



The DEWETRA platform

Quantitative impact-based multi-model Early Warning System in a multi-hazard perspective

A contribution from the WMO Commission for Hydrology

Lauro Rossi, EWS Program Director



FONDAZIONE CIMA
CIMA RESEARCH FOUNDATION

CENTRO INTERNAZIONALE IN MONITORAGGIO AMBIENTALE
INTERNATIONAL CENTRE ON ENVIRONMENTAL MONITORING

The Dewetra platform

The Dewetra platform is a **real-time impact scenario builder**, which enables the decision maker to take prevention actions based on impact forecast.

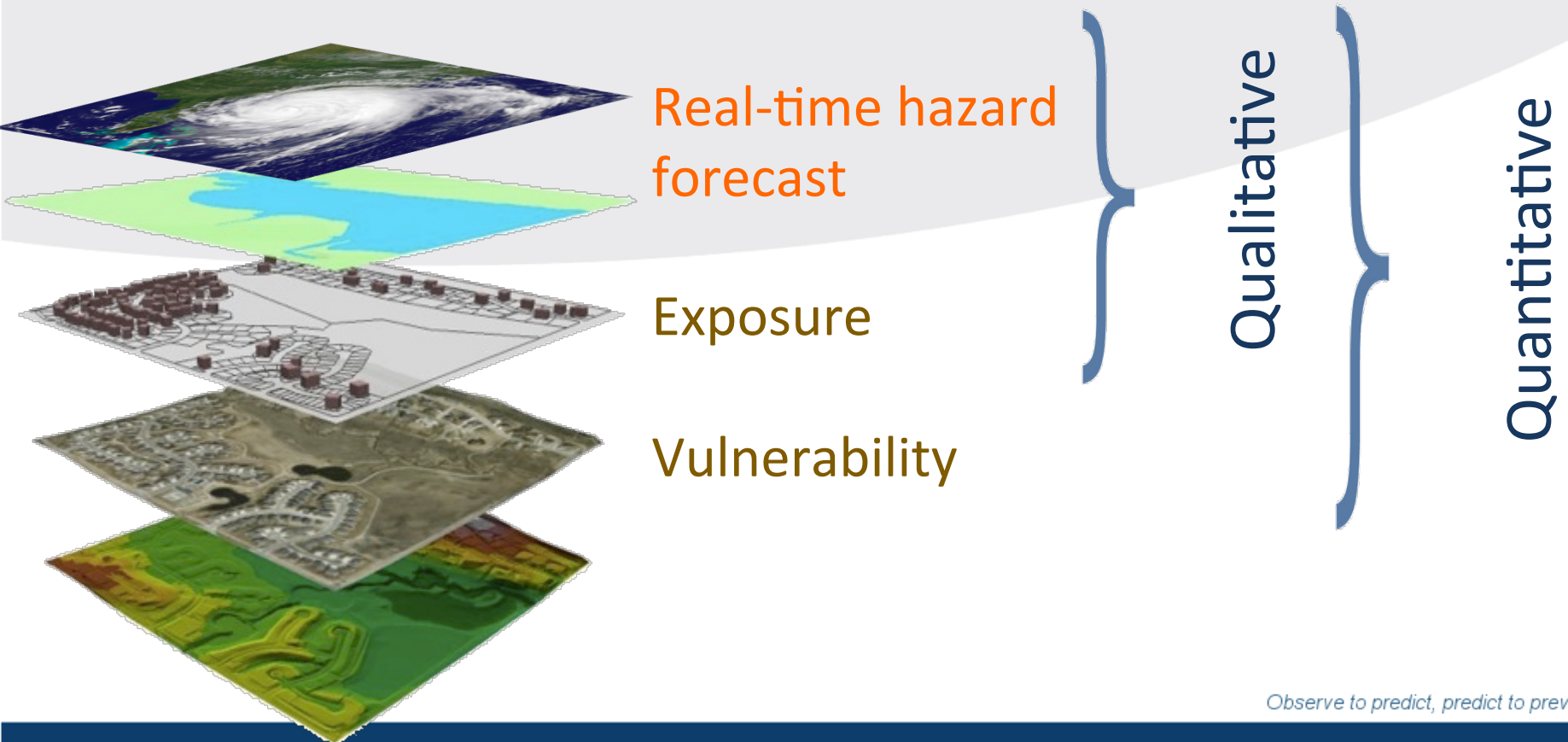
Dewetra is not a mere hazard forecasting tool, but also integrates information on vulnerability and exposure



