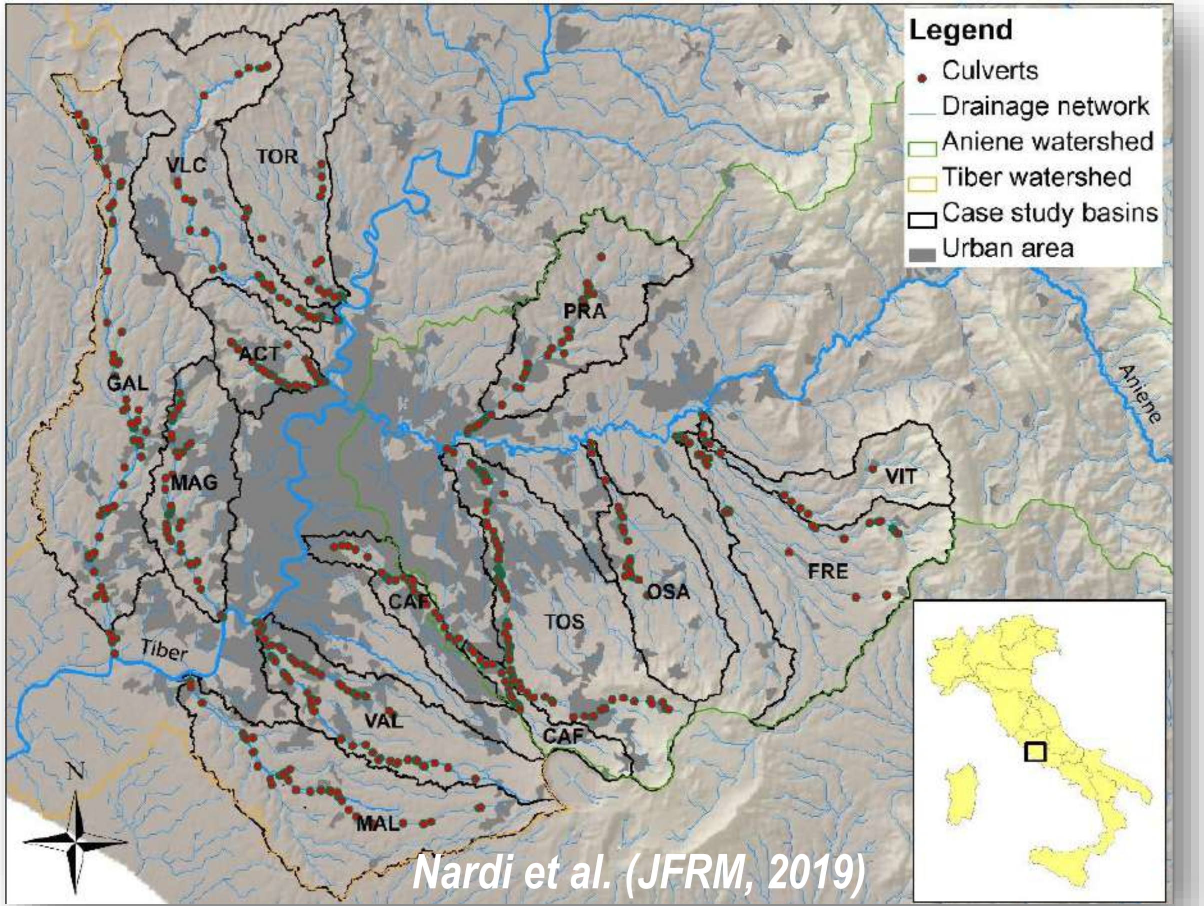
A **proximity to river analysis** is developed by the GFPLAIN algorithm for identifying fluvial corridors associated to maximum **flow level h / energy E** power law (h/E ∝ A) with contributing area A as scaling factor

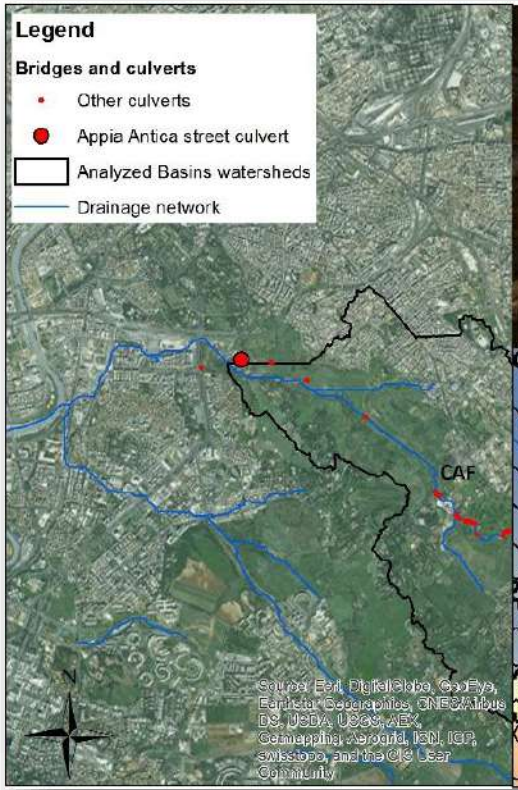
https://github.com/fnardi/GFPLAIN

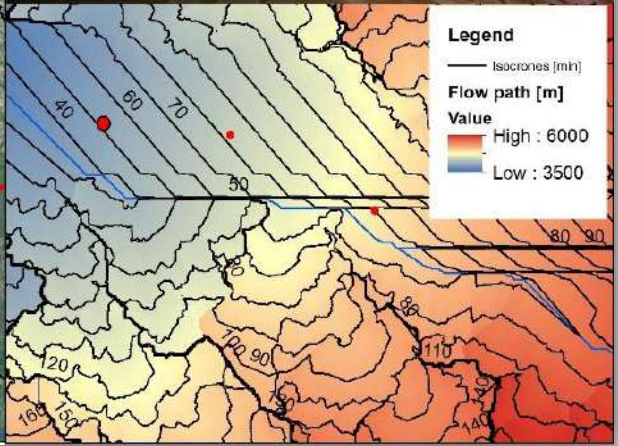


Nardi et al., Scientific Data, 2019

Flood governing factors and mitigation actions



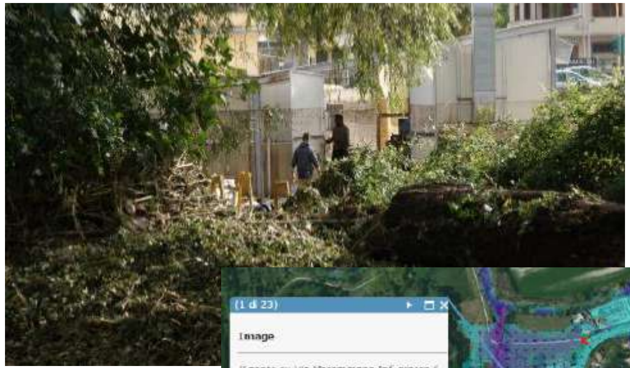


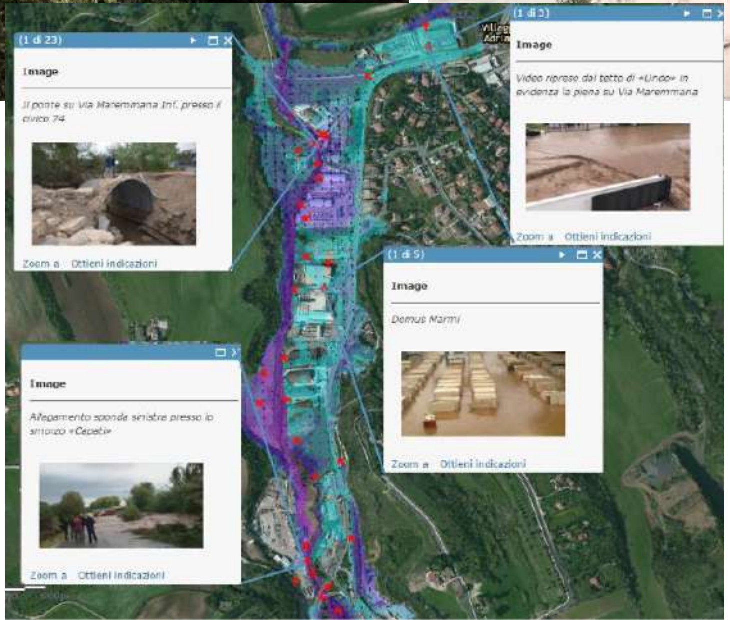


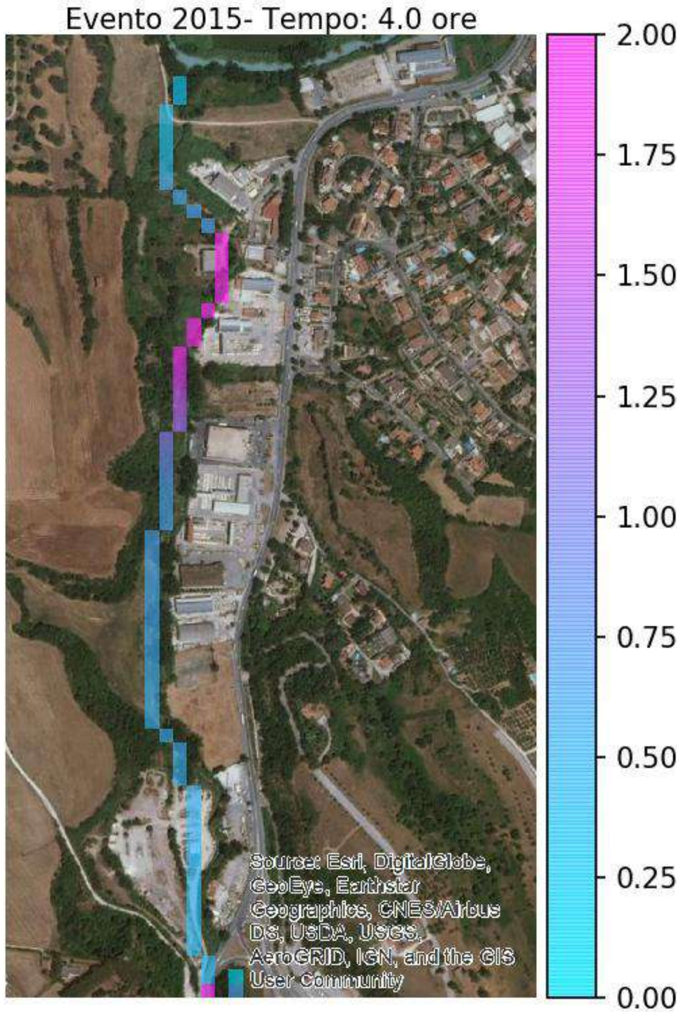
220 km of River Network
600 Bridges and culverts

