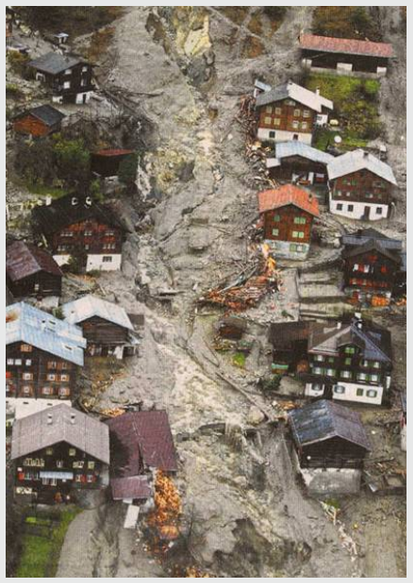


From EO and Data sharing to Early Warning Systems: the Technological platform DEWETRA

Paolo Fiorucci & Marco Massabò
CIMA Research Foundation

Observe to predict, predict to prevent

CIMA is a non profit research foundation active to promote and sustain capacity bulding, research and technological development in the field of disaster risk reduction caused by weather related events mainly floods and forest fires.

PROTEZIONE CIVILE
Presidenza del Consiglio dei Ministri
Dipartimento della Protezione Civile

Università degli Studi di Genova

REGIONE LIGURIA

Provincia di Savona

CIMA in numbers

55 employes

36 Average age

2 Headquarters in Savona with a branch office in Tirana

23 Active research project

73 papers

RESEARCH FOUNDATION
cimα

WHERE WE WORK

Commissione europea

UNISDR
The United Nations Office for Disaster Risk Reduction

Turning data into information for Decision makers

DEWETRA is a technological platform developed by CIMA on behalf of the Italian Civil Protection Department that shares and organizes EO and information **from local to national and regional level**

Using **technology** for making EO data and information available for decision-makers in **real time** and for turning data into information useful for decision makers

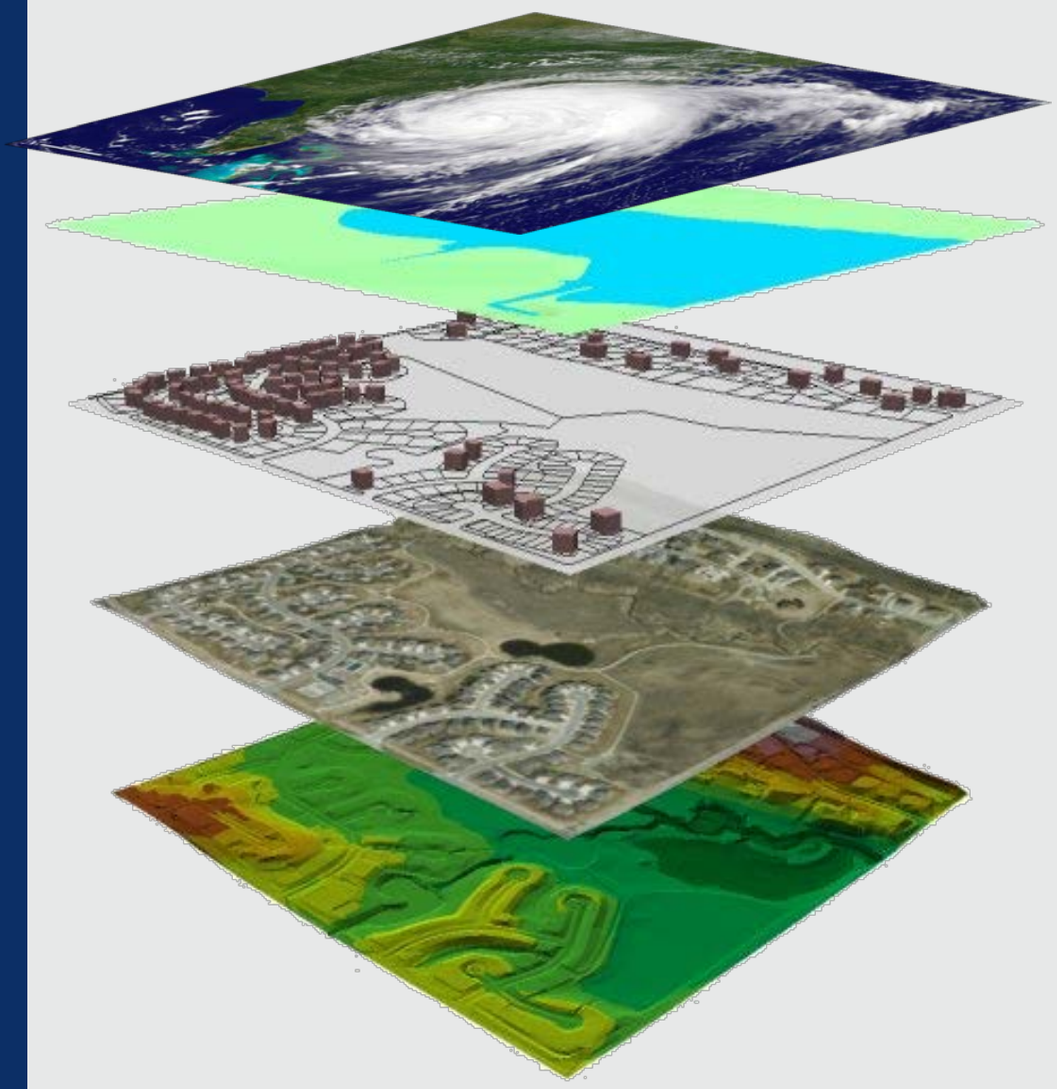
THE BASIC IDEA: Real-time Risk Assessment & Prediction

EXPOSURE: Persons & assets

VULNERABILITY: potential unitary losses

HAZARD: Expected intensities of events (i.e. rainfall, water level)

$$R = E \times V \times H(t)$$



Real-time information

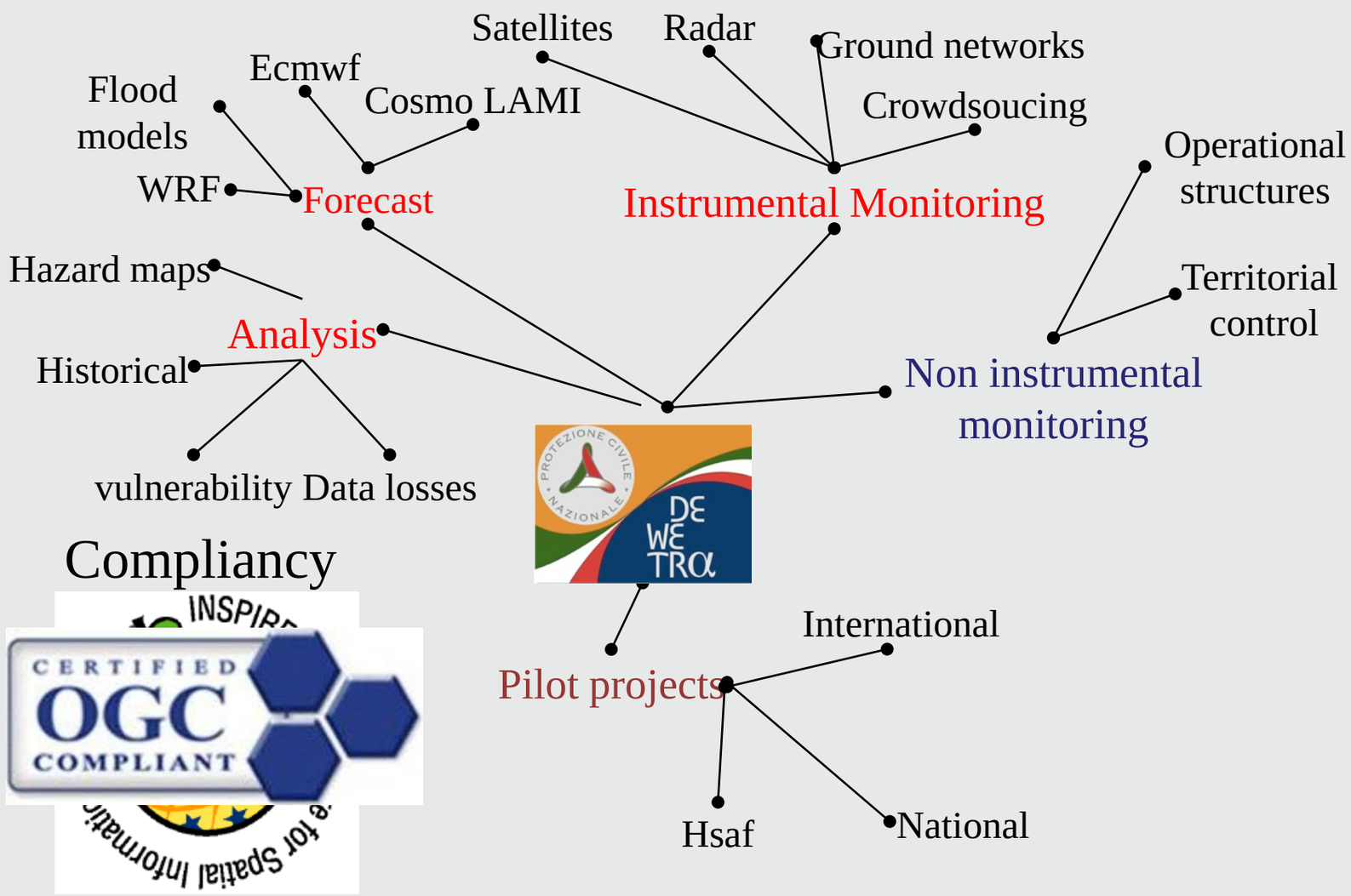
medium and short range weather forecasts,
hydro-meteorological monitoring ,
impacts prediction (flood, soilslip),
uncertainty estimation,...

Quasi-static information

element at risks, hazard maps, ...

Multiple-sources of data and products

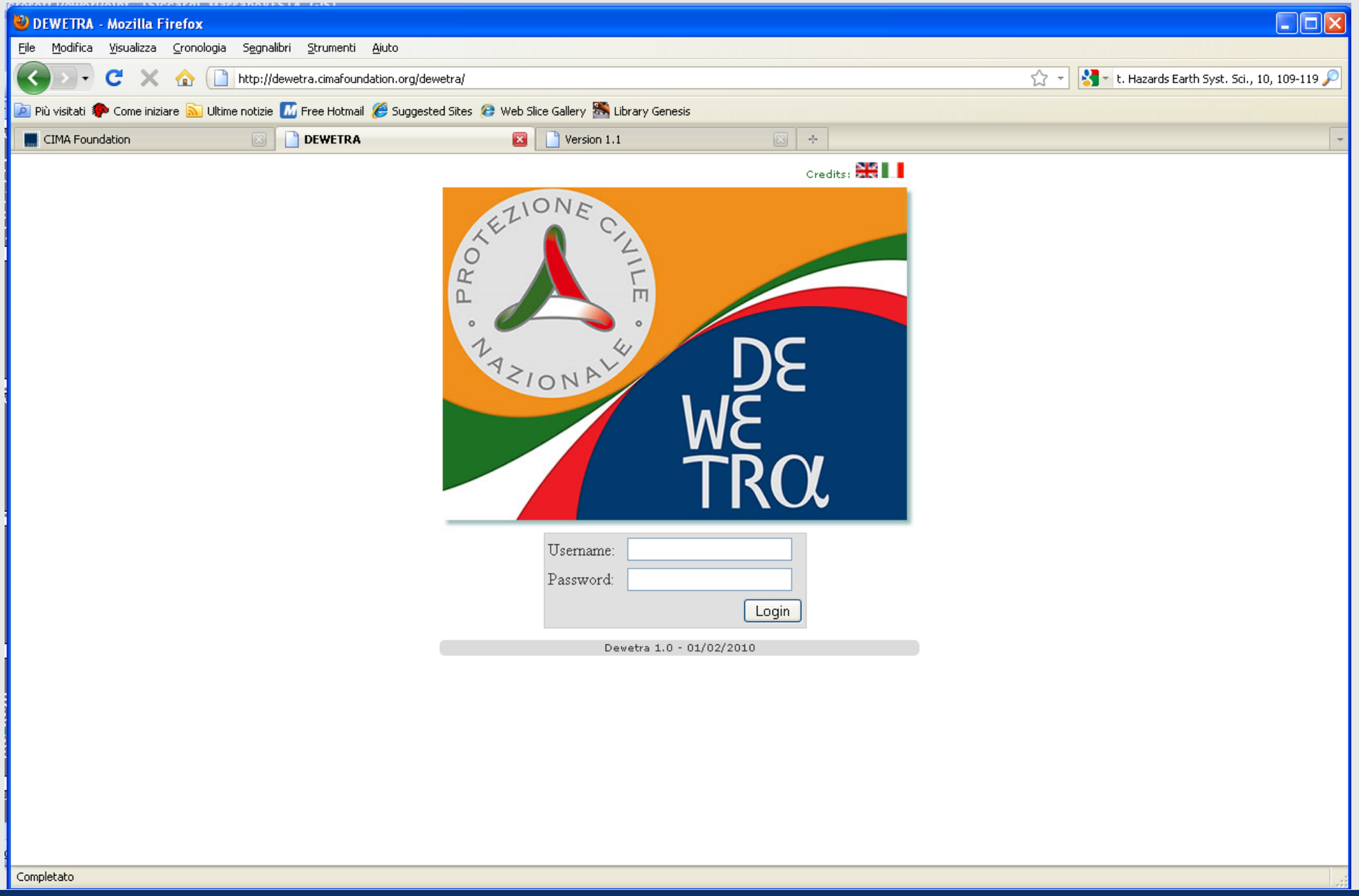
Data are spread into several local, regional, national and international organizations, DEWETRA is the technological tools that allow the collection, harmonization and dissemination of data and information from multiple-sources



