Role of the National Meteorological and Hydrological Services

Second Experts' Symposium on

Multi-Hazard Early Warning System

The Italian Early Warning System

Pierluigi Soddu
pierluigi.soddu@protezionecivile.it

Italian Department of Civil Protection

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Focus on

- Risks overview
- Risk Matrix
- The Italian Civil Protection System
- Applications

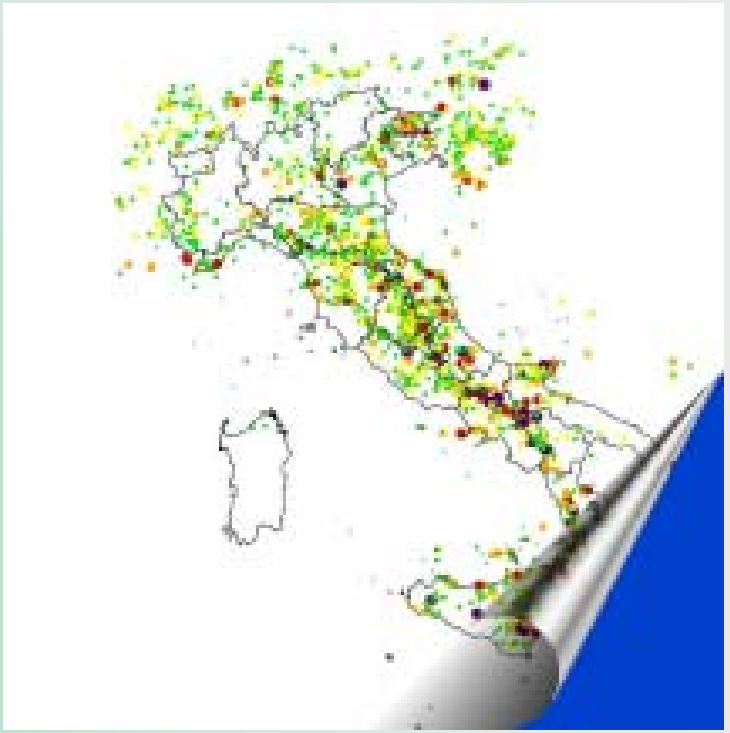
The “ BELPAESE ”

Role of the National Meteorological and Hydrological Services

PROTEZIONE CIVILE NAZIONALE

The seismic problem in Italy

- In the last millennium about 30.000 events occurred (220 characterised by high macroseismic intensity >= VIII MCS scale)
- In the last 25 years earthquakes caused monetary losses for over 125 billions euro.
- In the last two centuries earthquakes caused about 150.000 victims; moreover, they damaged and/or destroyed a great part of our historical and artistic heritage, whose value is not valuable



Italian major seismic events

Casamicciola (Ischia island)
July, 28 1883 - IX grado MCS

Reggio Calabria e Messina
December, 28 1908 – XI-XII degree MCS

Avezzano (Central Italy)
January,13 1915 - XI degree MCS

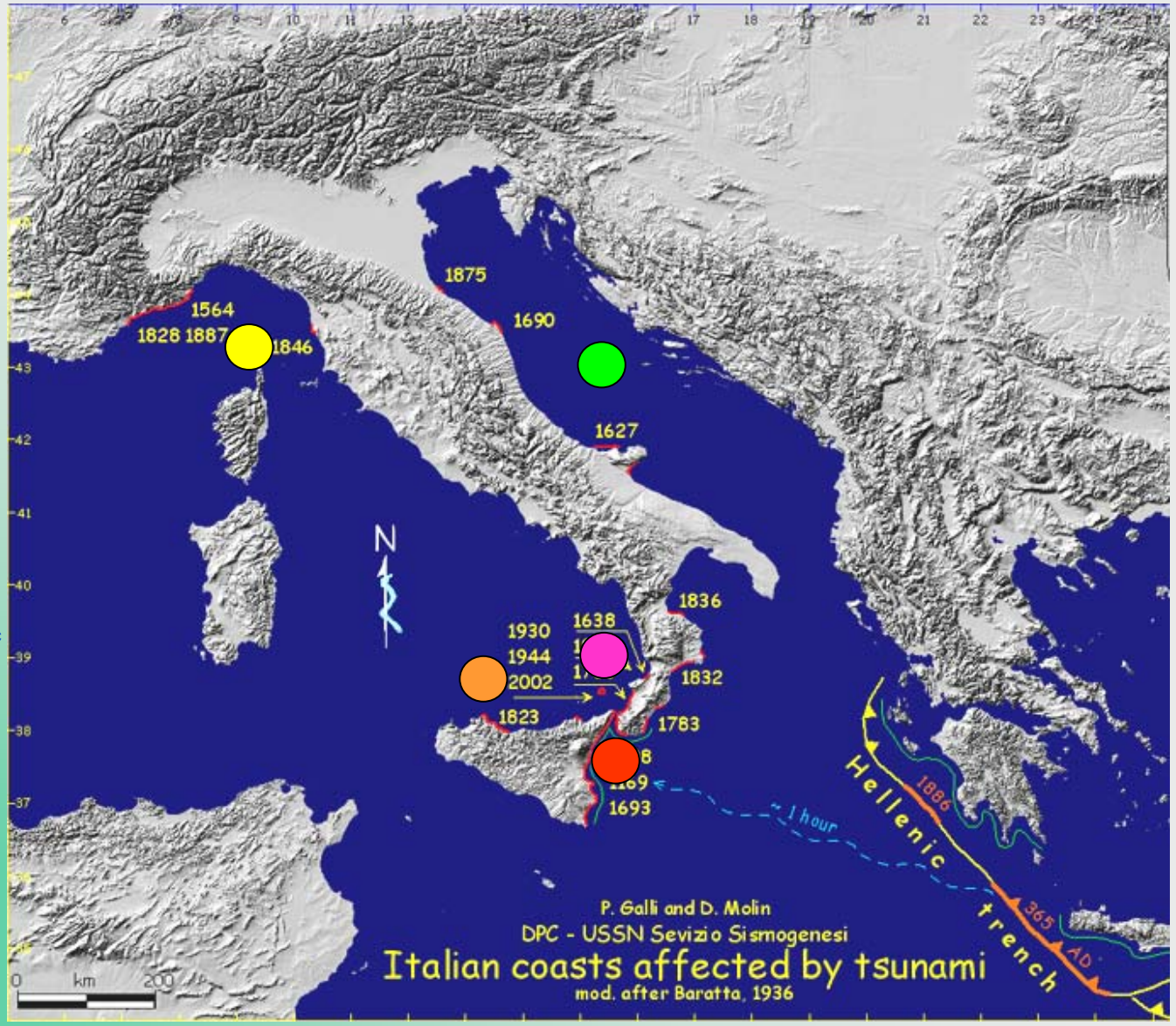
Irpinia (Central Italy)
July, 23 1930 - X degree MCS

Tsunami

Role of the National Meteorological and Hydrological Services

AMBRASEYS scale '62

- II° Low
- III° Moderate
- VI° High
- V° very high
- VI° Catastrophic



Tsunami source:

Close the italian coast: arrival time 10-12 min related earthquake with magnitudo => 7 Catastrophic

From the Greece area: arrival time 30-60 min related earthquake with magnitudo => 8 (rare) Moderate high

Stromboli
2002

Volcanic risk in Italy

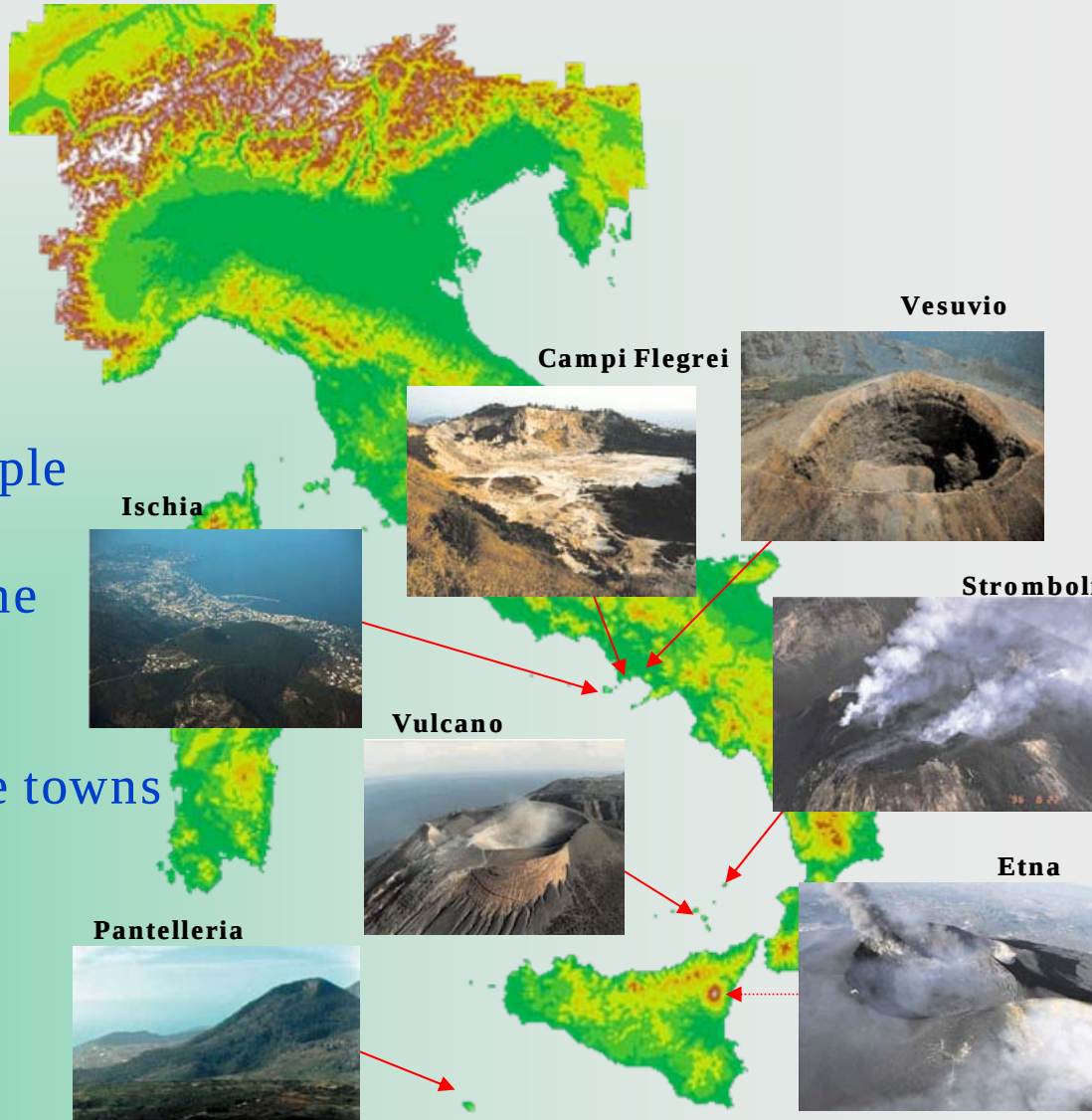
Exposition data
2 millions people live in hazard areas

