The Civil Protection System of the Autonomous Region of Friuli Venezia Giulia (Italy)

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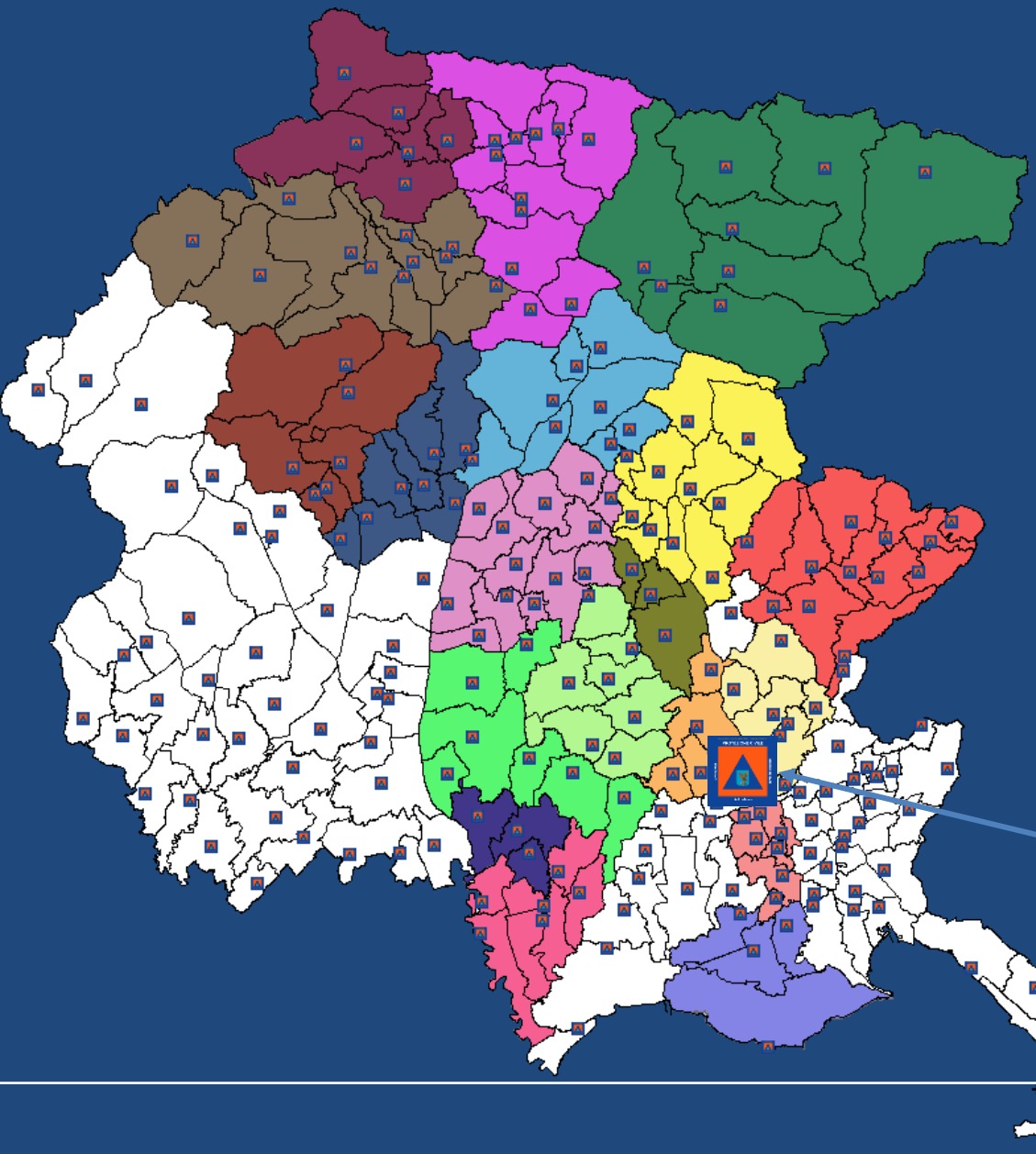
La Plata, November 2017

Friuli Venezia Giulia Autonomous Region

Organisation widespread on the regional territory



- 216 Municipalities
- 216 Civil protection Municipality Groups
- 23 Districts

- Regional Civil protection Operative Center in Palmanova: SOR/SOUP/CCS

Volunteers

Emergence examples

29 th August 2003
Flood in
Val Canale - Canal del Ferro
Pontebba - Pietratagliata