180 Bridges and Structures of Historical and Archaeological Significance

Flood governing factors and mitigation actions

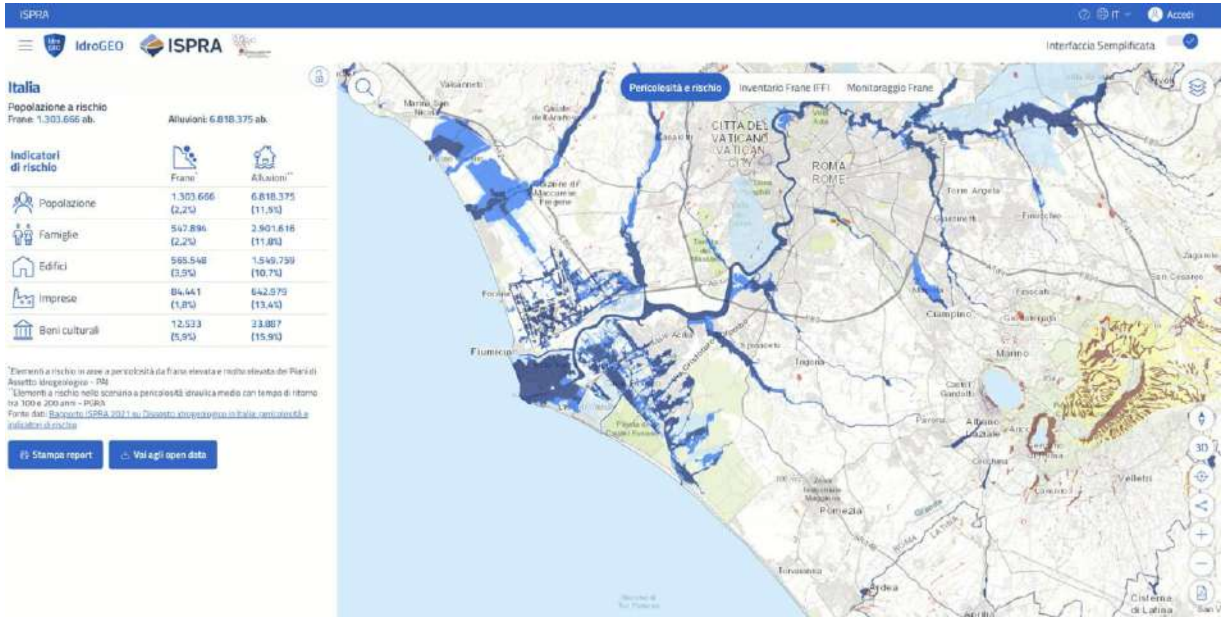






2018
Flood Event
Via Maremmana (Fosso S. Vittorino)

Unveiling flood risk



Coastal areas

Land reclamation / rural areas

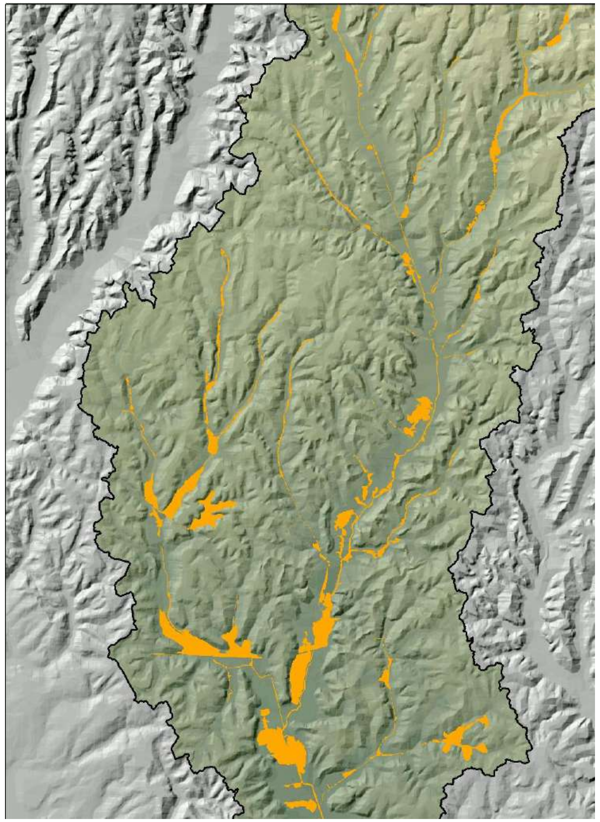
Critical infrastructures (airports, ports, highways)

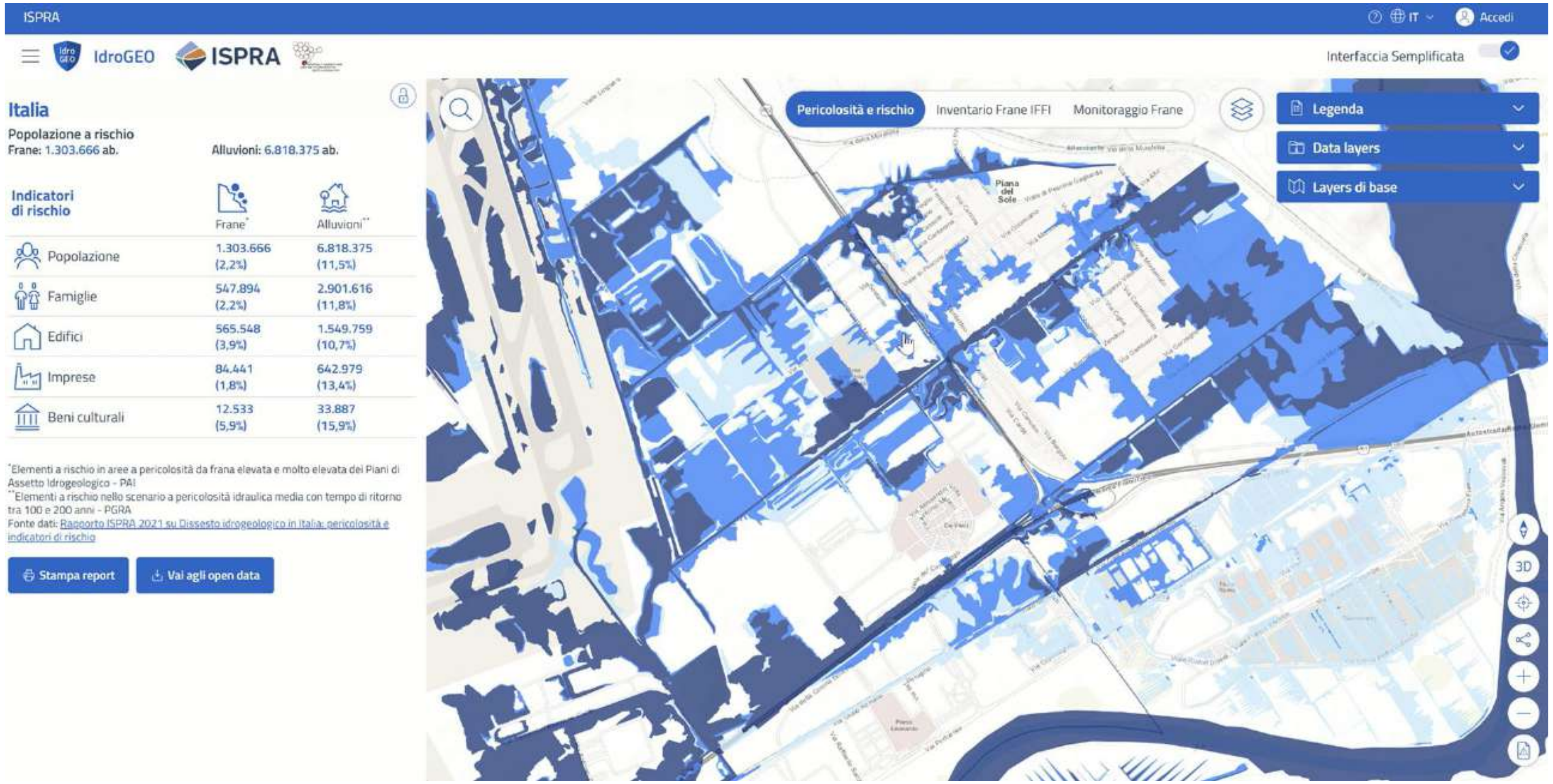
Subsidence, levee protected

Complex hydrography (natural major rivers, artificial drainage rural channels)

Lack of detailed flood studies

Unveiling flood risk





Small ungauged basins

Lack of hydrologic monitoring data

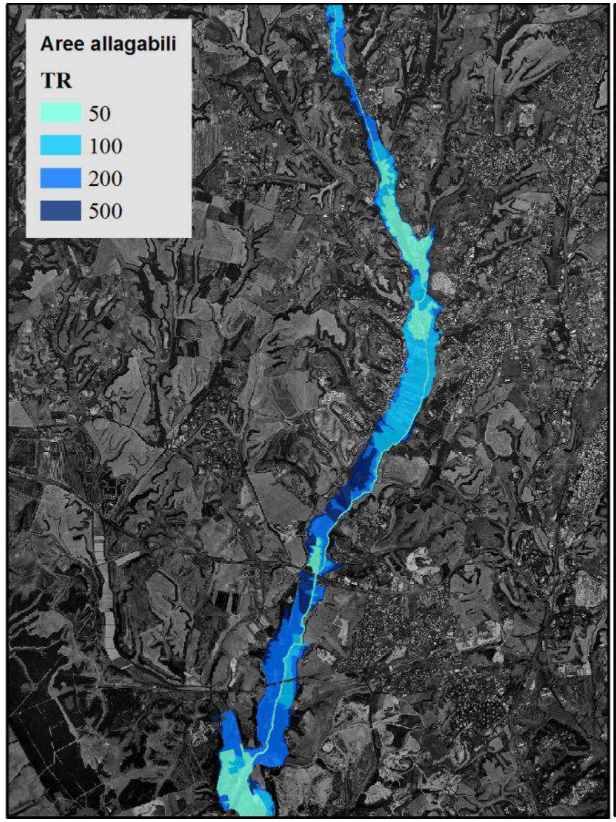
Critical human settlements and infrastructures

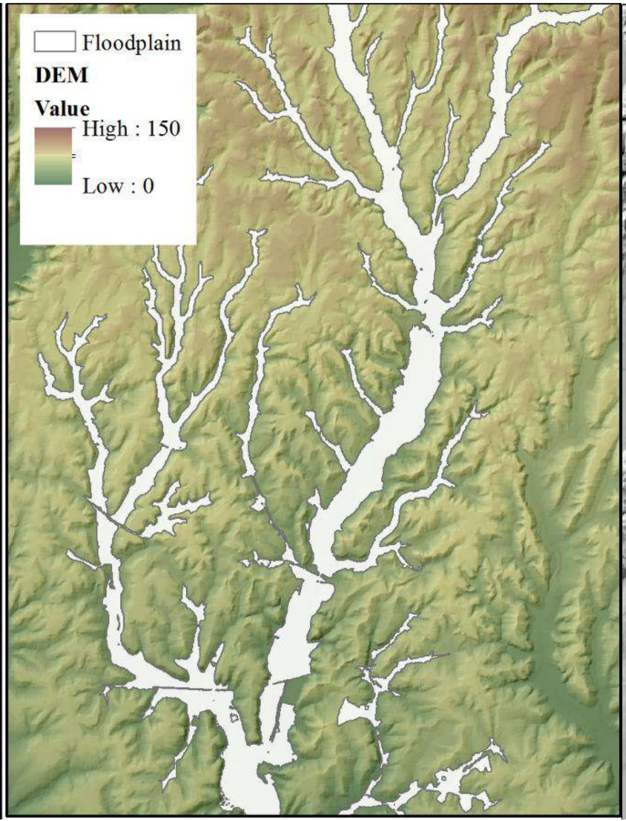
Cultural heritage and internal areas

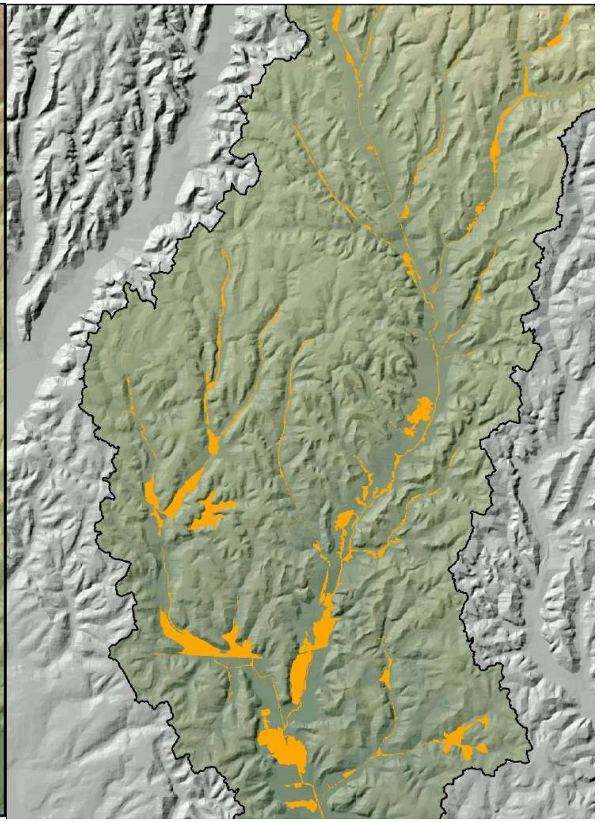
Natural resources and ecosystem services