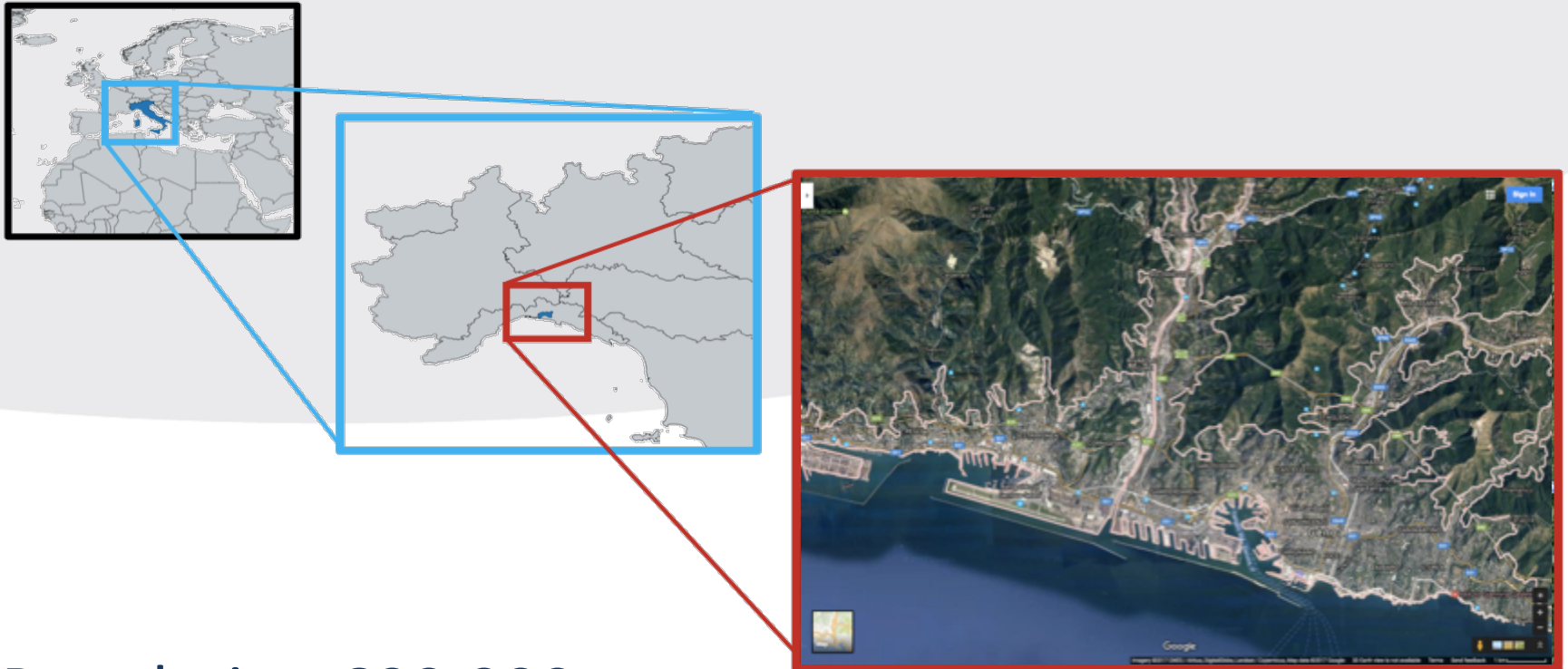
The Dewetra platform

Real-time Impact Prediction

$$\text{Impact} = f(H, E, V, A)$$



Two applications in Genoa urban area: forest fire and flash flood



Population 600.000

Population density (2400/Km²)

