

# Extremes of the extremes

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Deciphering River Flood Change  
Vienna, 3-5 September 2012

## Proposed meaning: floods caused by big rainfall outliers

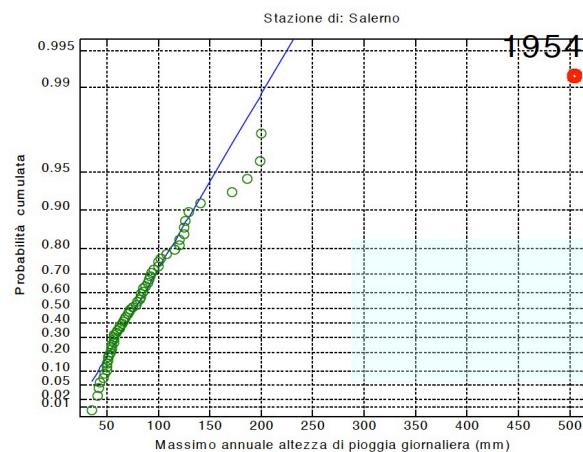
Rainfall observations **exceedingly** different from the rest of the station record

Values *almost statistically impossible* to observe, in '**stationary**' terms, in a lifetime (if considering only the station record):

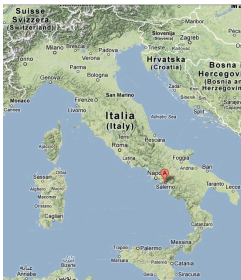
However....

if we are observing them relatively frequently in a **region**, they should not be as **highly unlikely!**

Definition of **REGION** is crucial for a correct transfer of information in space



# Some of the worst Italian Big rainfall Outliers



Cetara 1910

It was not an earthquake!

[www.idrologia.polito.it](http://www.idrologia.polito.it)

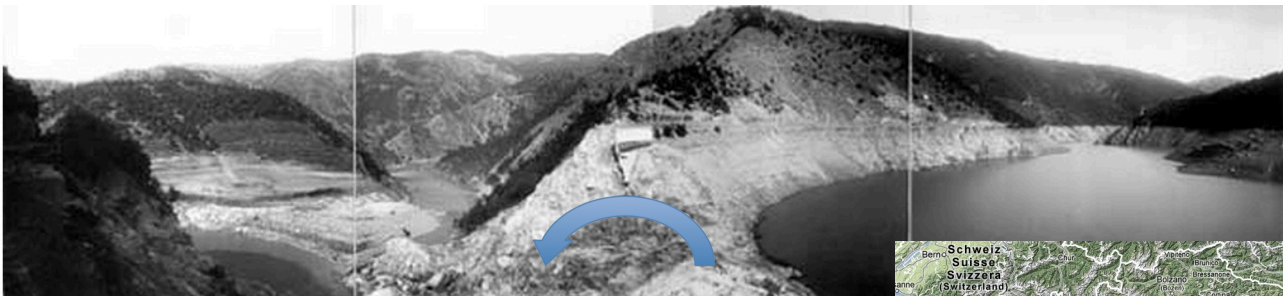
7

## Molare disaster (Ortiglieto dam)

13 August 1935

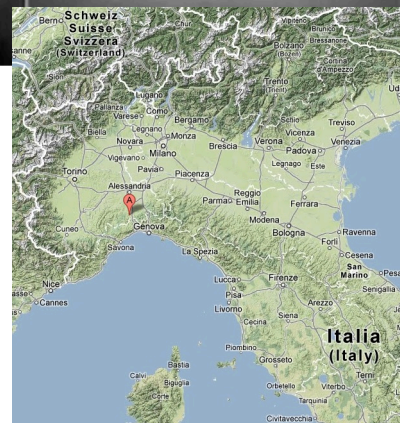
**554 mm in 24 h** (>30% MAP)

**111 victims**



[www.idrologia.polito.it](http://www.idrologia.polito.it)

[www.molare.net](http://www.molare.net)



## 1954 – Salerno Disaster



**25/26 October 1954**

Worst catastrophe in Italy (**318 victims**) due to rainfall-induced floods

**504 mm in 24 h** (40% of the MAP)

[www.idrologia.polito.it](http://www.idrologia.polito.it)