Lack of flood studies in internal and uphill areas

Unveiling flood risk







Small ungauged basins

Lack of hydrologic monitoring data

Critical human settlements and infrastructures

Cultural heritage and internal areas

Natural resources and ecosystem services

Lack of flood studies

RETURN

Finanziato dall'Unione europea NextGenerationEU

Ministero dell'Università e della Ricerca

Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA

RETURN – Multi-Risk Science for Resilient Communities under a Changing Climate

Funding: €115 million from Italian Ministry of University and Research (MUR), under the National Recovery and Resilience Plan (PNRR)

26 partners including universities, research centers, public authorities, and private stakeholders

8 Thematic Spokes:

VS1: Water

VS2: Soil instability

VS3: Earthquakes and volcanoes

VS4: Environmental degradation

TS1: Urban and metropolitan settlements

TS2: Multi-risk resilience of critical infrastructure

TS3: Community resilience to risks

DS: Climate services science for risk mitigation and adaptation

Objectives

Improve understanding of environmental, natural, and anthropogenic risks and their interaction with climate change

Enhance forecasting capabilities and develop methodologies for prevention, adaptation, and mitigation

Develop new methodologies and technologies for monitoring

Promote efficient and sustainable use of data, products, and services

Strengthen links between research and real-world applications, fostering skills development, technology transfer, and service integration

Return

multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate

Simplified large scale hydrologic, hydraulic and geomorphic modelling for identifying flood hot spots - FloodNodes

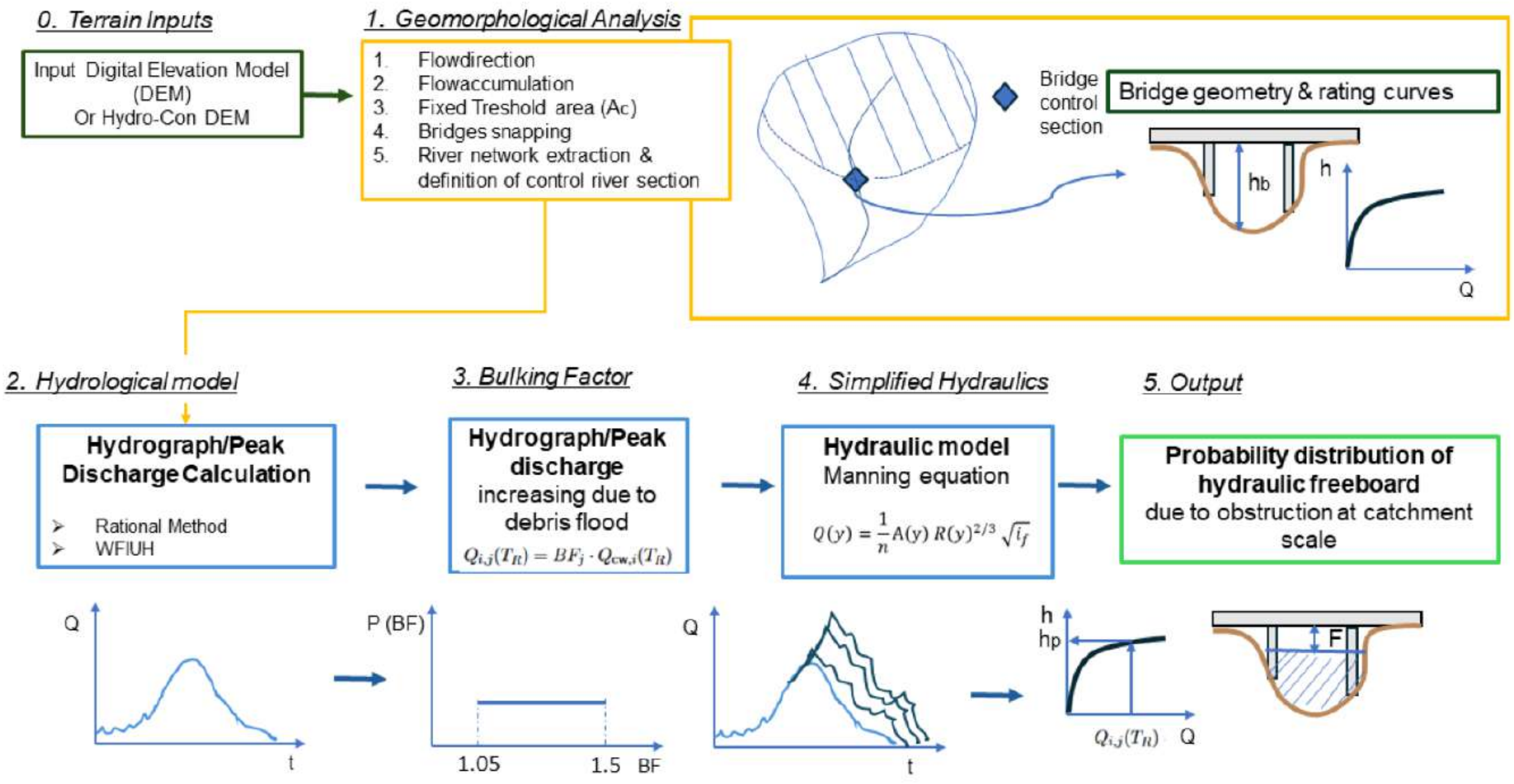
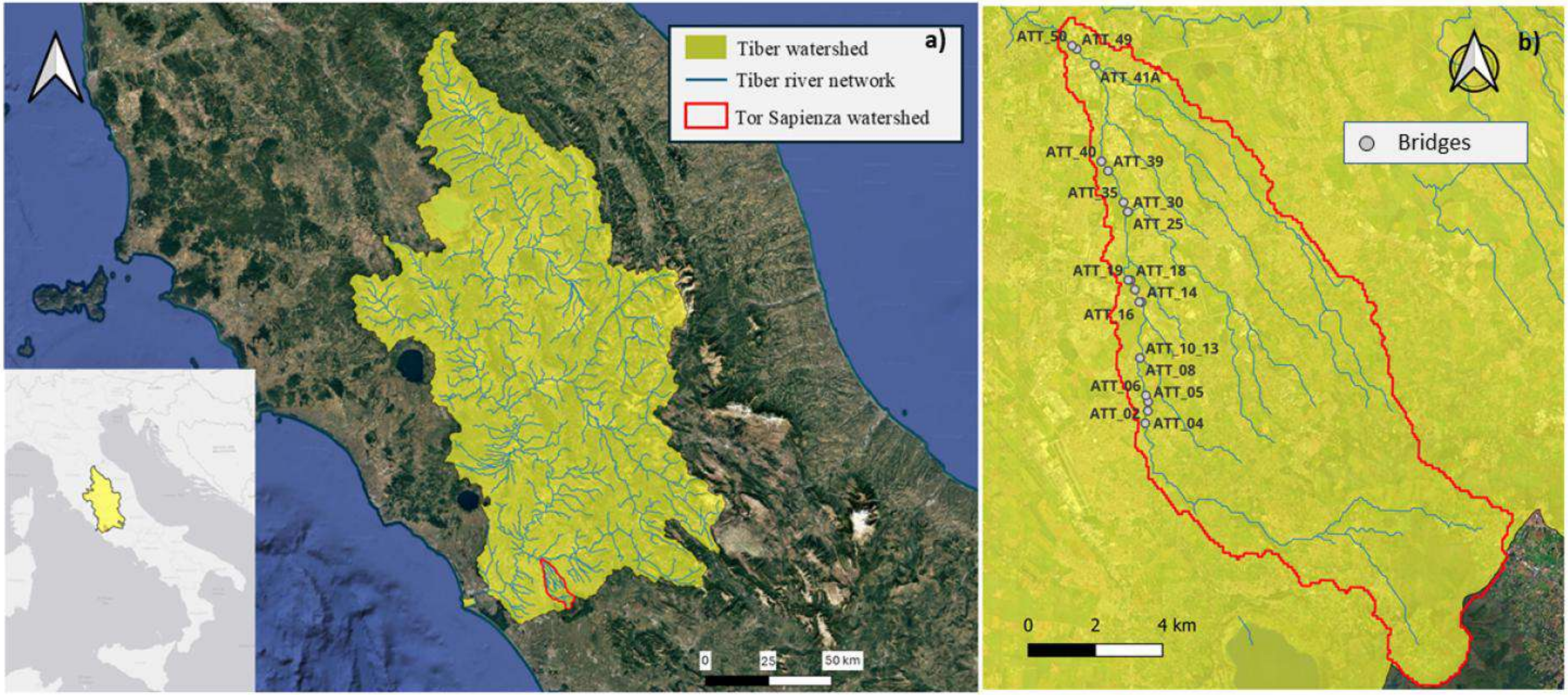


Figure 1: FloodNodes Workflow

Simplified large scale hydrologic, hydraulic and geomorphic modelling for identifying flood hot spots - FloodNodes

TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA



Simplified large scale hydrologic, hydraulic and geomorphic modelling for identifying flood hot spots - FloodNodes

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UNIVERSITÀ DEGLI STUDI DI ROMA

