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Common borders. Common solutions.

Earthquake, Landslide and Flood Disaster Prevention: the SciNetNatHaz project

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Acknowledgments:

The SciNetNatHaz Project is partially funded by the EU and Hellenic National funds within the context of the Black Sea Basin Joint Operational Programme 2007-2013

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The Parthership!

TEI OF CENTRAL MACEDONIA SERRES GREECE
Lead Partner

DEMOCRITUS University of THRACE, Greece

Institute of Engineering Seismology & Earthquake Engineering, EPPO

"Assen Zlatarov" University BULGARIA

OVIDIUS University ROMANIA

"Dr. Ghitu" Institute, Acad. of Sciences MOLDOVA

BSB, Environmental Academy of Sciences UKRAINE

Bogazici University-Kandhili Observatory & Earthquake Research Institute, TURKEY

Basic Info:

Black Sea Basin Joint Operational Programme 2007-2013

Duration: 24 months *(trying to increase it to 31 months due to a **nine month delay in expenditure verification!** Thanks Greek FLC!*
Total Budget (**ENPI + IPA**): 1.053.000,00
Total Grand (**ENPI + IPA**): 947 700,00
Start - End Dates: **01.05.2013 - 30.04.2015**

Areas of investigation

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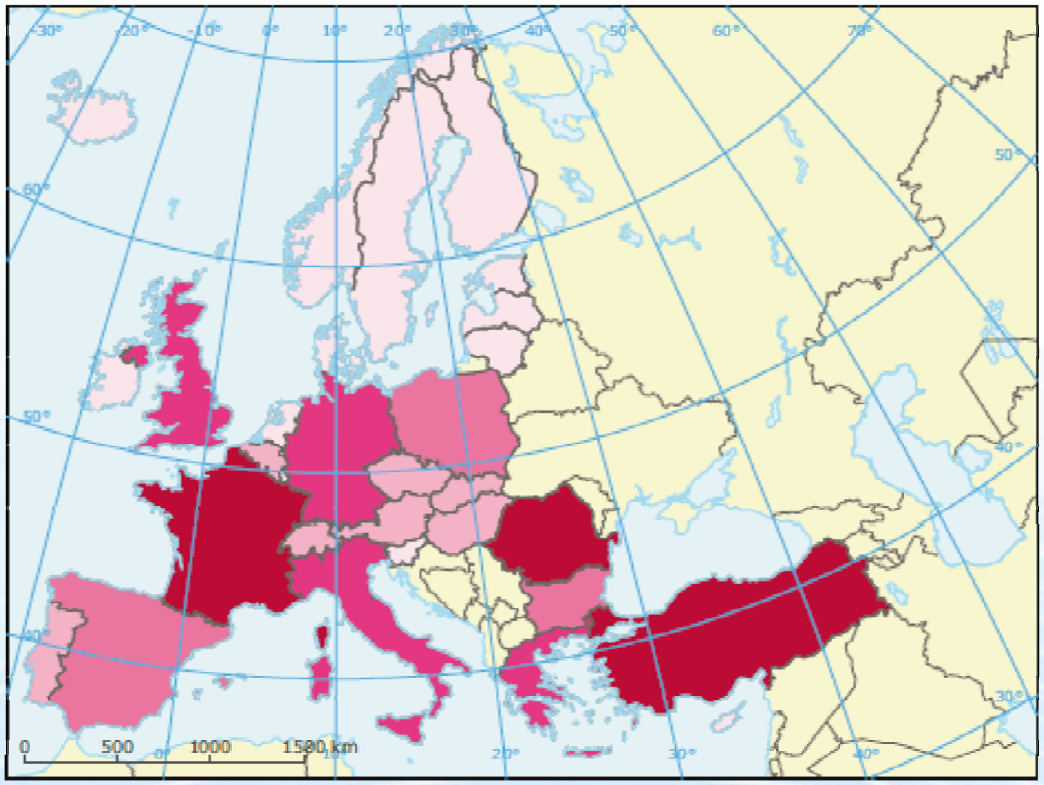
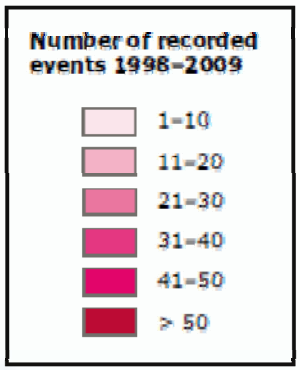
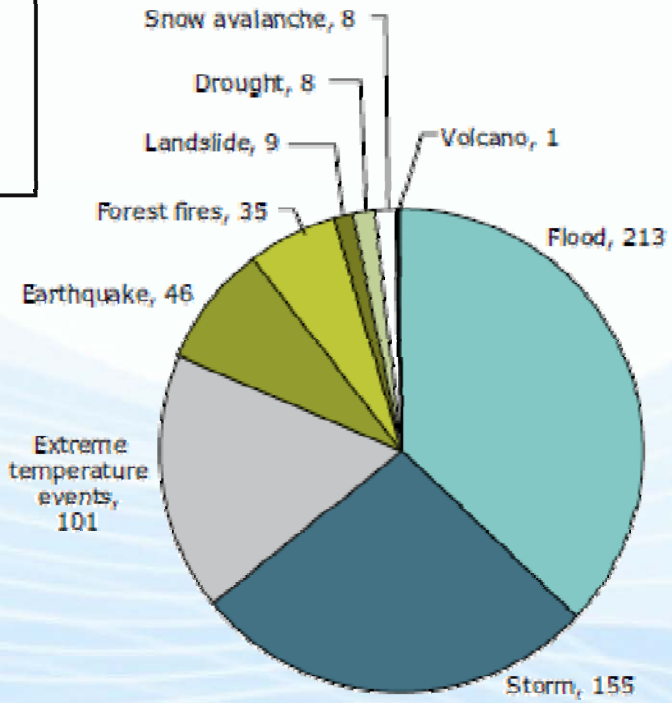




Source: ETC-LUSI based on EM-DAT, 2010.