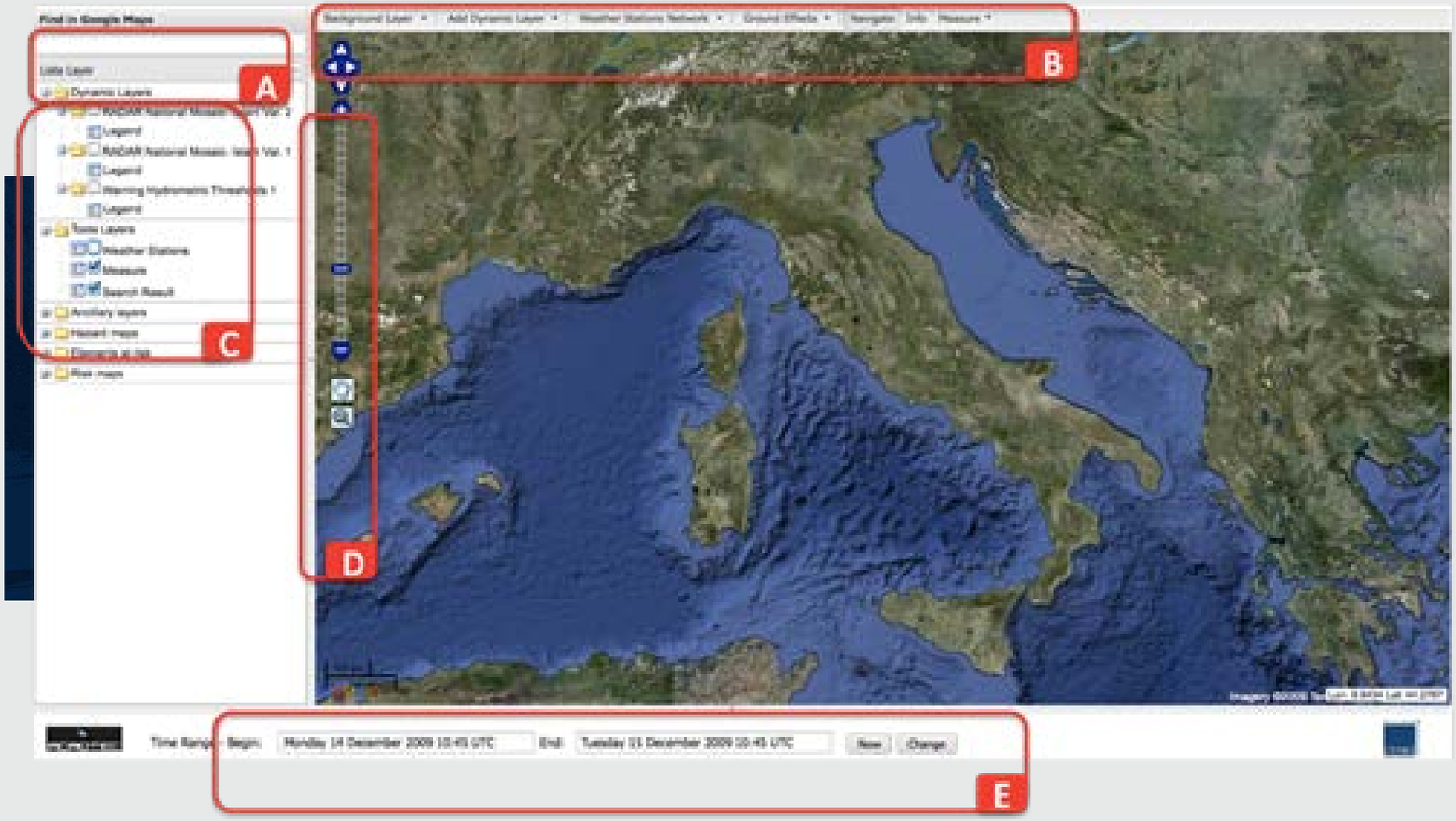
DEWETRA – the technology

Web-based – WebGIS – application to ensure capillary distribution of information.

Access policy: different user profiles



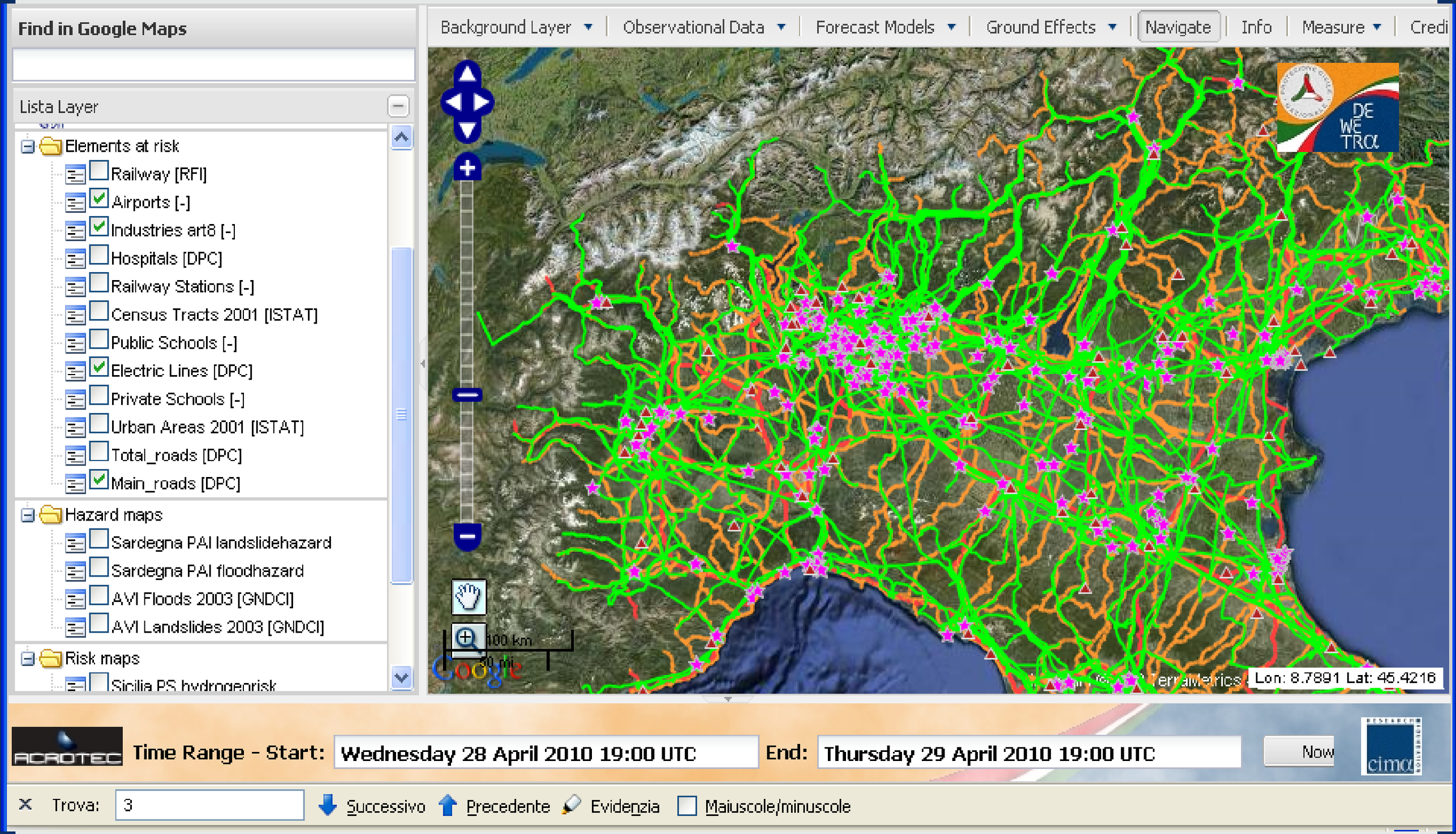
GRAFICAL USER INTERFACE



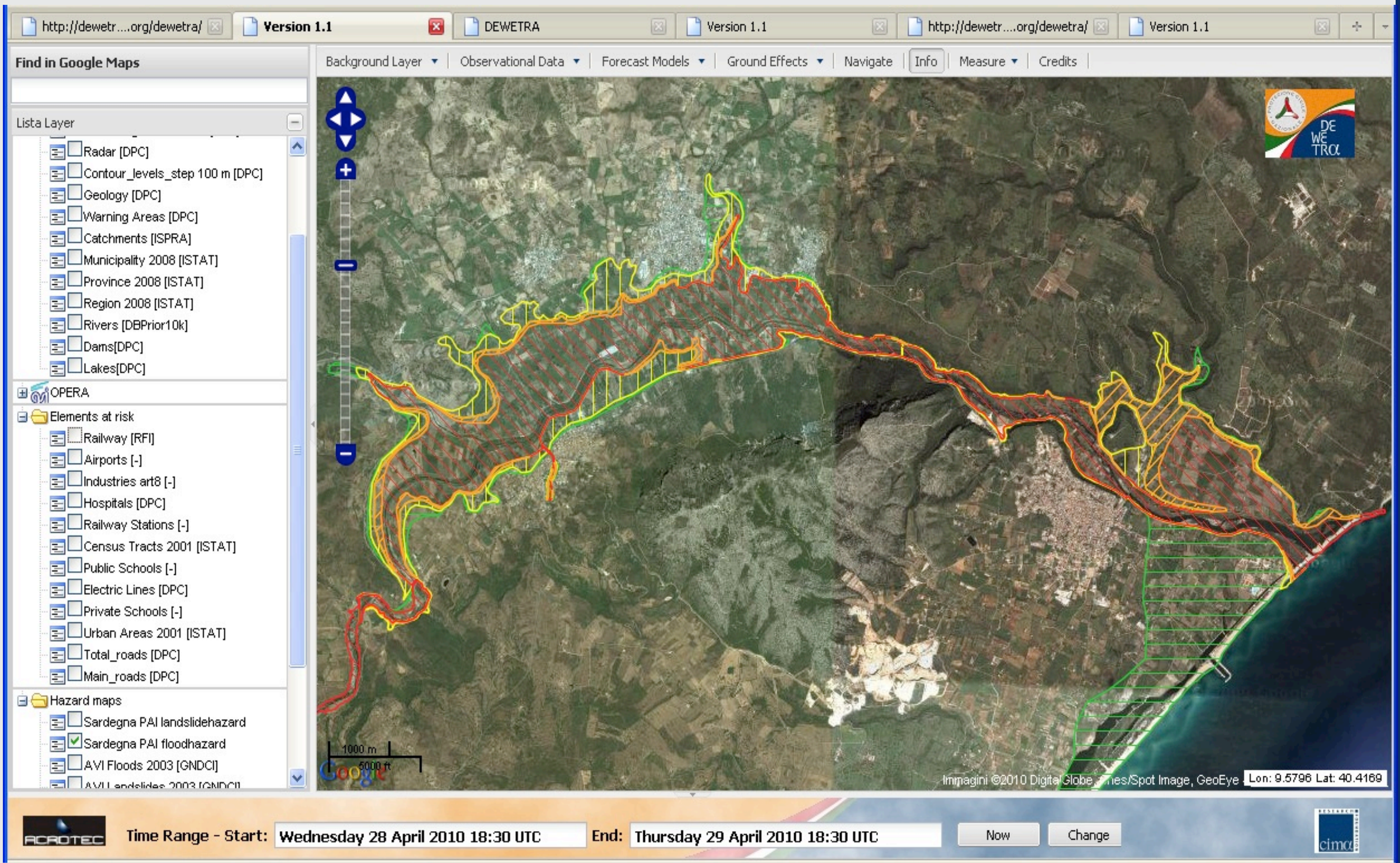
A: Worldwide toponymies search (Google Maps®) and local search of Meteo Stations
B: Dynamic information (hazard)
C: Quasi static information (exposure and vulnerability)
D: Navigation tools
E: The time range of the data visualized .