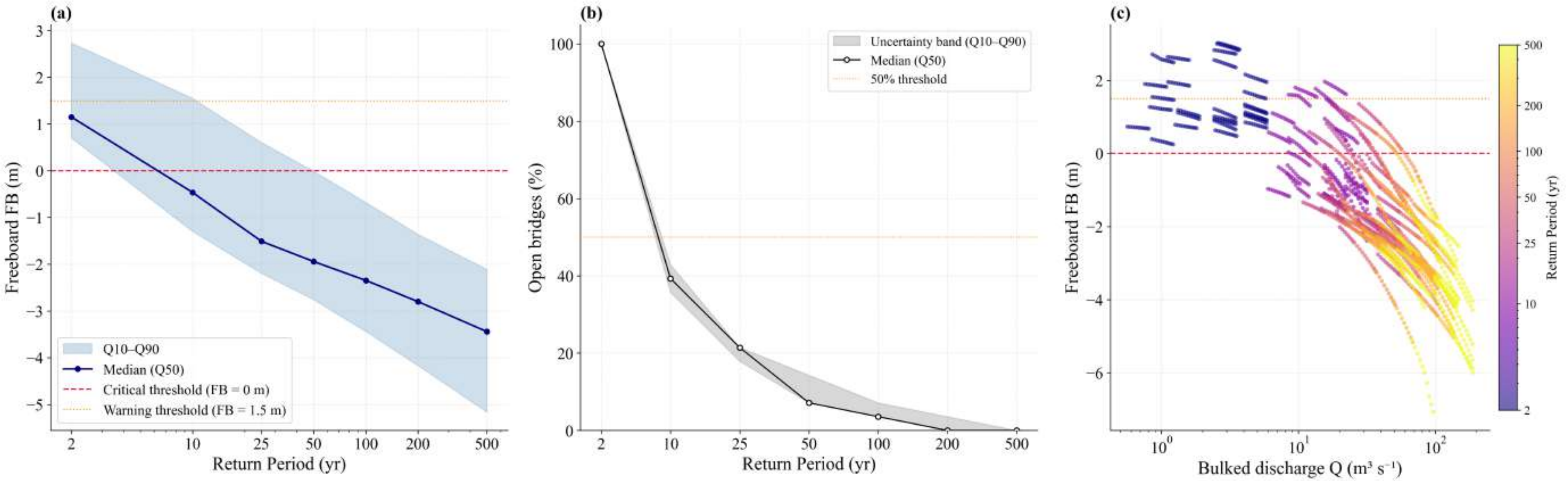
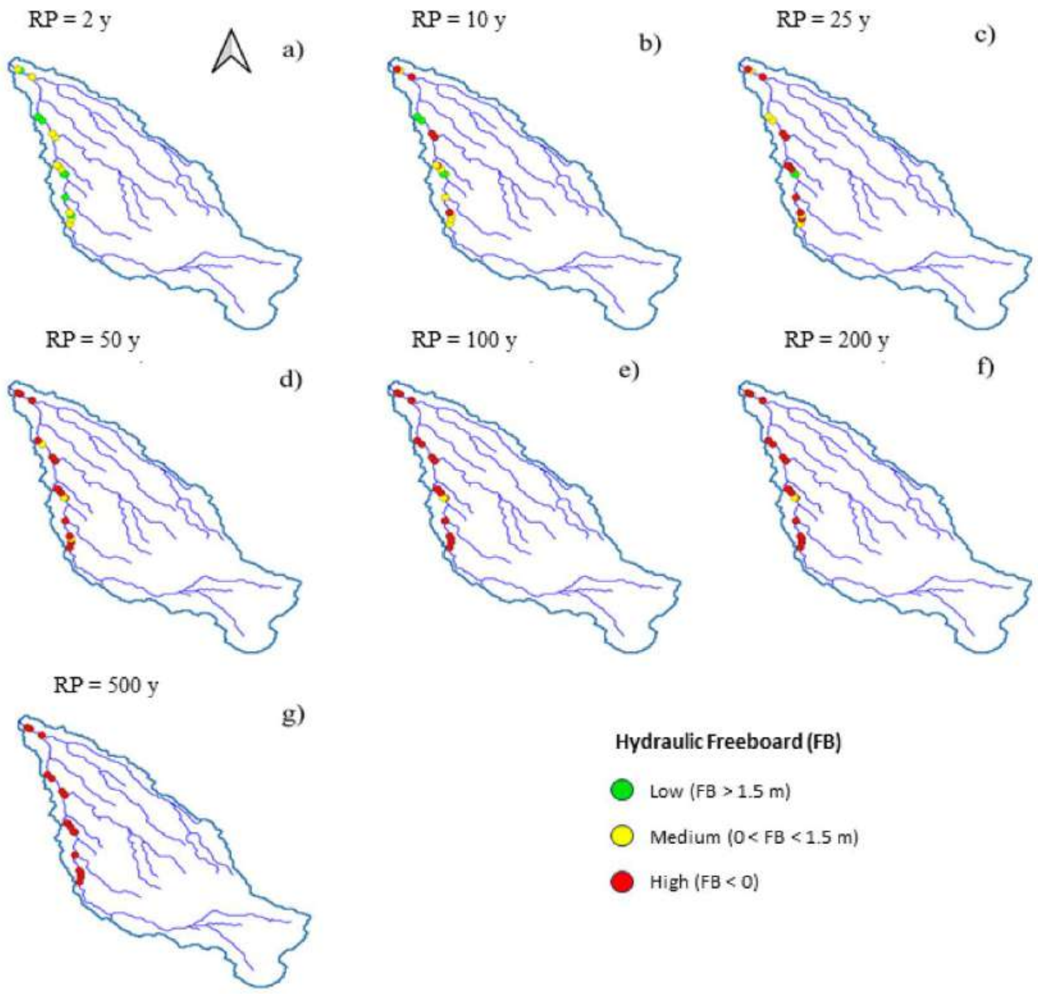


Figure 3: Basin-scale hydraulic risk assessment for the Tor Sapienza sub-basin. (a) Distribution of freeboard (FB) across all bridges and bulking factor scenarios: shaded band represents the Q10–Q90 interquantile range; solid line is the median (Q50). The red dashed line marks the critical threshold (FB = 0 m); the orange dotted line the warning threshold (FB = 1.5 m); (b) Fraction of bridges remaining hydraulically open (FB > 0 m) as a function of return period. The grey band spans the Q10–Q90 uncertainty range induced by the bulking factor distribution (BF = 1.05–1.50); the black line represents the median scenario. (c) Scatter plot of freeboard versus bulked discharge for all bridge–return period combinations, coloured by return period

Simplified large scale hydrologic, hydraulic and geomorphic modelling for identifying flood hot spots - FloodNodes