Vesuvio 700.000 people

Campi Flegrei 250.000 people

Vulcano 15.000 people (in the summer)

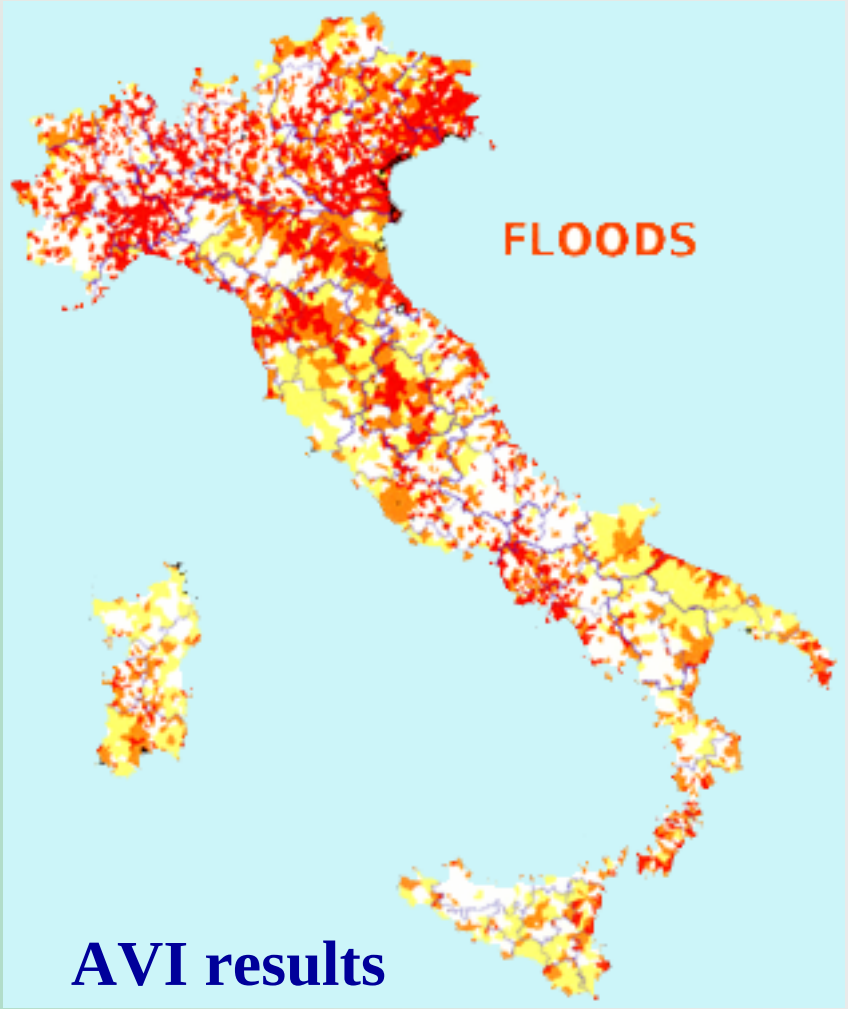
Etna large damage and whole towns in hazard area



Flood risk in Italy

- The **AVI** project: an inventory of sites historically affected by floods for the period 1918-1994.
- **Very high vulnerable sites** (L. 267/98)
- **PAI** Hydrogeological Plan of Basin (L. 267/98)

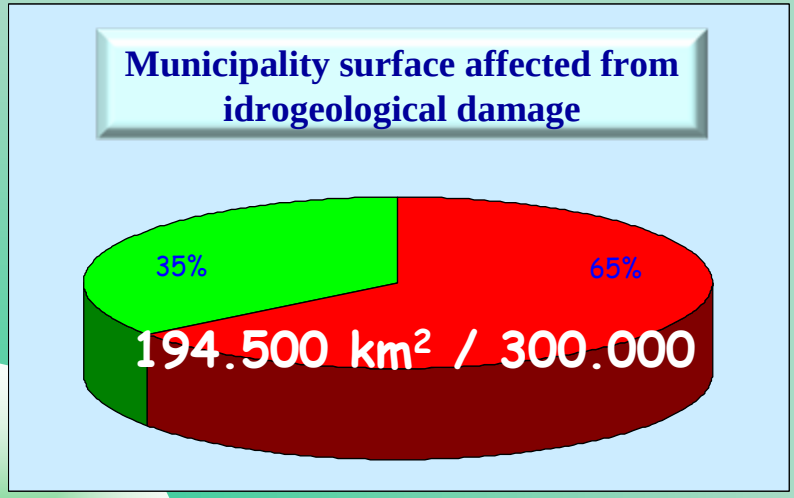
Plus of 7.500 events from 1800 to 2008



Municipality zoning based on site density
Darker colours indicate an increasing number per square kilometers o f sites in each municipality

Landslide risk in Italy

- The **AVI** project: an inventory of sites historically affected by floods for the period 1918-1994.
- **Very high vulnerable sites** (L. 267/98)
- **PAI** Hydrogeological Plan of Basin (L. 267/98)



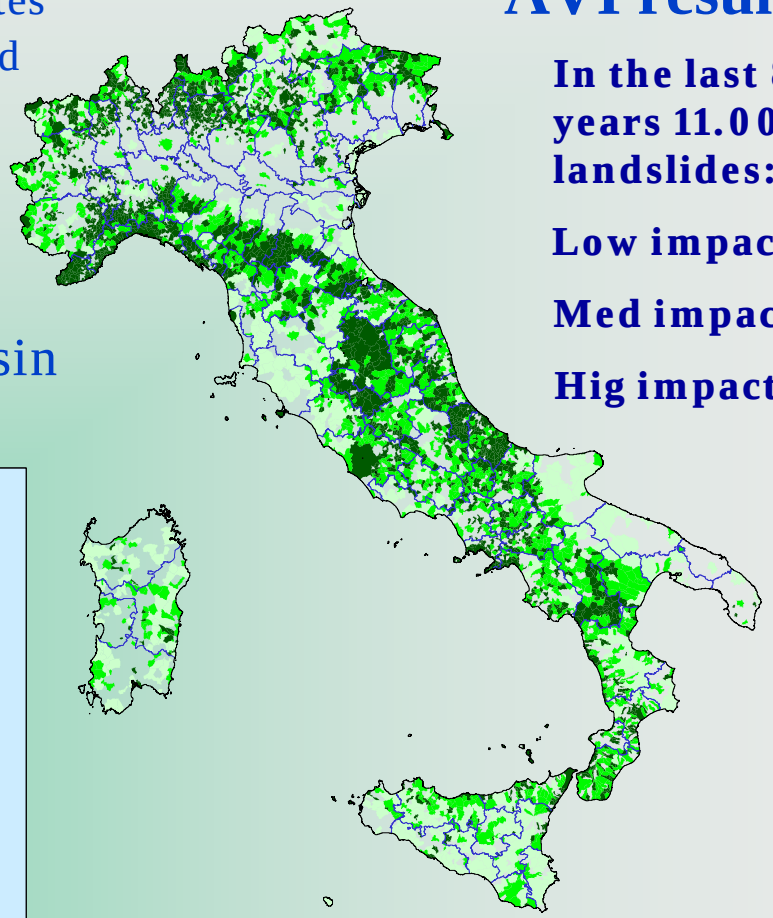
AVI results

In the last 80 years 11.000 landslides:

Low impact 50%

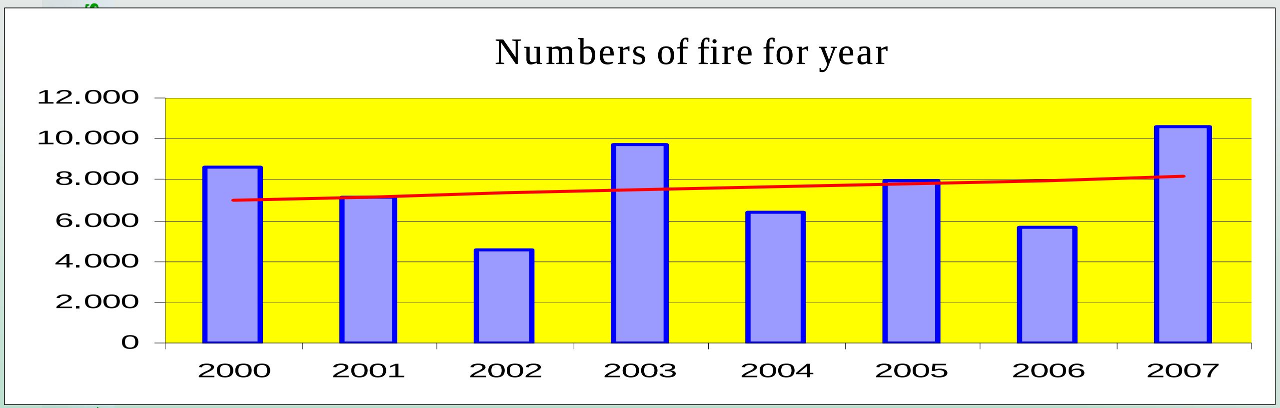
Med impact 35%

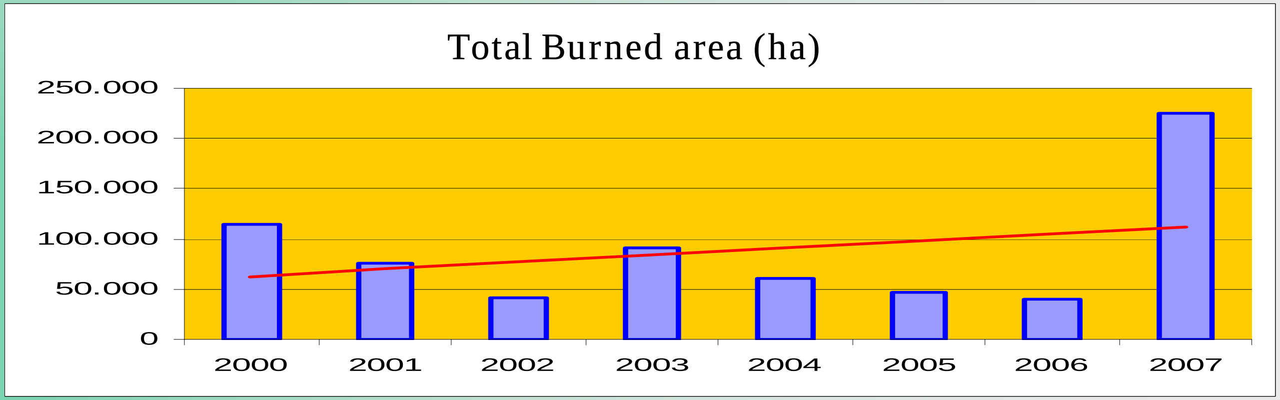
Hig impact 15%



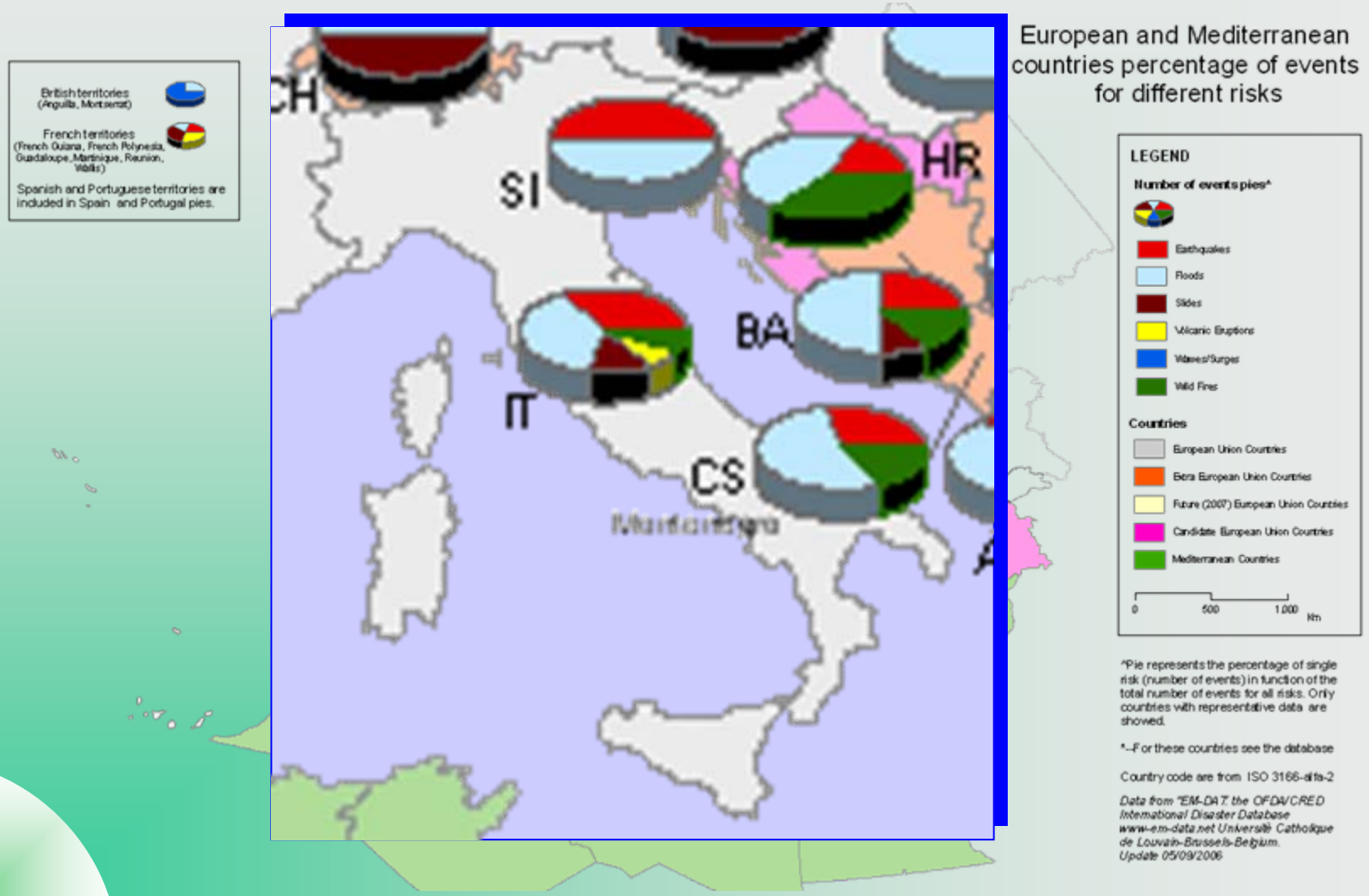
Municipality zoning based on site density
Darker colours indicate an increasing number per square kilometres of sites in each municipality