293 mm / 4 hours

Pietratagliata (Pontebba) –Fella river and Rio Geloviz Confluence

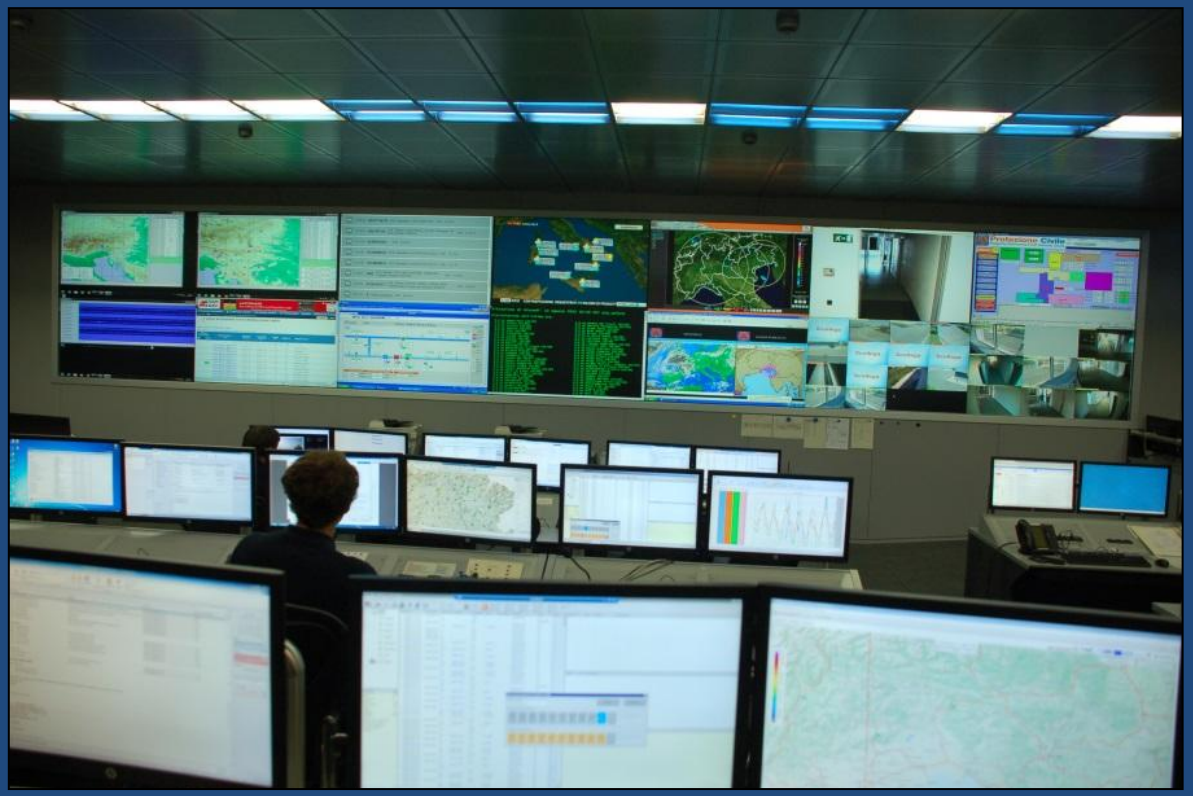
4th September 2009 – Flood
Val Canale - Canal del Ferro - Val Dogna

Main tools for risk management and realisation of prevention actions

- **Regional Operative Room (SOR)** in Palmanova
- Territory real-time control and monitoring systems
- **Emergency planning**
- **Prevention**, **fast intervention** and **restoration** works
- Civil protection **personnel**, **volunteers** and **population training**

CIVIL PROTECTION OPERATIVE ROOM

- h24 control room
- Monitoring networks and logistic
- Regional Radio network
- Coordinates the operations of civil protection
- Connected with National civil protection Department (DPC)



Territory real-time control and monitoring systems

The data from all of the Civil Protection Monitoring Networks are collected in the Operative Centre in Palmanova :

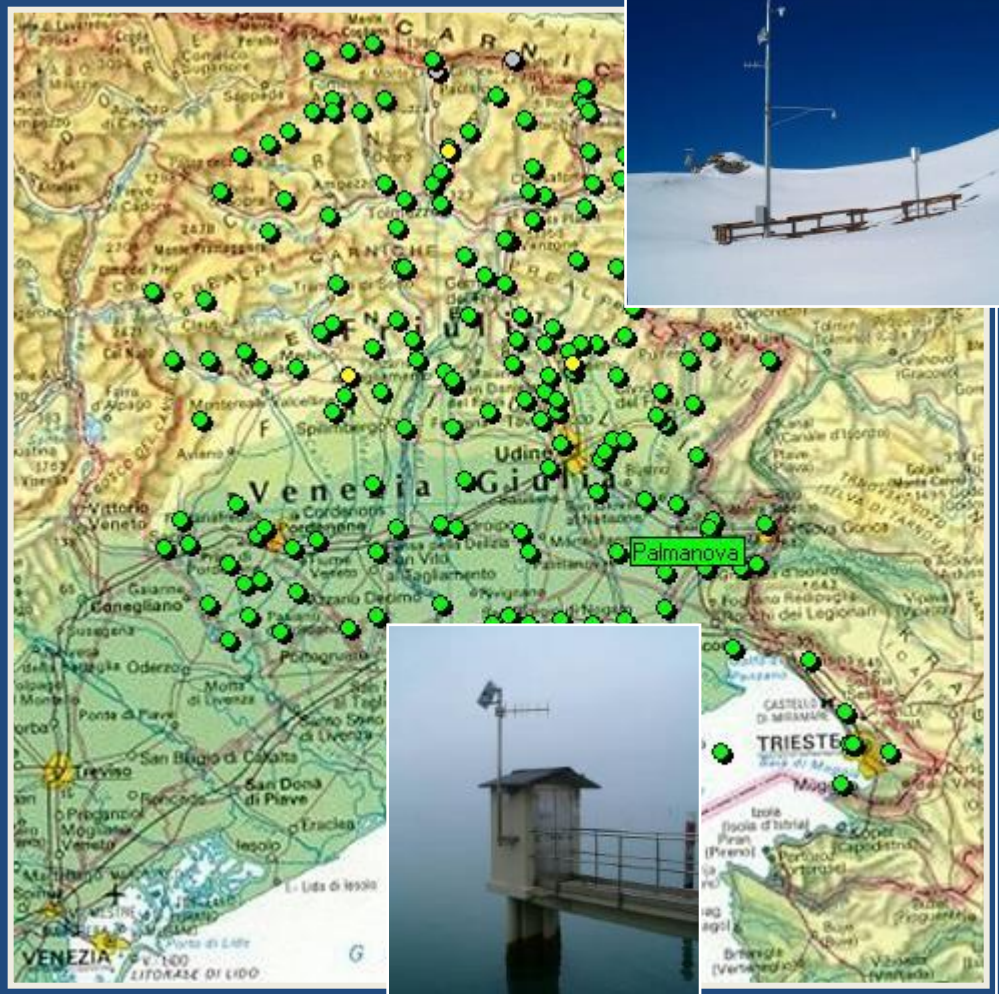
- Hydro-Meteo-Marine monitoring network
- Hydro Geological monitoring network
- Meteorological Radars for nowcasting
- Satellite observations (Meteosat MSG)