Forest Fire

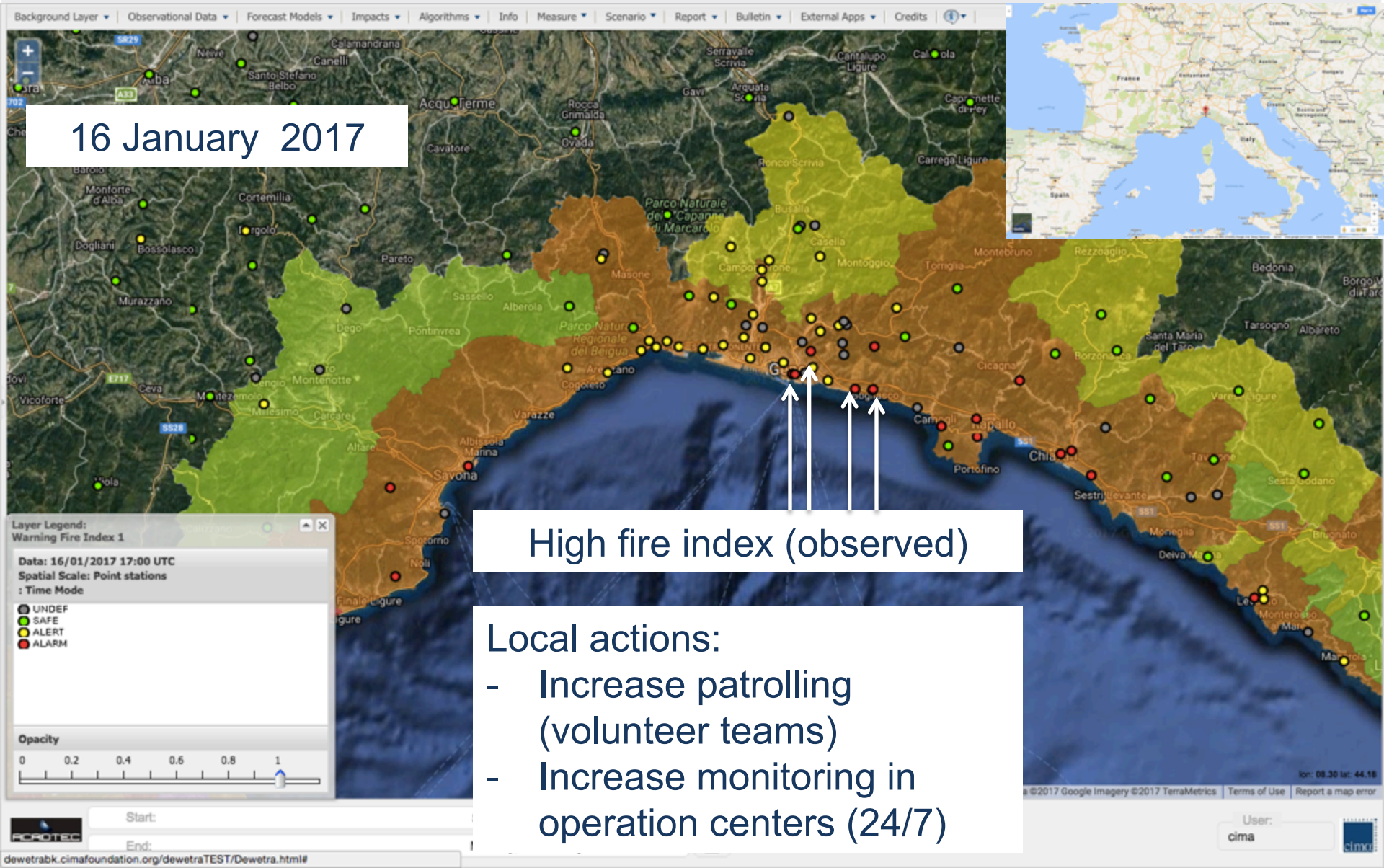
Forest fire hazard forecast and observations

16 January 2017

High fire index (observed)

Local actions:

- Increase patrolling (volunteer teams)
- Increase monitoring in operation centers (24/7)



National distributed bulletin preparation

Lauro Rossi
(master cima)

FIRE ALERT

Menu


Mappe


Testo

Messaggi

LIVELLO DI SUSCETTIVITA':

 Livello basso

 Livello medio

 Livello elevato



