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Black Sea CROSS BORDER COOPERATION

Common borders. Common solutions.

Відкритий семінар

«Застосування відкритих геоінформаційних систем для запобігання наслідкам повеней, землетрусів і зсувів»

за результатами проекту «Формування наукової мережі для попередження ризиків землетрусів, зсувів і повеней»

A Scientific Network for Earthquake, Landslide and Flood Hazard Prevention(«SciNetNatHaz»)

13 жовтня 2015 р., ОНМА, Ізмаїл

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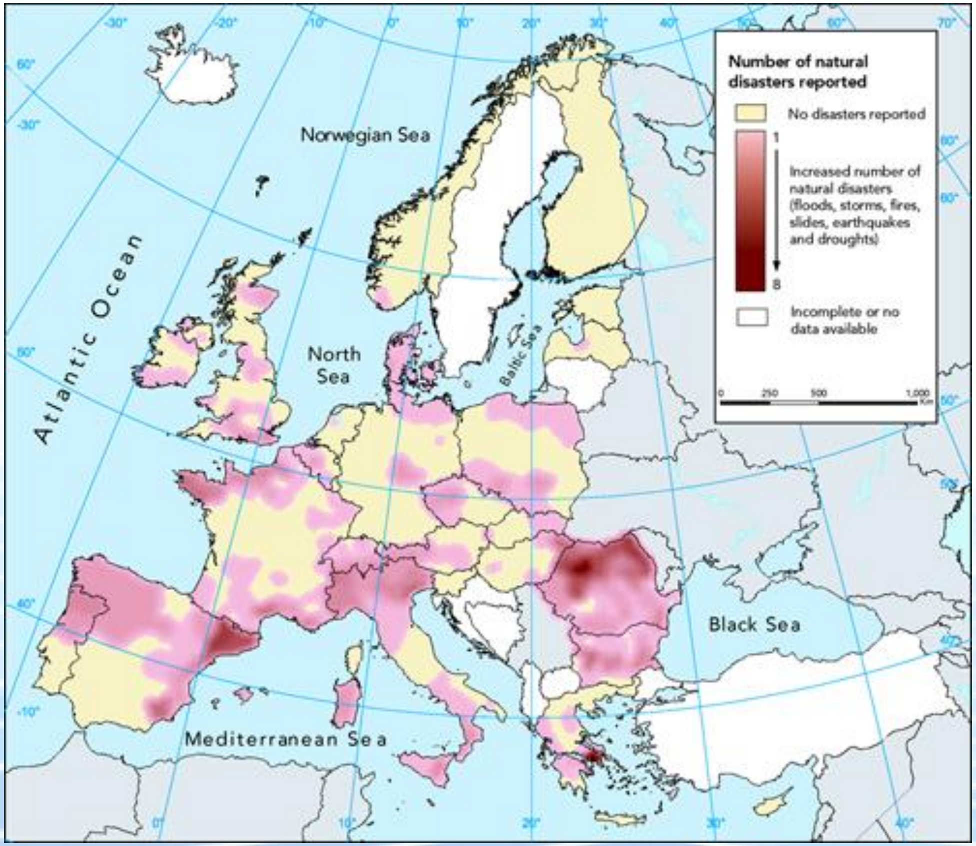
Natural Hazards – Natural Disasters



Natural Hazards – Natural Disasters

- ✓ **Natural hazards** can lead to **Natural Disasters** when combined with **vulnerability** and **insufficient capacity to reduce the potential chances of risk**

Natural Disaster Mitigation

- ✓ Disaster **mitigation** is the ongoing effort to reduce the impact disasters have on people and property. Because of the varying degree of each natural disaster, there are different mitigation strategies for each.

- ✓ **Disaster Mitigation as a management process** can be divided into:
  - ✓ **pre-event measures**,
  - ✓ actions during and immediately following an event, and
  - ✓ post-disaster measures.

- ✓ **Key elements for Natural Disaster mitigation** are:
  - ✓ **Hazard Id**entification and **Risk assessment** and
  - ✓ Applied Research and Technology transfer

Natural Disaster Mitigation as a Management Process

- Depends heavily on it's first stage:
  - **pre-event measures** are the most **cost effective**, **provided** that they are **based on accurate and reliable Hazard Identification and Risk Assessment**

…. Which in turn, are based on:
- **Accurate and Reliable** Data
- **Scientifically proven** (after being adapted to local conditions, tested and accepted) **Methodologies**

- The necessity of the aforementioned is more evident considering that **Hazard Identification and Risk Assessment provide the background needed for the effective planning** of the rest of the Disaster Mitigation stages (actions during and immediately following an event, and post-disaster measures)

Problems & Drawbacks

…in respect to the Scientific Community of the Black Sea wider area

- ✓ Lack of **RELIABLE** information
- ✓ The **COST** of required **DATA**
- ✓ Lack of **SYSTEMATIC** hazard assessment
- ✓ Lack of a "common ground" in terms of Methodologies and Procedures adapted so that results can be comparable
- ✓ Lack of a scientific body that will provide assistance, advice, support to decision makers and will help COORDINATE joint actions

…and regarding the local administration

- ✓ Not imposed **LEGAL FRAMEWORK**
- ✓ Lack of **PUBLIC AWARENESS**

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Problems & Drawbacks – are they recognized?