- Seismic Monitoring Network

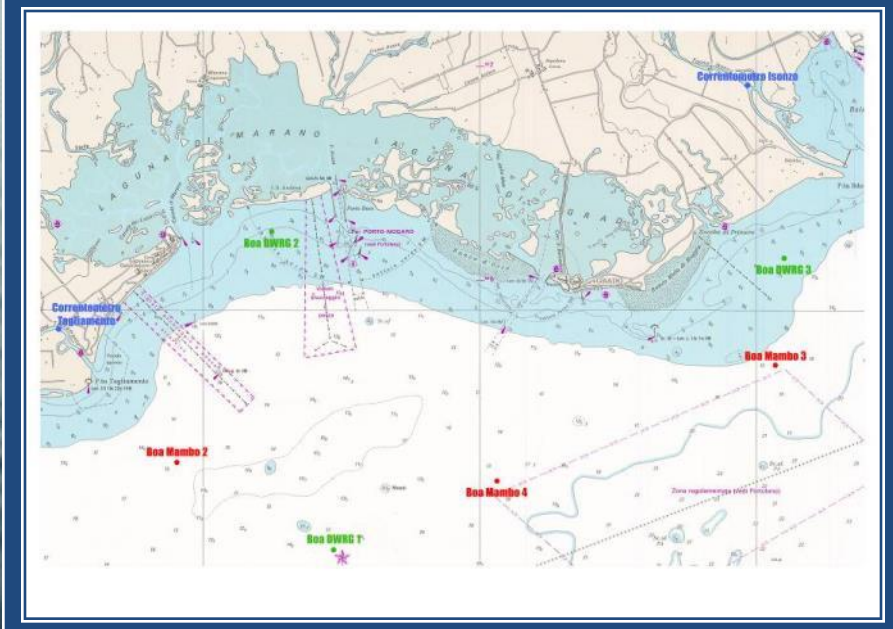
Hydro Meteo Marine monitoring network

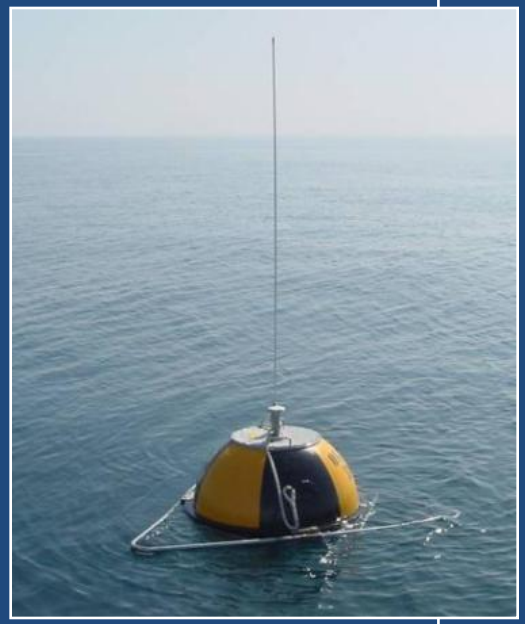
Real time monitoring ground effects of meteorological events by automatic monitoring network managed by regional civil protection :

- 191 monitoring stations
- 111 hydrometers
- 112 rain gages
- 27 barometers
- 100 air thermometers
- 5 sea level sensors
- 18 snow level sensors
- 4 present weather sensors



Hydro Meteo Marine Monitoring Network



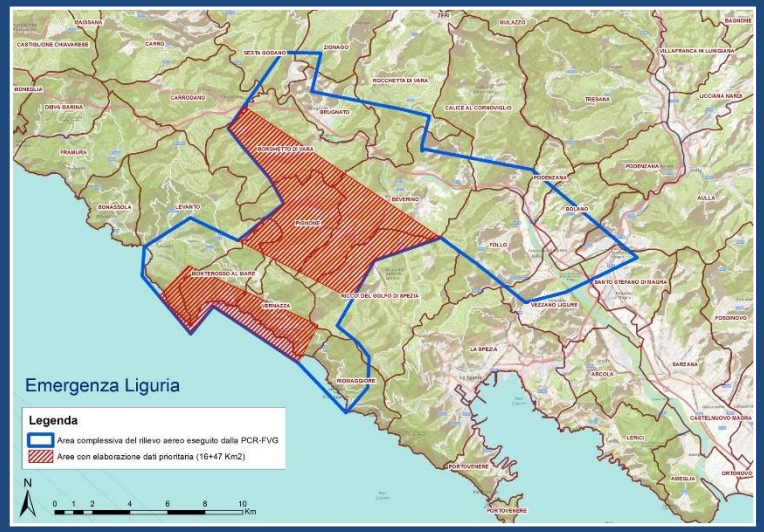


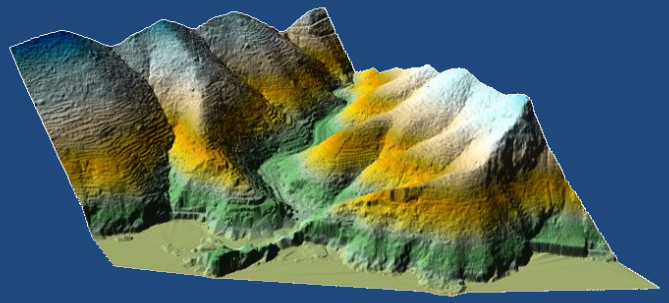
6 marine buoys (3 meteo-oceanographic + 3 for waves monitoring)

Real time monitoring system based on fixed buoys on which different oceanographic and meteorological sensors are installed.