Forest Fires





European and Mediterranean countries percentage of events for different risks

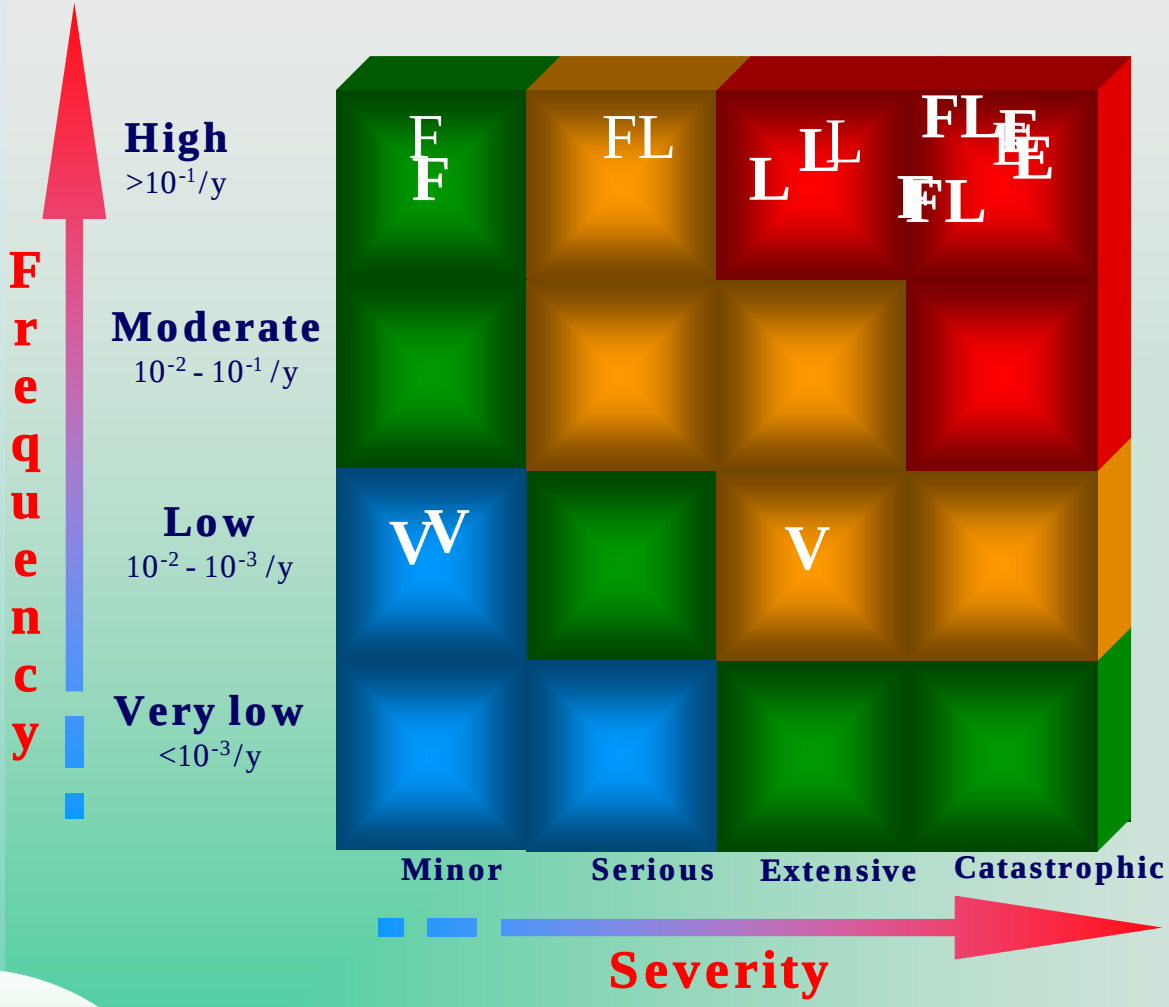


Italian Risk Matrix

	N° of Events	Year (Dbase)	Frequency Event/N° Y	Killed	Total Affected	Damage M €
Earthquake	29	100	0,28	$1,5*10^5$	$9,7*10^5$	44.000
Flood	29	85	0,34	$7*10^2$	$2,9*10^5$	32.000
Landslides	13	85	0,15	$2,5*10^3$	$20*10^3$	1.700
Volcano	5	101	0,05	$7*10^2$	$210*10^2$	0,31
Wild Fires	6	24	0,25	14	300	12.000

Risk Matrix

Role of the National Meteorological and Hydrological Services



High-risk condition with higest priority for mitigation and contigency planning (immediate action)

Moderate to high risk condition with risk addressed by mitigation and contingency planning (prompt action)

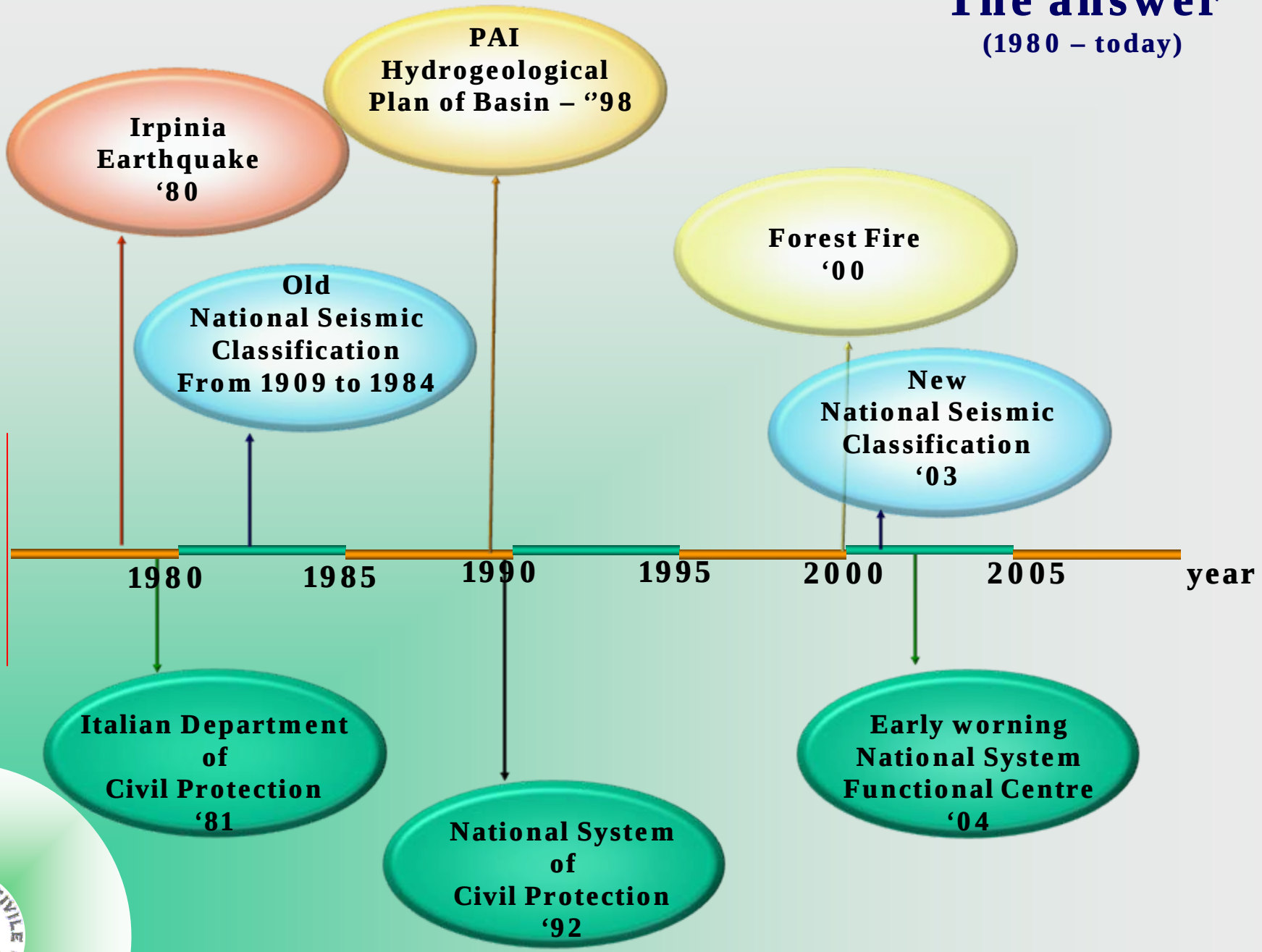
Risk condition sufficently high to give consideration for further mitigation and planning (planned action)

Low risk condition with additional mitigation contingency planning (advisory in nature)

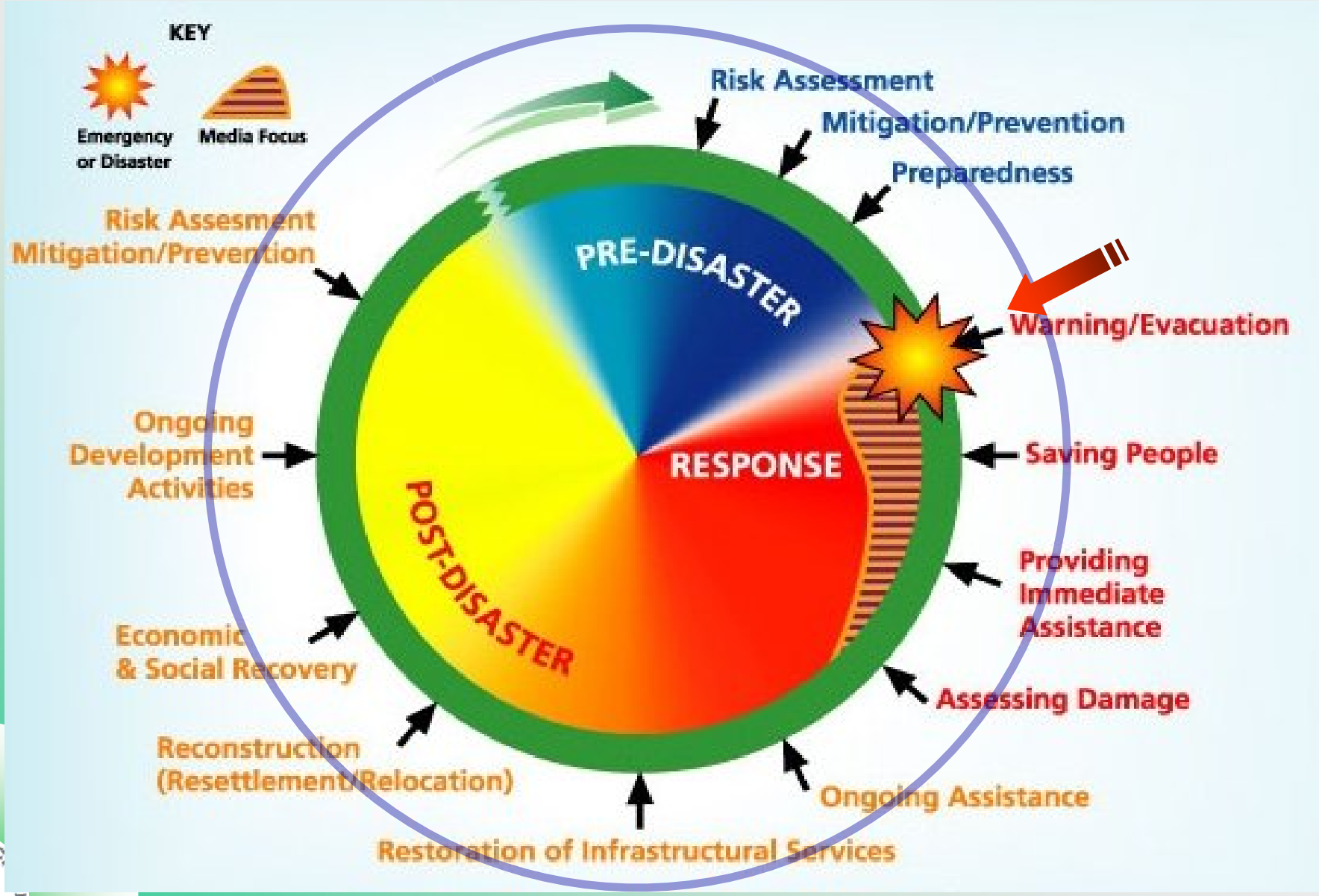
E = Earthquake F = Forest fire L = Landslides
V = Volcanic FL = Flood