REPORT OF THE "FLOOD AND LANDSLIDE ISSUES IN THE BLACK SEA REGION " MEETING

Date: 26-27 October 2010

Venue: Novo Hotel, Trabzon TURKEY

General Overview

Disaster and Emergency Management Presidency, Europan Disaster Training Center (AFEM) with support of EUR-OPA organized a seminary to take up flood and landslide issues in the Black Sea Region. Two keynote speech and 17 presentations made during two days programme. More than 60 experts, academicians and local administrators, NGOs, Chamber of Geological Engineers attended to the seminary. EUR-OPA Secretariat and the "European Training Information Center" in Baku also represented in the seminary.

Seminary included 3 sections called; *"Climate Change, Floods And Early Warning Systems"*, *"Landslides Case Studies In The Black Sea Region"* and *"Solutions To Flood And Landslide Problems"*.

- There is an urgent need for landslide inventories and related documents to be compiled systematically. There is also a need for those databases to be shared for public use. Goverment units must play a crucial role for creating and managing such databases,

  Studies on landslide mapping and susceptibility are limited with the academic studies with some exceptions at governmental level exists. Local authorities and public units must be more involved at these studies.

  There is no specific information about landslides in school curricula. In order to create public awareness information especially for children, landslides must be included at school curricula.

- This meeting once again showed that databases and historical information about past events are very important. There is a strong need to harmonise those data and must be reached through single one source.

- Participants also took attention to the need for a common terminology at disaster management is very crucial for Turkey and need to be established and distributed to all stakeholders.

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Problems & Drawbacks – are they recognized?

SafeLand

Search

Introduction | Reasons for research | Objectives | Results | Consortium | Contact | Extranet

Work area 1
Work area 2
Work area 3
Work area 4
Work area 5

Introduction

Living with landslide risk in Europe: Assessment, effects of global change, and risk management strategies.

SafeLand is a Large-scale integrating Collaborative research project funded by the The Seventh Framework Programme for research and technological development (FP7) of the European Commission. Thematically the project belongs to Cooperation Theme 6 Environment (including climate change), Sub-Activity 6.1.3 Natural Hazards. The project team composed of 27 institutions from 13 European countries is coordinated by Norwegian Geotechnical Institute (NGI).

SafeLand will develop generic quantitative risk assessment and management tools and strategies for landslides at local, regional, European and societal scales and establish the baseline for the risk associated with landslides in Europe, to improve our ability to forecast landslide hazard and detect hazard and risk zones. The scientific work packages in SafeLand are organised in five Areas:

- Area 1 focuses on improving the knowledge on triggering mechanisms, processes and thresholds, including

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Scope of the SciNetNatHaz Project

To establish a strong regional (BS) cooperation by developing a Scientific Network for Earthquake, Landslide and Flood Hazard prevention that will set the basis for:

- ✓ **Systematic data acquisition**, harmonization, management and disposal to the scientific community
- ✓ Standardization of Methodologies and Procedures adapted
- ✓ A systematic Hazard assessment
- ✓ The formation of a Scientific body that will provide assistance, advice and support to decision makers, to local communities, to public bodies and that will help coordinate JOINT ACTIONS

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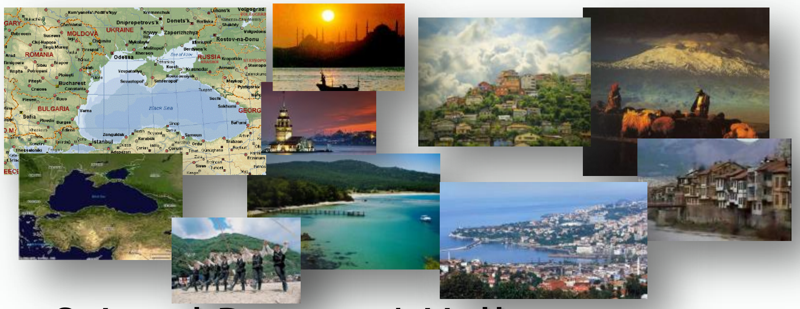
The Partnership



ENPI partners

- ✓ Tech. Edu. Institute of Serres, Applicant & Lead Partner * Hellas
- ✓ **E**arthquake **P**lanning & **P**rotection **O**rganisation-EPPO /Thessaloniki branch. The Institute of Engineering Seismology & Earthquake Design * Hellas
- ✓ Civil Engineering Dept., Democritus University of Thrace * Hellas
- ✓ Burgas Assen Zlatarov University , Burgas* Bulgaria
- ✓ Ovidius University of Constanta, Constanta * Romania
- ✓ “Dr. Ghitu” Institute of Electronic Engineering & Nanotechnology, Academy of Sciences * Moldova
- ✓ The Black Sea Branch of the Ukranian Environmental Academy of Sciences, Odessa * Ukraine

IPA partner

- ✓ **K**andilli **O**bservatory & **E**arthquake **R**esearch **I**nstitute, Bogazici University, Istanbul * Turkey