Number of disastrous events recorded in EM-DAT by country in 1998–2009

Disastrous events recorded in EM-DAT by hazard type in 1998–2009



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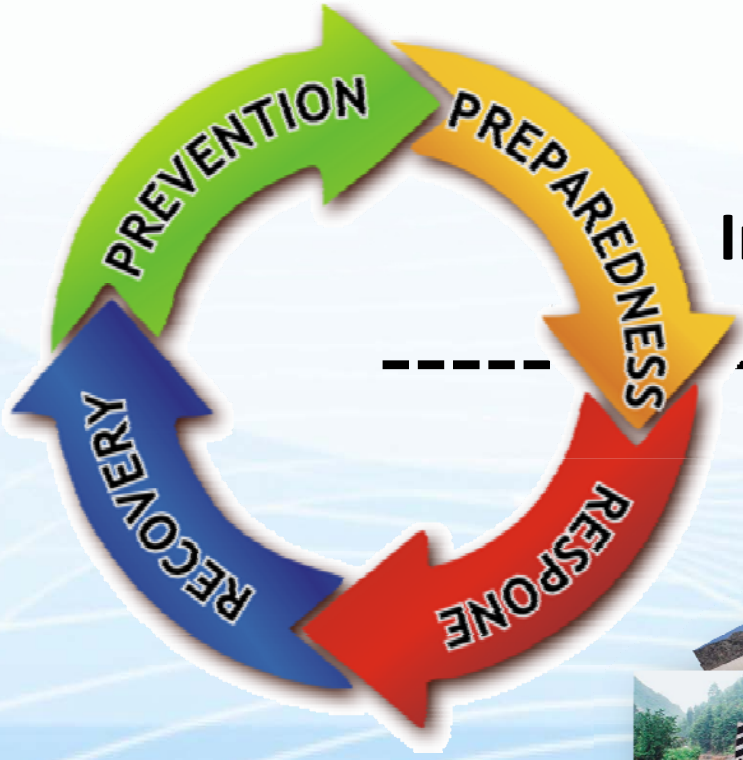

Vulnerability &
Insufficient Capacity
to Reduce the RISK

- Unforeseen events
- Poorly assessed Hazard location and/or magnitude of events
- No preventive actions taken due to various reasons (economic, etc)
- Lack of public awareness
- ….and more ….

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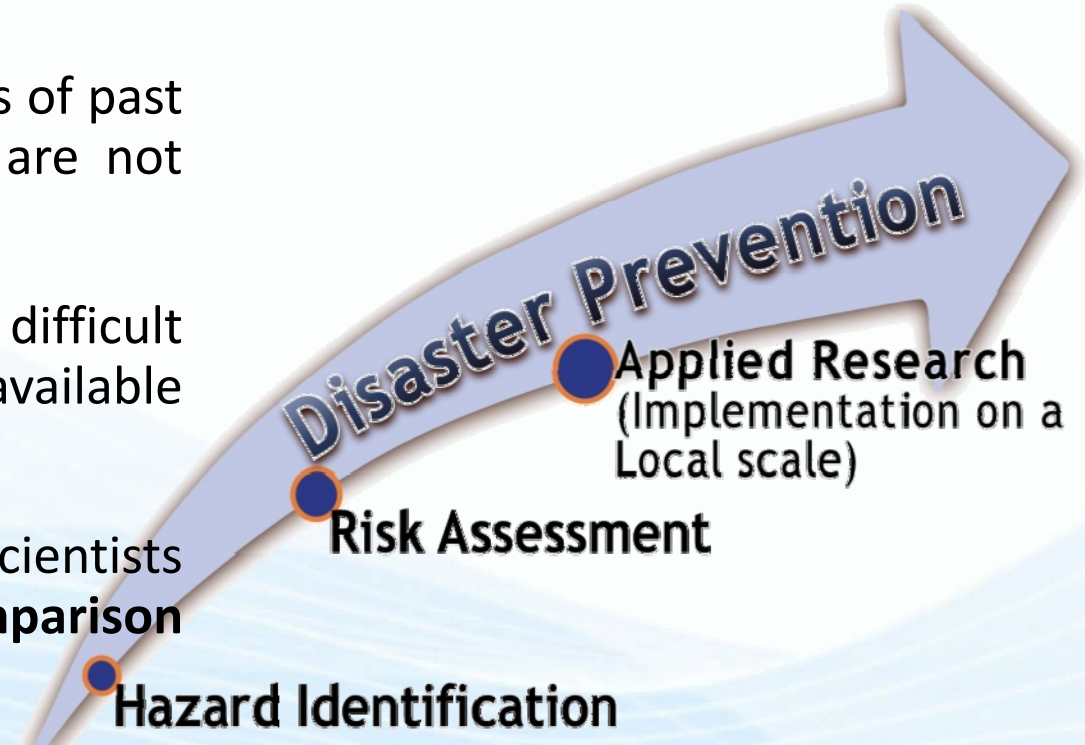
Hazard Assessment in the EU… the Information Gap!

- **Usable Data are still lacking**. Inventories of past landslides and floods do not exist or are not accessible.
- **Metadata** are not supplied so it's very difficult to assess reliability and accuracy of available data (if found).
- **Different methodologies** are used by scientists even in the same country, **making comparison** of results, **impossible.**
- **Hazard identification & Risk assessment on a local scale** (that could provide the essential information for planning preventive measures) **has only been sparsely implemented**.



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Some Flood related issues

- **Serious problems regarding floods in large rivers are being tackled** with **early warning systems**, **preventive measures** and **management plans** developed

- All though there is great advance in **cross border flood management issues**, there is still a lot to be done in terms of a **common approach of the flood problem** in neighboring countries.

- **Flash floods,** which are frequent and common in most of the Mediterranean and the Black Sea countries, **are not dealt with**. This fact has already been recognized by the EU and flood management plans are foreseen to be designed during the next period of the Directive 2007/60/EC implementation.

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What needs to be done

CONSENSUS among the members of the scientific community involved in ELF Disaster mitigation regarding:

- **Harmonization of METHODOLOGIES** used to assess the hazards…in order to create a large network of potential partners working on the same problem, supporting each other, sharing competencies.
- **DATA harmonization** including **METADATA** creation.
- **DATA** collection and **SHARING**
- **COOPERATION in all four steps** of the Disaster Management cycle ("harmonization" is a pre-requisite)
- **Applied Research** to provide support for decision making

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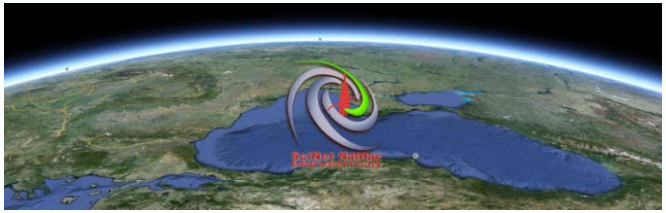
Scope of the SciNetNatHaz Project



A. **To establish a strong regional (BS) cooperation by developing a SCIentific NETwork** for Earthquake, Landslide and Flood (ELF) Hazard **Prevention** that will set the basis for:

B. **Systematic data** acquisition, **harmonization**, management and **sharing** with the scientific community

C. **Harmonization of Methodologies** and **Procedures used to assess ELF hazards**

D. A **systematic Hazard assessment - Pilot implementation in selected areas** so that preventive measures can be proposed

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…some of the results (so far) #1

A. **More than 80 Scientists** are already participating in the Project coming from 12 different Universities, Academies of Sciences and Research Institutes around the Black Sea area. More scientists have expressed their interest in being voluntarily involved in the implementation phase.