The answer

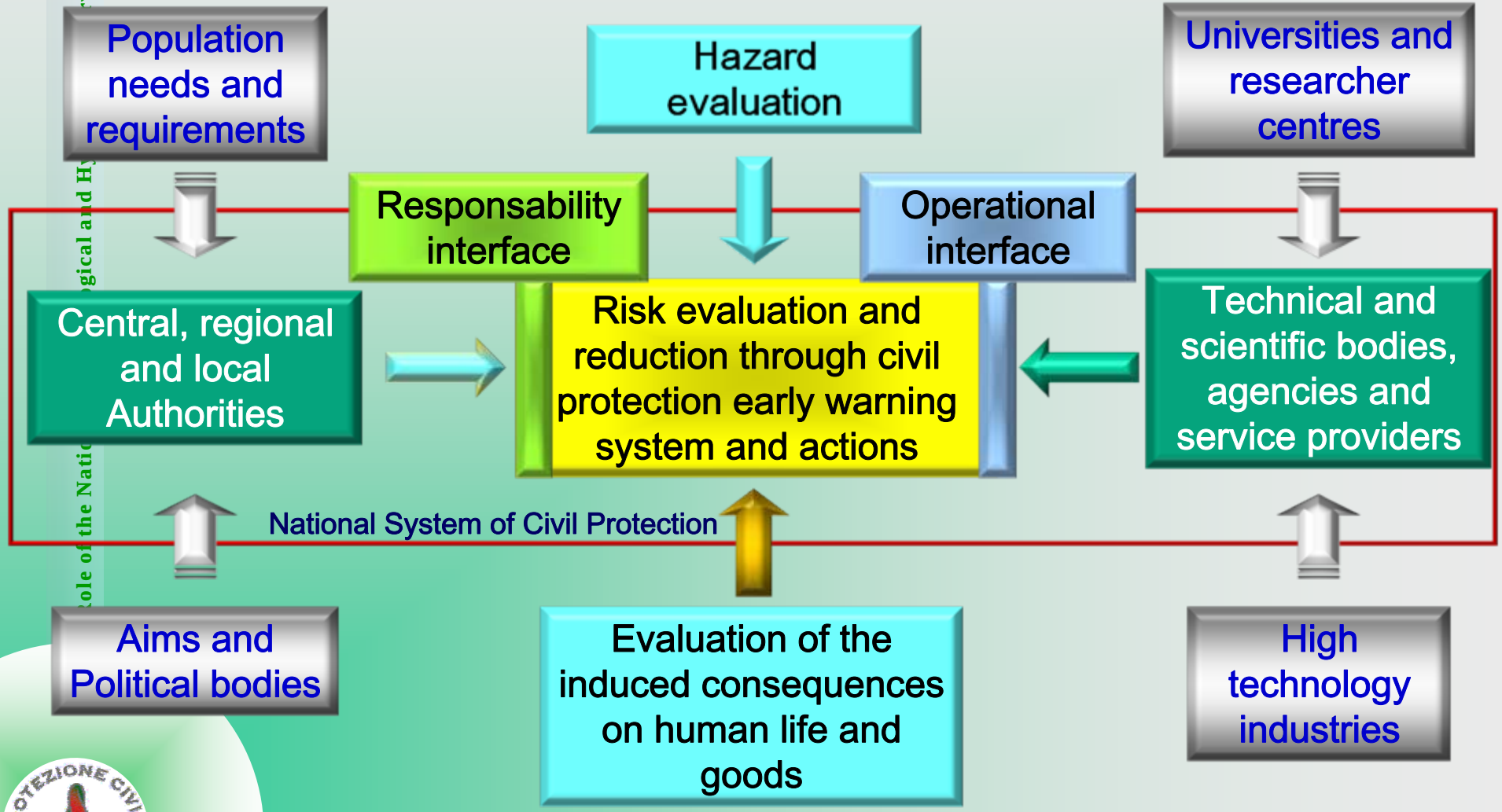
(1980 – today)



Activities in charge to the Civil Protection



The Italian public policy to cope with risk assessment and management



Role of the Nation … Hydro

PRESIDENCY OF THE COUNCIL OF MINISTERS

Department of Civil Protection

Coordination activities

- **Interior**
  - National Fire-fighters Corps
  - Police
  - Prefectures
- **Foreign Affairs**
- **Environment**
  - APAT
- **Health**
  - 118
- **Economy and Finance**
  - Revenue Guard Corps
- **Defence**
  - Army
  - Navy
  - Air Force
  - Carabinieri
- **Productive Activities**
  - G.R.T.N.
- **Transportation and Infrastructures**
  - Costal Guard
  - ANAS
  - National Highway
  - National Railway
- **Cultural Heritage**
- **Education, University and Research**
  - I.N.G.V.
  - C.N.R.
  - National Institutes
- **Communications**
- **Agricultural Policy and Forestry**
  - State Forest Corps
- **Regions**
- **Provinces**
- **Municipalities**

PROTEZIONE CIVILE NAZIONALE

How does the Civil protection work ?

REAL TIME

Forecast activity and emergency actions

DCP coordinates the regional and local civil protection structures

Crisis

DELAYED TIME

Ordinarian Operativity

DCP provides the guide lines and collaborates with Regional authorities and scientific research centres

Prevention

Operational Commitee

is set up within the Department of Civil Protection to ensure a unified direction and coordination of emergency management

Role of National Meteorological and Hydrological Services

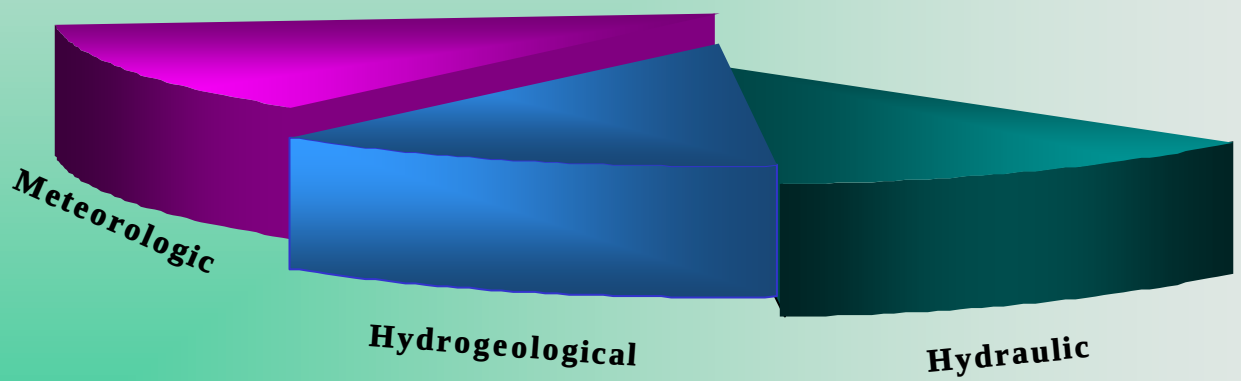
- ANAS
- Highway
- Railway
- RID
- Italian Met. Service
- RFI
- National Fire Brigades
- Police
- Italian Red Cross
- Alpine Rescue Corps
- CNR
- ENAV
- National health system
- Regions and Local Autonomies
- APAT
- Volunteers organisations
- ENAC
- ENEA
- Army
- Navy
- State Corps of Foresters
- INGV
- **Head Department of Civil Protection**
- RAI
- ENEL
- Tim
- Postmaster
- Telecom
- Vodafone
- Wind

The problem is: Yes or Not ?

this requires to bridge the gap between scientific output (probability) and the boolean logic (YES-NO) of decision-makers

So, we start in the 2004 ....

and the Directive (DPCM 27/2/04) identified the activation of the Functional Centres for the hydrogeological, meteorologic and hydraulic risks , but..



National early warning system management

direttiva PCM 27/02/2004

Role of the National Meteorological and Hydrological Services

National warning system is provided by DCP and Regions by the "Centri Funzionali" National Network, along with the "Centri di Competenza" involved in risk management

Centri Funzionali (CFSE)

CFSE are the operative support units, which are able to collect, elaborate and exchange every kind of data risks (meteorological, hydrological data for hydro-geological, hydraulic, seismic, volcanic) which provides a multiple support system for decisions. The DCP is charged with the guide lines issue, procedural and operative standards.

Centri di Competenza (CTS)

CTS are Institutions which provide services, information, data, elaboration, technical and scientific contributions for specific topics. According to the Directives some National Competence Centres, concerning hydro-geological and hydraulic, volcanic, seismic risk, have already been defined.