 Cancella 24h

 Cancella 48h

LIVELLI DI SUSCETTIVITA' PREVISTI PER Martedì 17 gennaio 2017

LIVELLI DI SUSCETTIVITA' PREVISTI PER Mercoledì 18 gennaio 2017



Actions at national level:
- water bombers displaced

Qualitative forest fire impact scenario

17 January 2017
A fire started at 5 am:
early detected thanks to
increased patrolling

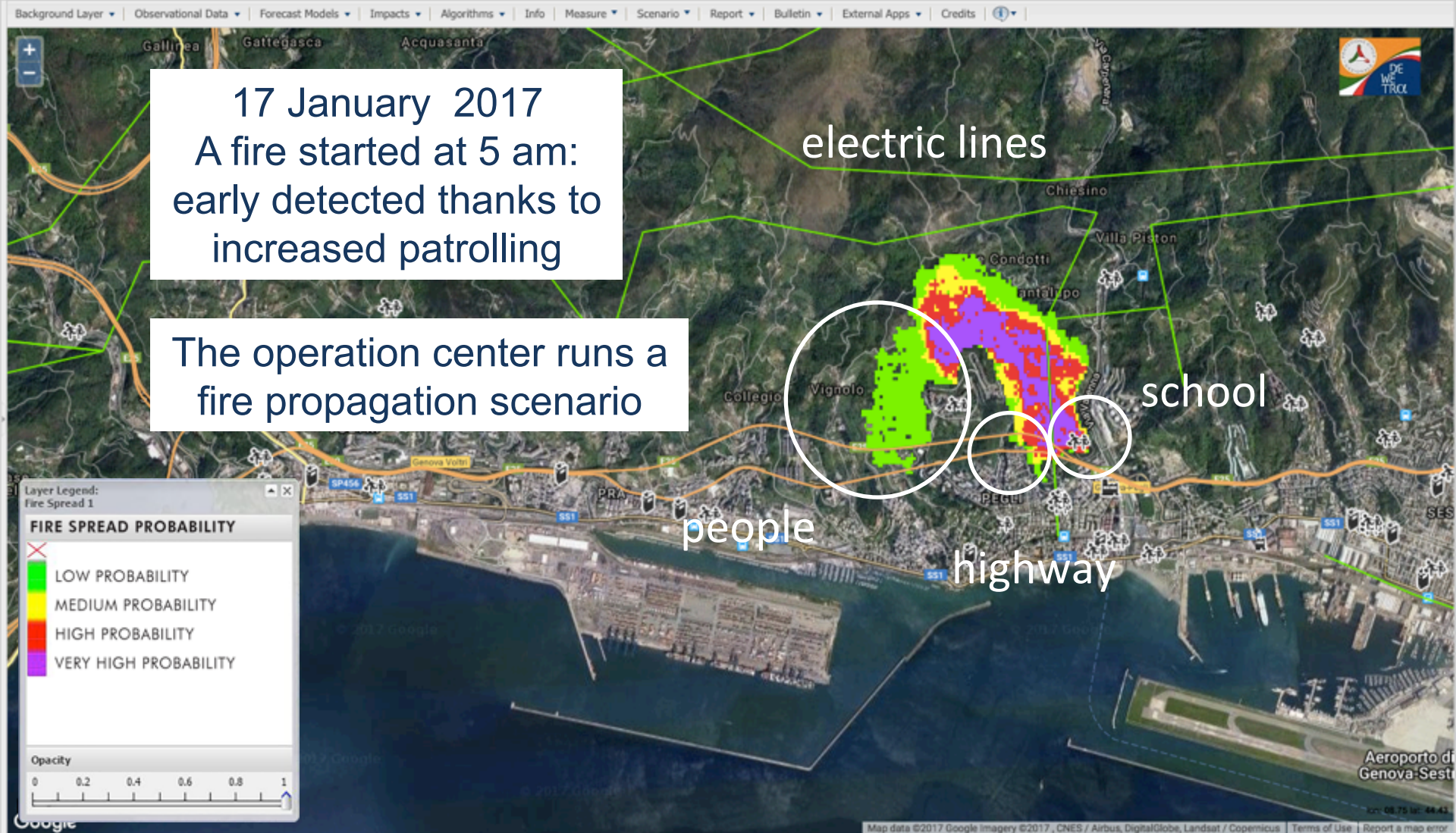
The operation center runs a
fire propagation scenario