Hydro Geological monitoring

Example of laserscan relief elaboration
Flood Liguria Region – November 2011

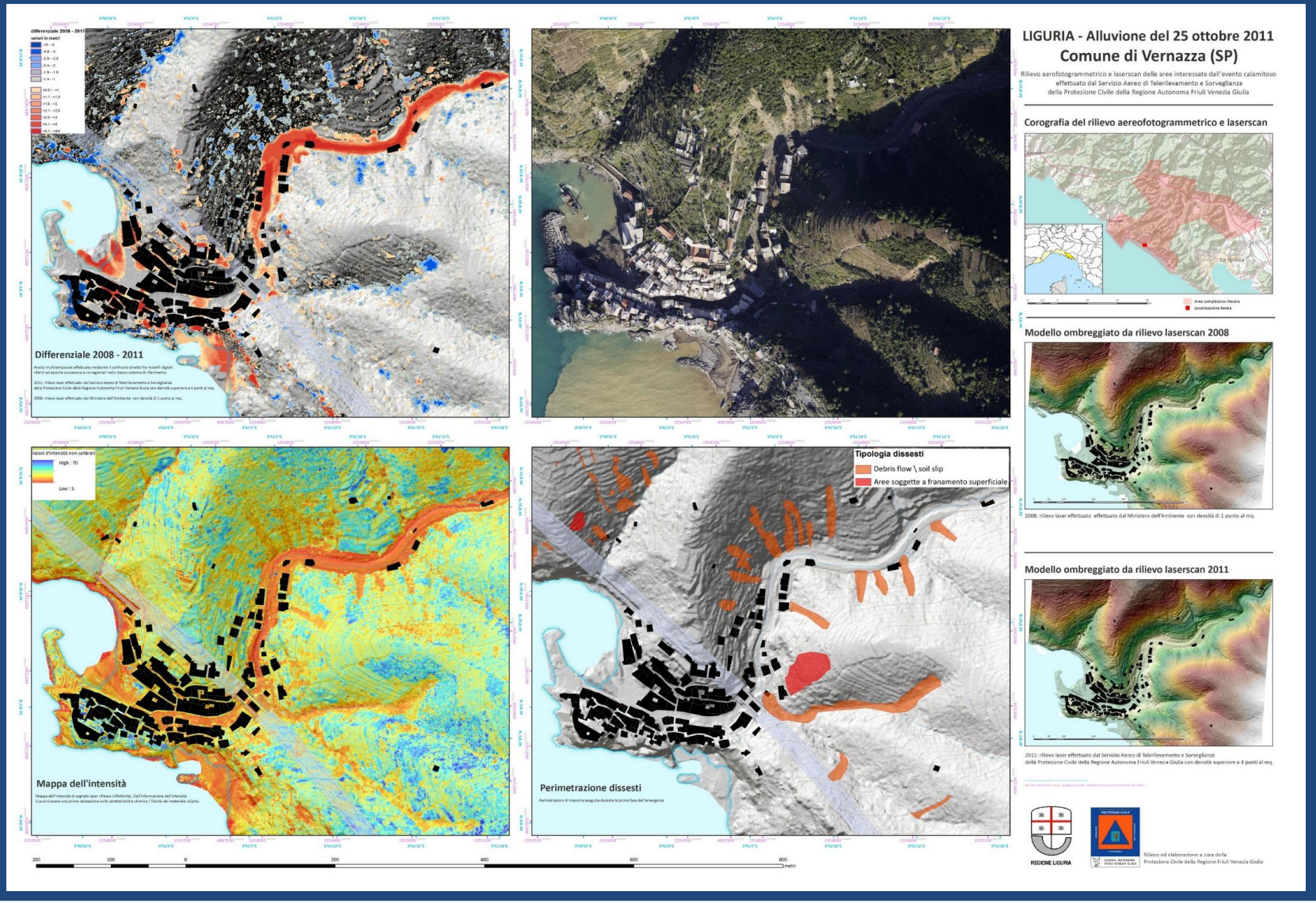




- Area: **200 km²**
- **Lidar points density > 4 points/m²**
- O**rtofoto**: ground resolution **15 cm/pixel**

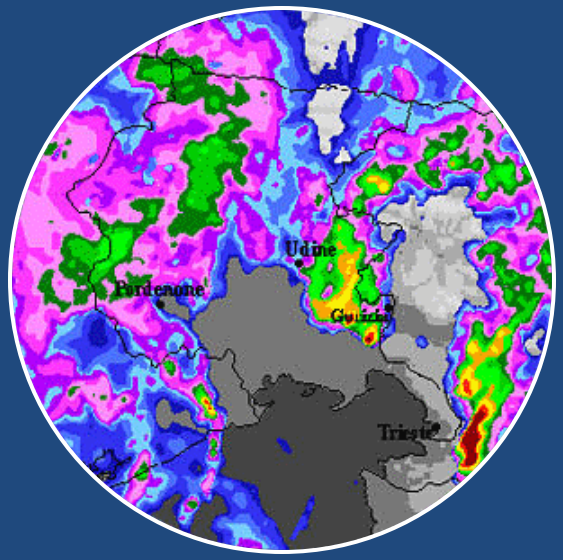
In the early days of the emergency, due to the calculation of the **difference** between the DTM created by the laserscan relief and the DTM already in the possession of the Liguria Region, **landslides** and **estimated volumes** have been identified.