Our Early warning system ...

- A **system able to share and exchange information in real time, through common standards and procedures, targeted the general assessment of the risk.** This is done by the network of "Centri Funzionali", centres which are charged of the collection and operational use of all available meteorological, hydrological and geological data and provide the technical and scientific support to the civil protection decision process.

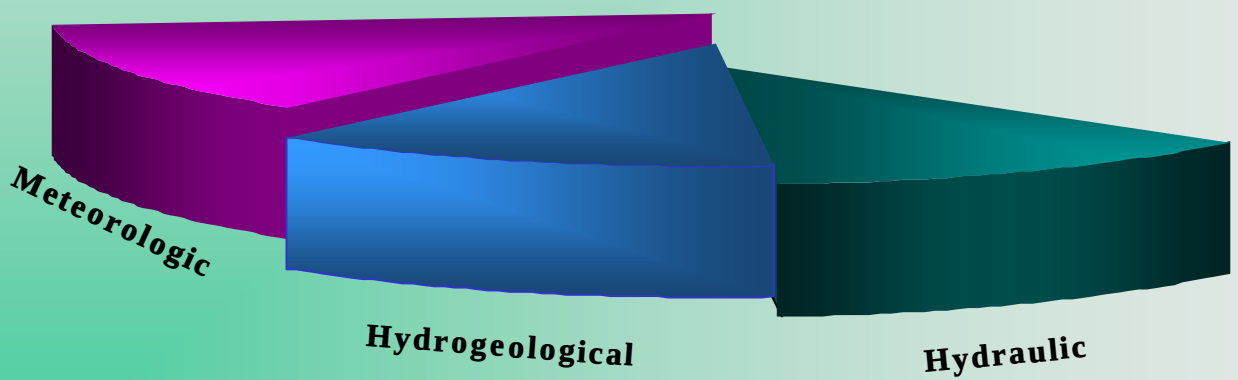
- **The "Early Warning System"** that, according to the Law DPCM 27/02/2004, **is under the direct control of the Civil Protection Authorities** and, basing on the network of "Centri Funzionali", is not only addressed to the evaluation of hazards, but mainly to forecast and survey the induced effects on human life and goods.

- A well organised and cooperative emergency management system to actuate the decided actions.

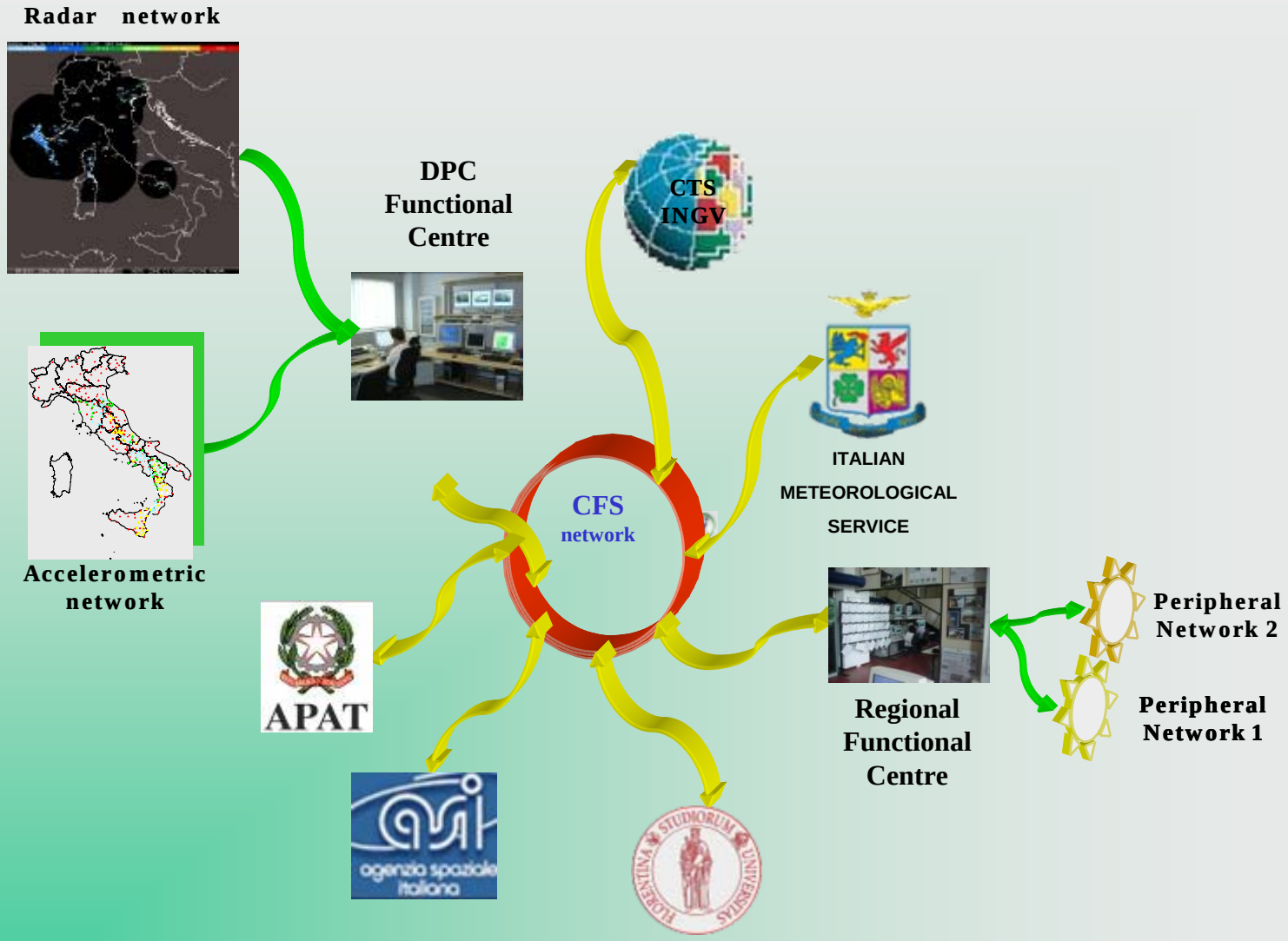
- An efficient "command and control" chain led by a well defined Institutional System of Authorities **sharing the responsibilities of decision and action at central, regional and local level.**

Actually....

.. other sectors are added and, actually, we have a true multirisk center to support the activities of monitoring, forecast and emergency.



Functional Centre Network



21 CFSE Functional Centres / 11 on line + Central

41CTS Competence Centres

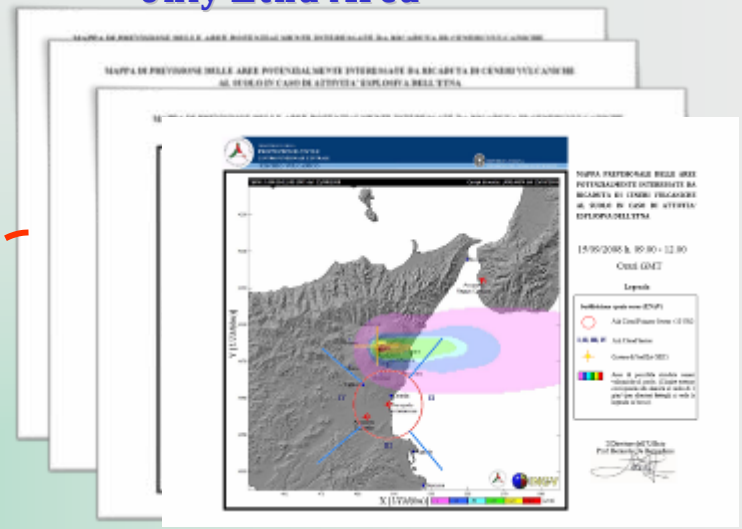
Dual Mode

Products of Functional Centre

Role of the National Meteorological and Hydrological Services

Forest Fire daily surveillance bulletin (only summer time)

Forecast maps of ash fallout – only Etna Area



Volcanic daily surveillance bulletin

Ministry
Regions
Prefecture
.....

Meteo daily surveillance bulletin

PROTEZIONE CIVILE NAZIONALE

How much?

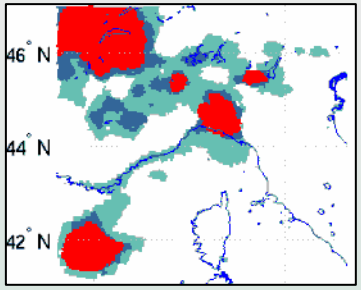
- Seismic and volcanic 28 M€
- Hydrogeological & forest fire 10 M€
- Others 1.5 M€

Meteo Service in.....

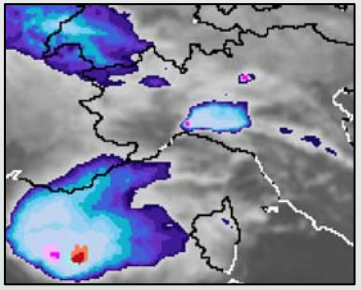
Improving meteo&hydrological forecast

Role of the National Meteorological and Hydrological Services

Rain Rate

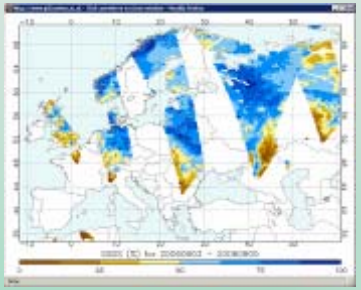


Zoom in North of Italy of the Estimated Rain Rate Classes from AMSU on MSG grid 2006- 8 -16 starting at 01:52 ending at 02:05



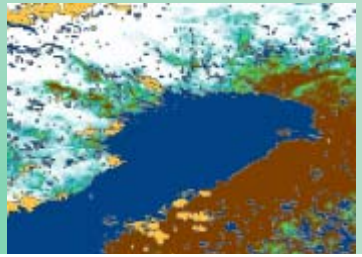
Zoom in North of Italy of Convective Detection Cloud by SEVIRI data 2006- 8 - 16 at 02:00.