electric lines

school

people

highway



Start: Saturday, 14 January 2017 00:00 UTC

End: Monday, 16 January 2017 17:00 UTC

User:
cima



17 January 2017

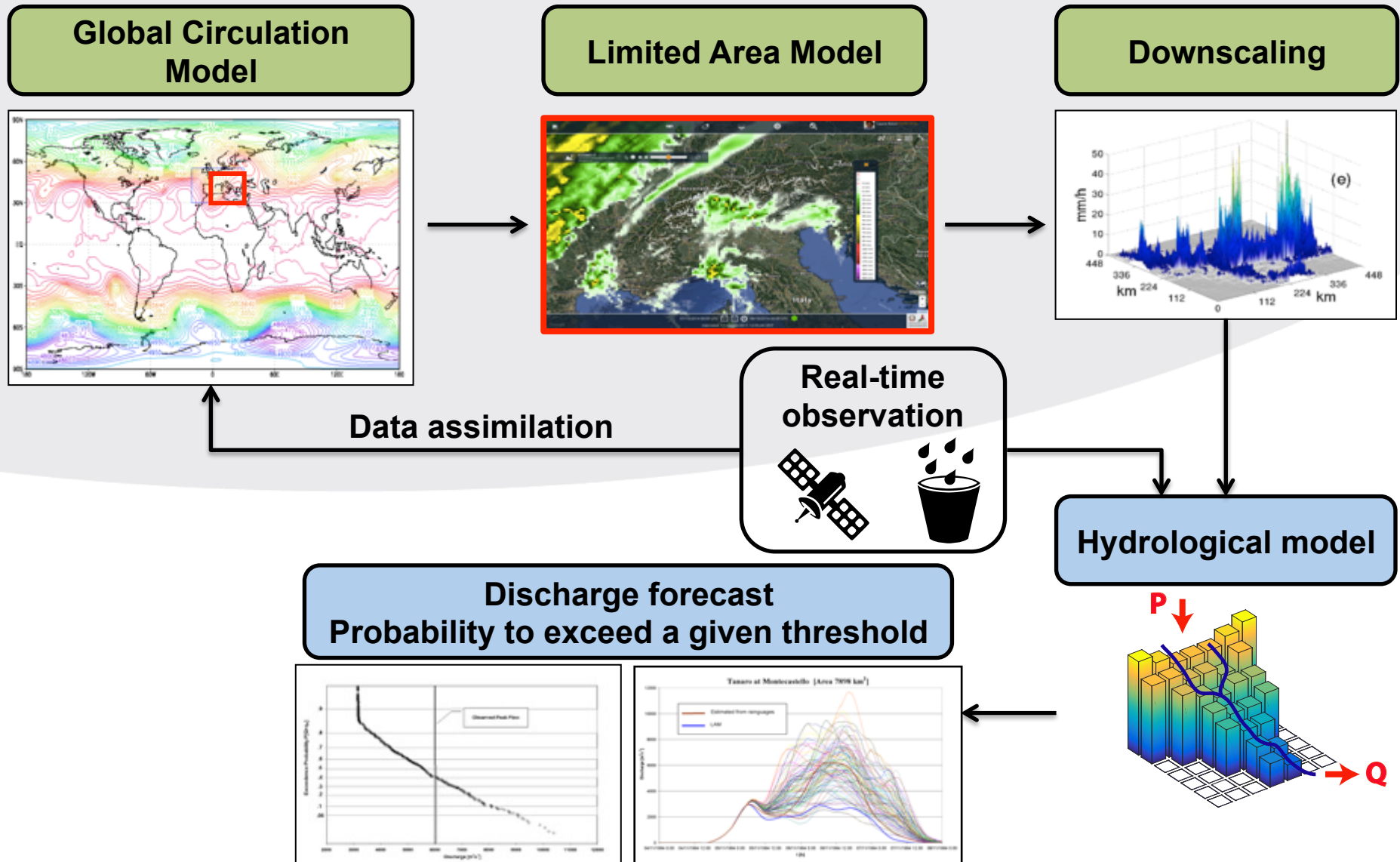


Main actions:

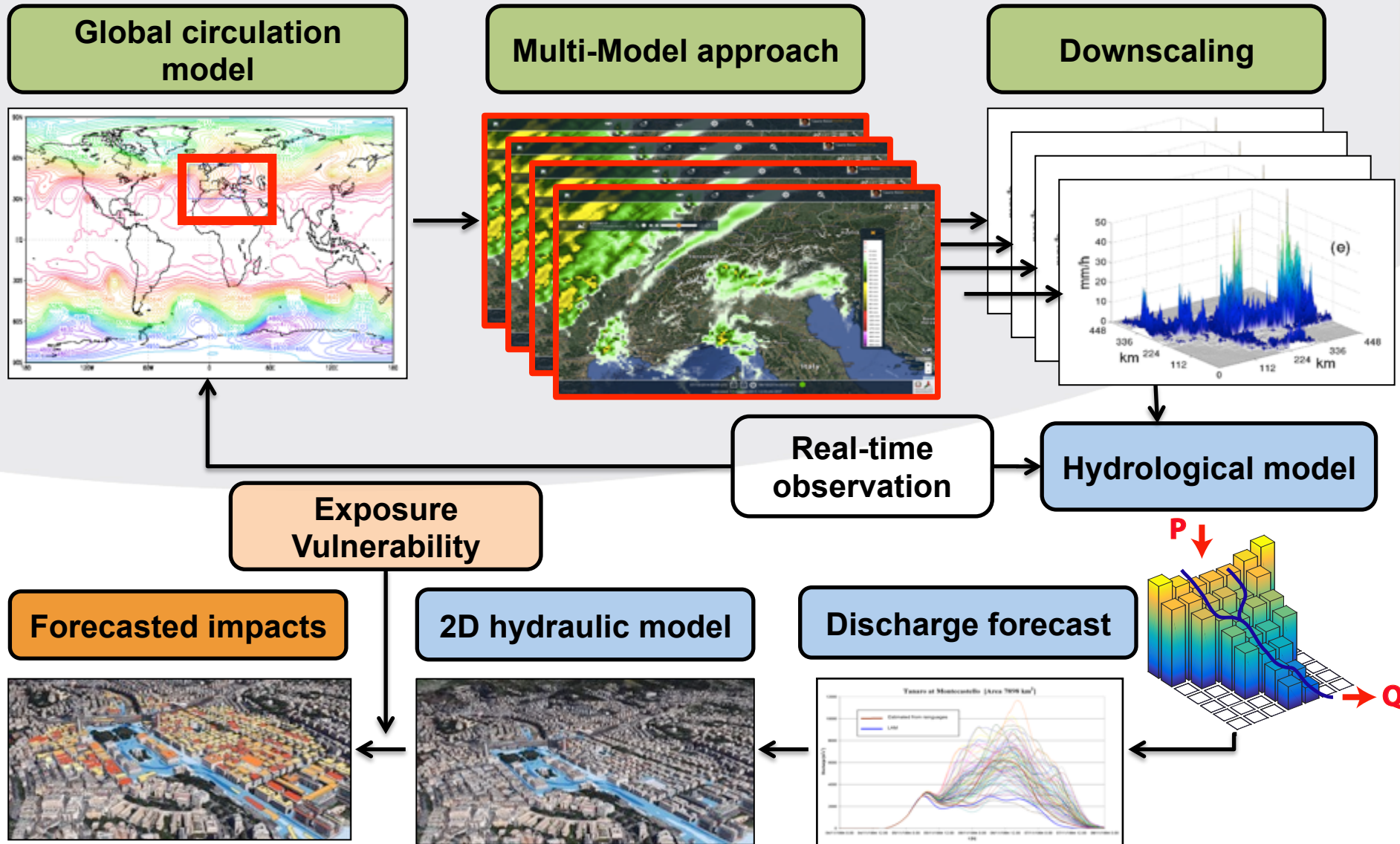
- 4 additional water bombers
- highway closed
- 275 people evacuated
- 1 school closed