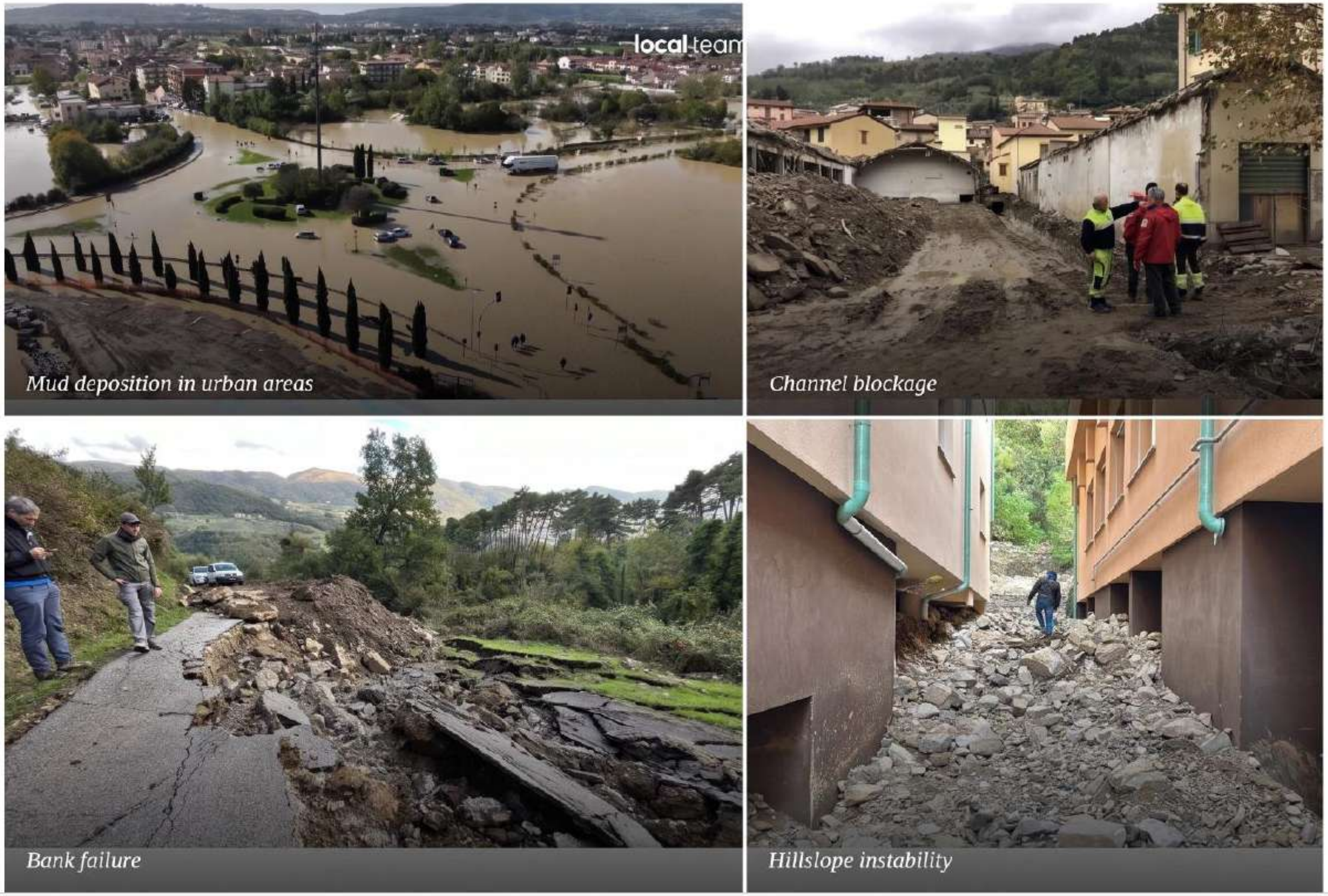


Backwater effects

Culvert-Bridge blockage

Bulking factor

Land instability and flooding



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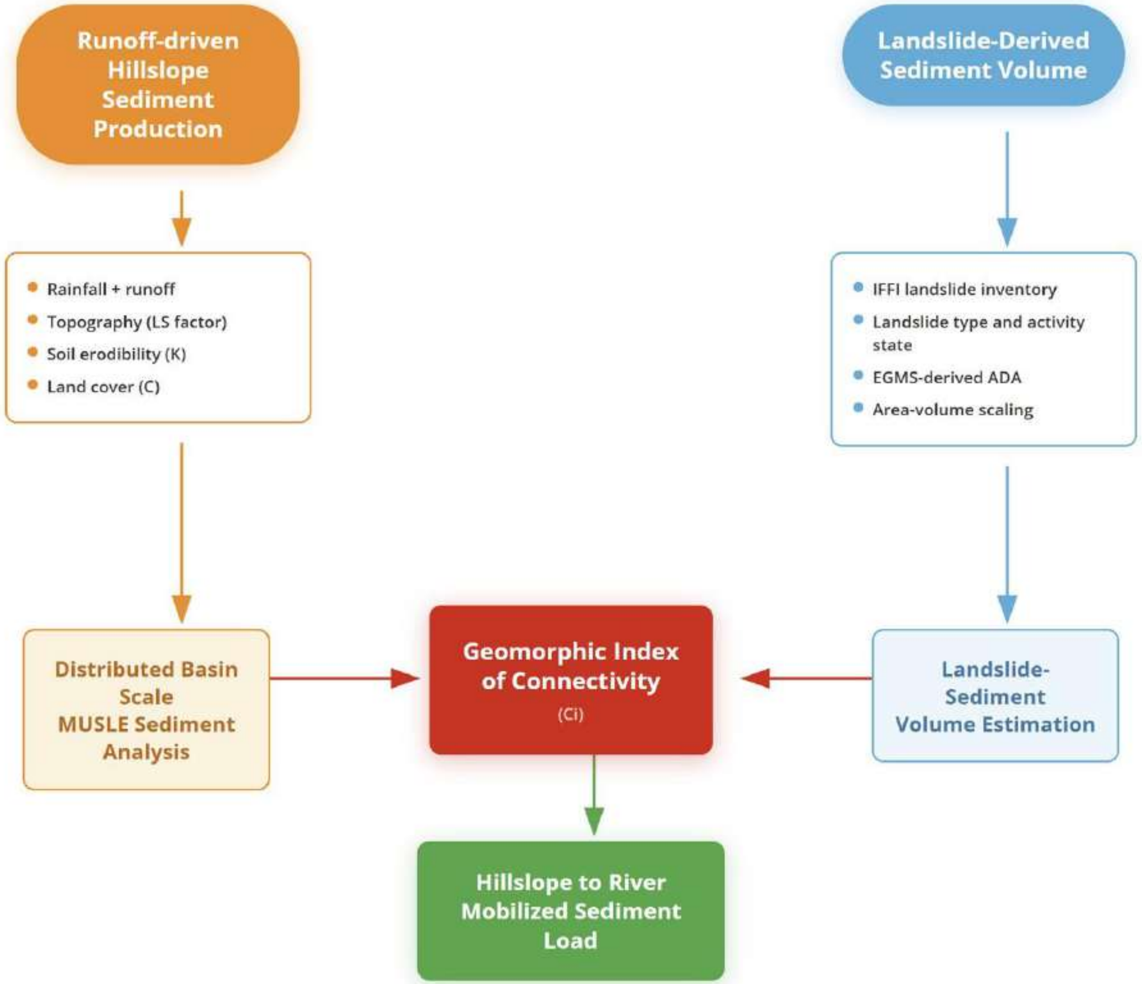
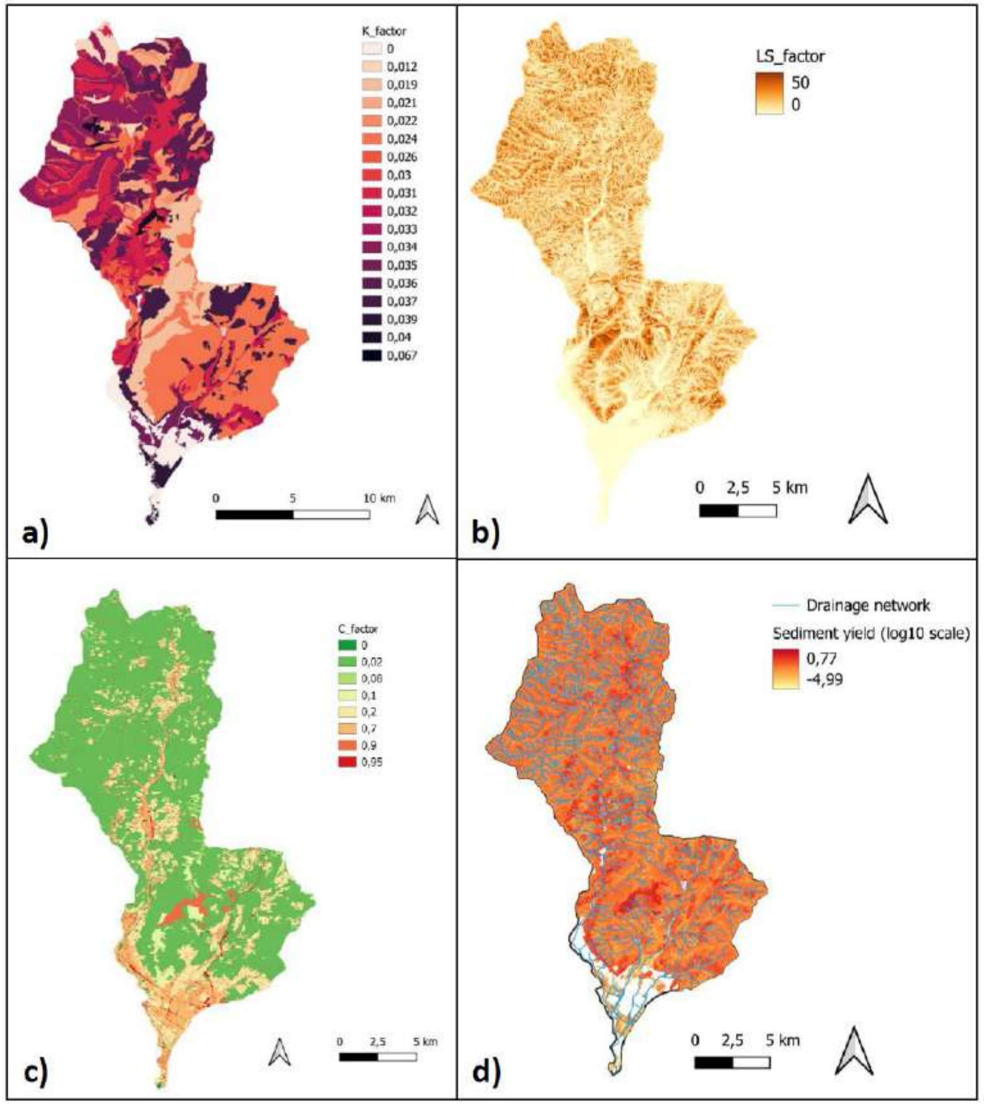
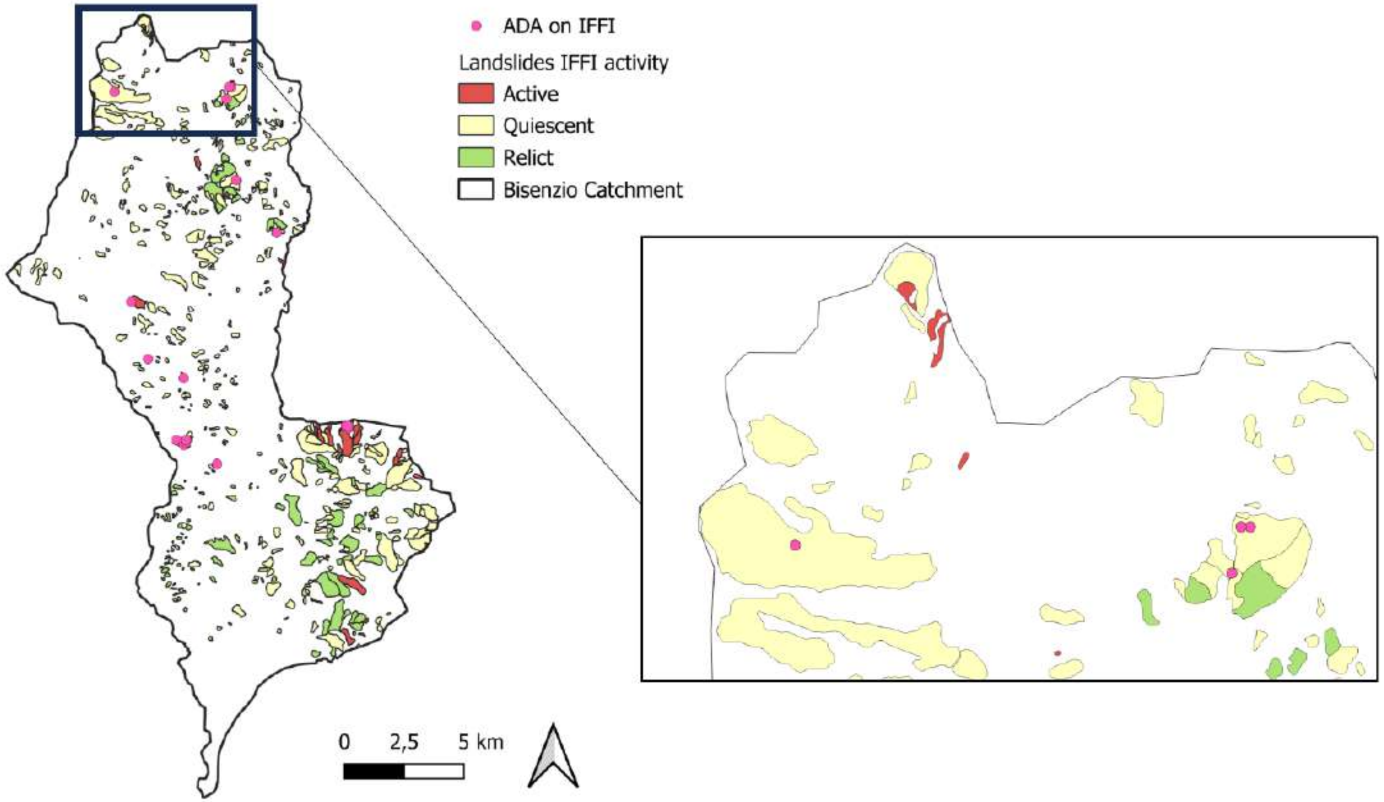
Land instability and flooding