Exposure and Vulnerabilities Knowledge

Elements at risk

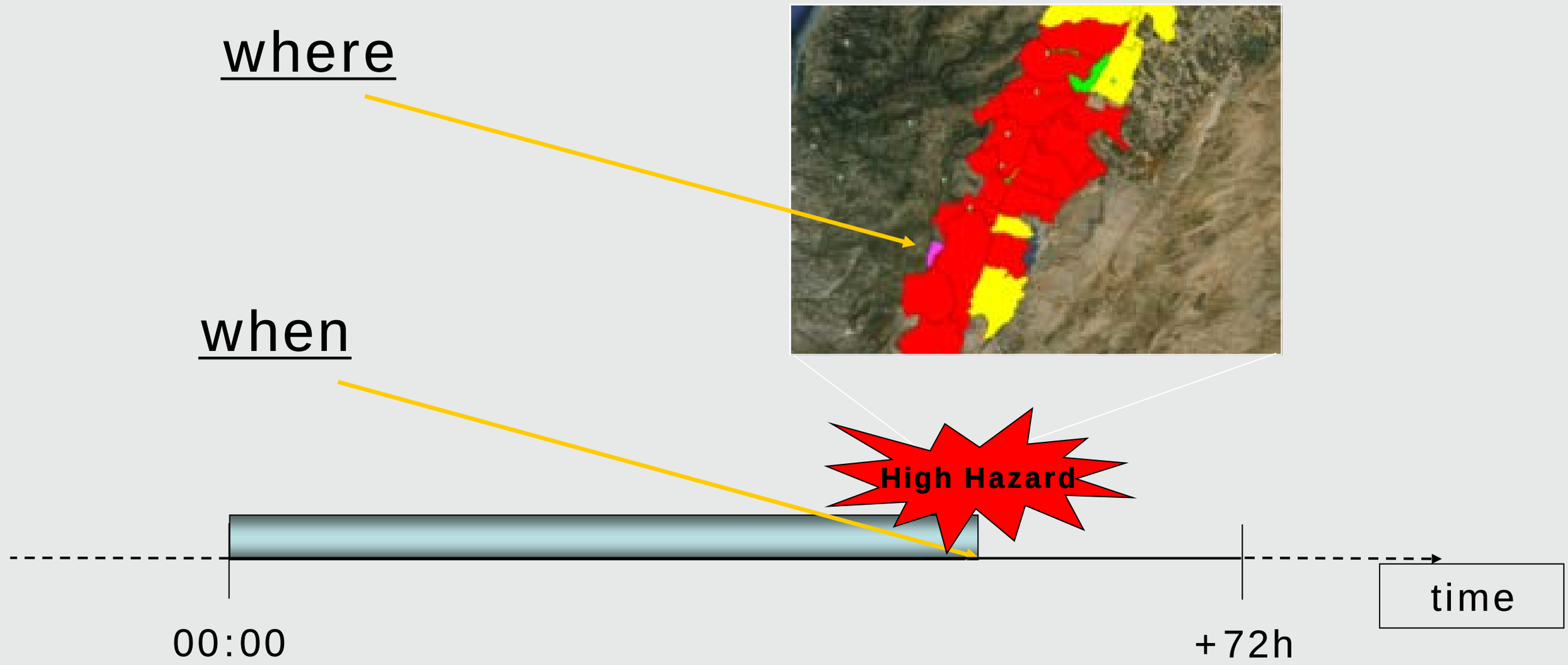


Hazard Maps (static Scenario)



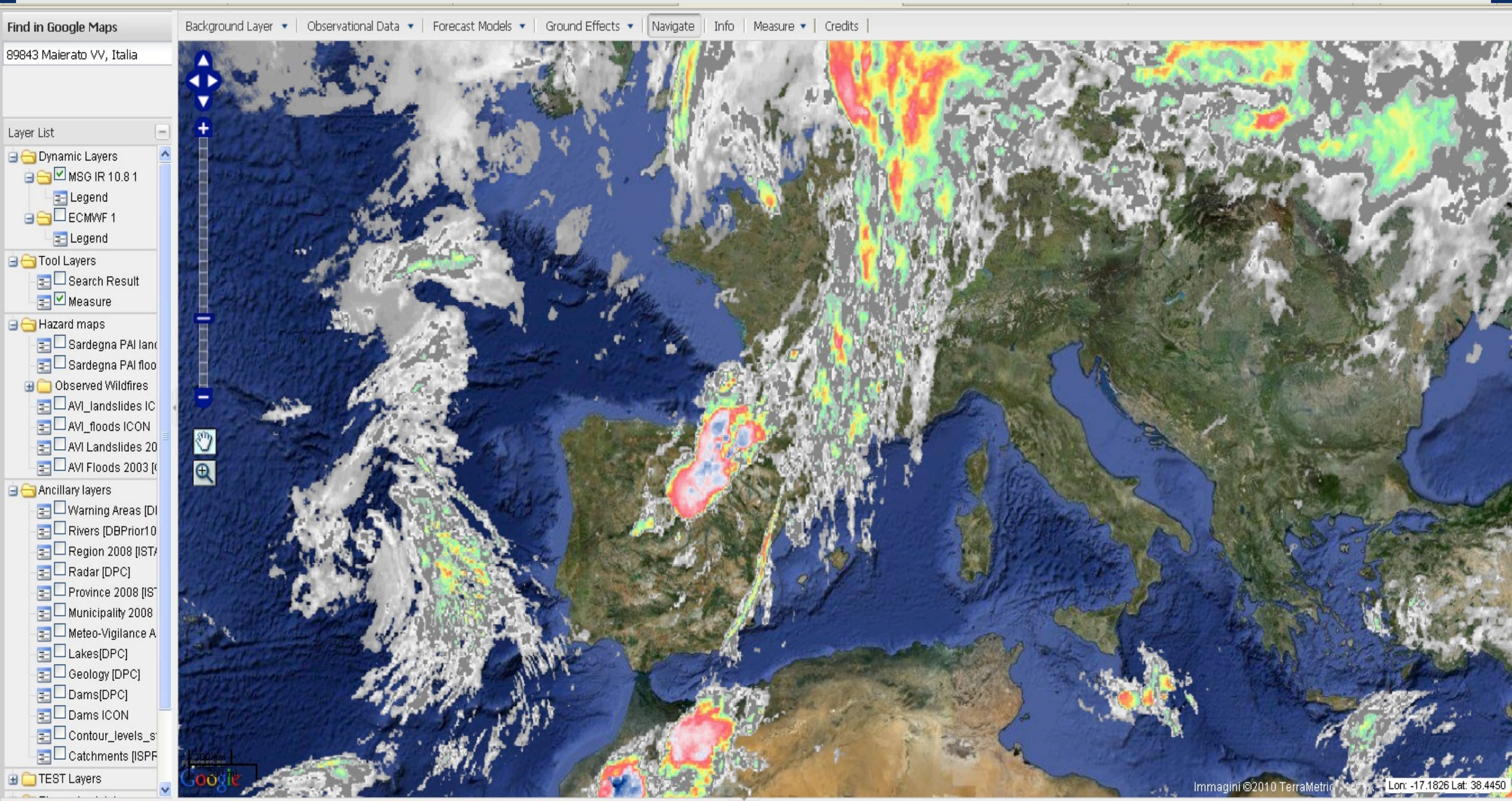
Real-time hazards assessment: dynamic information

- Real-time observation
- Short range forecast (+72h)