Soil Moisture



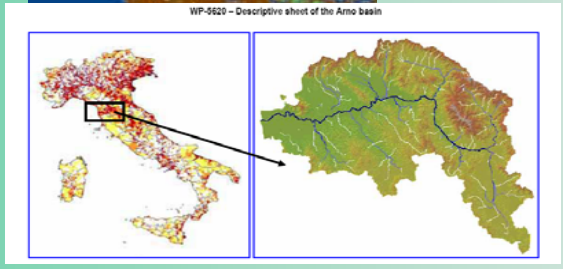
ASCAT:25 Km Res - Typical large-scale soil moisture product

Snow parameters



fraction of Snow Covered Area, derived by Terra/MODIS level 1B data, around Bay of Bothnia

Hydrological validation

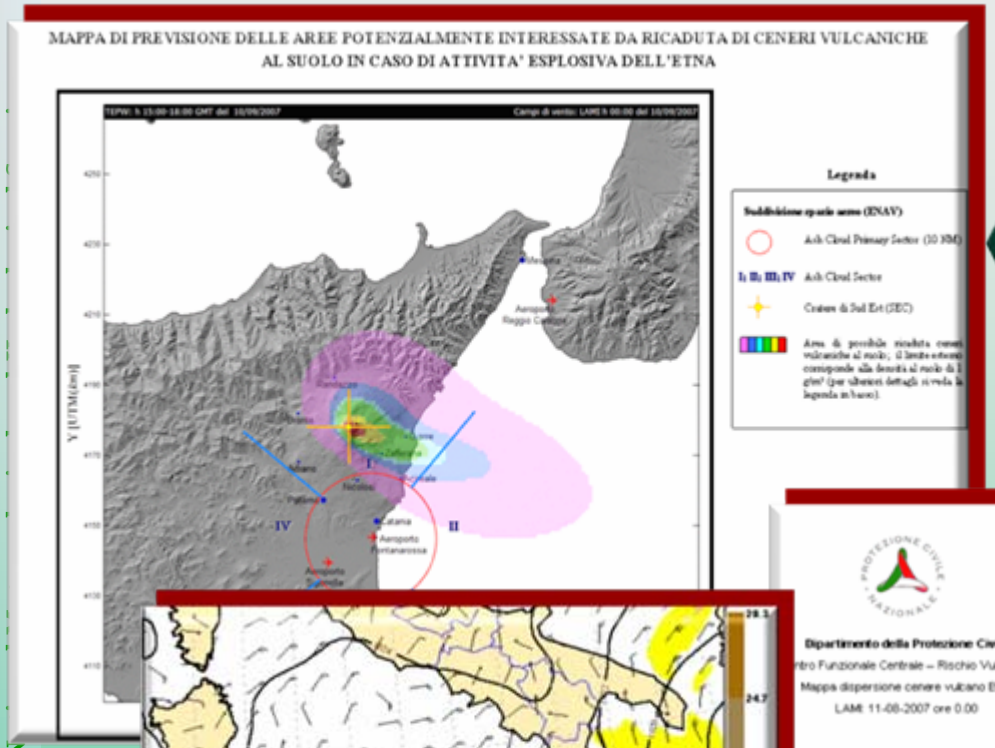


Impact on hydrological forecast

Eumetsat: HSAF Project

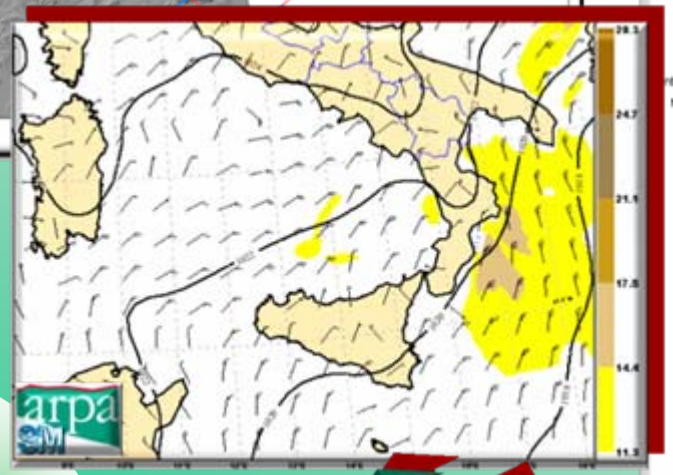
Volcanic Risk - Catania – Ash

models

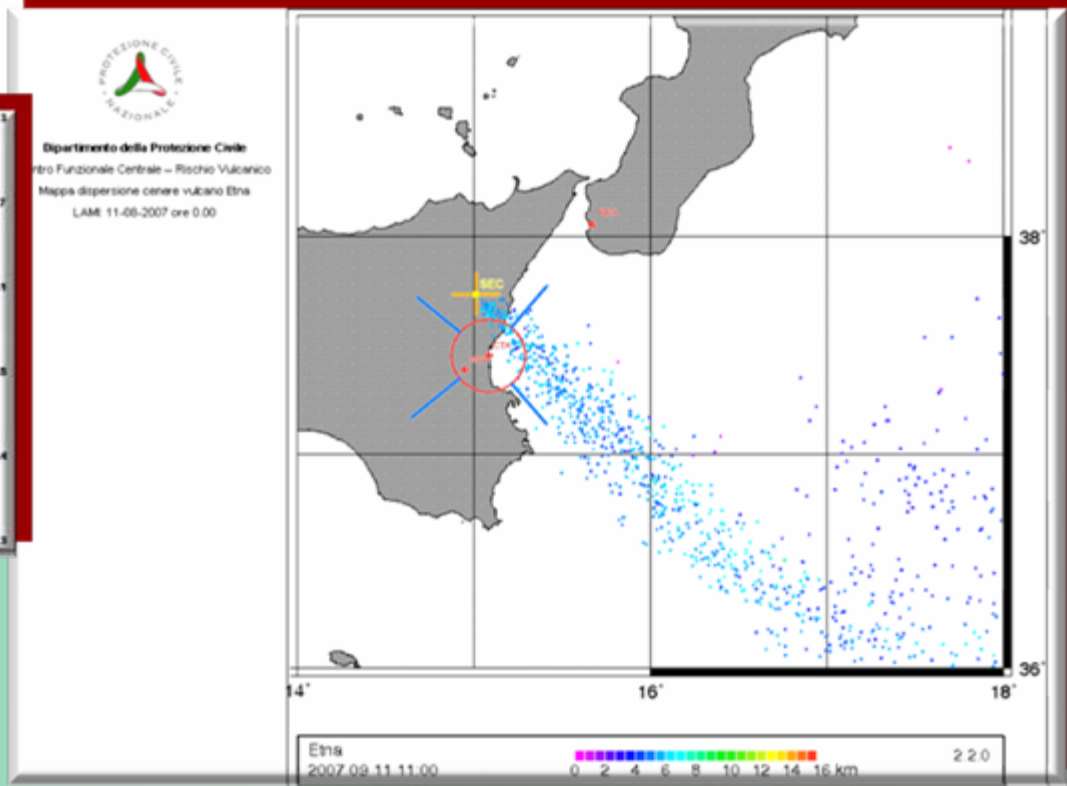


Tephra

Puff



Wind



Role of the N

Forest Fire

Modis – 24/07/2007 time 14:10

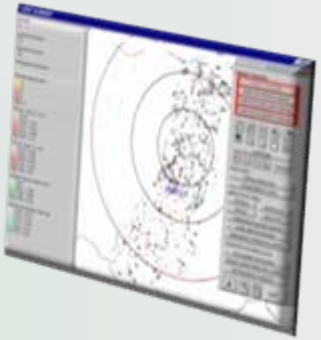
Role of the National Meteorological and Hydrological Services

Sige Products

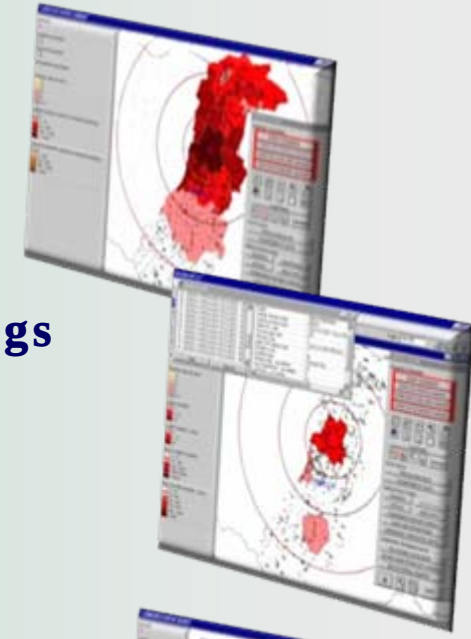
SIGE

Scenario
dinamic

Event
- Intensity
- PGA
- PGV
- Spectral acceleration



Losses scenario
- Number of collapsed-unsafe-damaged buildings
- Economic Loss
- Fatalities and injured people