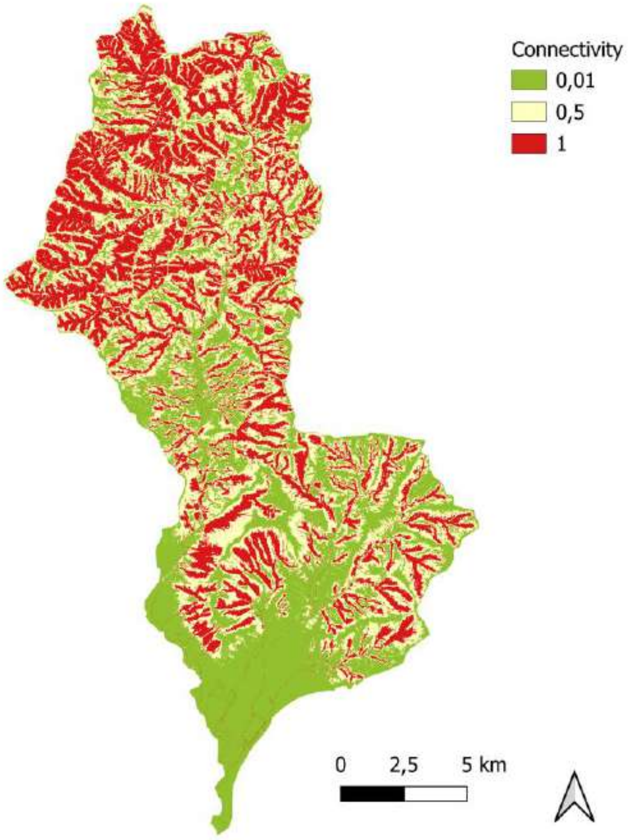


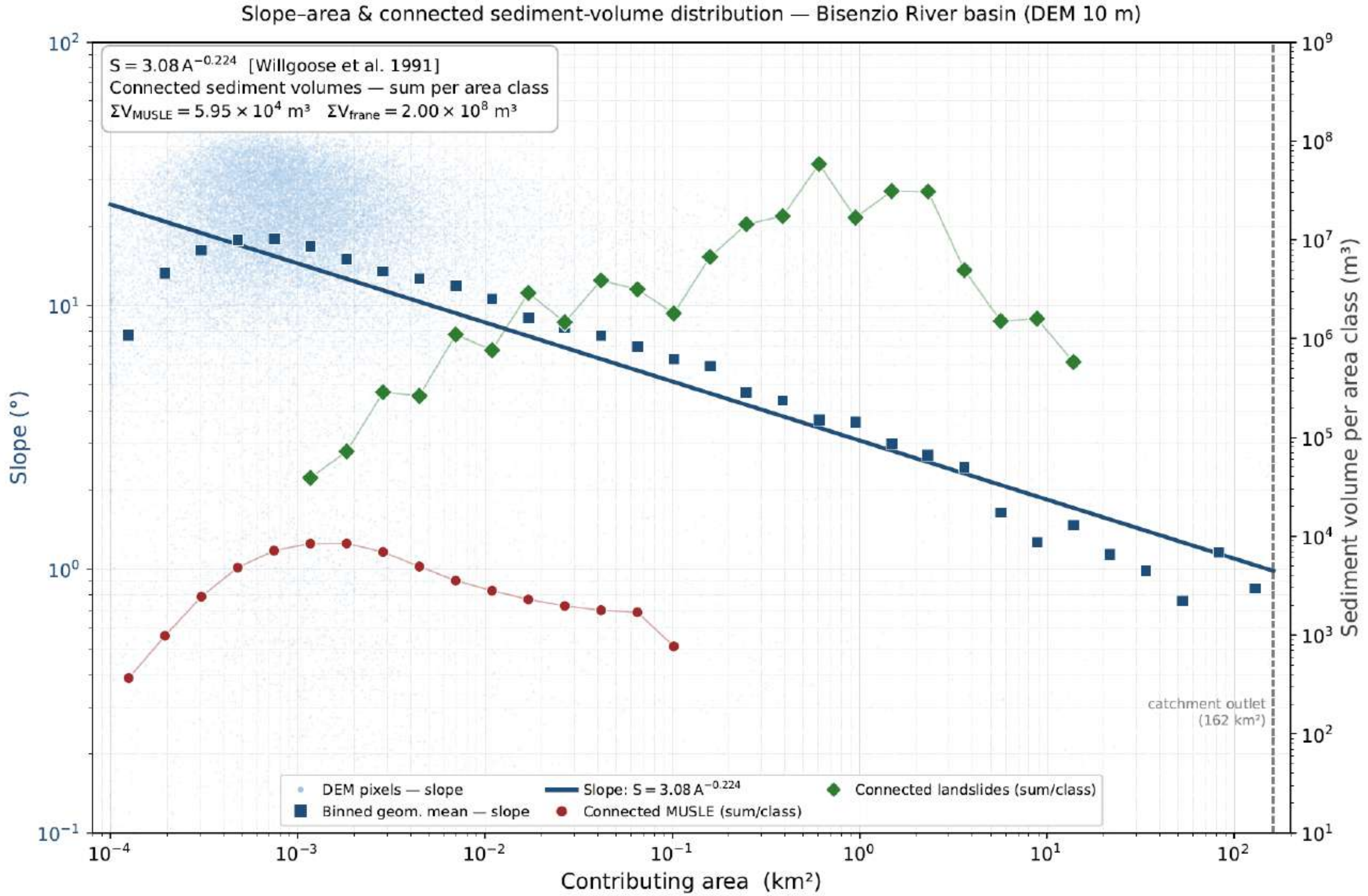
Land instability and flooding





Land instability and flooding





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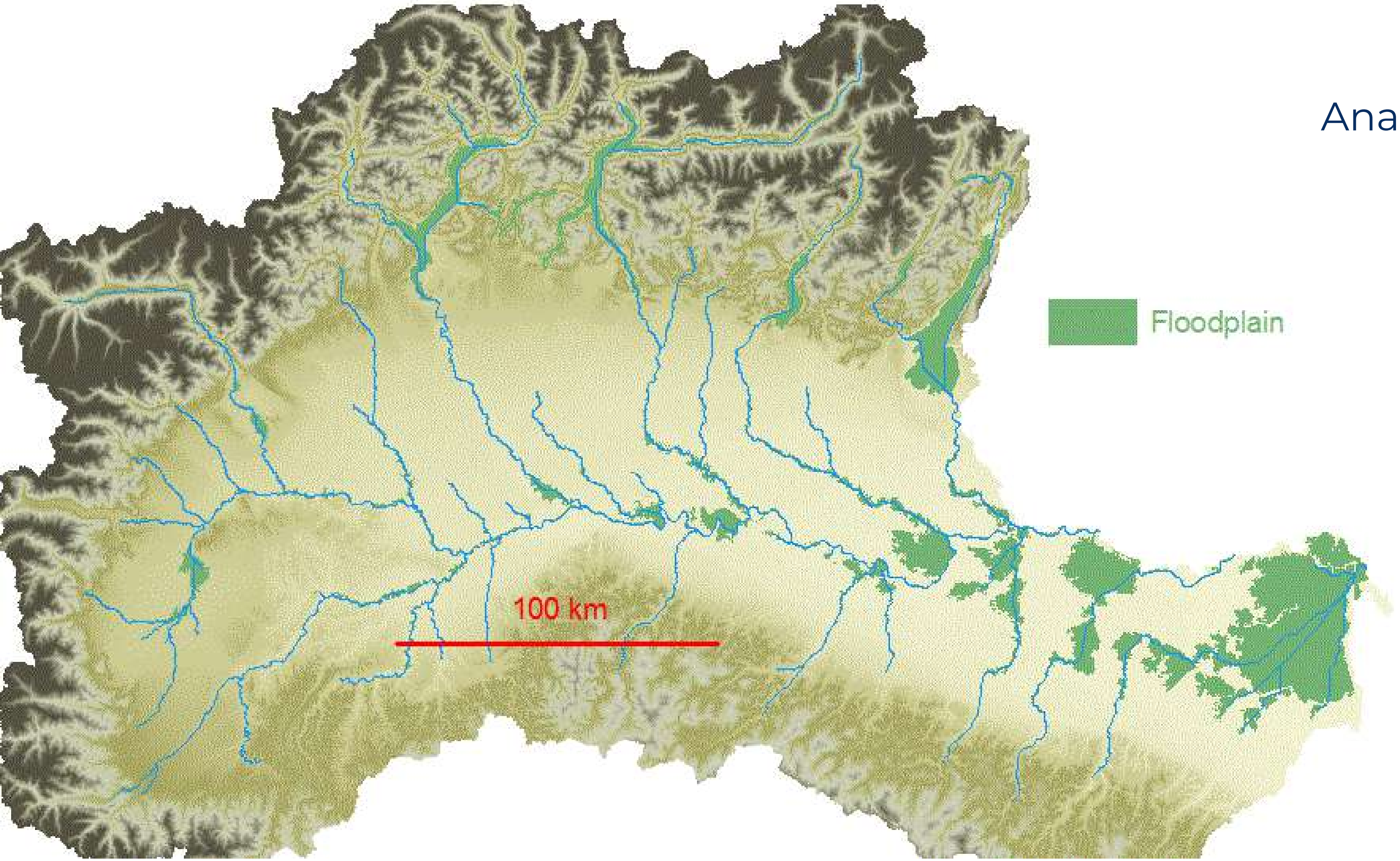
Land instability and flooding

Sediment component	Quantity	Unit	Interpretation
Gross hillslope sediment production from MUSLE	1.44×10^5 t equivalent volume : 1.07×10^5 m³	m³	Potential hillslope sediment production generated during the event
Connectivity-conditioned hillslope sediment production, Σ(YjCj)	7.98×10^4 t equivalent volume : 5.96×10^4 m³	m³	MUSLE-derived hillslope sediment weighted by structural connectivity to the channel network
Total geometrical landslide stock, Vmin–Vmax	1.48×10^8 - 2.44×10^8 m³	m³	Estimated range of pre-existing landslide sediment stock
Total geometrical landslide stock, central estimate	2.03×10^8 m³	m³	Representative central estimate of landslide sediment stock
Potentially transferable connected landslide stock, Σ(ViCi), fi = 1	9.14×10^7 - 1.50×10^8m³	m³	Volume potentially transferable to the channel network in the upper-bound case
Lower-bound landslide remobilization scenario, fi = 0	0 m³	m³	No remobilization of connected landslide sediment during the event

Beyond erosion modelling: a geomorphic-hydrologic framework for event-scale sediment supply integrating hillslope erosion, landslides and connectivity during extreme floods

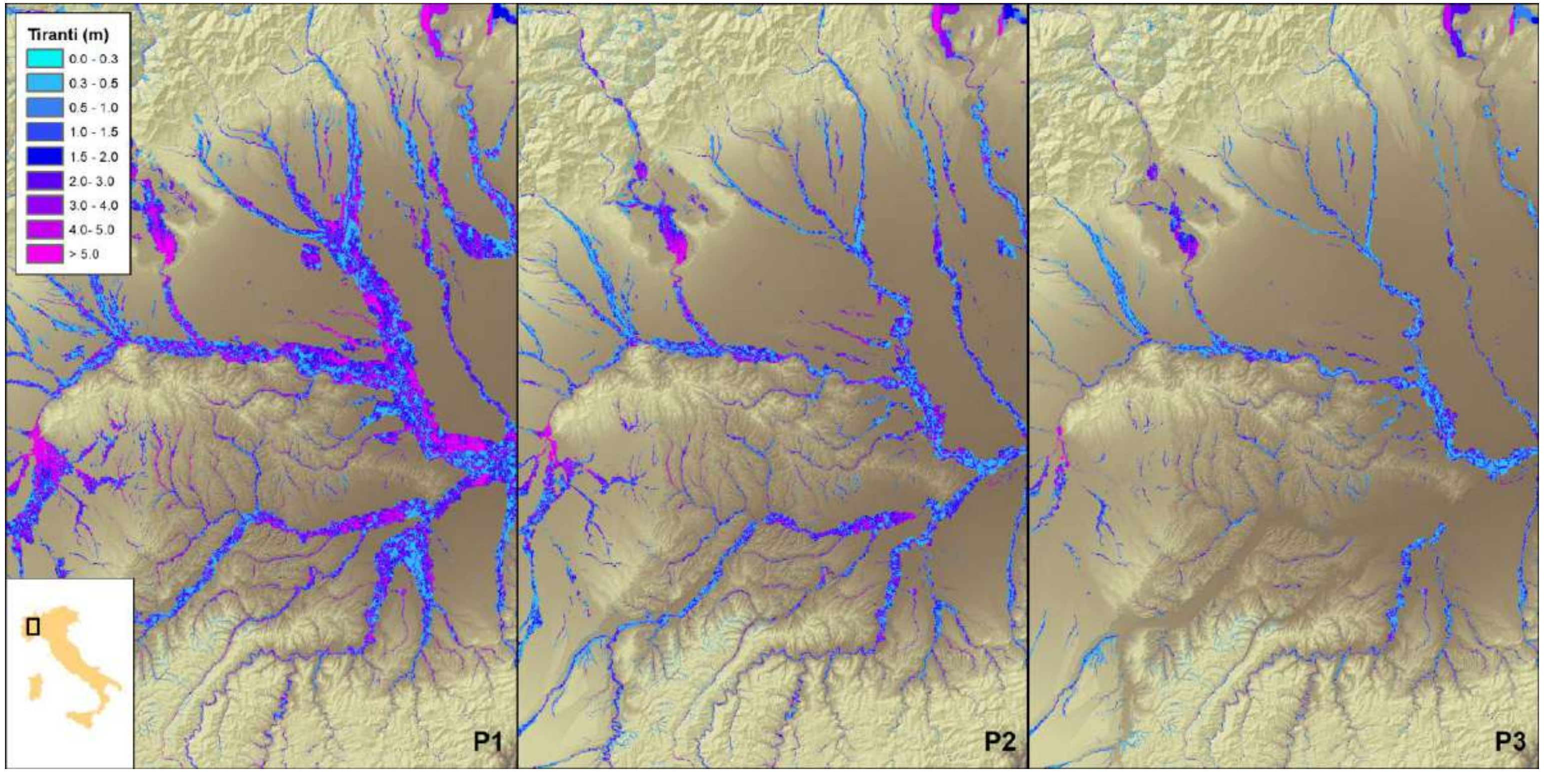
Insurance parametric for NATCAT: economica damages