B. **Topographic and Thematic maps** in analogue and digital format, **digital and tabular data were collected, processed and Metadata files created** according to the INSPIRE directive (around 1000 files).

- A **Geodatabase** has been developed as part of a WeGIS which will host both data and Results produced by the Project. Open source software has been adopted for all applications in order to be shared with the stakeholders. Open Seminars are being scheduled for the next months.
- A **Web GIS platform** has been developed and is already operational. It will provide data and pilot implementation results to stakeholders.

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…some of the results (so far) #2

C. **Harmonized Methodologies** selected/adapted to local conditions are proposed and **are being used for ELF Hazard assessmen**t throughout the implementation area.

D. **Pilot Implementations of Flash Flood Hazard** assessment/Design of Preventive measures, have already been carried out in two areas in Greece and two areas in Romania.

- **More than ten Presentations in International Conferences and six Paper Publications in Scientific Journals** have already been supported by the project. Publications are being made in order to communicate the Project (Outputs, funding source & Programme, results etc) with the stakeholders – especially the Scientific Community -and receive feedback.

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Landslide Susceptibility of Natural and Cut slopes

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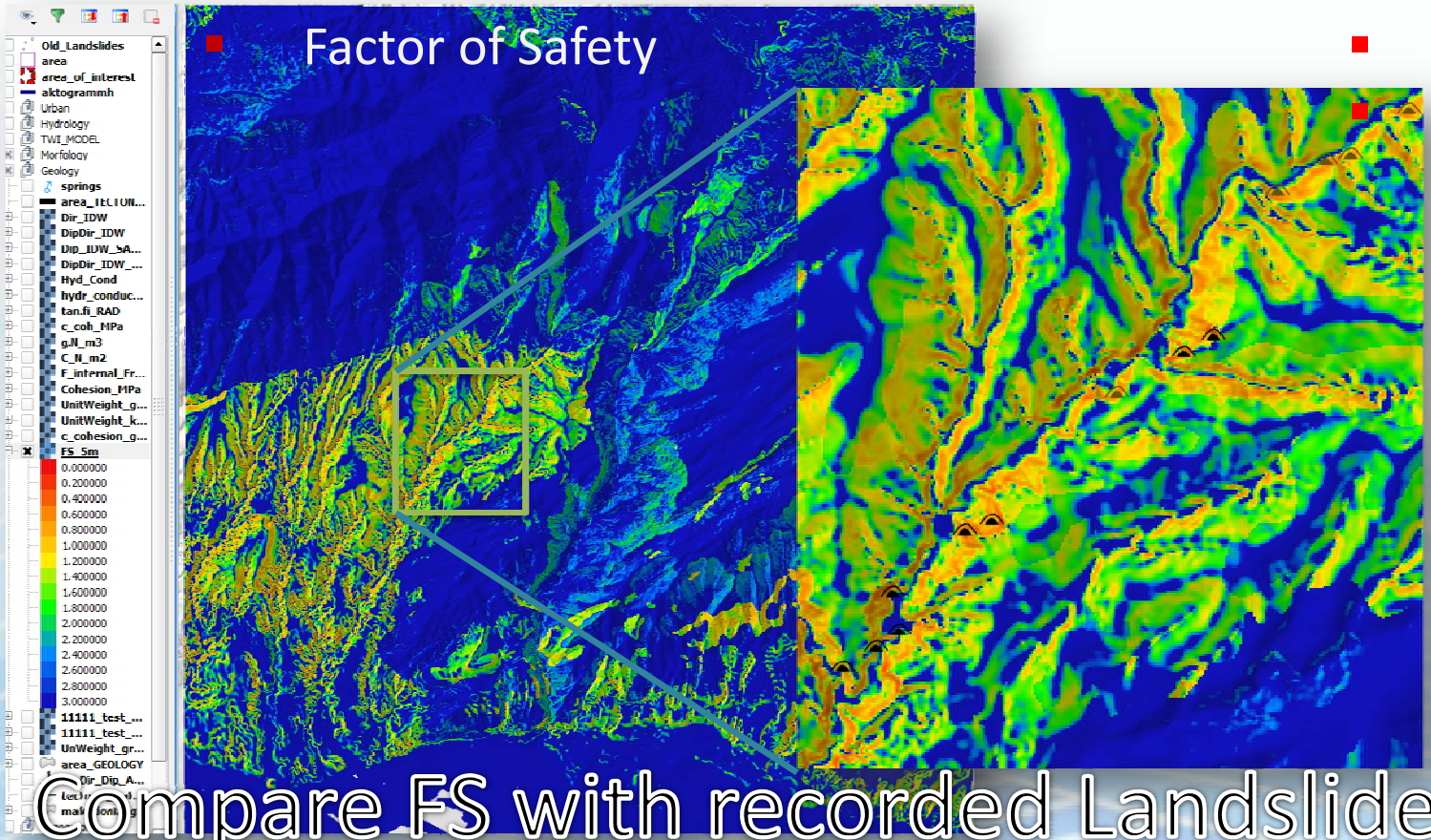
Landslide Hazard … on Regional Scales