Expected Results

- Closer **scientific cooperation** among the participants
- Data and meta-data harmonization provisions according to EU directives/regulations
- **Methodologies** adapted to local conditions (tested and proven)
- **Hazard assessment maps** in various scales
- **Pilot implementation** of the proposed methodologies
- A **geo-database & WebGIS** that will provide reliable and accurate data (as related to various scales implementing Natural Hazard assessment methodologies) tested through certified procedures
- A Web-page that will provide **information to scientists and to the public** regarding Natural Hazards in the area
- The formation of an initial scientific group that will be joined by others at a following stage

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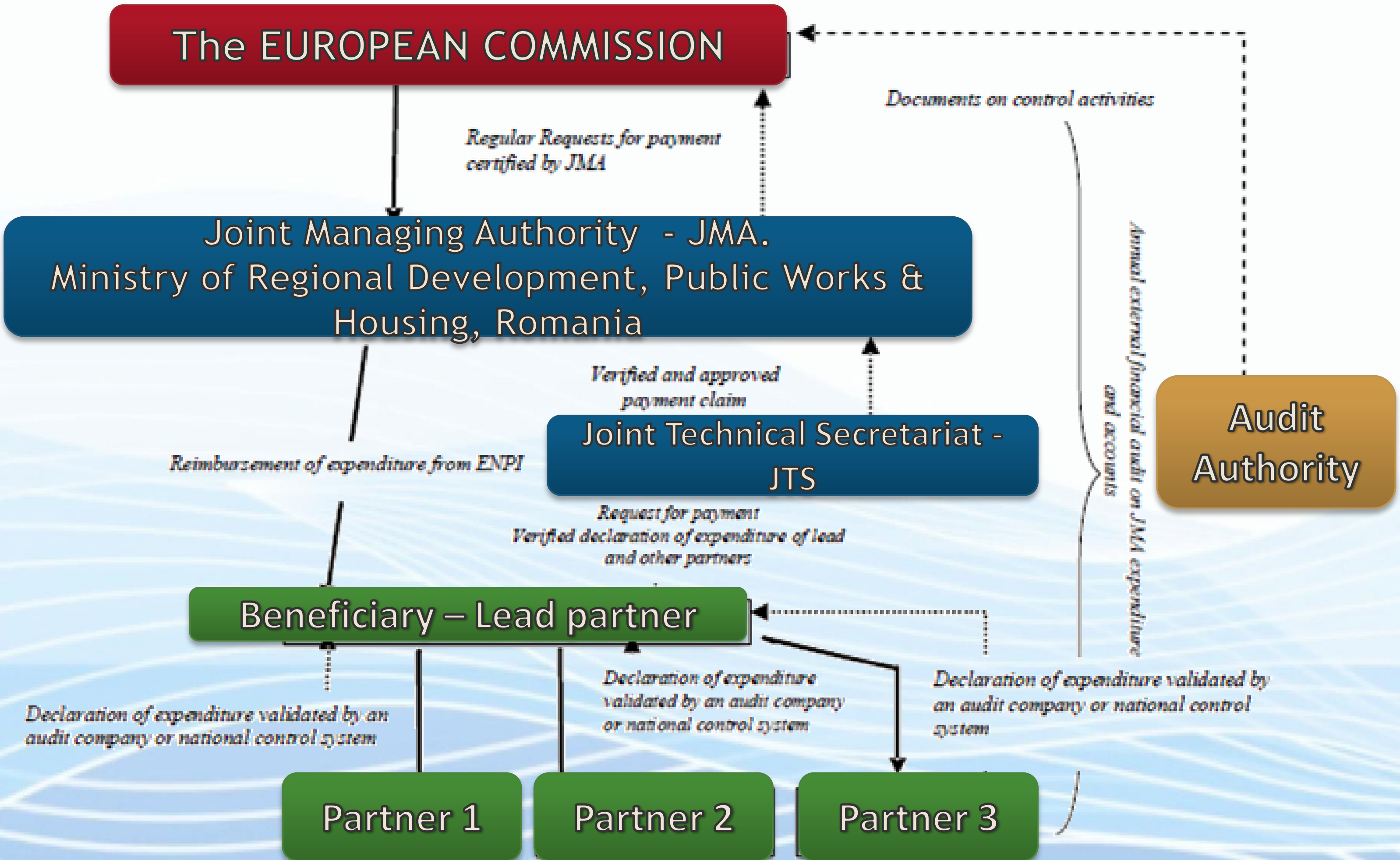
BSB Programme Structure