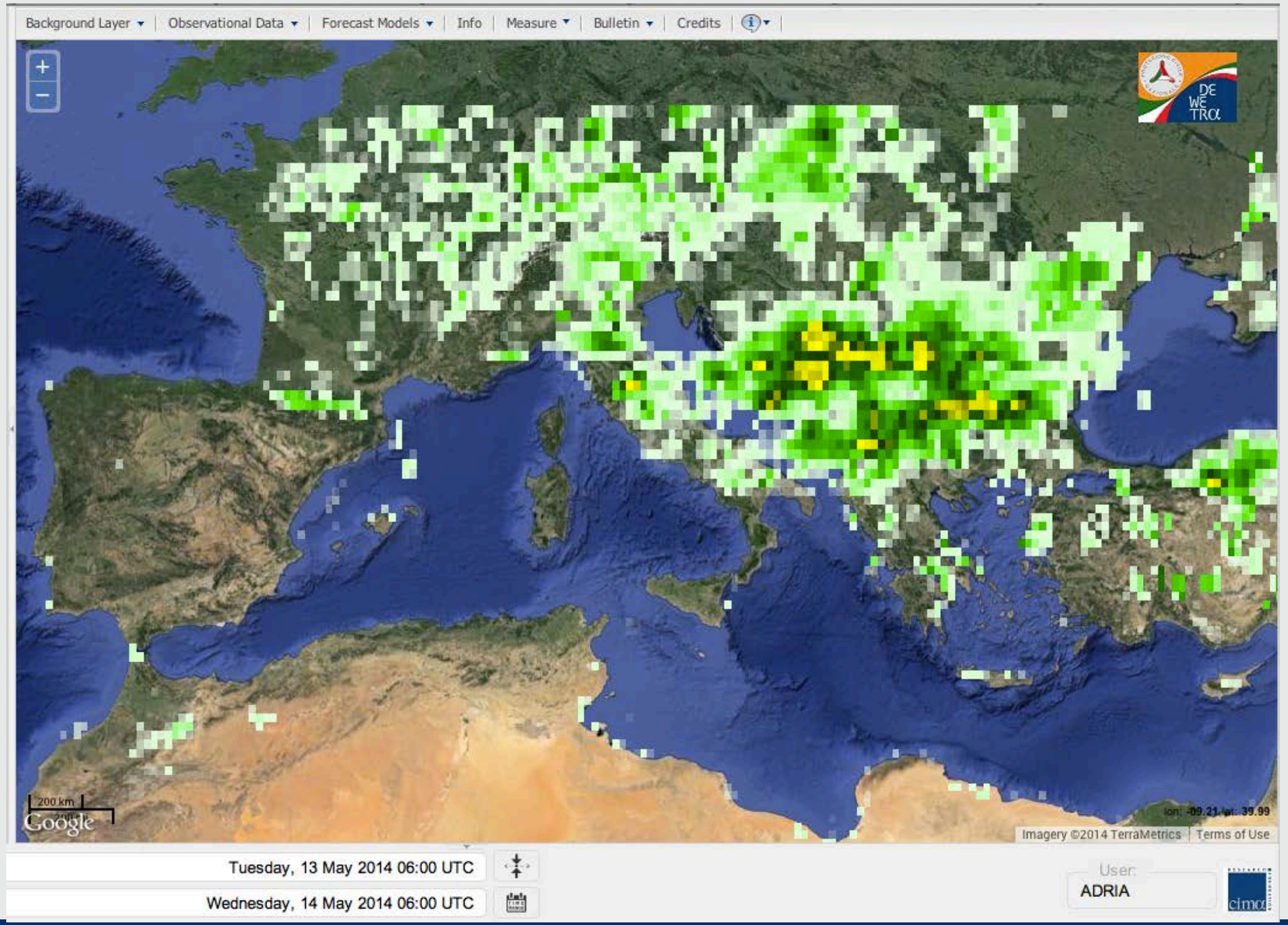


Real-time hazards assessment: observations

Geostationary Meteorological Satellites

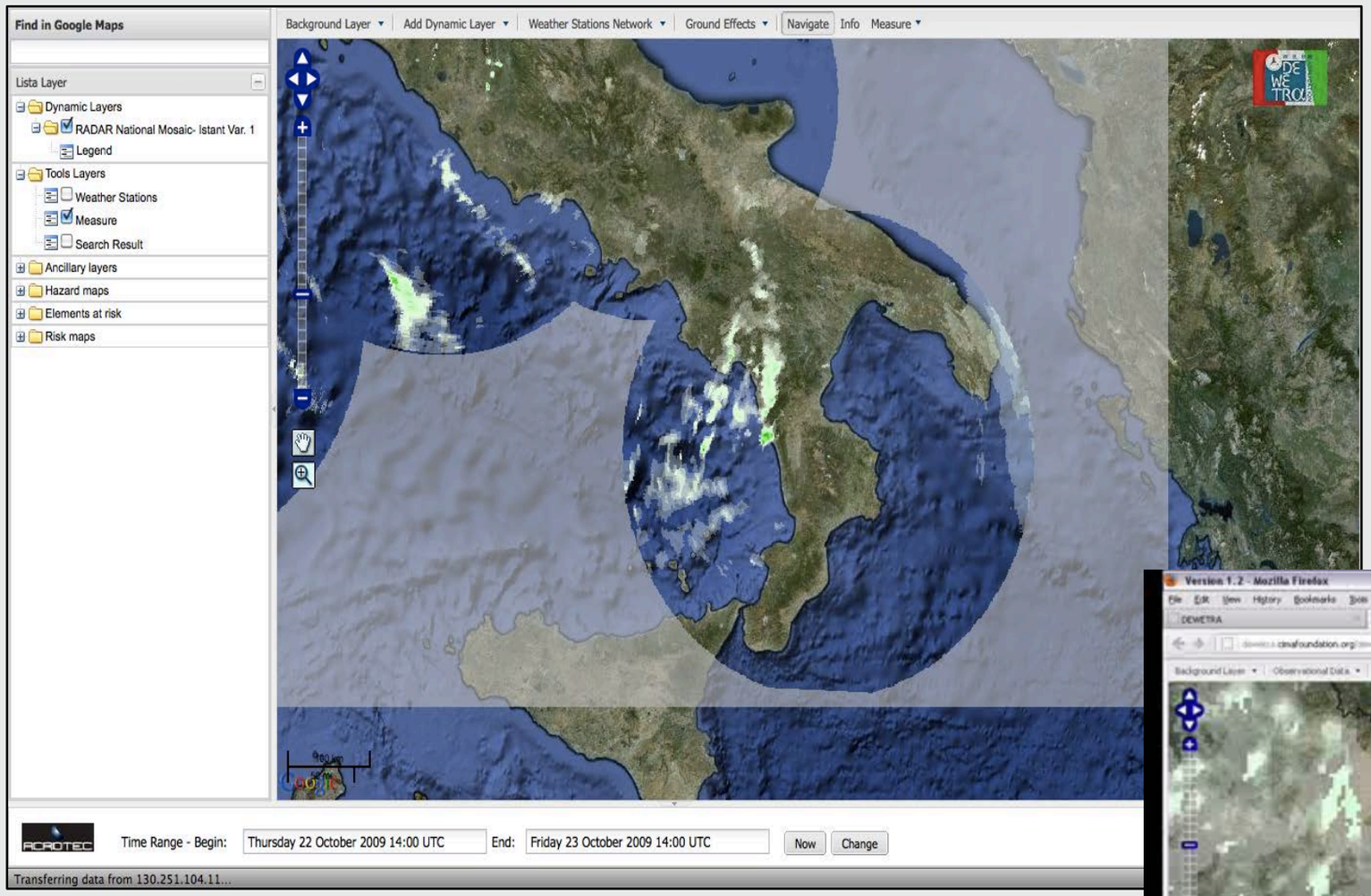


Precipitation estimation TRMM (3h) (14 may 2014)