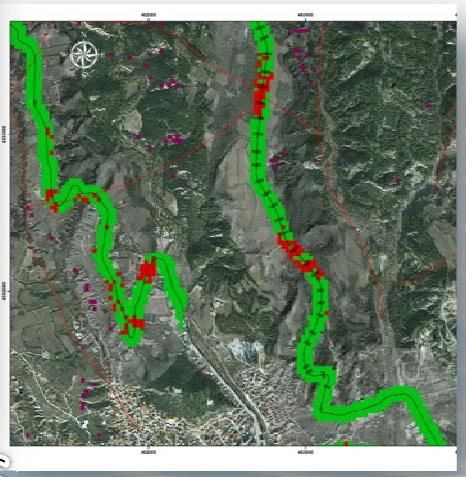
Methodologies Selected

- FEMA HazUS
- Mora & Vahrson
- Safety factor



Compare FS with recorded Landslides

Landslide Hazard Maps for Natural and Cut slopes



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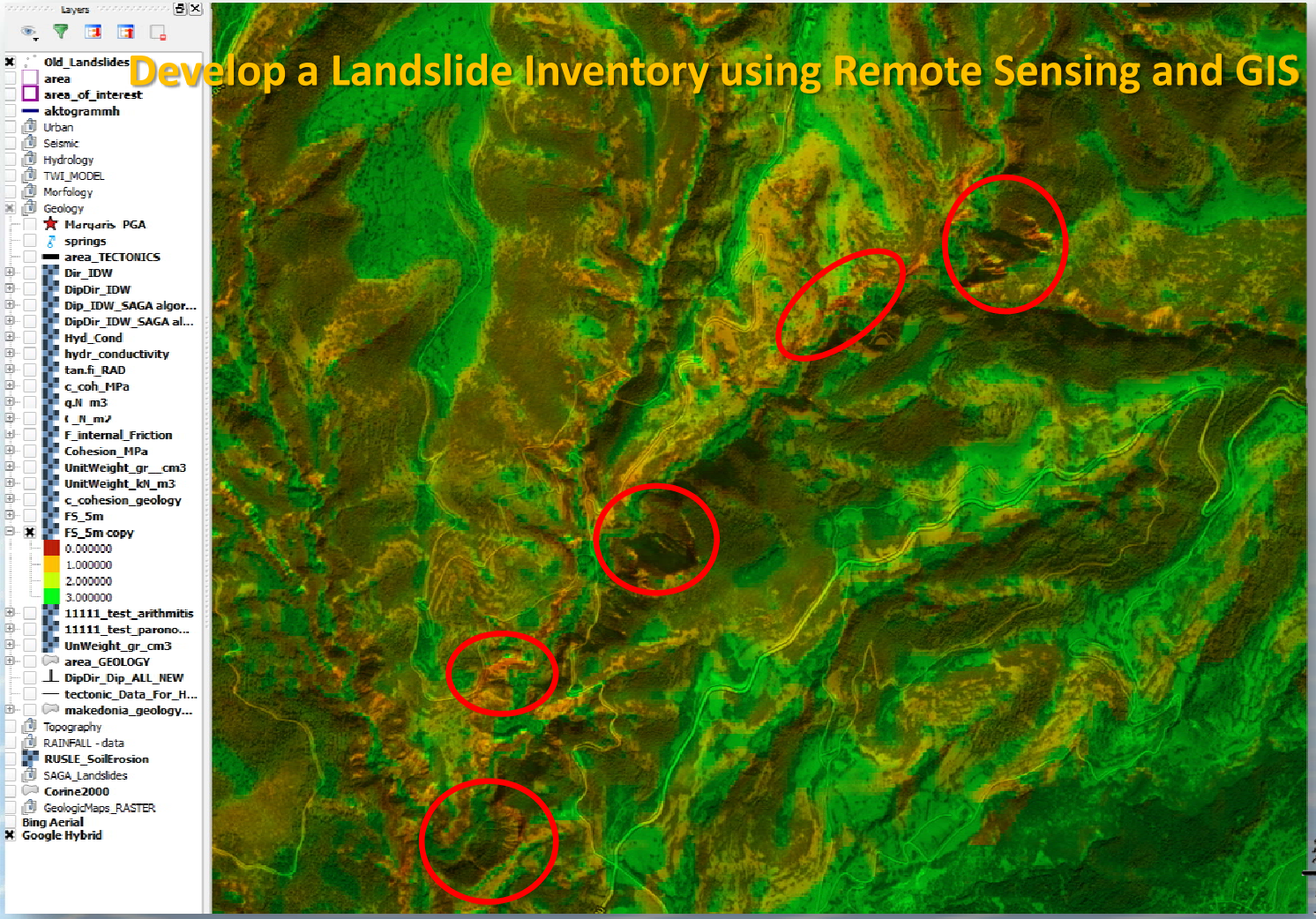
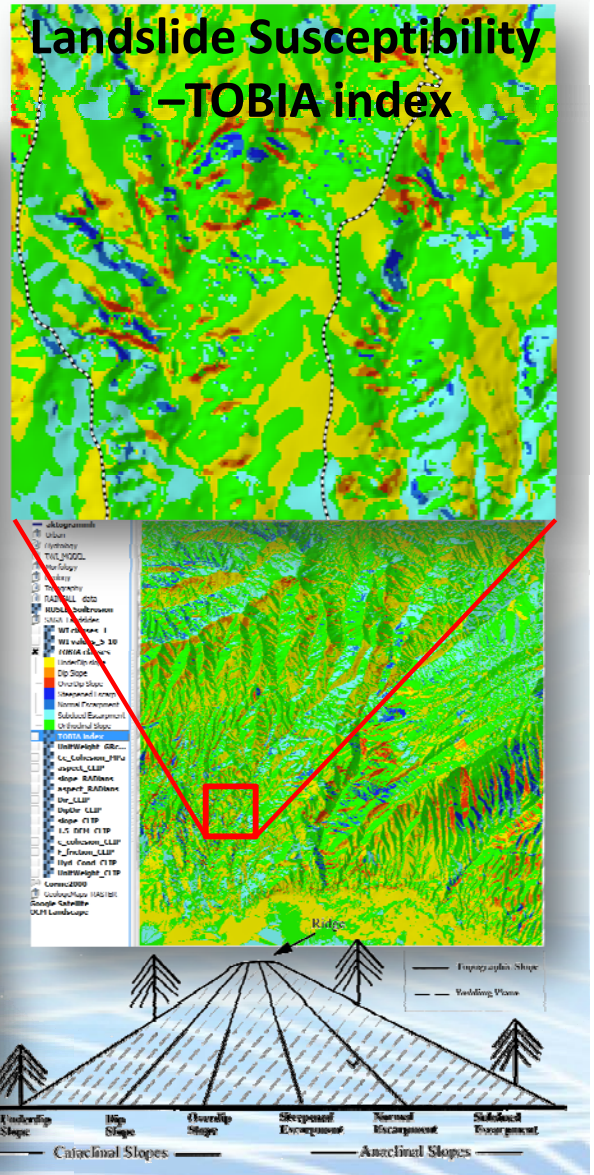
Landslide Hazard … on Regional Scales





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Flash Flood Hazard Assessment - Model selection Considerations

- Sequential Steps for Model selection:

1. Problem definition;
2. Specification of the objectives;
3. Evaluation of the available data;
4. Determination of the available computer/hardware facilities;
5. Specification of economic & social constrains;
6. Adoption of a particular class of hydrologic models;
7. Selection of the particular type of model within a selected class;
8. Model Calibration/Adaptation to local conditions;
9. Performance evaluation;
10. Potential use of the model for prediction purposes;
11. The possibility of embedding the specific model into a more general one.