Analisi dei massimi livelli di piena
su larga scala

Bacino del Po

Stima danno in termini monetari associato alla pericolosità idraulica

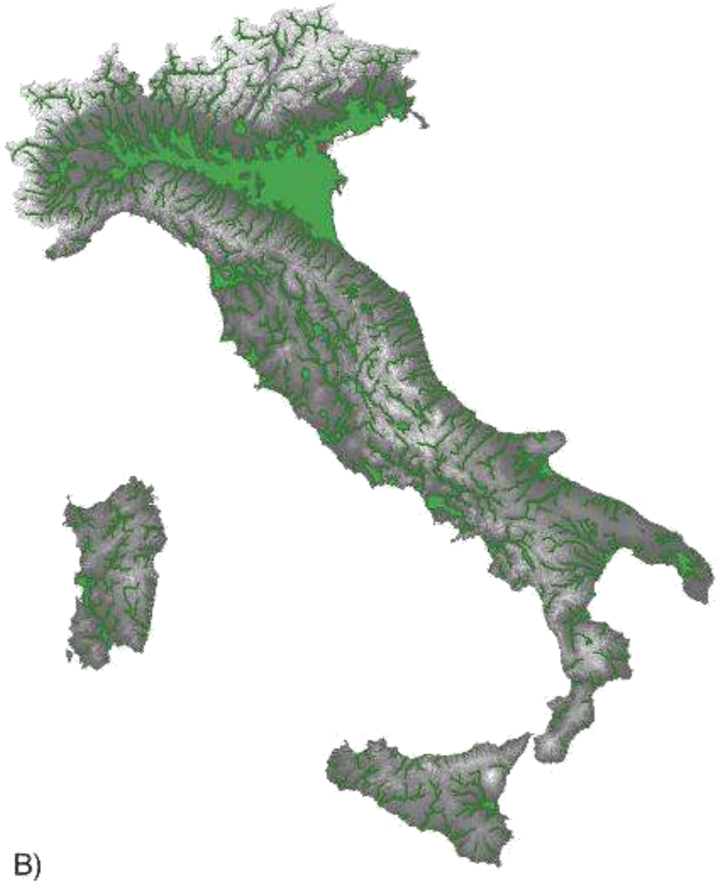


Tirante idrico: il massimo livello dell’acqua rispetto alla quota del terreno. Può essere associato ad un vento reale o a un evento sintetico (relativo a un tempo di ritorno)

Tiranti
PAI
tempo di ritorno

Validazione dei dati per il rischio idraulico

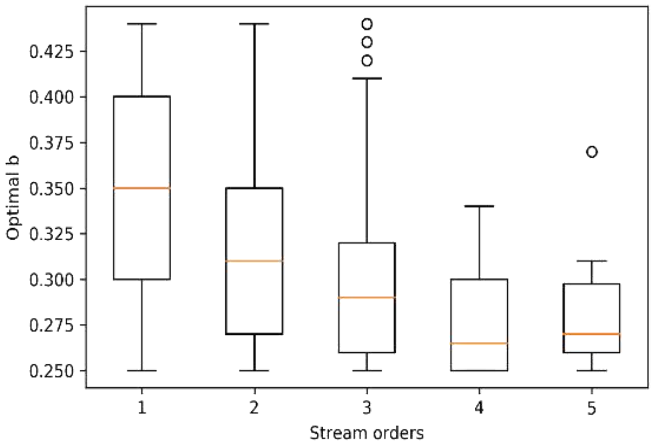
Fasce PAI



Modello GEOSAFE Rischio Idraulico

Tirante idrico: il massimo livello dell’acqua rispetto alla quota del terreno. Può essere associato ad un vento reale o a un evento sintetico (relativo a un tempo di ritorno)

Validazione per ciascun ordine del reticolo idrografico



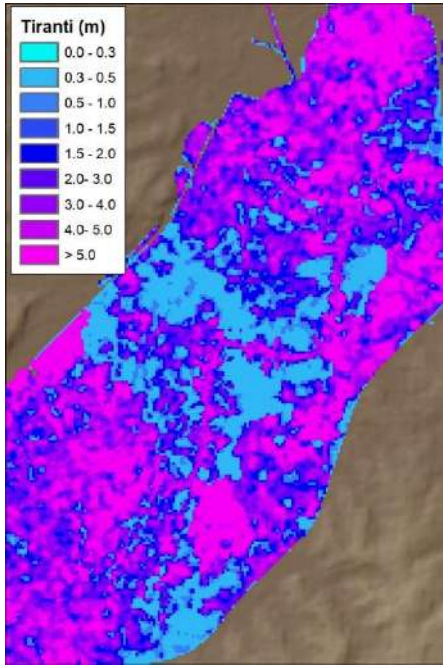
Validazione dei dati per il rischio idraulico

Livorno 2017

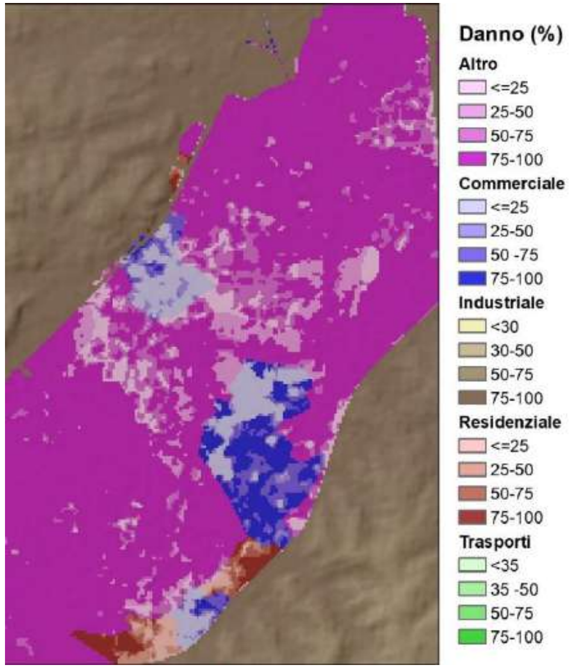
Genova 2011

Roma 2014

Stima danno economico da rischio idraulico



Tiranti idrici



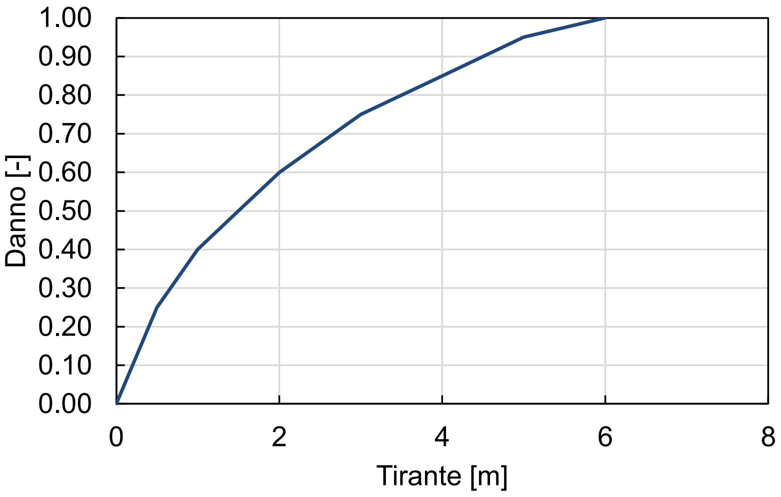
Danno potenziale

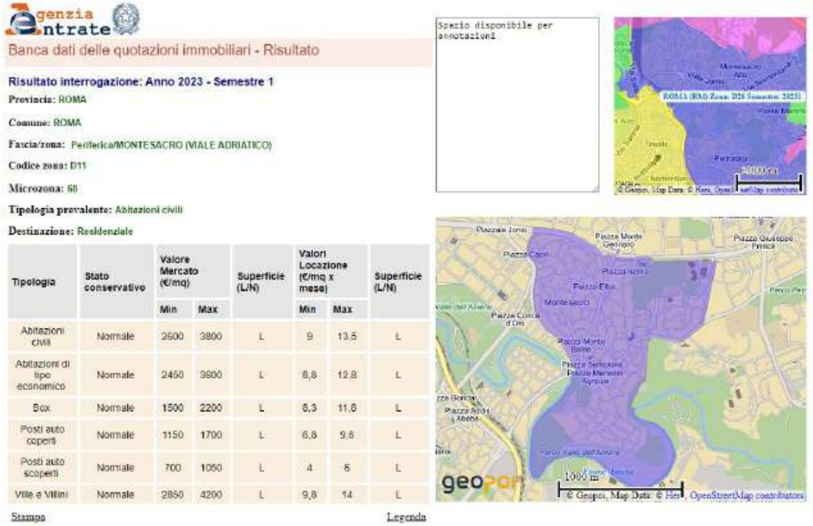
Danno economico €

Viene dato un valore economico in funzione di valori di riferimento (OMI, Valore medio di ricostruzione, AdE) e delle categorie di edificio (residenziale, commerciale, ecc)

$$D(€) = Dp \, * Val \, (€)$$

Danno economico





Agenzia Entrate

Banca dati delle quotazioni immobiliari - Risultato

Risultato interrogazione: Anno 2023 - Semestre 1

Provincia: ROMA

Comune: ROMA

Fascia/zona: Periferica/MONTESACRO (VIALE ADRIATICO)