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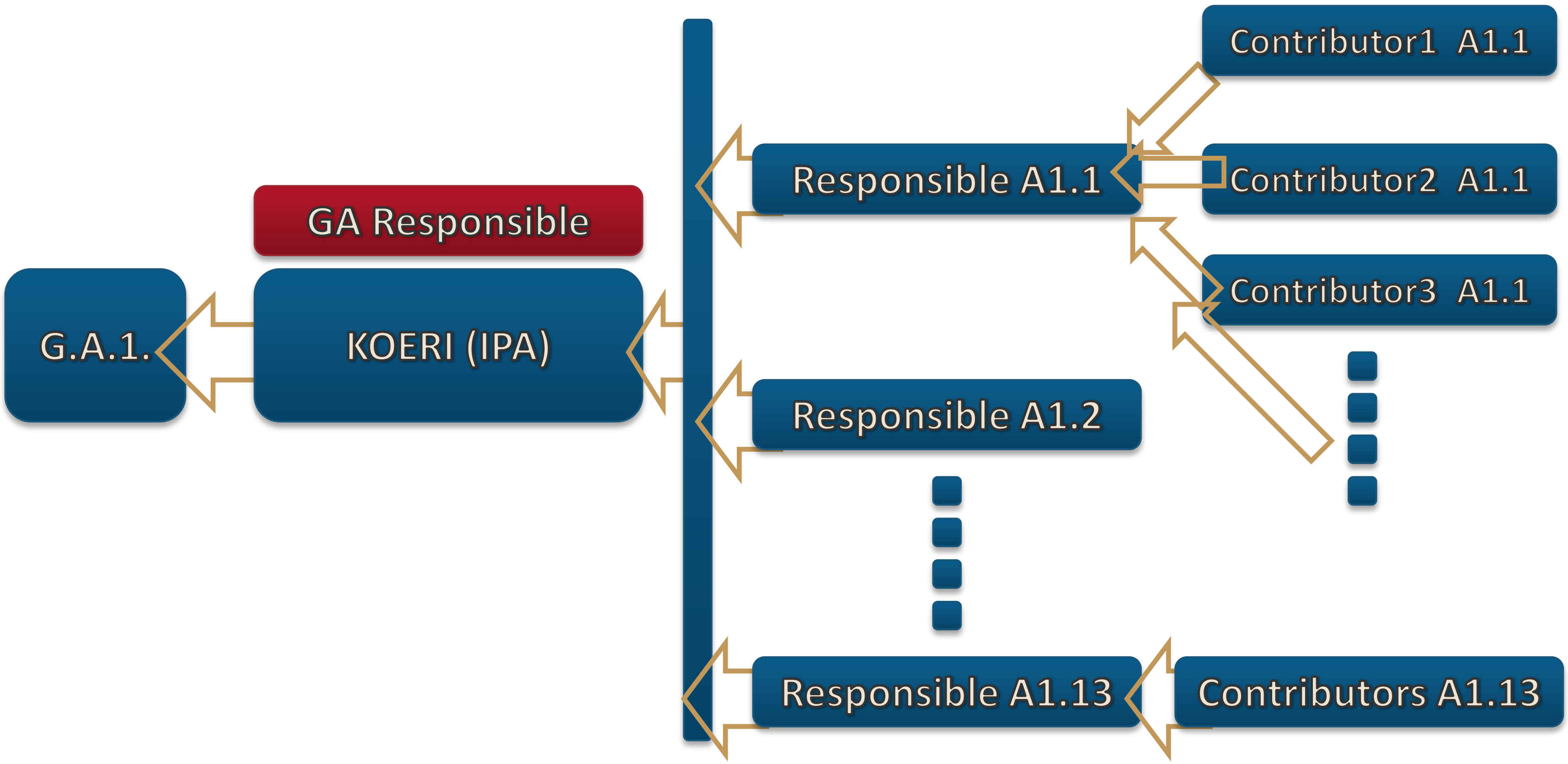
An overview of the Project's G.A.

Group of Actions	Content & Objectives	Responsible
G.A.1.	Current Status Assessment. Selection of Methodologies	KOERI (IPA)
G.A.2.	Data collection, standardization, development of geo-database and Web GIS	LP
G.A.3.	Pilot Implementations in Regional & Local scales	P1
G.A.4.	Visibility	LP
G.A.5.	Project & Financial Management	LP

G.A. Implementation Structure



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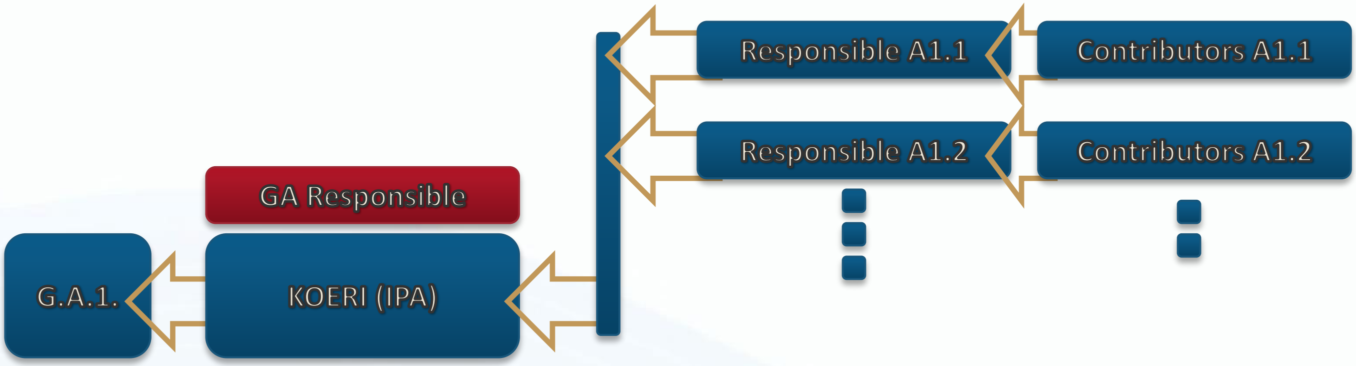
The Reason for proposing such a Structure



This Structure ensures that **each partner will be responsible for at least on Action.** In this respect he will understand and get used to issues regarding:

- ✓ **Communication**
- ✓ **Cooperation**
- ✓ **Coordination**
- ✓ **Timely** provision of deliverables

…and hopefully, we will all achieve a high level of cooperation

ICNAR 2014

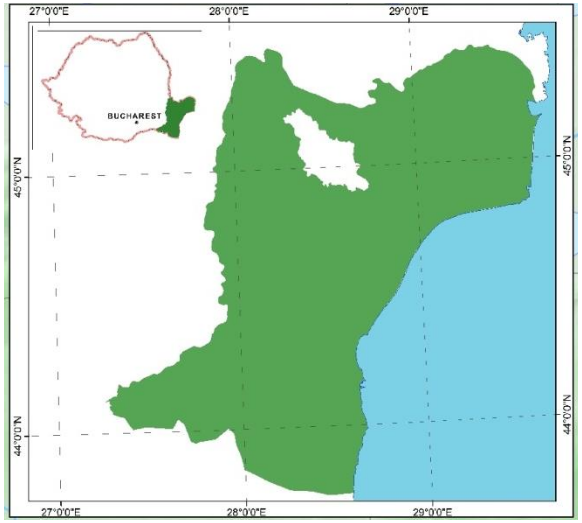
MAPPING THE FLASH FLOOD PRONE AREA IN THE TAITA WATERSHED (ROMANIA) USING TOPOGRAPHIC INDEXES AND HYDRAULIC MODEL