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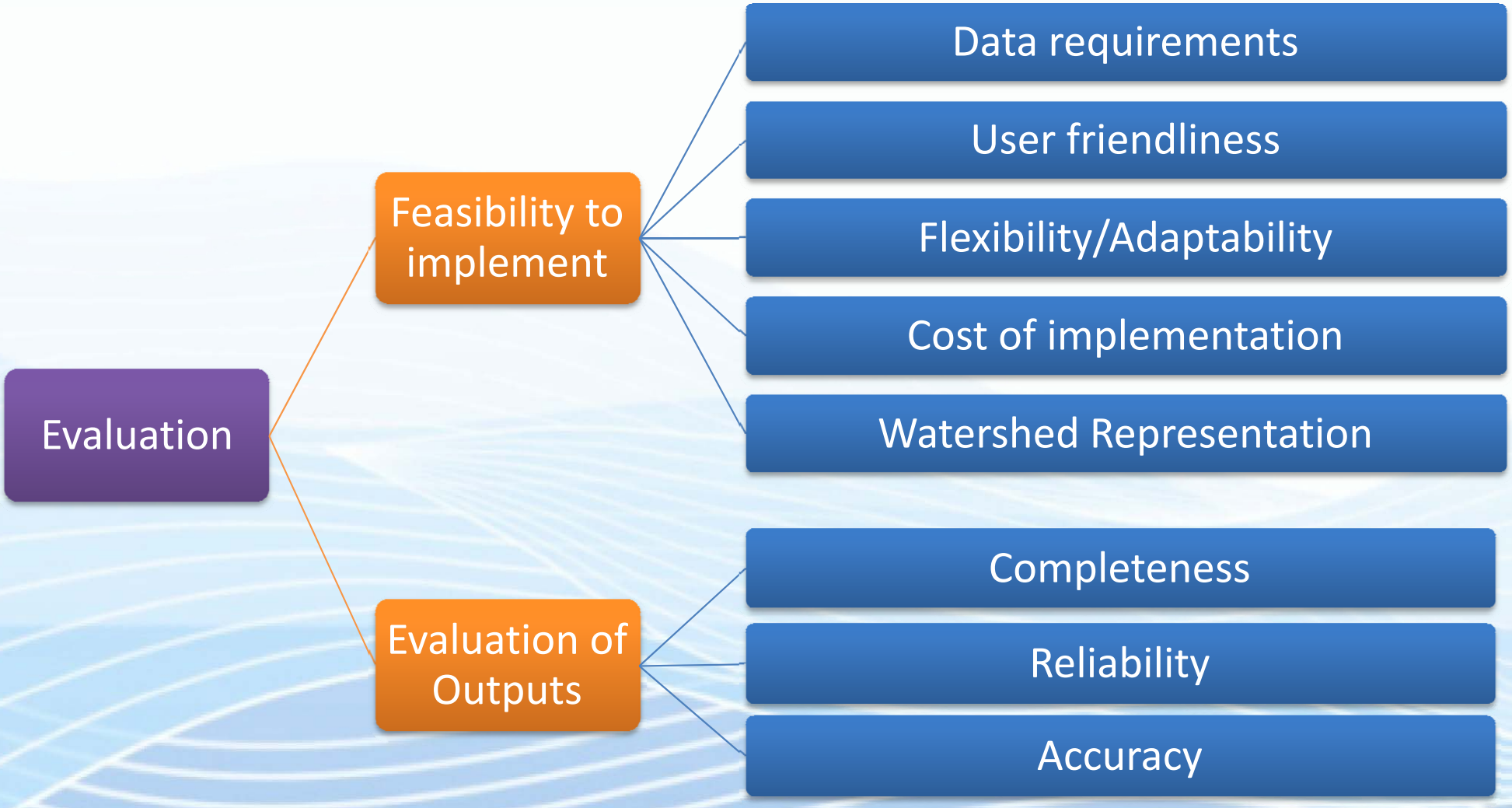
Evaluation criteria (a brief list)



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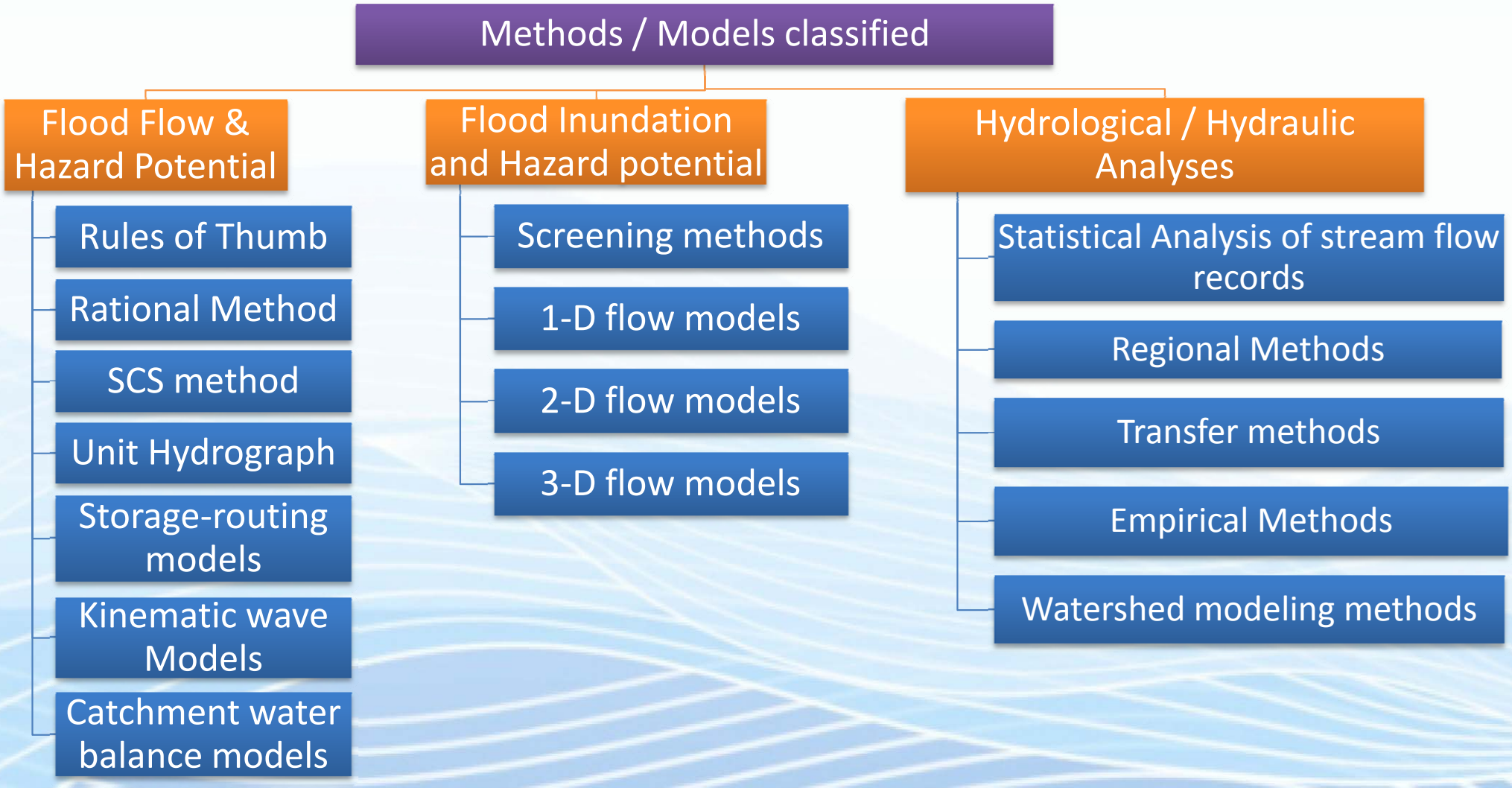
Flood Models, Methods and Techniques considered