Codice zona: D11

Microzona: 68

Tipologia prevalente: Abitazioni civili

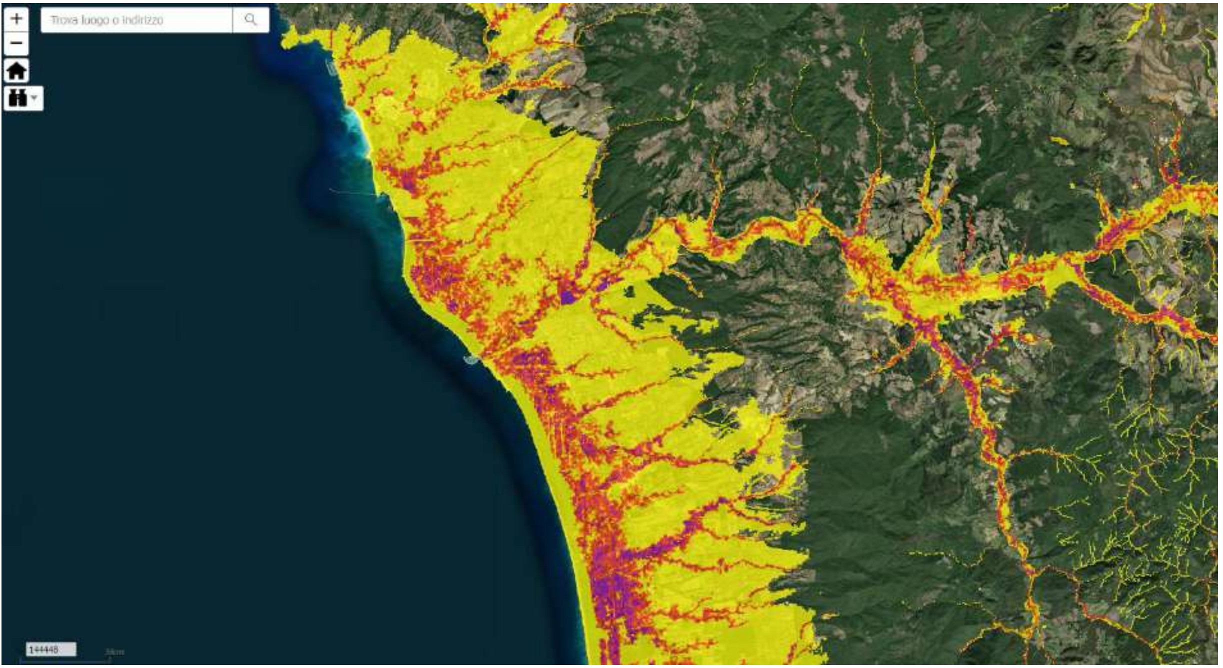
Destinazione: Residenziale

Tipologia	Stato conservativo	Valore Mercato (€/mq)		Superficie (L/N)	Valori Locazione (€/mq x mese)		Superficie (L/N)
		Min	Max		Min	Max	
Abitazioni civili	Normale	2600	3800	L	9	13,5	L
Abitazioni di tipo economico	Normale	2450	3600	L	8,8	12,8	L
Box	Normale	1500	2200	L	8,3	11,8	L
Posti auto coperti	Normale	1150	1700	L	6,8	9,8	L
Posti auto scoperti	Normale	700	1050	L	4	6	L
Ville e Villini	Normale	2850	4200	L	9,8	14	L

Stampa   Legenda

Spazio disponibile per annotazioni

GEOSAFE by Ania SAFE

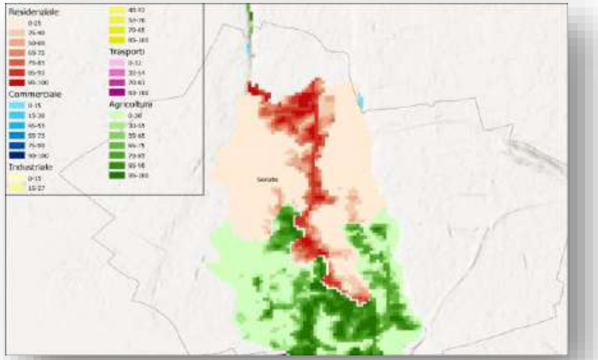


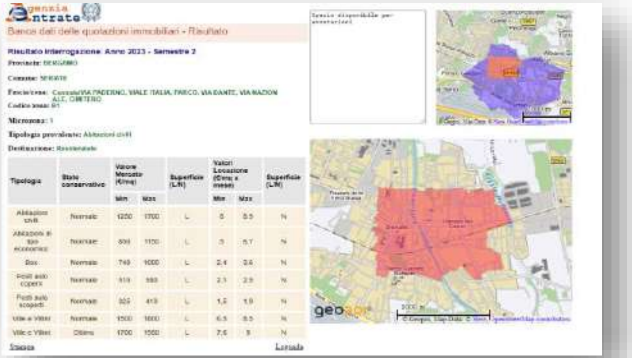
ANIA GEOSAFE Alluvioni
Stima del danno economico

ANIA GEOSAFE fornisce la stima del danno economico associato ad eventi meteo-climatici intensi.

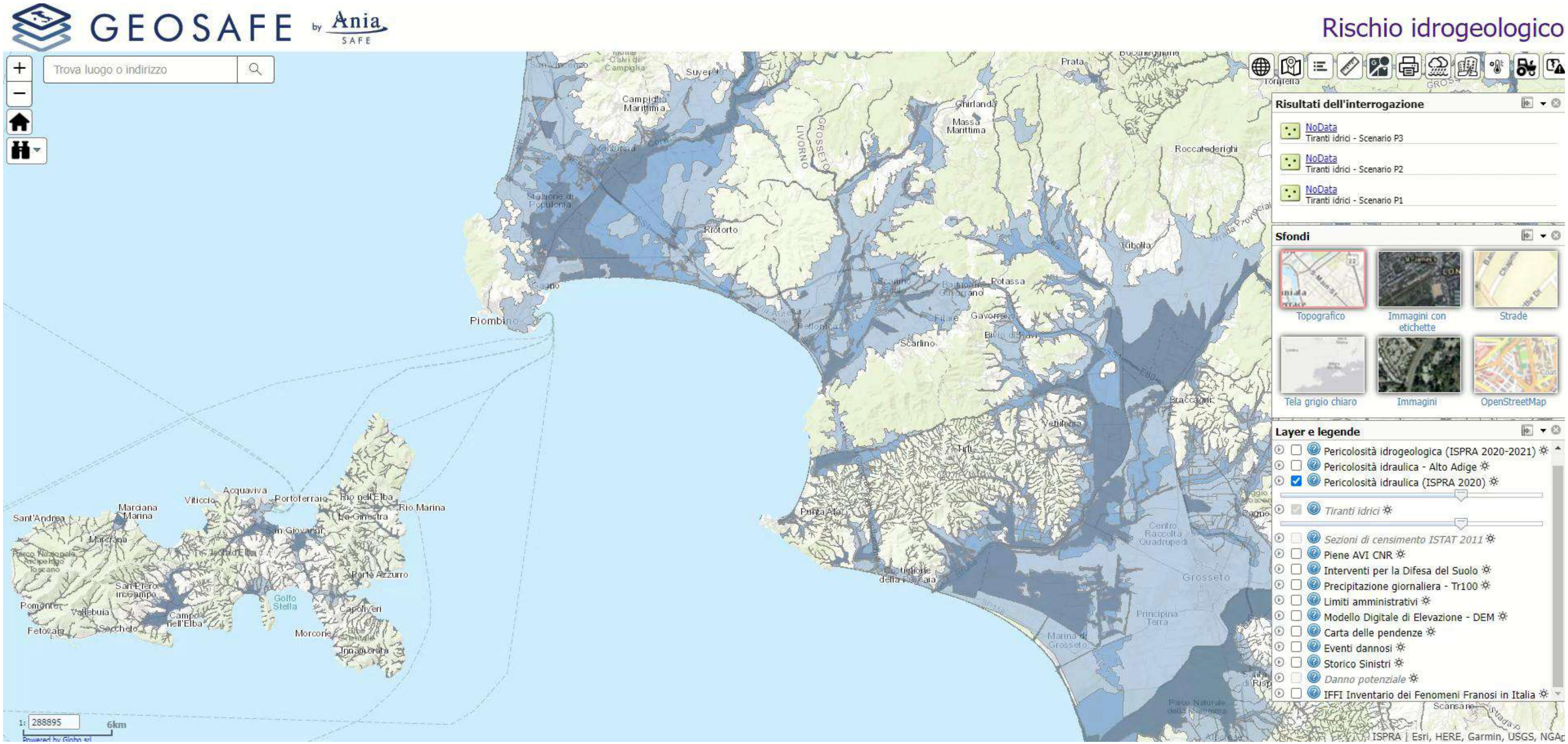
L’utente può selezionare qualsiasi zona d’Italia a rischio idrogeologico e produrre, per ogni tipologia di edificio o proprietà, un report di analisi del massimo danno economico da eventi alluvionali estremi.

L’algoritmo di calcolo della stima del danno si basa sul modello ad alta risoluzione dei massimi livelli e impatti di piena combinato con informazioni di riferimento dei valori economici delle proprietà a rischio (i.e. valori mercato immobiliare, costi di ricostruzione)





Alluvioni: Stima del danno economico



Alluvioni: Stima del danno economico

Ania
Associazione Nazionale fra le Imprese Assicuratrici

Ania SAFE

GEOSAFE by Ania SAFE

REPORT TECNICO GEOSAFE

INPUT

	INDIRIZZO	Viale Camillo Sabatini, 00144, Roma
	COORDINATE	Lat: 41.820198, Long: 12.442744
	TIPOLOGIA IMMOBILE	Abitazioni civili
Icona superficie	SUPERFICIE	3000 mq
	PIANO DELL'EDIFICIO	0
	ANNO DI COSTRUZIONE	1980
	STATO CONSERVATIVO	Normale
	PARCHEGGIO/DEPOSITO PIANO STRADA	Si
	INTERRATI, SCANTINATI, GARAGE	Si
	VULNERABILITA' DELL'EDIFICIO	Cemento armato

Stima del danno

PER IMMOBILE

P1	Danno potenziale P1	5%
P2	Danno potenziale P2	5%
P3	Danno potenziale P3	5%

Stima del danno

€	Valore economico totale dell'immobile (minimo-massimo)	1.900 - 2.700 €/mq
€ P1	Danno economico P1 (minimo-massimo)	313.500 - 445.500 €
€ P2	Danno economico P2 (minimo-massimo)	313.500 - 445.500 €
€ P3	Danno economico P3 (minimo-massimo)	313.500 - 445.500 €

Attenzione, i calcoli non tengono conto dei danni potenziali associati ai parcheggi o depositi esterni, quali ulteriori danni a macchinari, materiali e downtime/fermo struttura

GEOSAFE by Ania SAFE

Prof. Fernando Nardi

fernando.nardi@uniroma2.eu

fnardi@idran.net


GEOSAFE by Ania SAFE
Pistoia
Florence
San Marino
Pesaro
Ancona
Sibenik
Ligurian Sea
Adriatic Sea
San Benedetto del Tronto
Parco Nazionale dei Monti Sibillini
Teramo
Bastia
Lago di Bolsena
Terni
Parco Nazionale del Gran Sasso
Pescara
Viterbo
L'Aquila
ABRUZZO
P.N.R. de Corse
CORSICA
Civitavecchia
Avezzano
Sulmona
Vasto
Parco Nazionale della Majella
Ajaccio
Vatican City
Rome
LAZIO
Parco Nazionale d'Abruzzo
Lago di Varano
Parco Nazionale del Gargano
Frosinone
MOLISE
Campobasso
Latina
Cassino
Foggia
PUGLIA
Formia
1594 m
1725 m
2199 m
2873 m
2642 m
2575 m
2780 m
114 m
2118 m
1160 m
2273 m
1369 m
1137 m

Thanks for your attention: any questions?

TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Prof. Fernando Nardi

fernando.nardi@uniroma2.eu