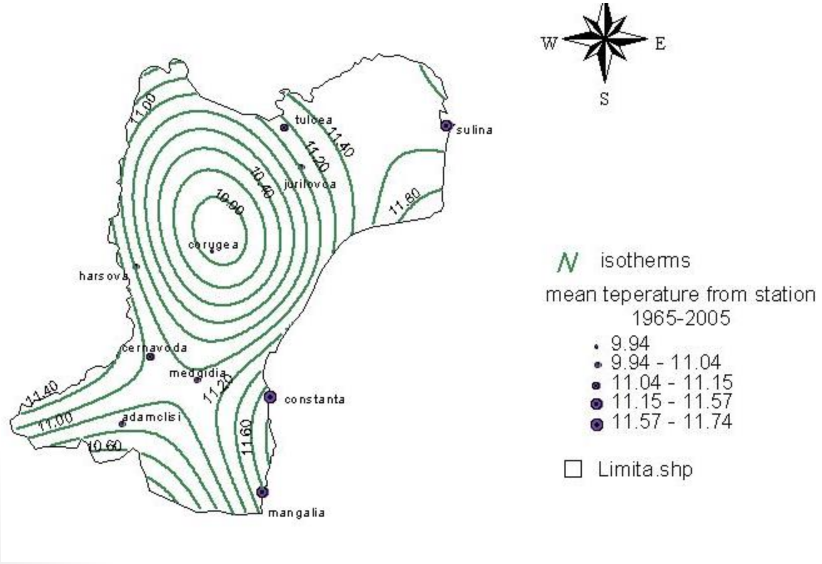
C. Maftei

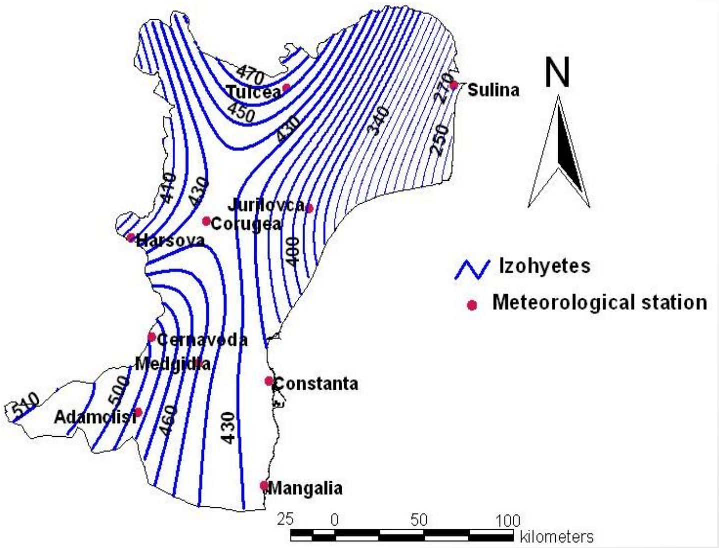
K. Papatheodorou

Dobrogea region

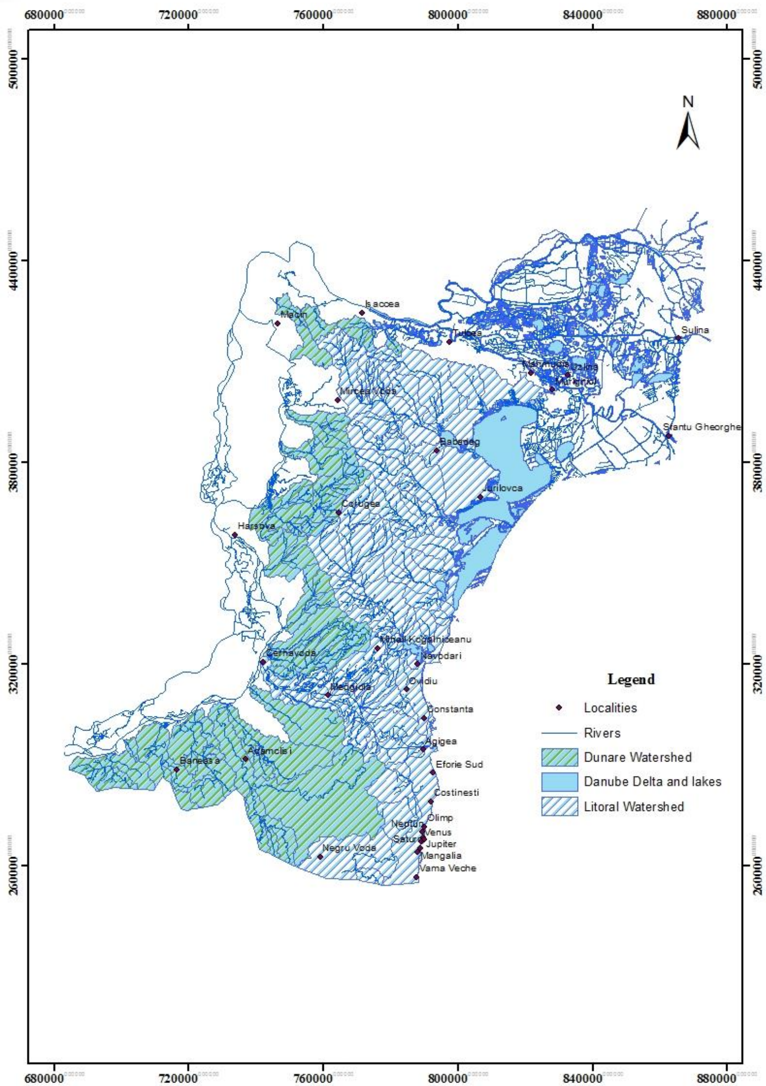
- Location
- Geo-morphology
- Climate
- Temperature
- Precipitation
- Hydrology