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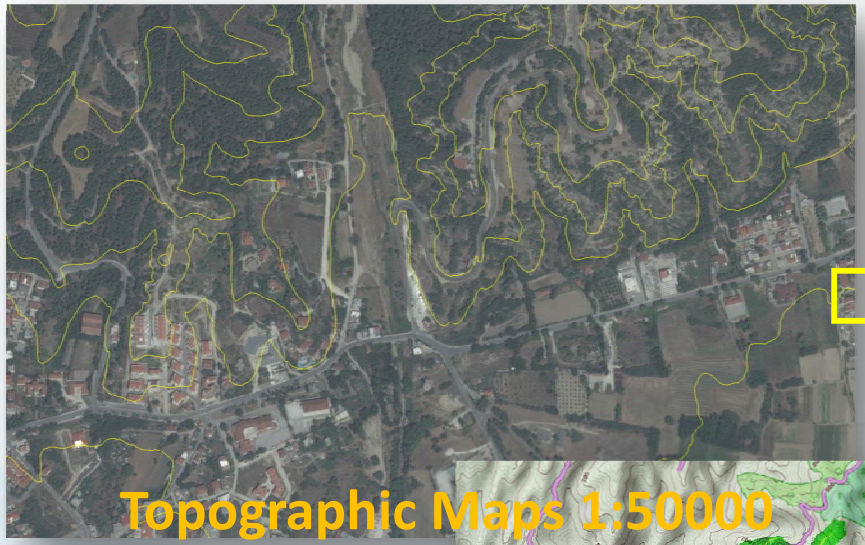
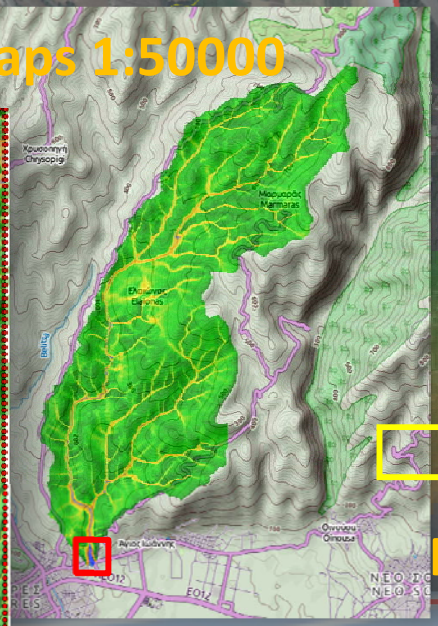
Flood Hazard… Screening from Regional to Local scales



Topographic Maps 1:50000



$$TWI = \ln\left(\frac{As}{\tan\beta}\right)$$

As: Upstream Contributing AREA per contour unit length

β: Slope

Regional Scale assessment of flood prone areas

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Local scale implementation topographic data (RTK)

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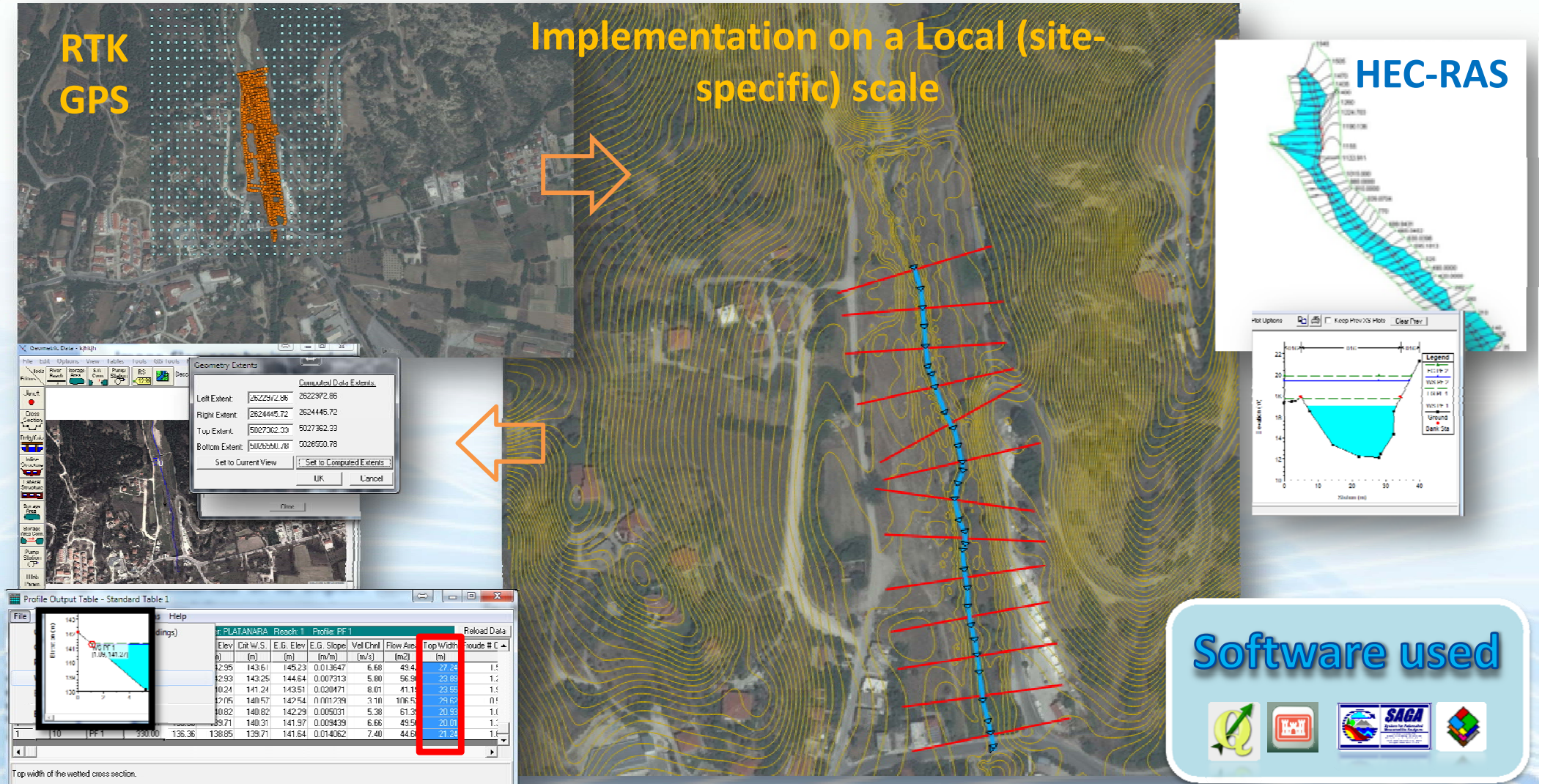
Flood Hazard… on Local scales – Hydraulic Models