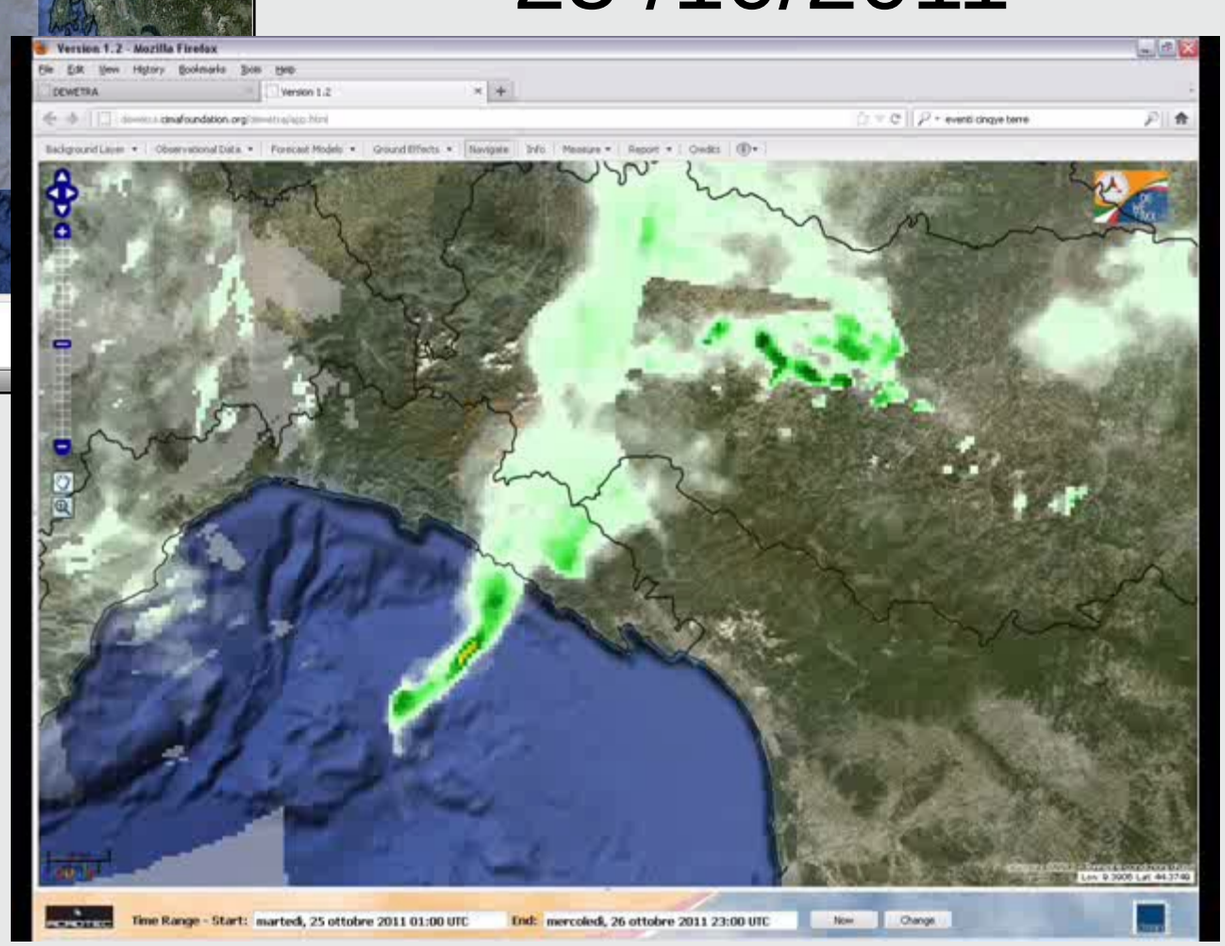


Real-time hazards assessment: observations

National weather radar network



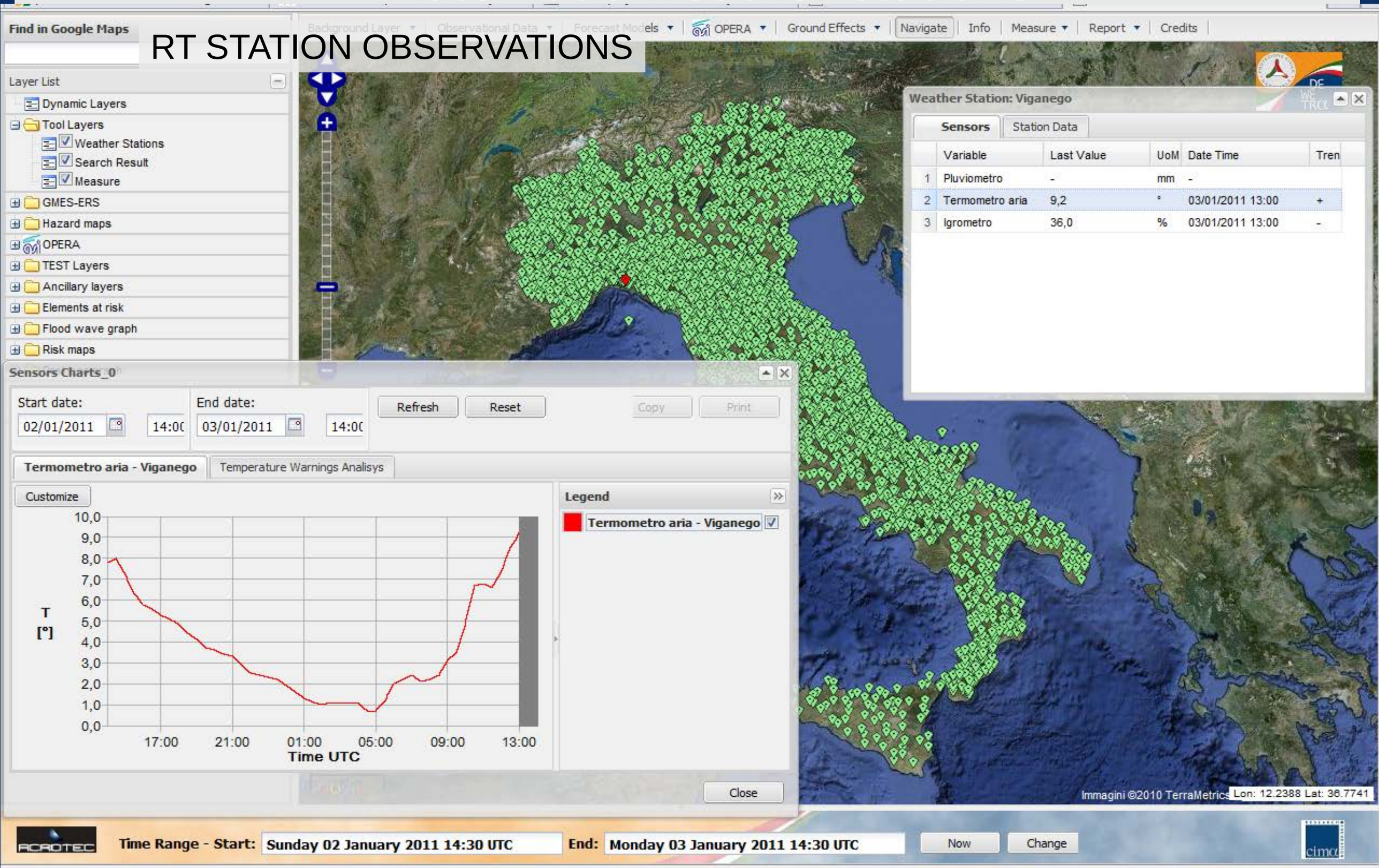
25 /10/2011



Real-time hazards assessment: observations

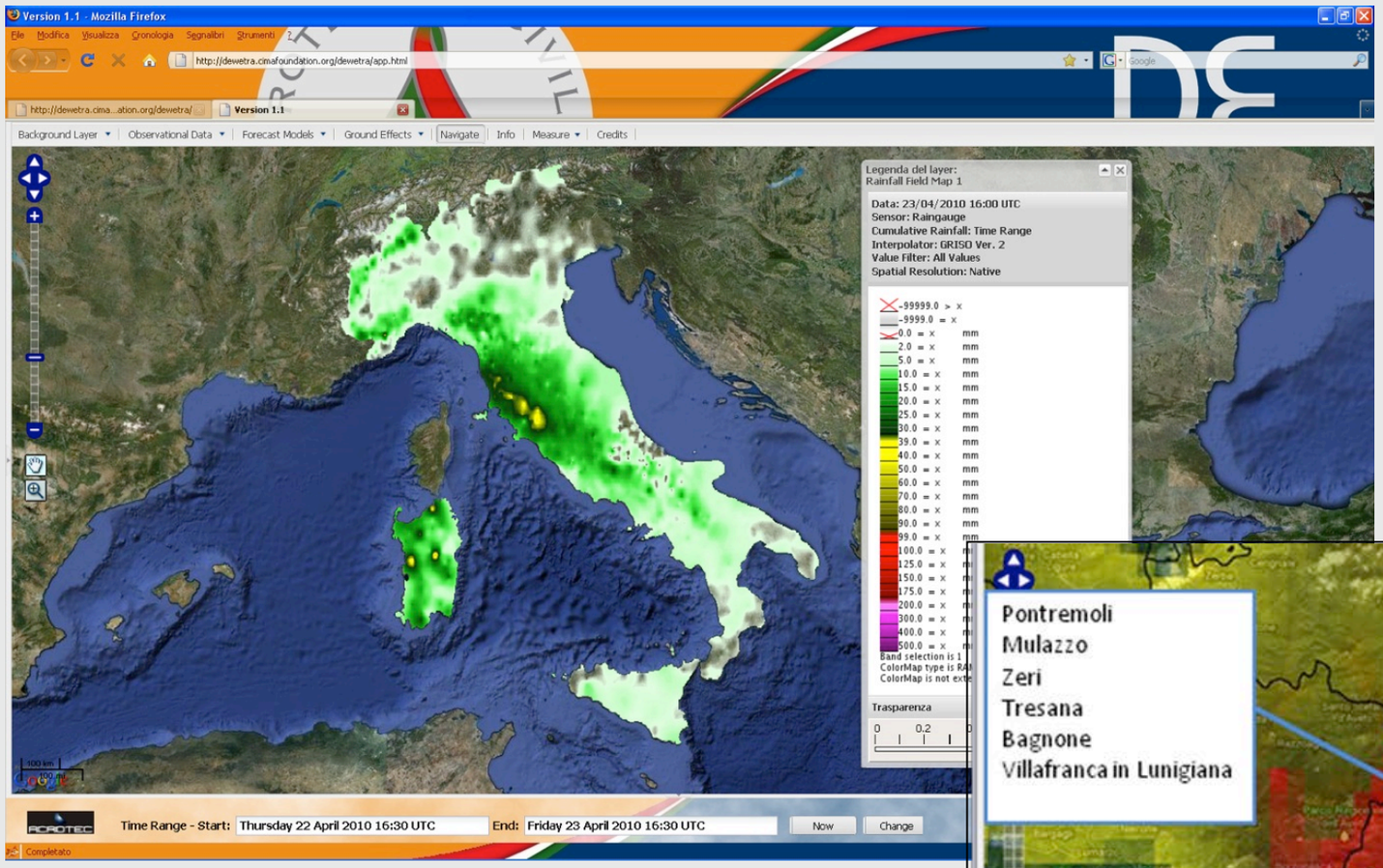
Automatic weather stations

RT STATION OBSERVATIONS