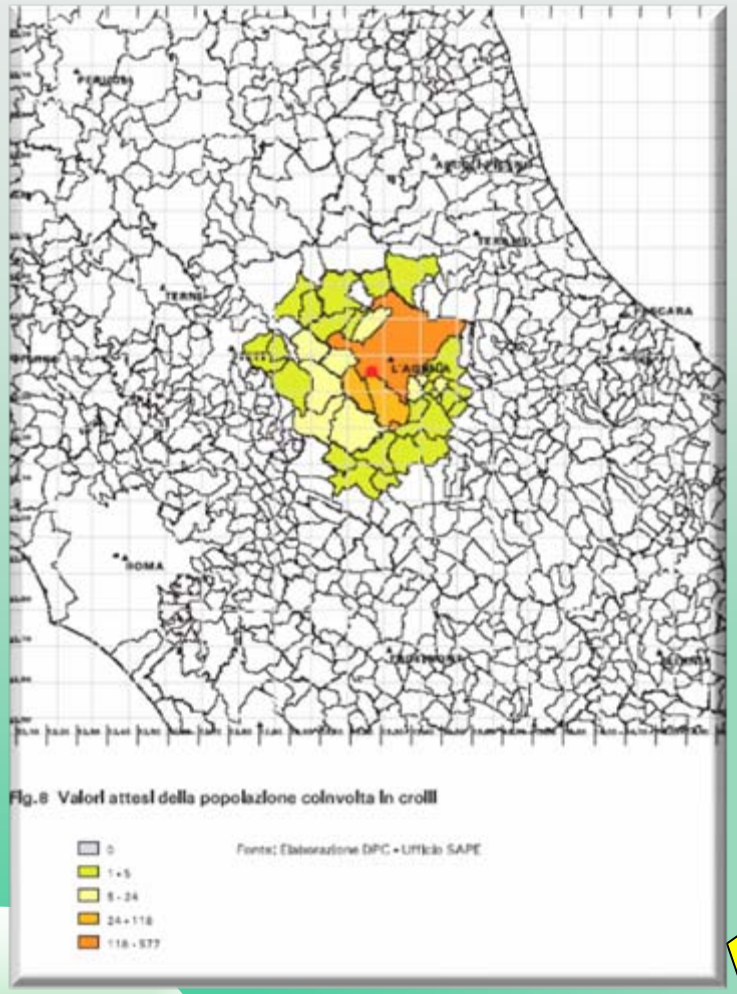


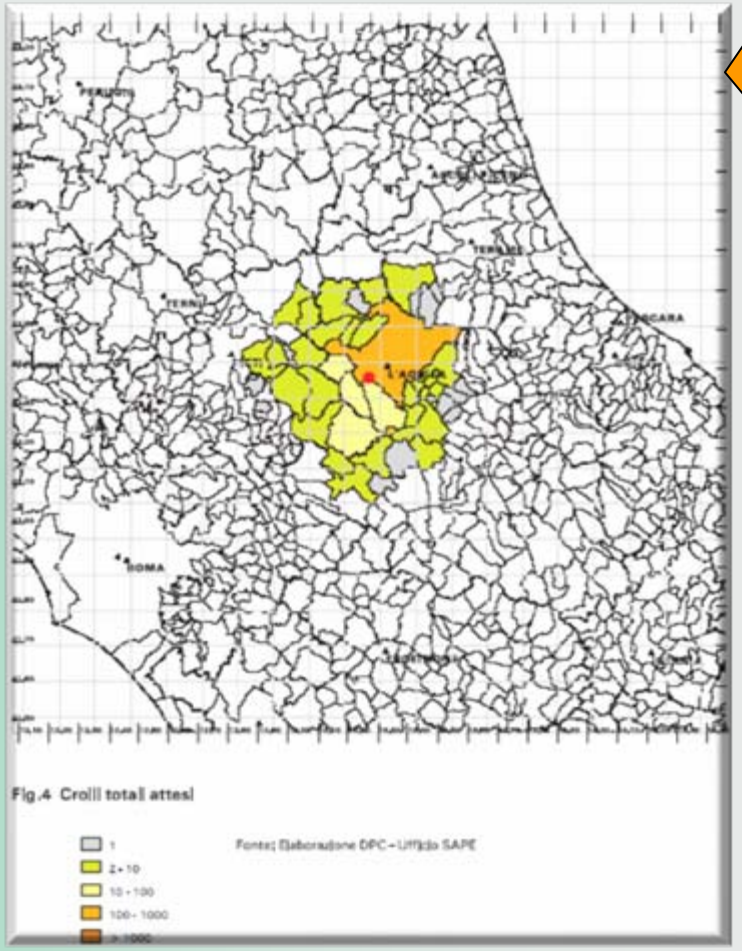
Territorial Scenario
static

Involved Area
- Population
- Vulnerability characteristics
- Hospitals, services
- Infrastructures
- Seismological and geological information

By SIGE

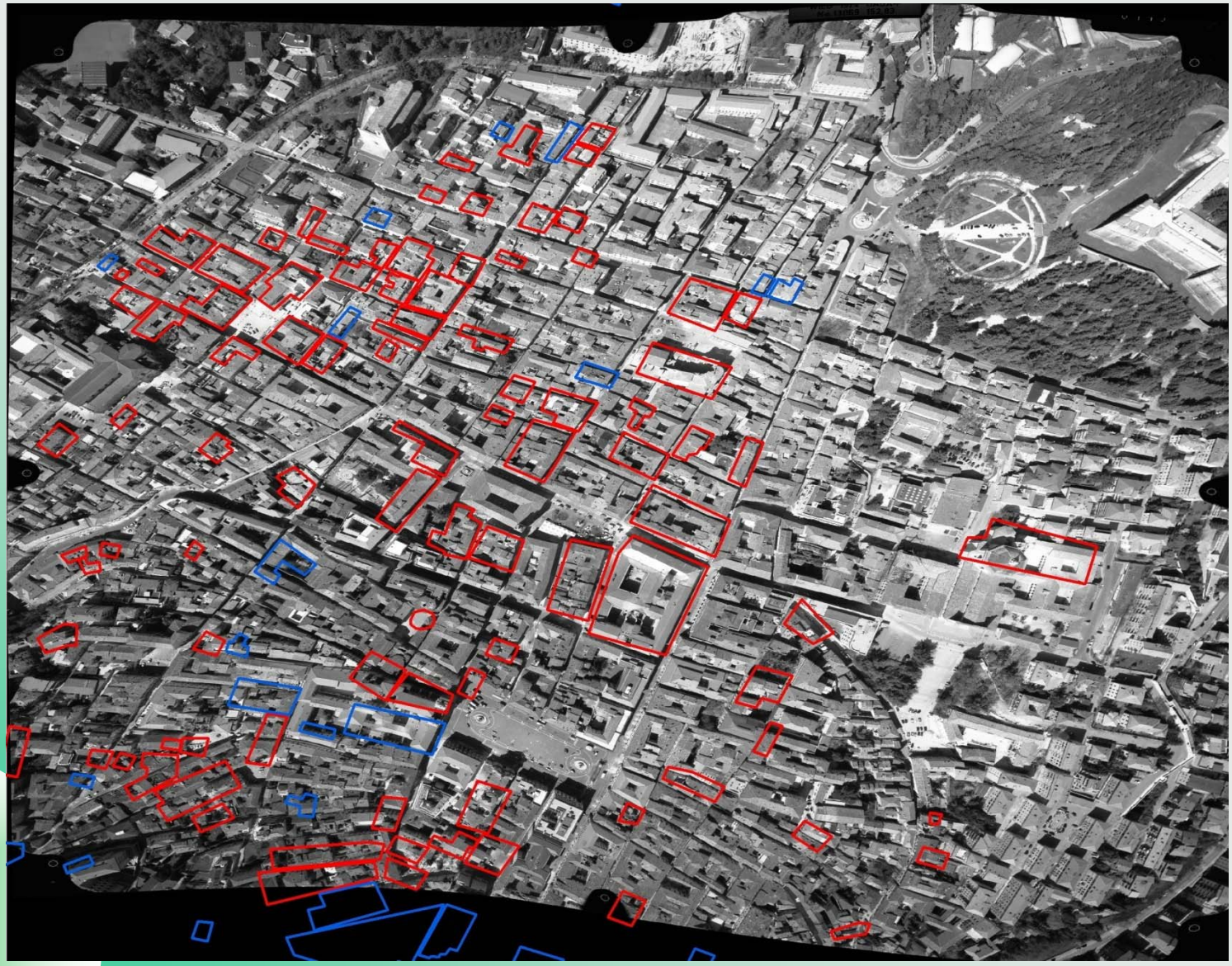
Expected structural damage collapsed



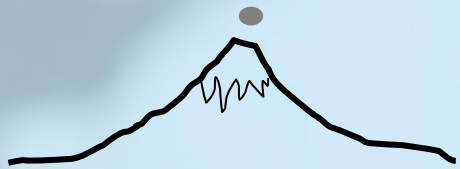


Expected number of casualties

Historical centre L'Aquila
Collapsed buildings -



That's all.
Thank you for your attenction



pierluigi.soddu@protezionecivile.it

Dipartimento della Protezione Civile- Roma
http://www.protezionecivile.it/