Flash Flood

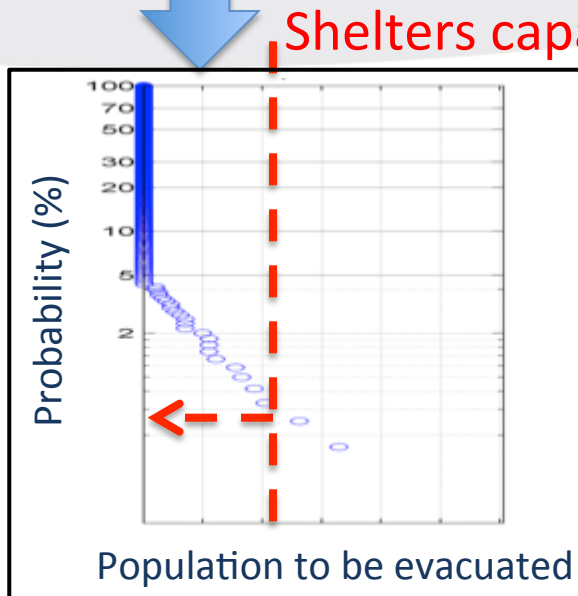
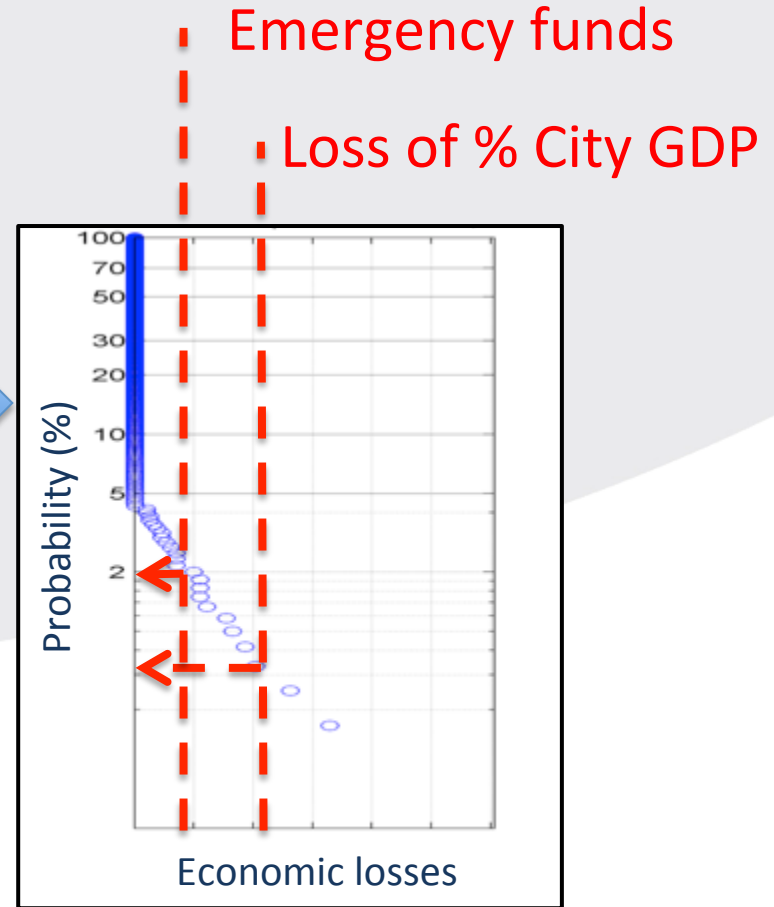
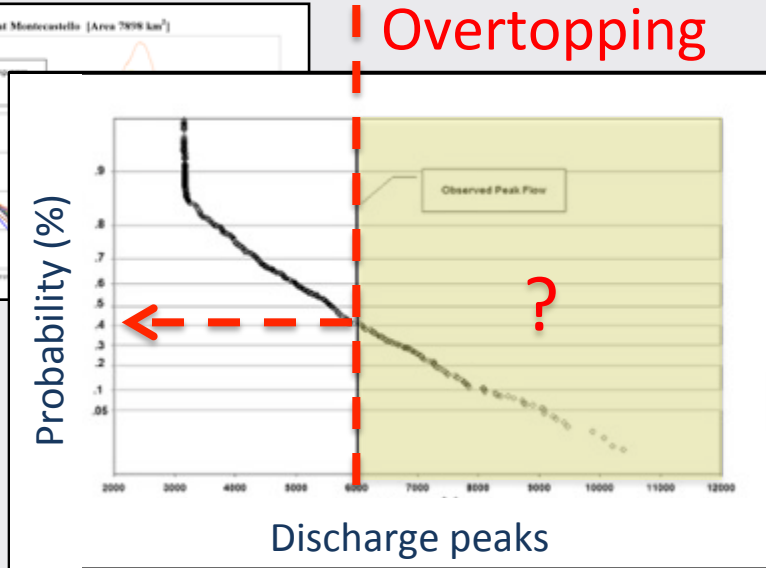
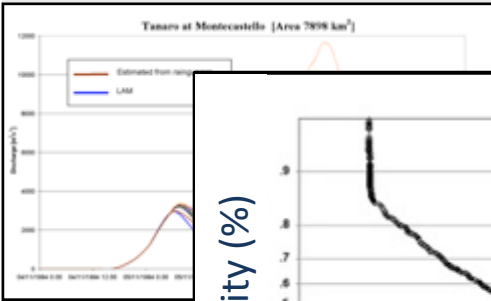
Flash flood forecast chain