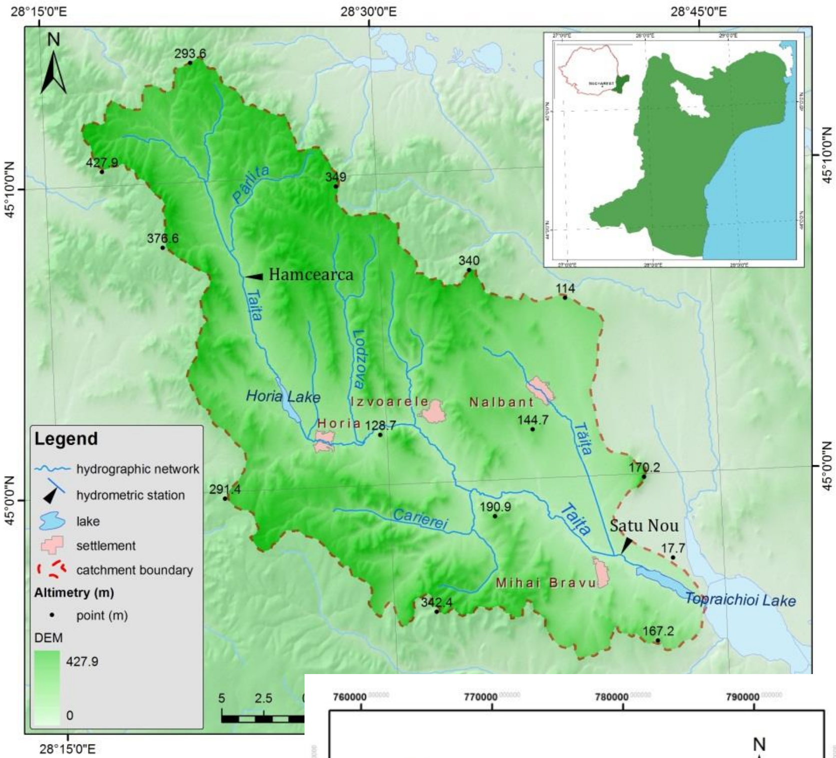
Flood problem in the Dobrogea region

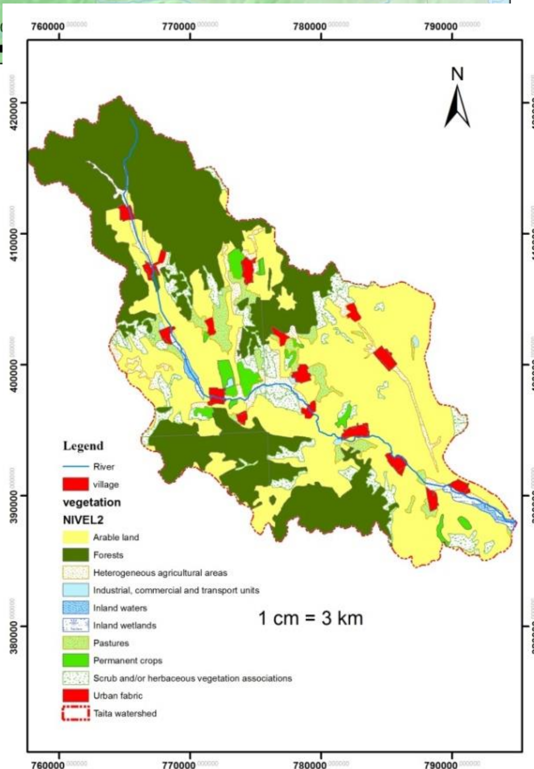


No	Town, village	Date	Characteristics	Damages
1.	Garlița	1963;1971	-	30 household teared down and animals taken away by the floods
2.	Casian	24.09.1968	442mc/s*	Households and crops destroyed, human lives lost
3.	Lumina	1967	-	Flooded households and destroyed
4.	Runcu	11.06.1985	h apa=1.60 m	Households destroyed and 5 deaths
5.	Baia	16.07.1967	-	Households and gardens flooded
6.	Constanța	01.07.1992;28 ,29.08.2004	rainfall >200 mm/12 h	Households flooded in the Western area , 3 deaths
7.	Nuntaşi/Nuntasi	01-11.09.1999	32.mc/s (fig.)	Households and gardens flooded, 1 death
8.	Cheia	02.-04.09.1999	-	Households and gardens flooded, school
9.	Costineşti	22-23.09.2005	Flood coming from upstream, at Biruinta registeredt>300mm/24 h	Damages to the railway, access roads, restaurants, households in Schitu
10.	Casimcea/Casimcea Cheia/Casimcea	30 - 31 V 2002 8 - 9 VIII 2002	398mc/s* 384mc/s*	Households and gardens flooded, access bridge damaged
11	Cuza Voda/Agi Cabul	2 - 4 IX 1999	57,8 *	no
12	Negureni, Valea Marea	2-7 IX 1999	26,8 *	no
13	Albesti	30 - 31 V 2000	153 mc/s*	
14	Sacele, raul Valea Sacele	8 - 9 VIII 2002	45mc/s*	
15	Saraiu, raul Topolog	2 - 20 VII 2005	214 mc/s*	
16	Biruinta,/ Valea Biruinta	20 - 25 IX 2005	131 mc/s*	
17	Urluia/V.Urluia	14-19 VI 1992	10.6mc/s*	
18	Taita/Taita	3.03.1985	56.6mc/s	

Study area and

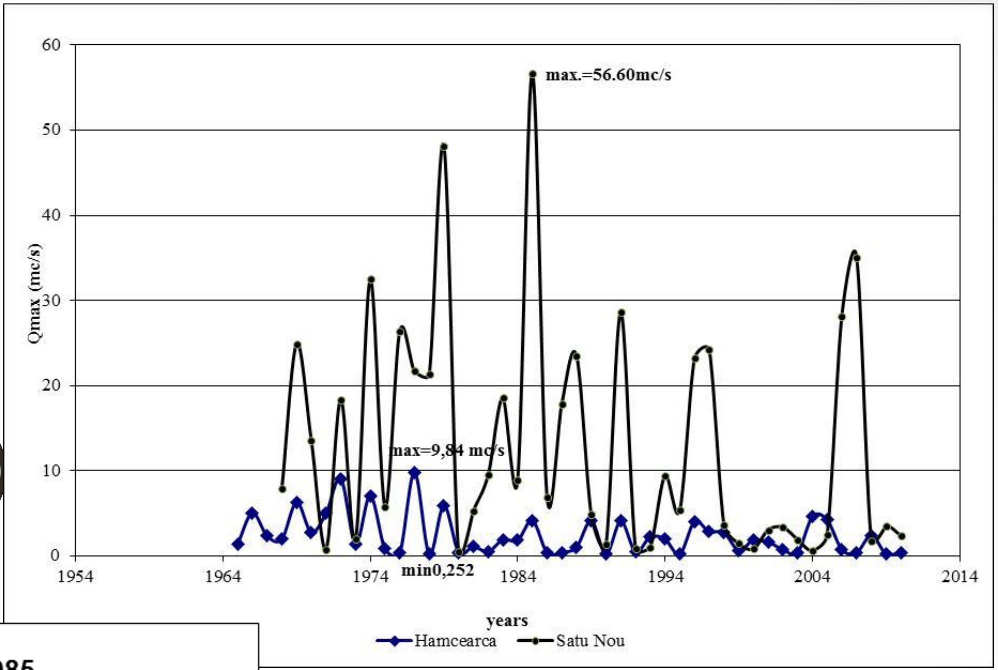
- Taita catchment
  - area 591 km^2
  - elevation ranges 261m
  - 10 tributaries
  - part of North Dobrogea Plateau
  - the main source of supply – precipitation 74%
- The hydrometric data are collected in two hydrometric stations:
  - Hamcearca
  - Satu Nou
- Vegetation
  - >33% forest