Real-time hazards assessment: observations

Information presentation : MAPPING-GRISO model)



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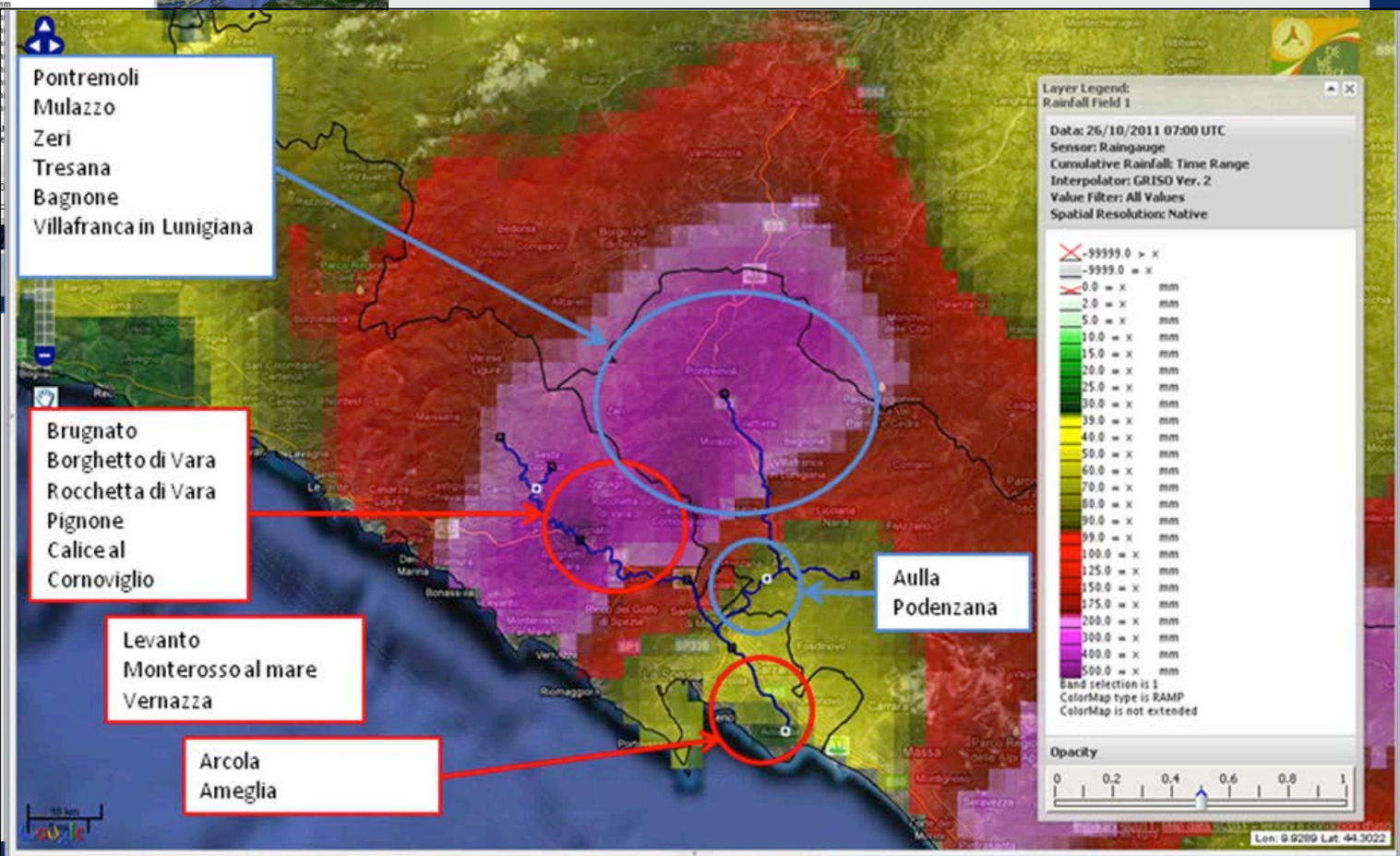
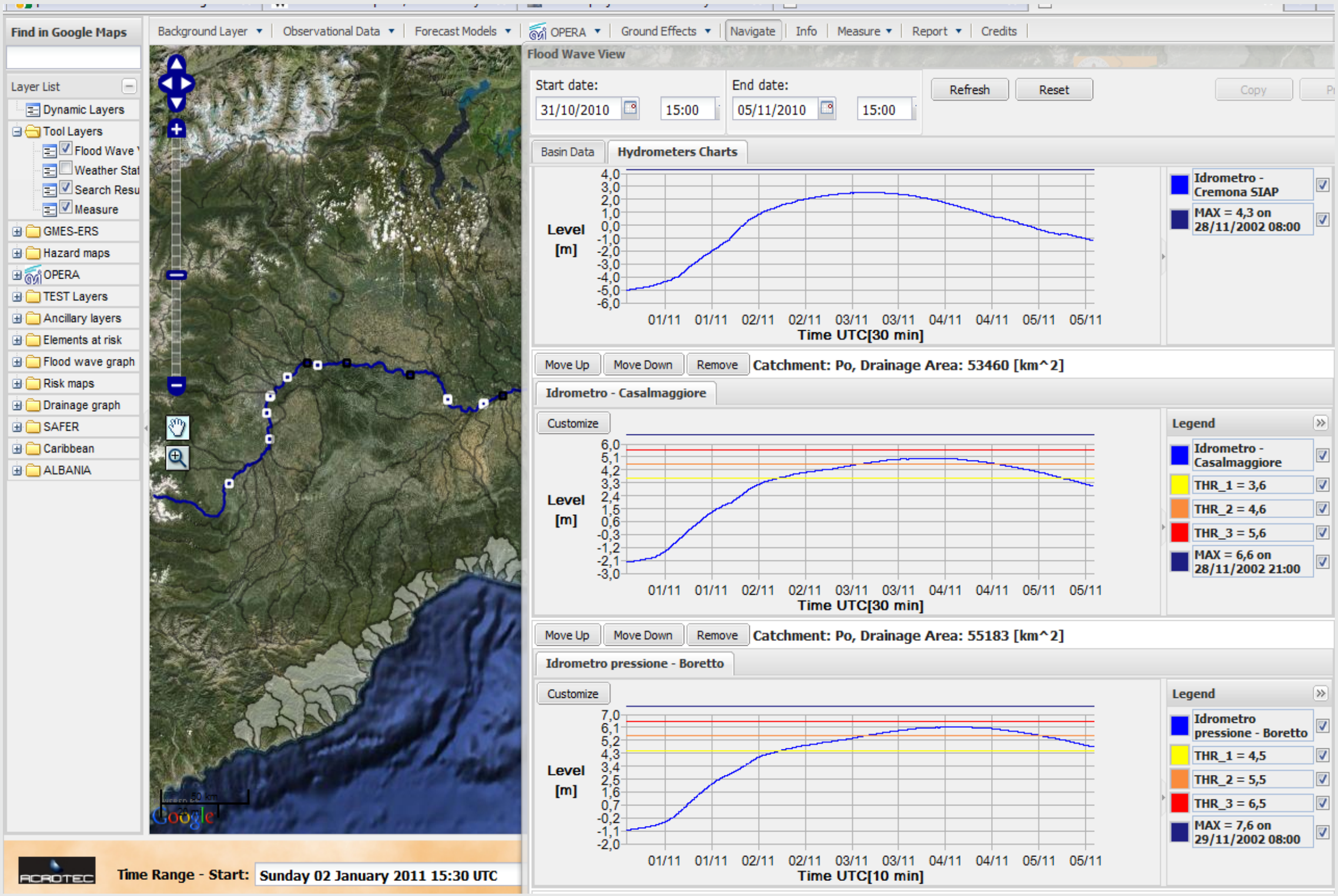


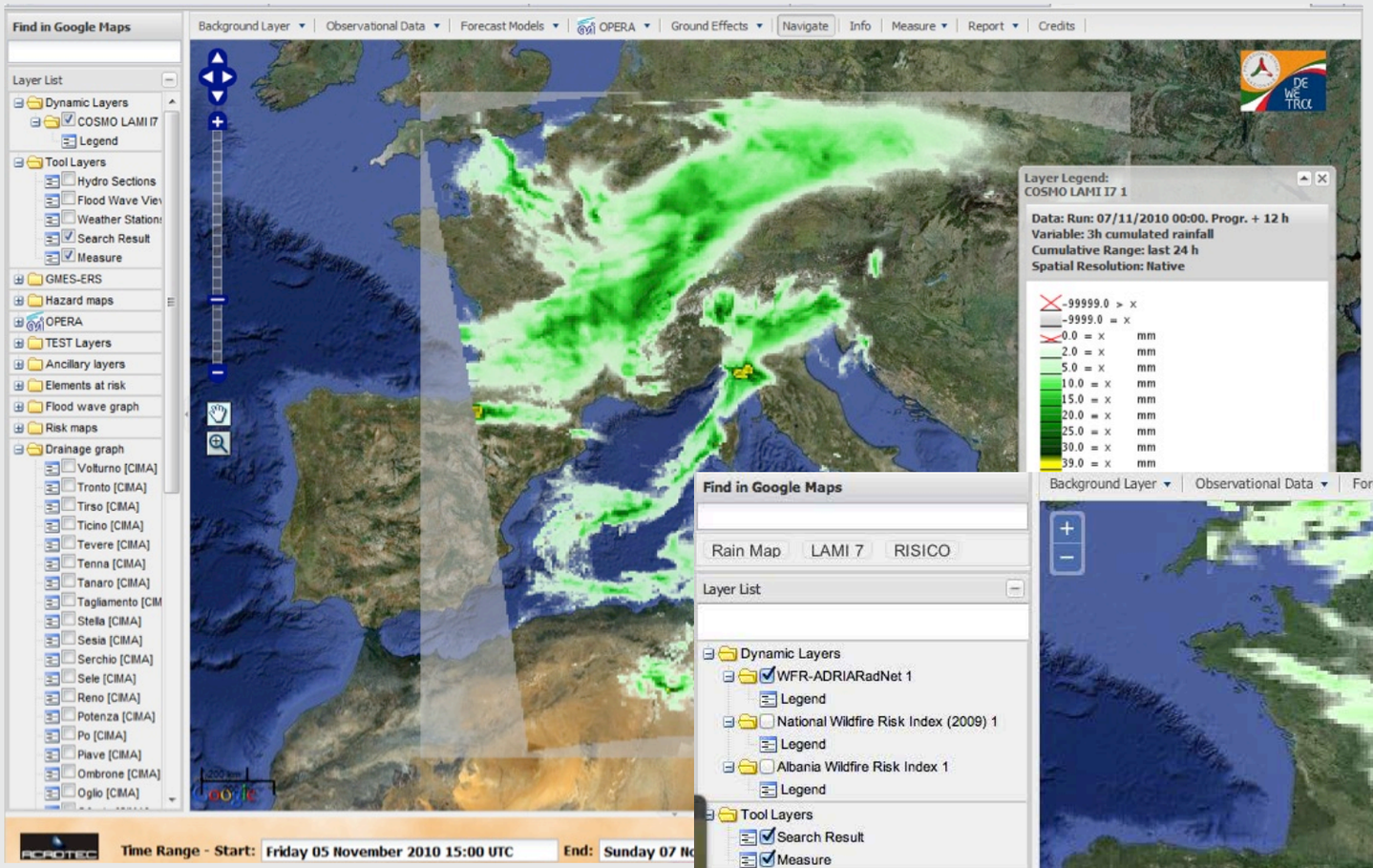
Real-time hazards assessment: observations