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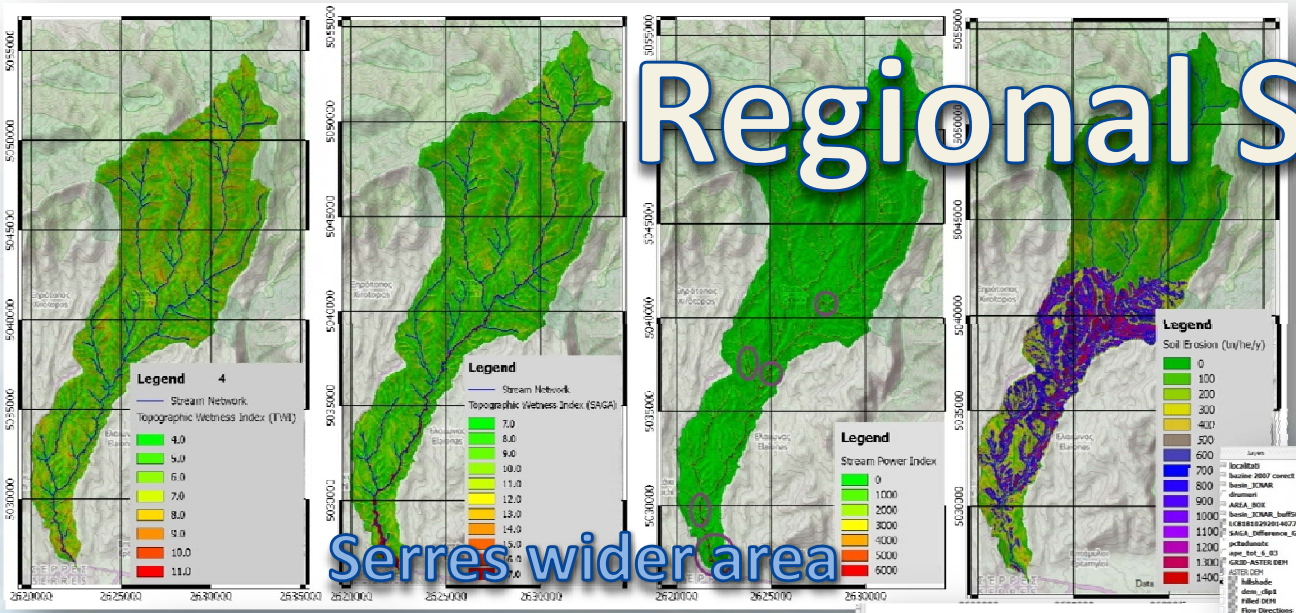
Flood Hazard… on Regional Scales and on Local scales