Example of laserscan relief elaboration
Flood Liguria Region – November 2011



Meteorological Radars for nowcasting

Fossalon Radar



Mount Zouf Plan Radar

- Meteorological radar data are used for civil protection purposes in order to detect and monitor critical events and, during the phase of meteorological nowcasting
- The meteorological radar of DPC installed on Mount Zouf Plan grants the maximum coverage of the mountain area of FVG and also of part of Carinzia region (Austria) and Slovenia

Flood monitoring

The High-water service

"High-water service" ("Servizio di piena") consists of procedures and activities for the monitoring of river embankment status, in the case of water level exceeding fixed warning levels. Are established 4 phases:

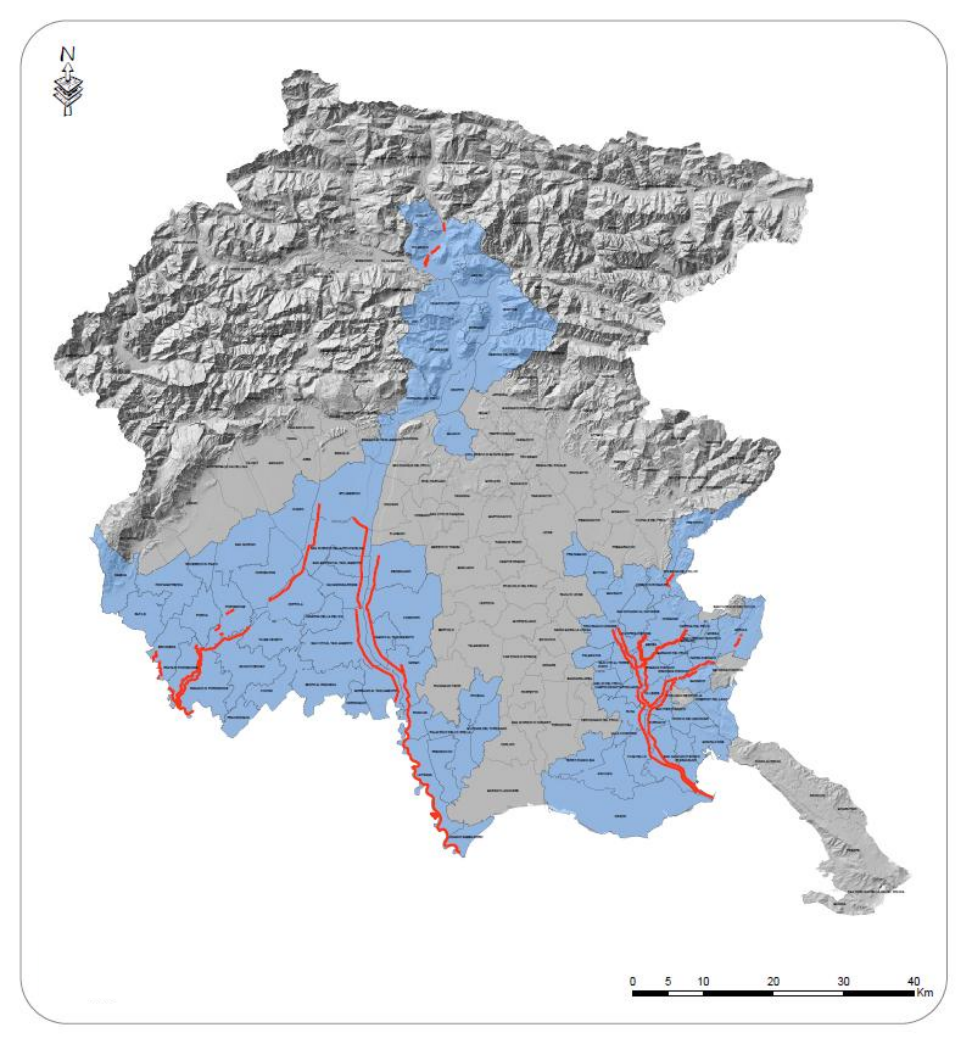
I) **Planning phase** → Task of Regional Civil protection (PCR) and Public Works Offices

II) **Monitoring and Meteorological alerting phase** → Task of PCR

III) **Embankment surveillance phase** → Task supported by volunteers of Civil protection Municipality Groups

VI) **Management and quick Intervention phase for prevention ed restoration** → Task of PCR and Public Works Offices

Organized high-water service on Embanked rivers



This service is organized for the selected and classified reaches of the main water courses, where embankments are of **first** and **second** or **third** category of importance.

Total length of the embankments:
235 Km

Meduna river - Prata di Sopra (PN) - 27 Nov 2002

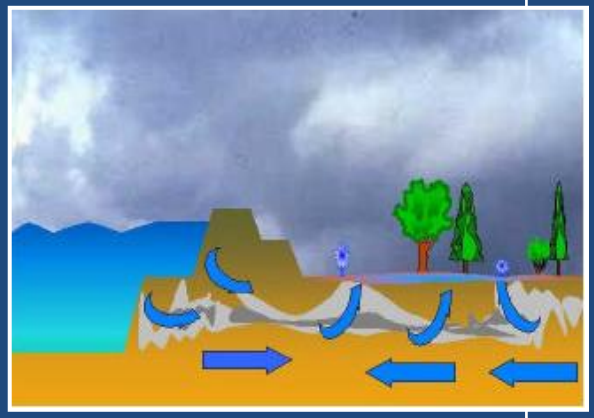
Livenza river – Loc. Traffe (PN) - 28 Nov 2002