Water level

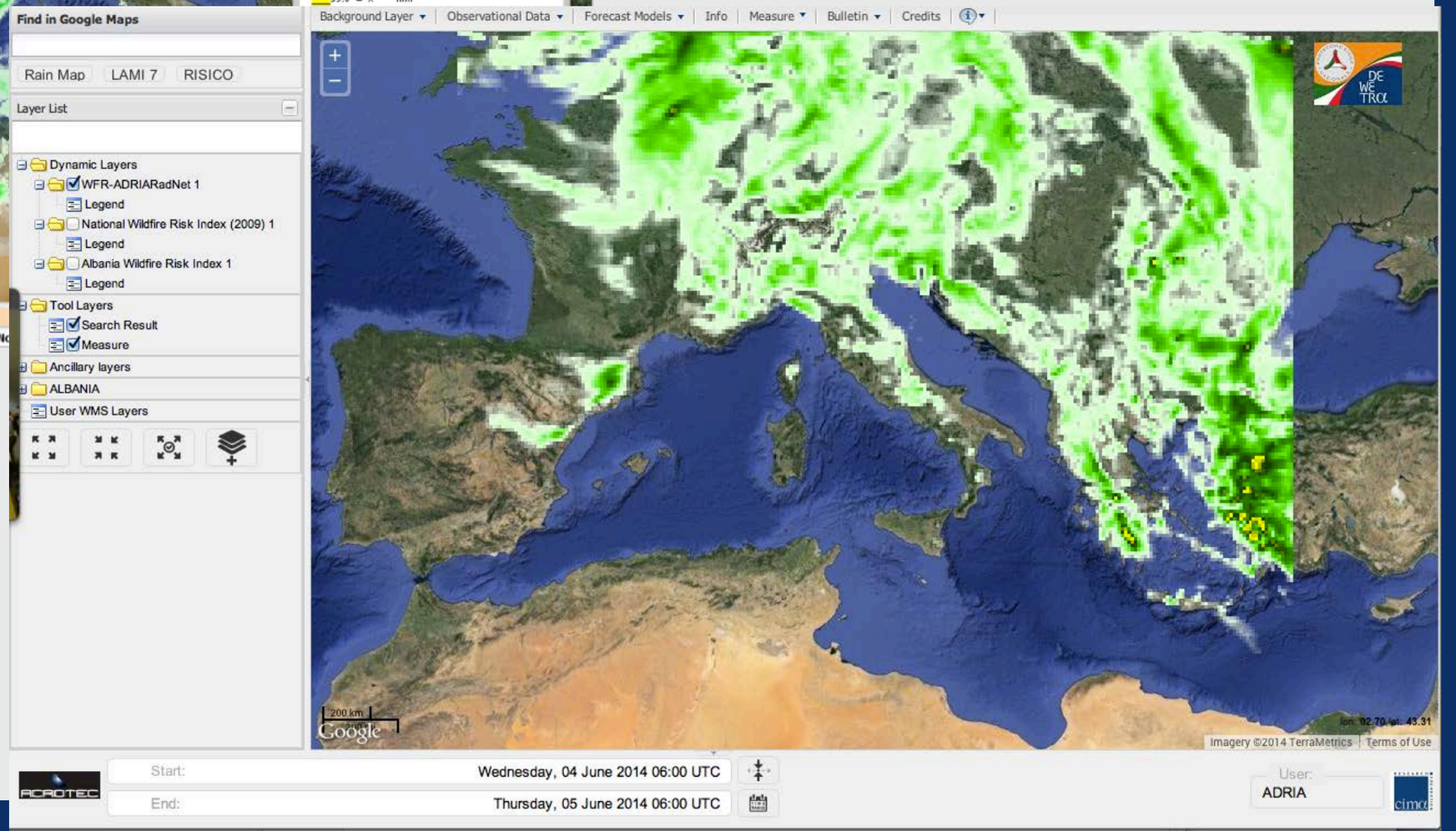


Real-time hazards assessment: forecasts

NWP: COSMO I7, COSMO I2.8, GFS, ECMWF, WRF

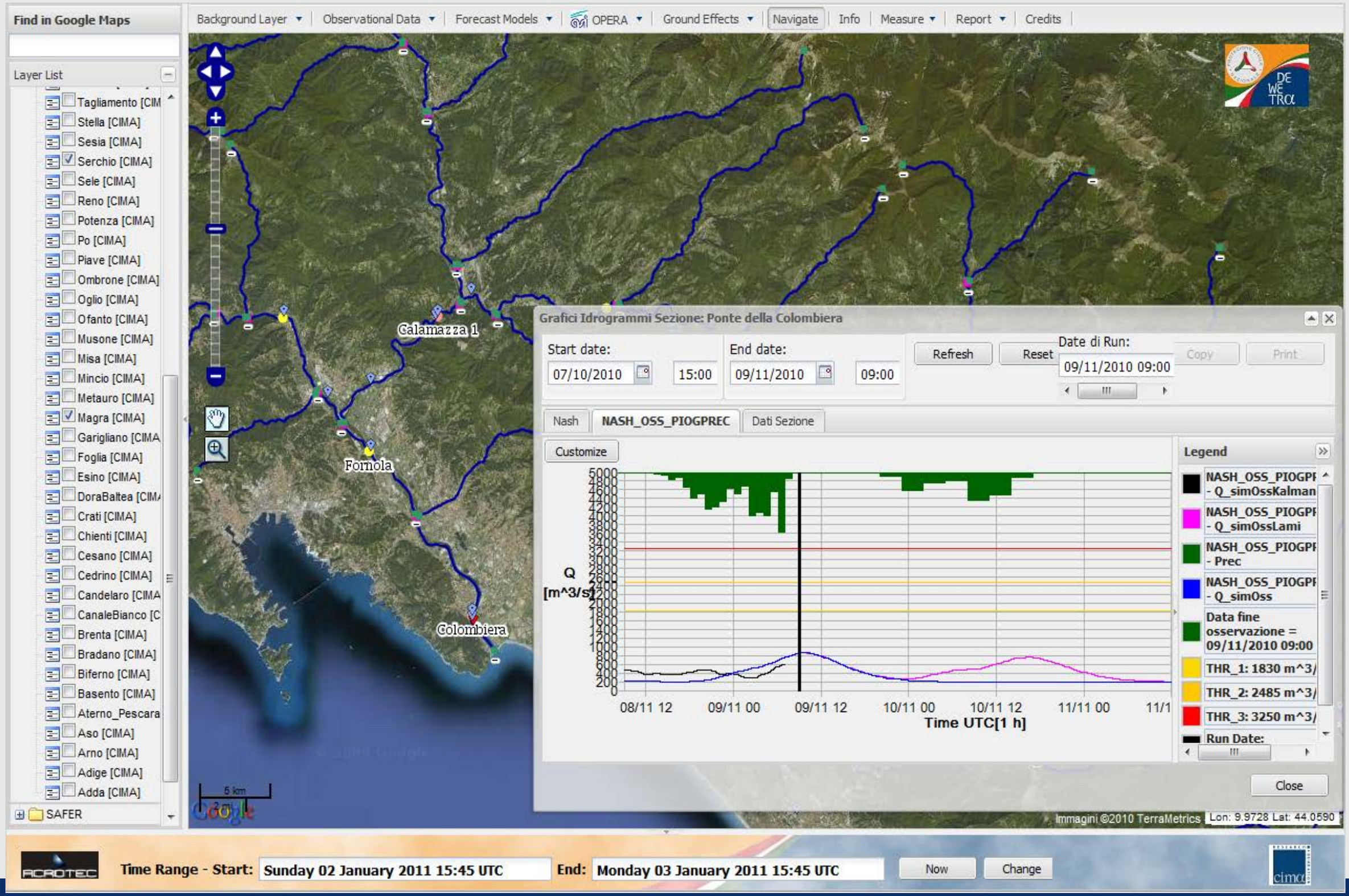


WRF- ADRIA

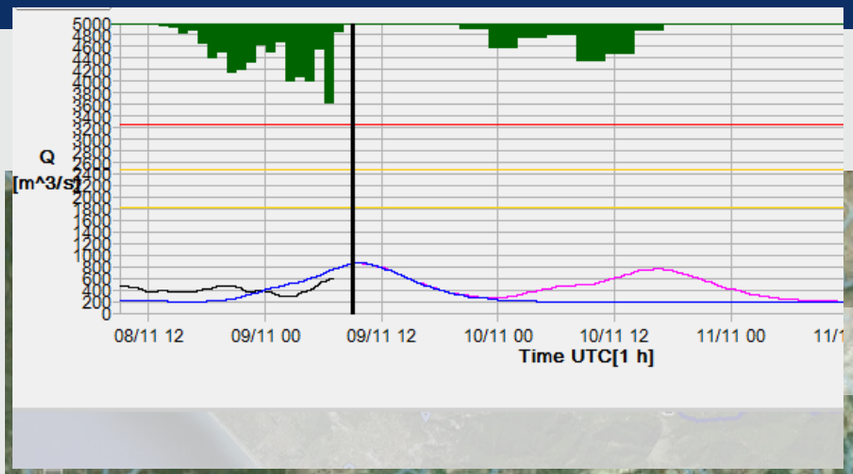


Real-time hazards assessment: forecasts

Flood predictions –FLOODPROOF, Chym



Real-time risk assessment: Building a risk scenario



Prediction models

Up-to-date hystorical records

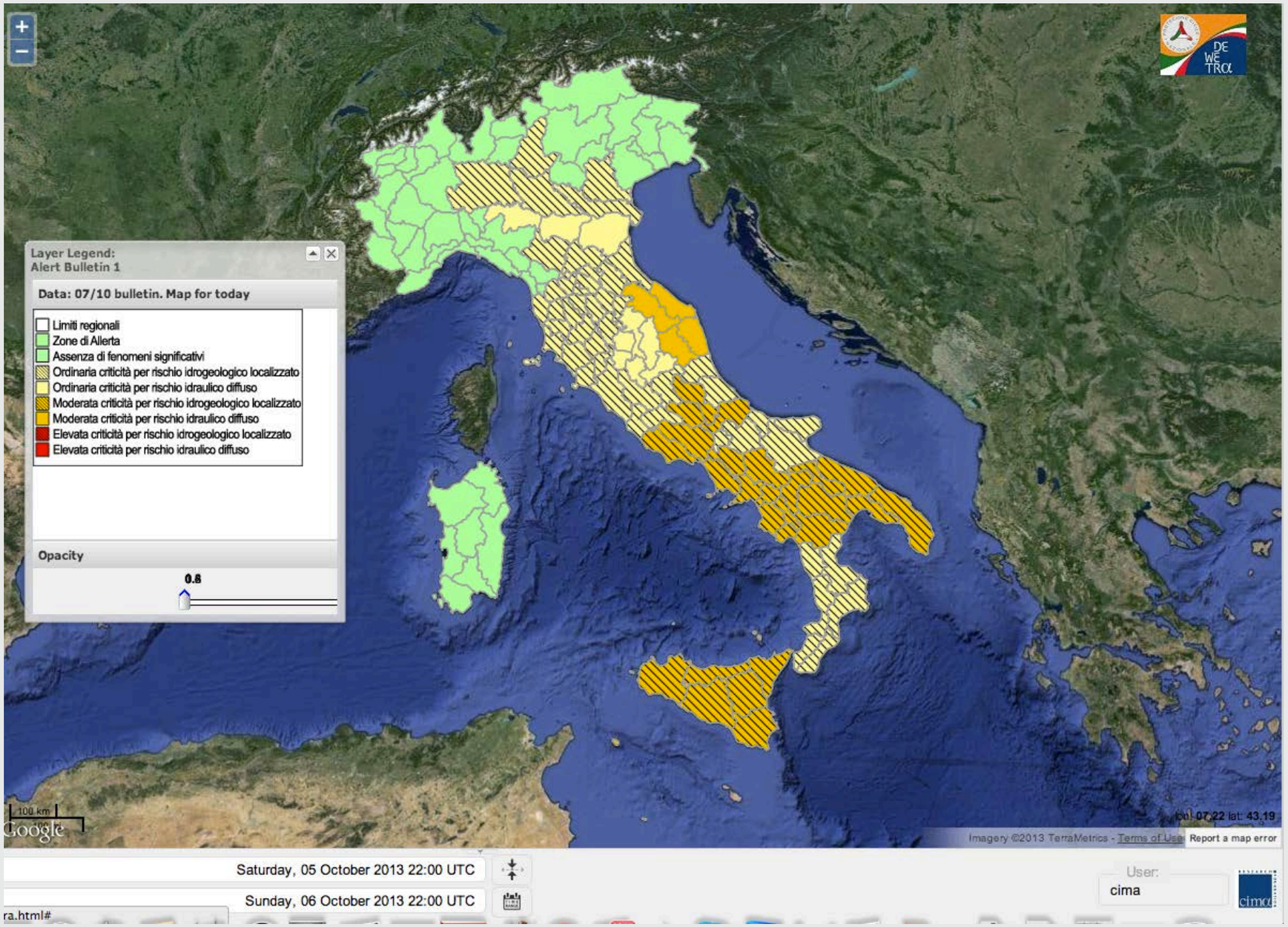
Automatic Weather Stations

Static risk assessment

Elements at risk

Immagini ©2010 DigitalGlobe, Cnes/Spot Image, GeoEye

Warnings and Dissemination



ADRIAtic integrated RADar-based and web-oriented information processing system NETwork to support hydro-meteorological monitoring and civil protection decision”

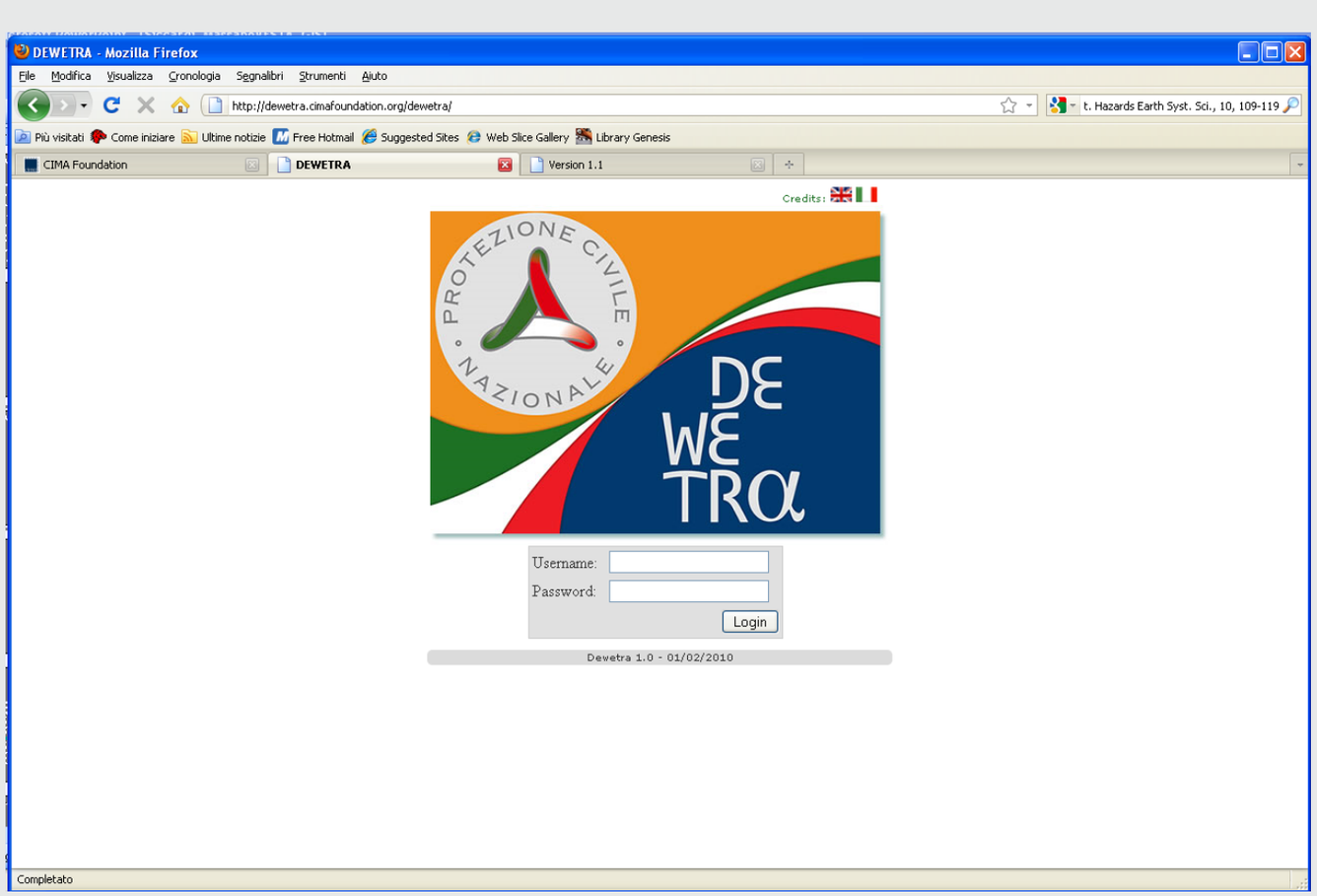
Partners and objectives

- Partner countries: Italy, Albania and Croatia

- Main Objectives
  - *The main aim of the ADRIARadNet project is to set up an integrated web-based platform for data sharing and consultation*
  - *development of an innovative integrated decision support tool for weather monitoring and hydro-meteorological applications based* ***on mini-radar****, satellite and model data*
  - *install and testing 4 mini-radar systems (1 in Croatia, 1 in Albania and 2 in Italy)*

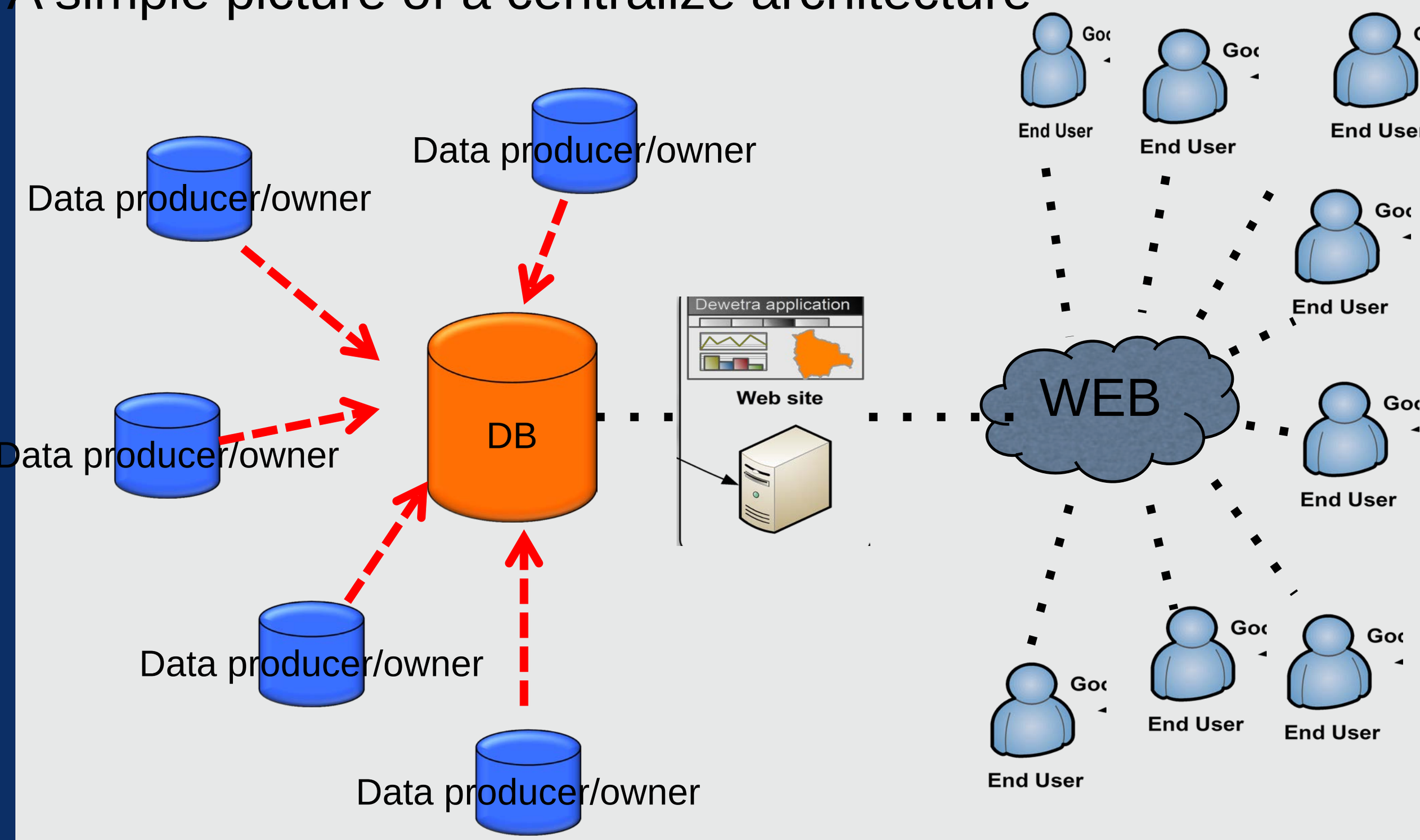
DEWETRA for ADRIATIC region

ADRIARadNet consortium agreed to adapt the existing DEWETRA system to new requirements of ADRIARadNet platform