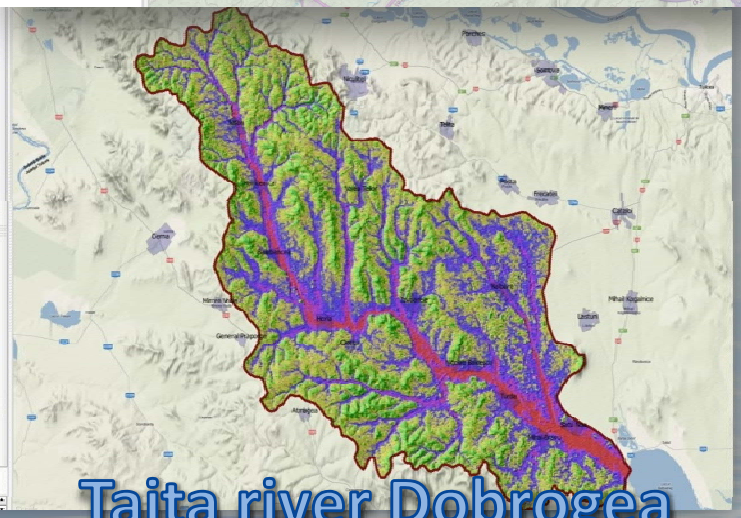
Regional Scale



Serres wider area

Tekirdag area-Turkey

Local Scale



Taita river Dobrogea

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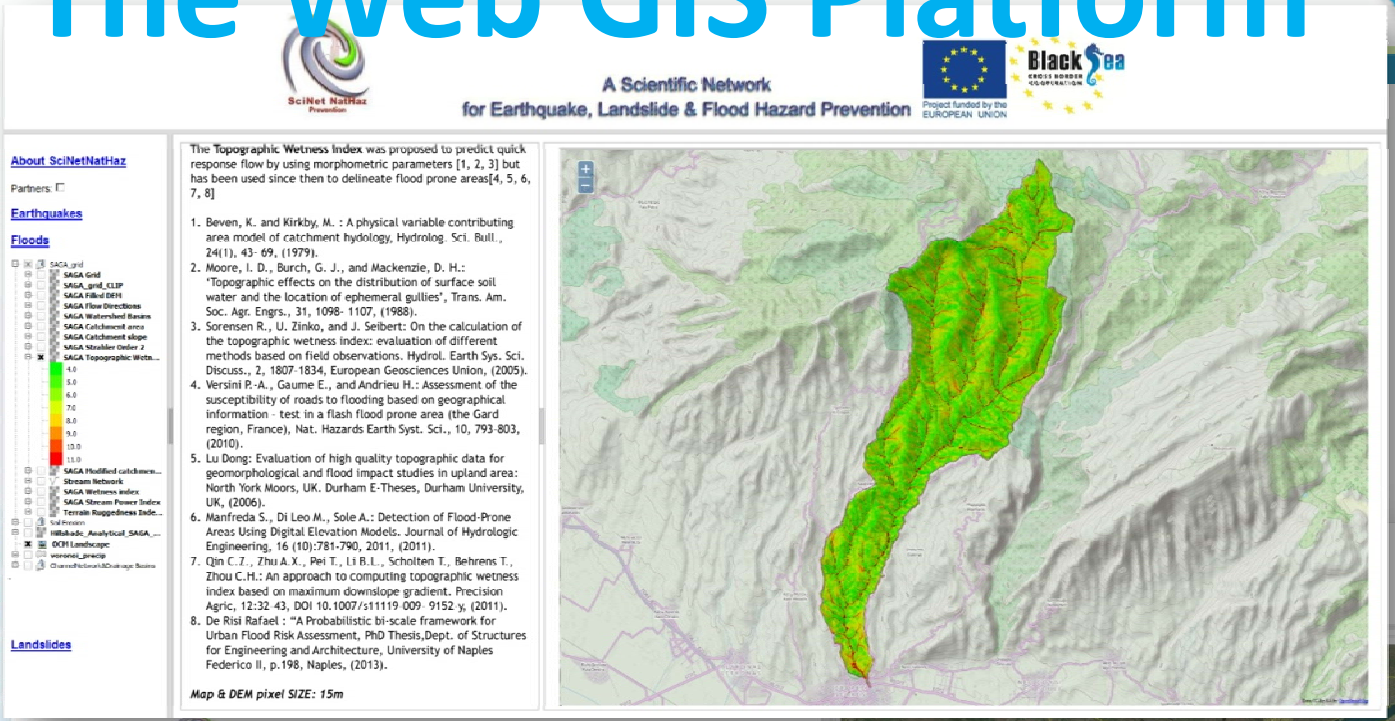
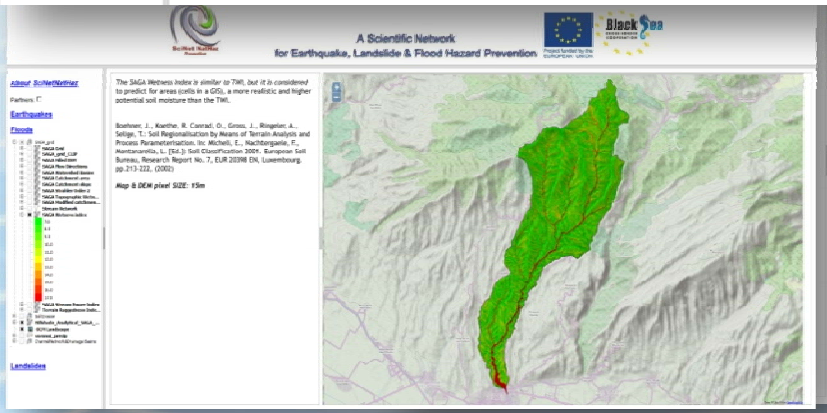
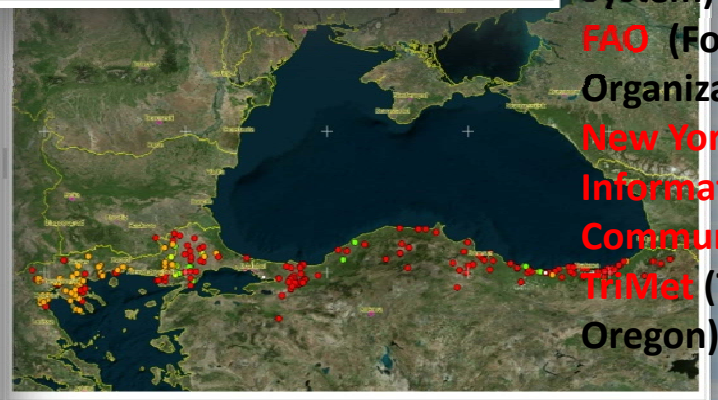
The Web GIS Platform

GeoServer







Who's using it?

MassGIS (Massachusetts state GIS)
Ordnance Survey (National Mapping Agency of the UK)
Institute Geographique National (National Mapping Agency of France)
GBIF (Global Biodiversity Information Facility)
World Bank
Global Earthquake Model
GMOS (Global Mercury Observation System)
FAO (Food and Agriculture Organization of the United Nations)
New York City Department of Information Technology & Communications
TriMet (Transit agency for Portland, Oregon)

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Open Invitation!

News & updates @: http://www.scinetnathaz.net/

Facebook: https://www.facebook.com/scinetnathaz.scinetnathaz

Follow us on **Twitter**: https://twitter.com/SciNetNatHaz

YouTube Channel: http://www.youtube.com/user/SciNetNatHaz

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A Scientific Network for Earthquake, Landslide and Flood Hazard Prevention

Thank You All for your Attention!

The Project

Acknowledgments:
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Final, Brussels, 23.2.2009

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- ✓ **Directorate General for Research (2005):** Extract of the DG RTD Unit I.4. Catalogue of Contracts topic: **Natural hazards Flood Related EU Hazard Research Projects** (Framework Programme 5 (1998 – 2002) "PROGRAMME ENVIRONMENT AND SUSTAINABLE DEVELOPMENT" and Framework Programme 6 (2002 – 2006): "PROGRAMME SUSTAINABLE DEVELOPMENT, GLOBAL CHANGE AND ECOSYSTEMS").
- ✓ **EUROPEAN COMMISSION RESEARCH DIRECTORATE-GENERAL (2003):** Background Information for Press Release: "**Floods: European research for better predictions and management solutions**", Dresden, 13 October 2003.
- ✓ **European Commission: Research and innovation (2006**): Workshop on "RESEARCH: **Floods!: Managing the risks of flooding in Europe**". Conference Minutes.
- ✓ European Commission DG Environment (2008): Member States' **Approaches towards Prevention Policy – a Critical Analysis**. Final Report. March 2008
- ✓ **Miet Van Den Eeckhaut and Javier Hervás (2012): Landslide inventories in Europe and policy recommendations for their interoperability and harmonisation**, A JRC contribution to the EU-FP7 SafeLand project. **JRC Scientific and Policy Reports**.