9

## Genova 1970: largest daily rainfall in Italy



**7/8 October 1970,**

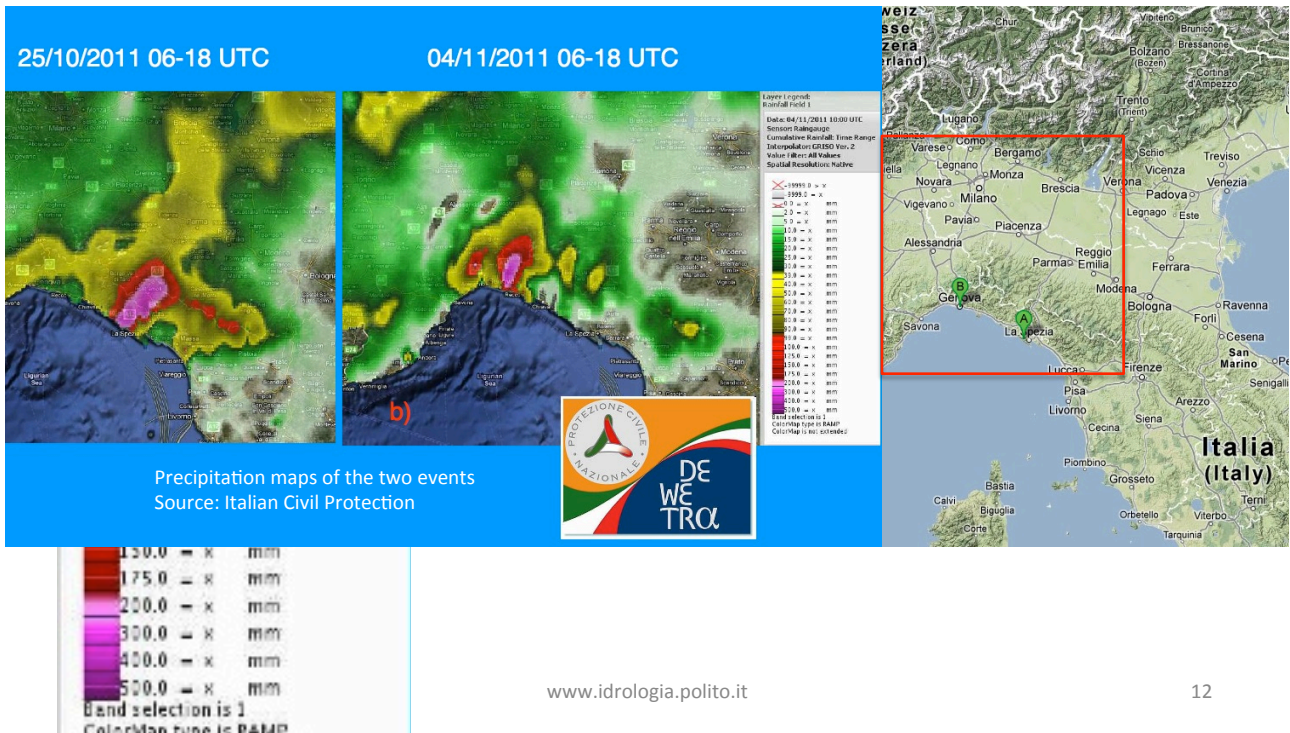
**948 mm in 24 h**, (90% of the MAP)

**43 victims**

[www.idrologia.polito.it](http://www.idrologia.polito.it)

10

# The november 2011 “1-2 hit in Liguria”



## Social relevance of the 2011 Genoa Flash Flood

- Scary event (in an advanced and big city)
- **Very well forecasted**, except exact position, yet producing victims
- Miscommunication between Weather Forecast Service and Local Civil Protection
- Children and schools involved

## Social relevance of the **Big rainfall Outliers** and their consequent flash floods

- Cause more and more fatalities, as compared to lowland floods
- Isolated, very fast events, huge unit discharges
- Very small basins, interaction with urban infrastructures (often river reach not even present)
- Flood hazard evenly distributed in the space
- Frequently associated to heavy debris transport (coastal hillslopes)

### Questions arising:

- **“Man in the street” question:** why are we still calling them **exceptional**? How frequent are they REALLY?
- **Civil Engineer question:** How do these ‘new’ observations should impact on design rainfalls?
- **Scientist questions:** Are STAT toolkits for frequency assessment adequate? Will the frequency increase in the near future?