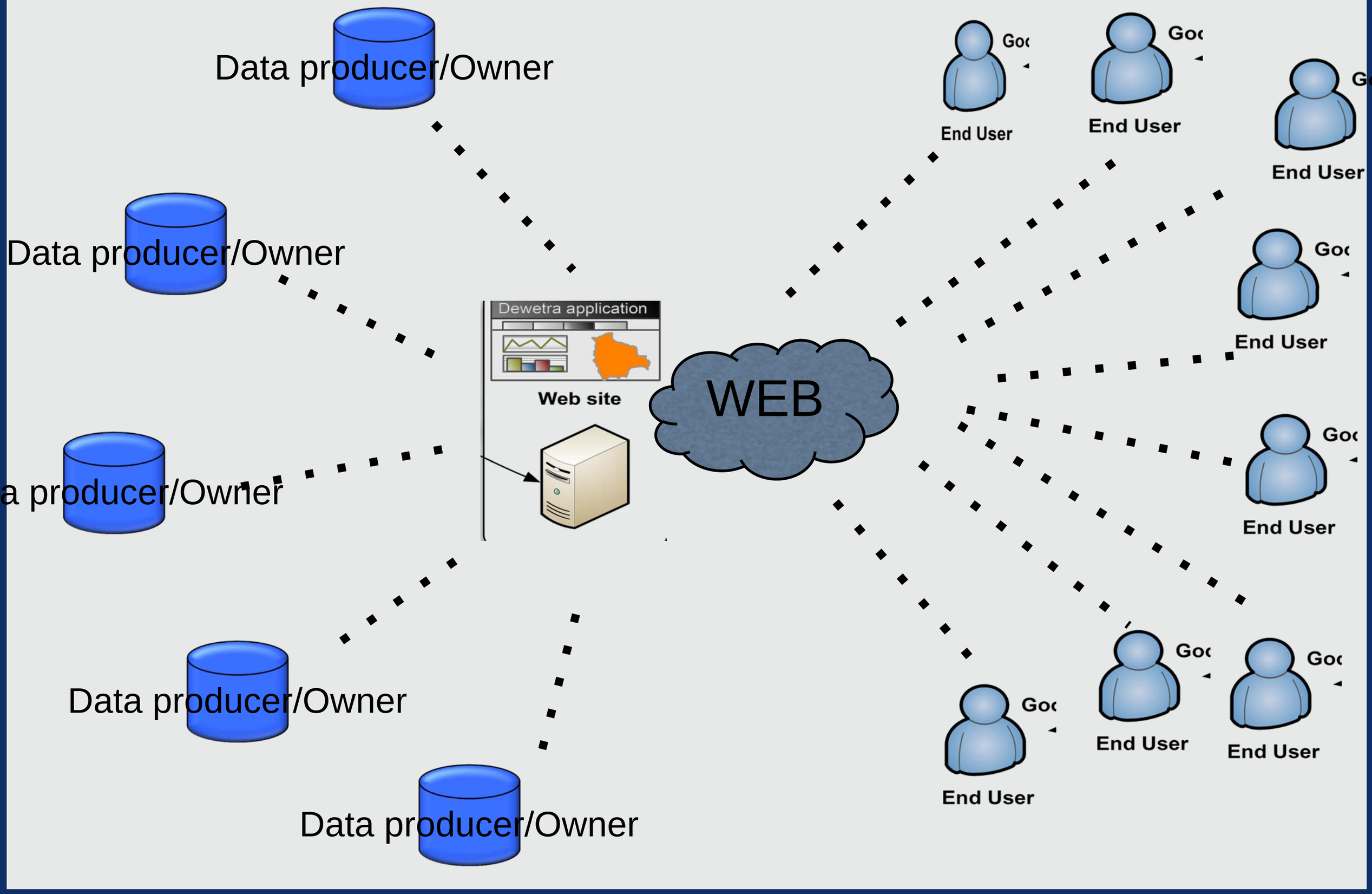


From centralized to decentralized/distributed systems for data management

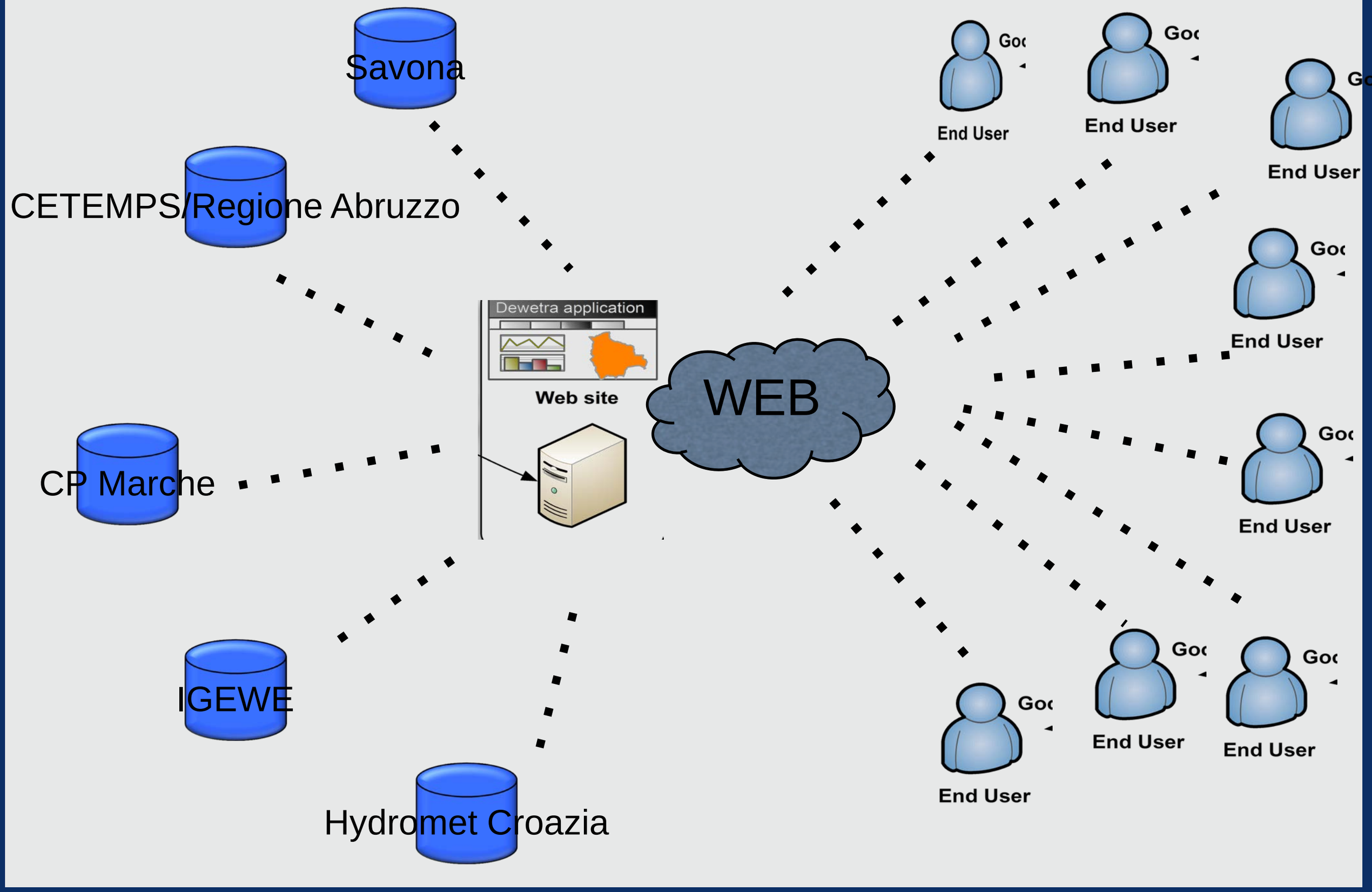
A simple picture of a centralize architecture



Decentralized/distributed architecture

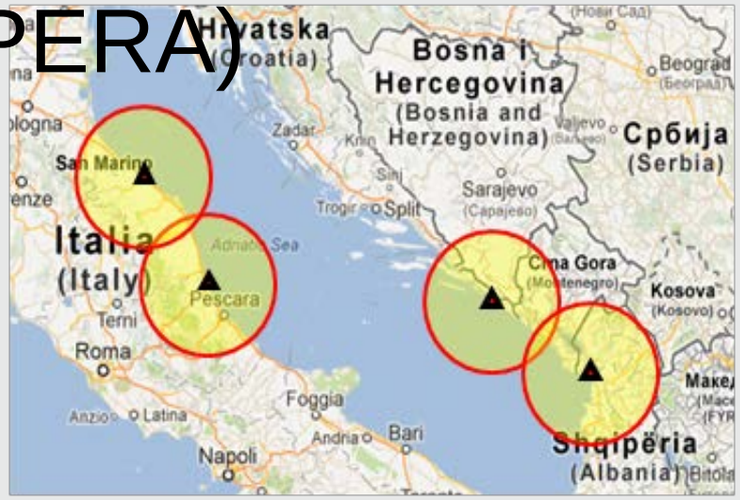


Decentralized/distributed architecture - ADRIARADNET



Radar-based products

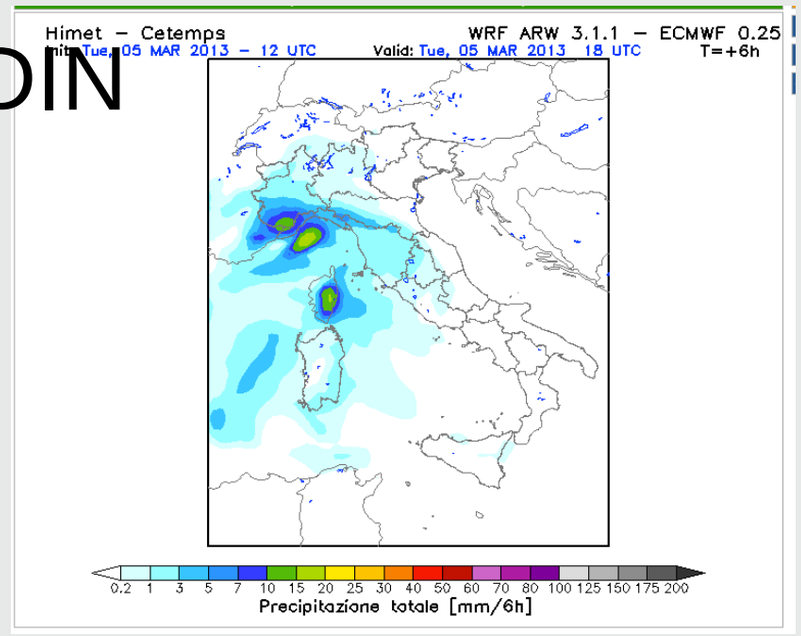
Existing products that consortium wishes to share
- Italian Radar network
- Regional radar (CETEMPS)
- Radar network Croatia (OPERA)



New project products with 4 mini-radar
-rainfall field
-now-casting products
-hale detection

Meteo-forecasting model

Existing models to be shared
- COSMO-LAMI, ECMWF, GFS
- ALADIN

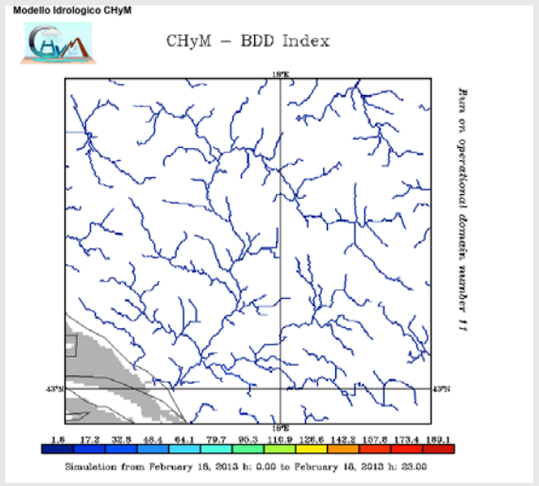


New project model
-WRF 3km

Hydro-meteorological model

Existing products that consortium wishes to share

- FloodProofs for DRIN
- Nash, Mike 11 (Marche)
- Chym (Abruzzo)



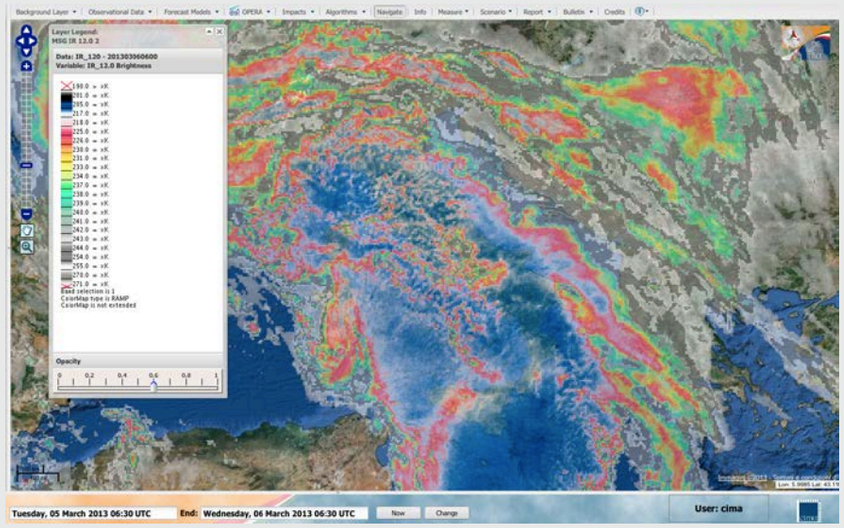
New project model

-CHym implemented in pilot basin (Neretva, Drin, Marche and Abruzzo)

Satellite products

Existing products

- Meteosat 12.0 10.8 0.6, HRV, WV
- TRMM and GSMAO



New project products

-rainfall field estimation

ADRIARadNet - NETWORK

Hydro-met service Croatia

CIMA

CP-Regione Abruzzo

CETEMPS

CP-Regione Marche

Internet

Internet

Internet

Internet

Internet

Internet

Internet

Internet

DEWETRA

Hydro-met service Albania

CP-Dubrovnik Neretva County

CP Albania

….other Local/National/international/organizations….

Thank you for your attention