Embankments surveillance phase

Civil protection municipality Groups are in charged of the surveillance of the embankments in order to permit a prompt "hydraulic quick intervention" in case of damages avoiding ruptures and flooding of inhabited areas

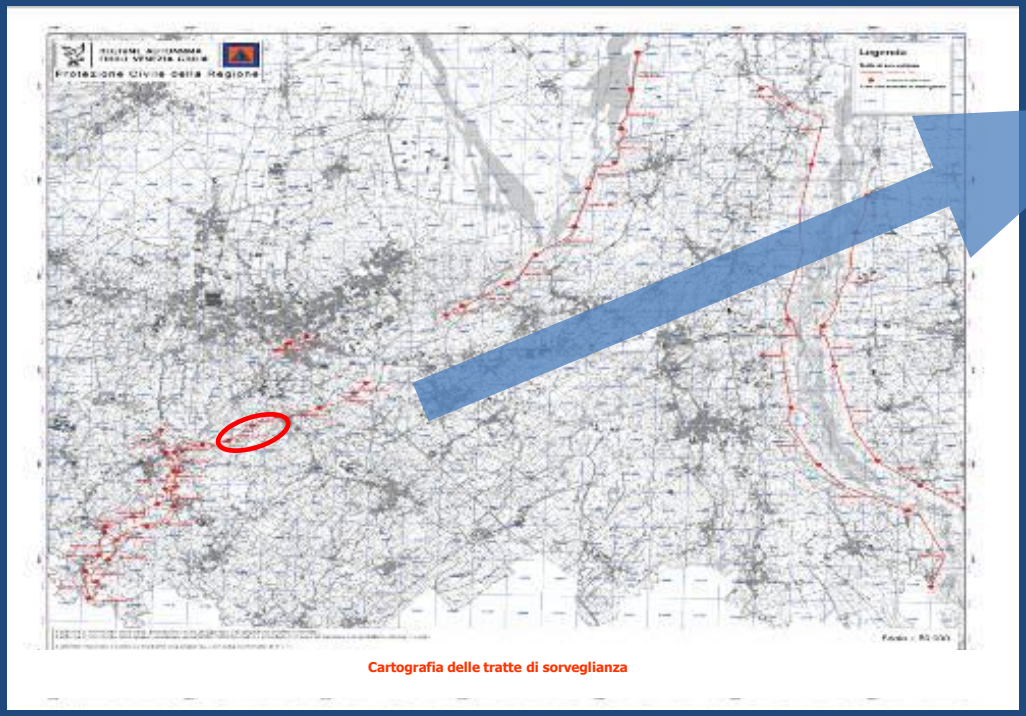
Embankment surveillance phase

Infiltration

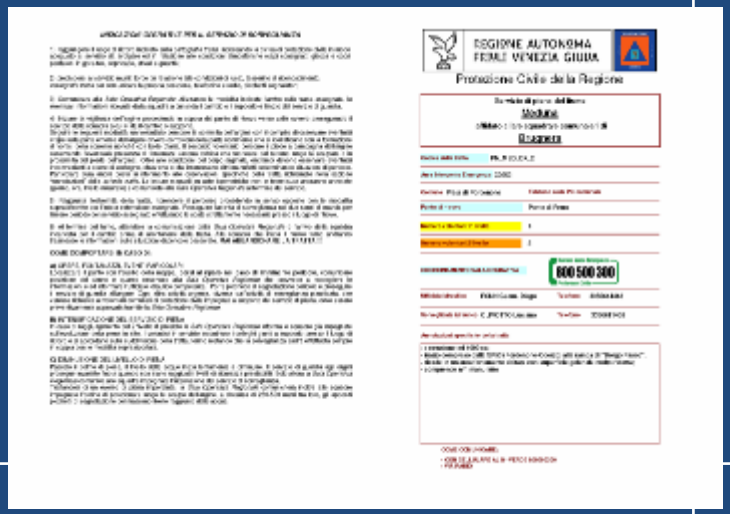


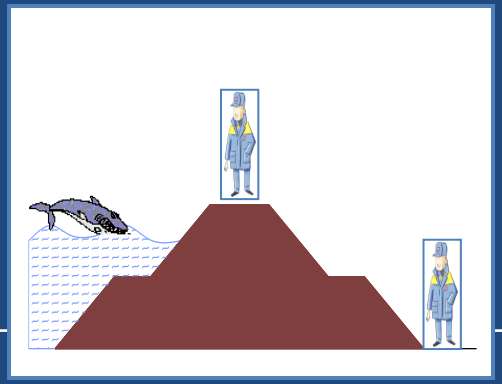
Cracks

Cartography Support for High-water service



Cartografia delle tratte di sorveglianza





REGIONAL OPERATIVE ROOM

High-water service Coordination

Technical-scientific activity

Institutional relations

High-water service Coordination : alerting levels

Continouous Monitoring of river levels on reference points to activate planned actions:

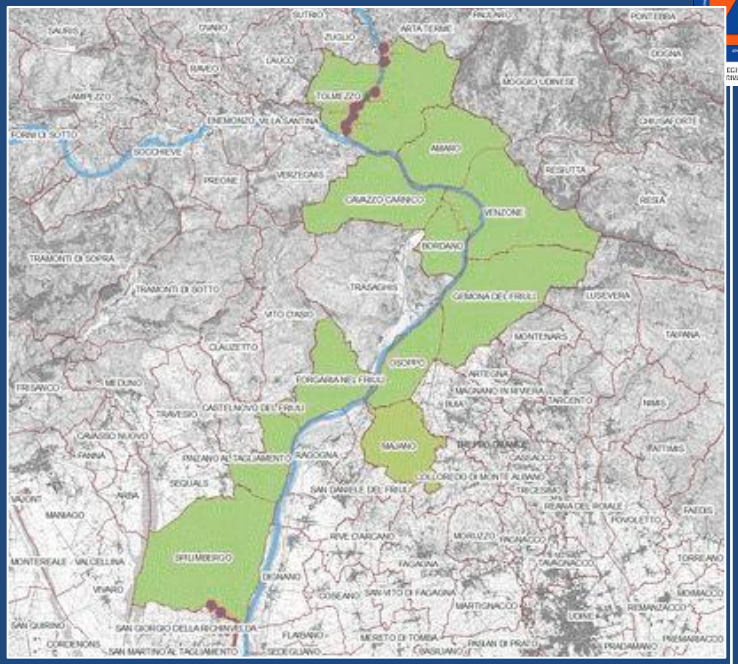
Attention (Guard) level : activation of hydraulic officers;

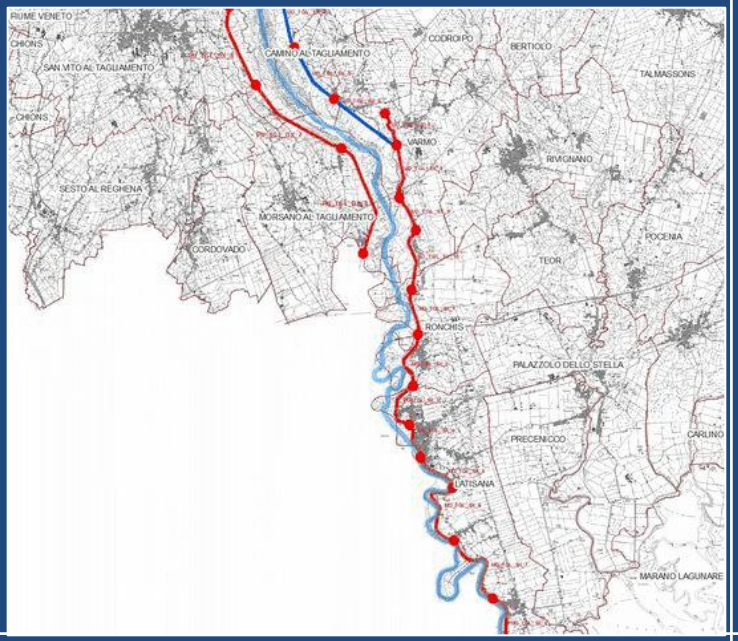
1° presidium level : activation of surveillance of embankments with volunteers of civil protection municipality Groups;

2° presidium level : intensification of surveillance with more volunteers of civil protection municipality Groups

Reference hydrometers

High-water service Coordination: Real-time GIS implementation





Immediate perception and visualization of situation on field

High-water service: activity on field

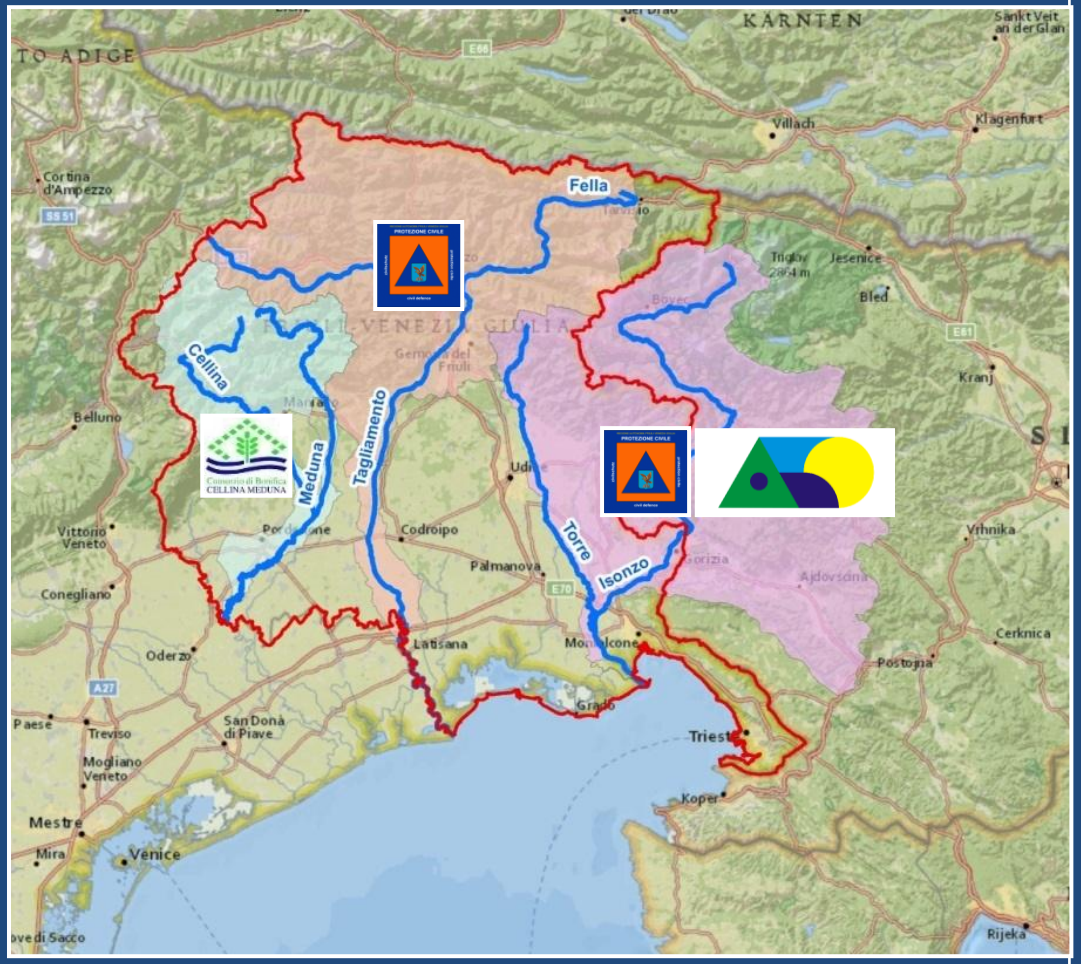
Embankment surveillance with men has an irreplaceable importance in order to allow prompt intervention, avoiding that an high-water event becomes a catastrophic inundation