Impact-based flood forecasting chain



From hazard to impact



Implementation in Genoa urban area

Genoa, 9 October 2014 | Flood hazard and economic losses



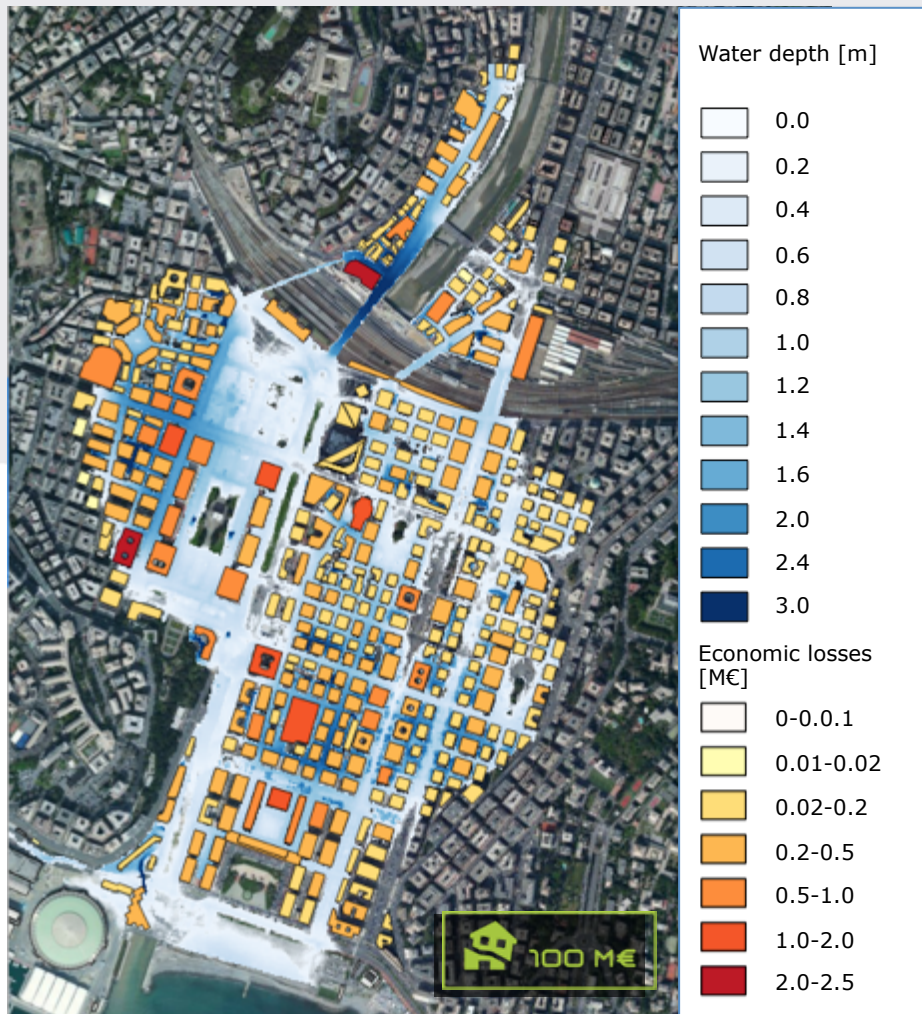
Genoa, 9 October 2014 event



Direct economic losses



People affected in different hazard zones



Genoa, recent flash flood past events

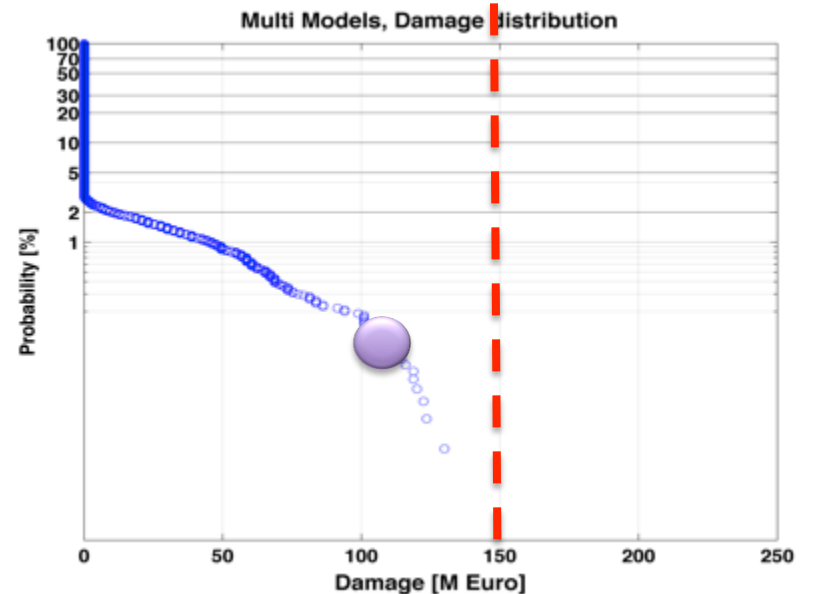
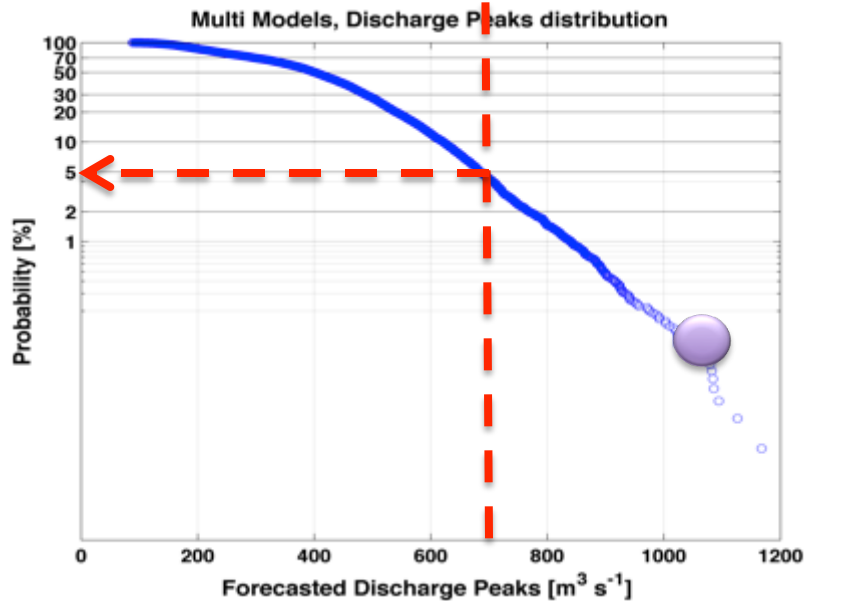
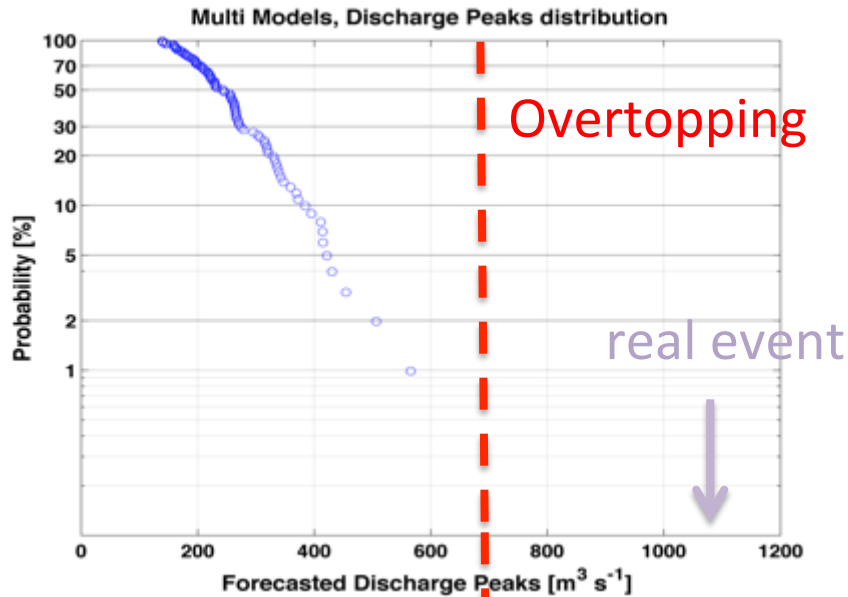
Past event	Discharge peak [m ³ s ⁻¹]	Return period [years]	Damage, current situation [M€]
1953	750 m ³ s ⁻¹	50 years	50 M€
1970	1100 m ³ s ⁻¹	100-200 years	190 M€
1992	700 m ³ s ⁻¹	30-50 years	-
2011	850 m ³ s ⁻¹	50-100 years	45 M€
2014	1050 m ³ s ⁻¹	100-200 years	100 M€

Quantitative impact forecast

Genoa, 9 October 2014 event

present operational
forecasting chain

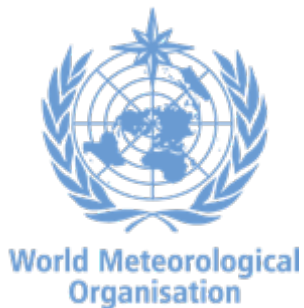
0.6% City GDP



The Dewetra platform available for any WMO member



On 24 March 2014, the Head of the **Italian Civil Protection Department** Franco Gabrielli and **WMO** Secretary-General of WMO, Michel Jarraud signed a memorandum of understanding under which the Civil Protection Department's integrated system for real time monitoring, prediction and prevention of natural risks – **DEWETRA** - is made available for any WMO member, as an open source tool.



Thank you

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