The hydrological forecasting and management system of Friuli Venezia Giulia

The Friuli Venezia Giulia Region has hydrological and hydraulic models for::

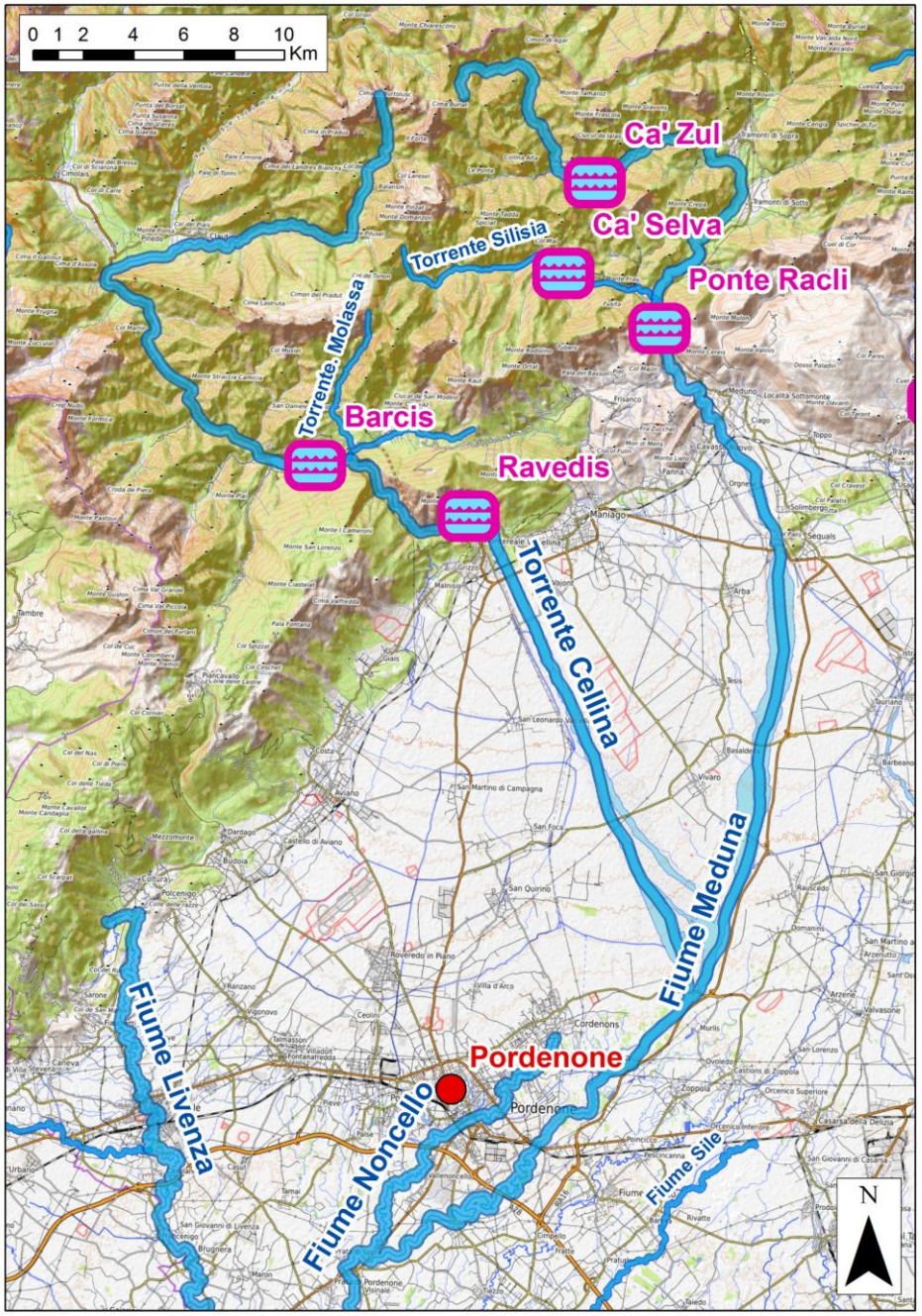
- basin of rivers **Cellina-Meduna**
- basin of river **Tagliamento**
- basin of river **Isonzo**

with GIS interface for environmental monitoring and “high water” real-time forecasting.



The dams of the basin Cellina-Meduna

Coordination between Civil Protection and Dam Managers to laminate the floods and mitigate downstream effects



Prevention, quick intervention and restoration works

3rd February 2003

water courses maintenance

Meduna river – Visinale di Sopra (Pasiano di Pordenone)

Vegetation cutting inside the river bed

14th April 2003

Flood 2003
(Ugovizza)

Gravel and material removal from the creek bed

Concrete screening of embankments (Latisana)

Civil protection personnel, volunteers and population training

Torre creek - bed cleaning

Thank you for your attention