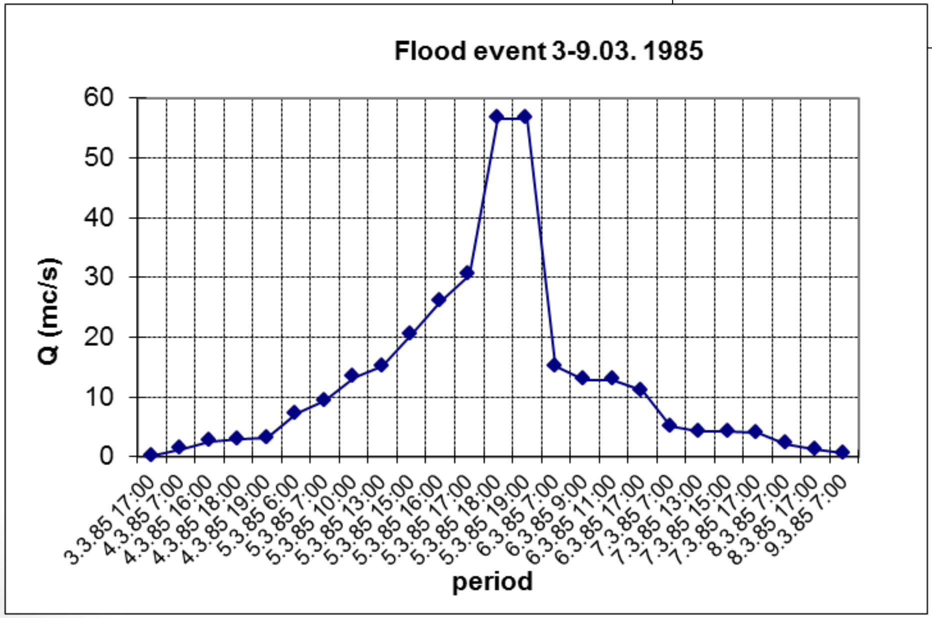




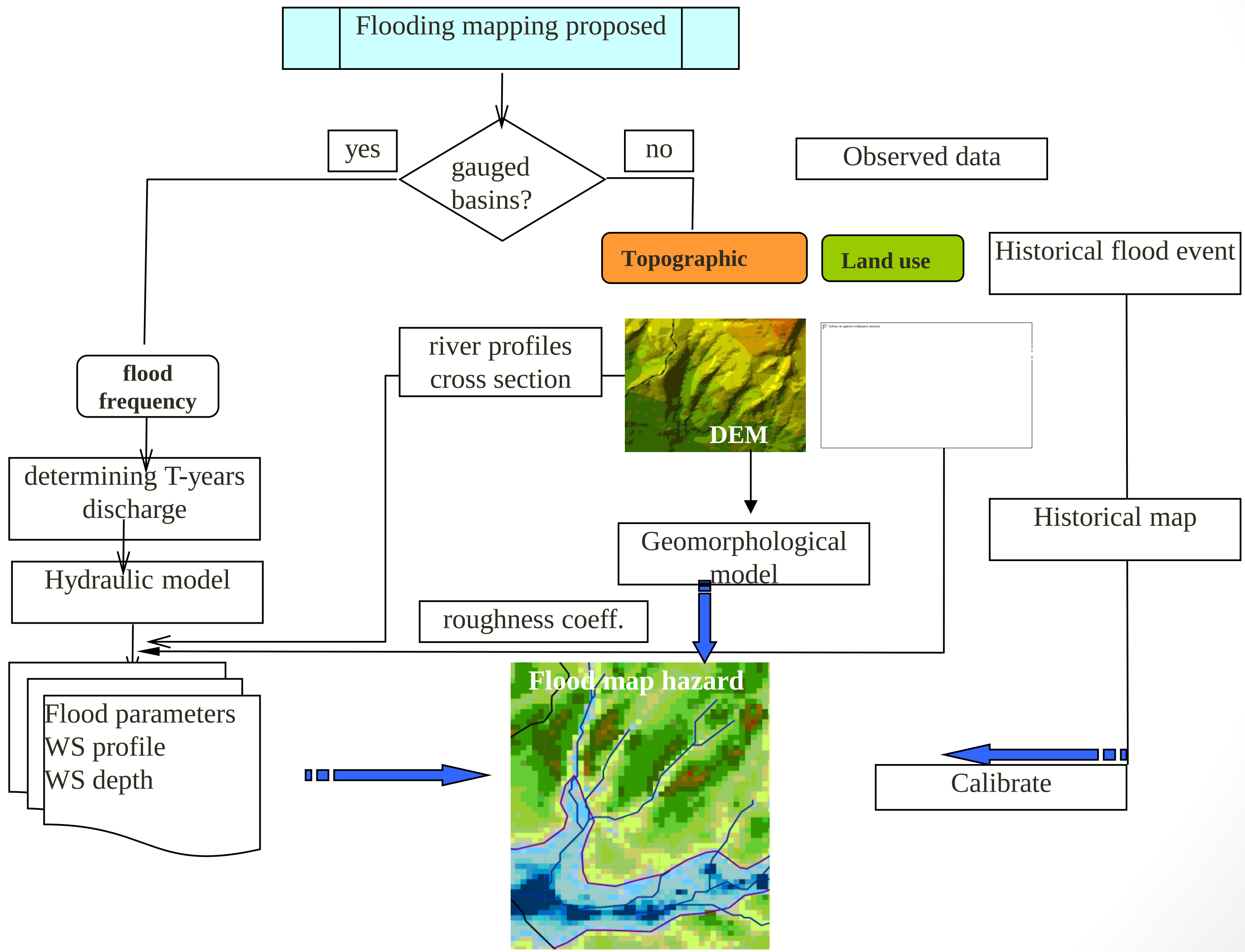
…data base

- In this study the series of annual maximum stream flow, covering the period 1968 (1965) 2010 have been used.





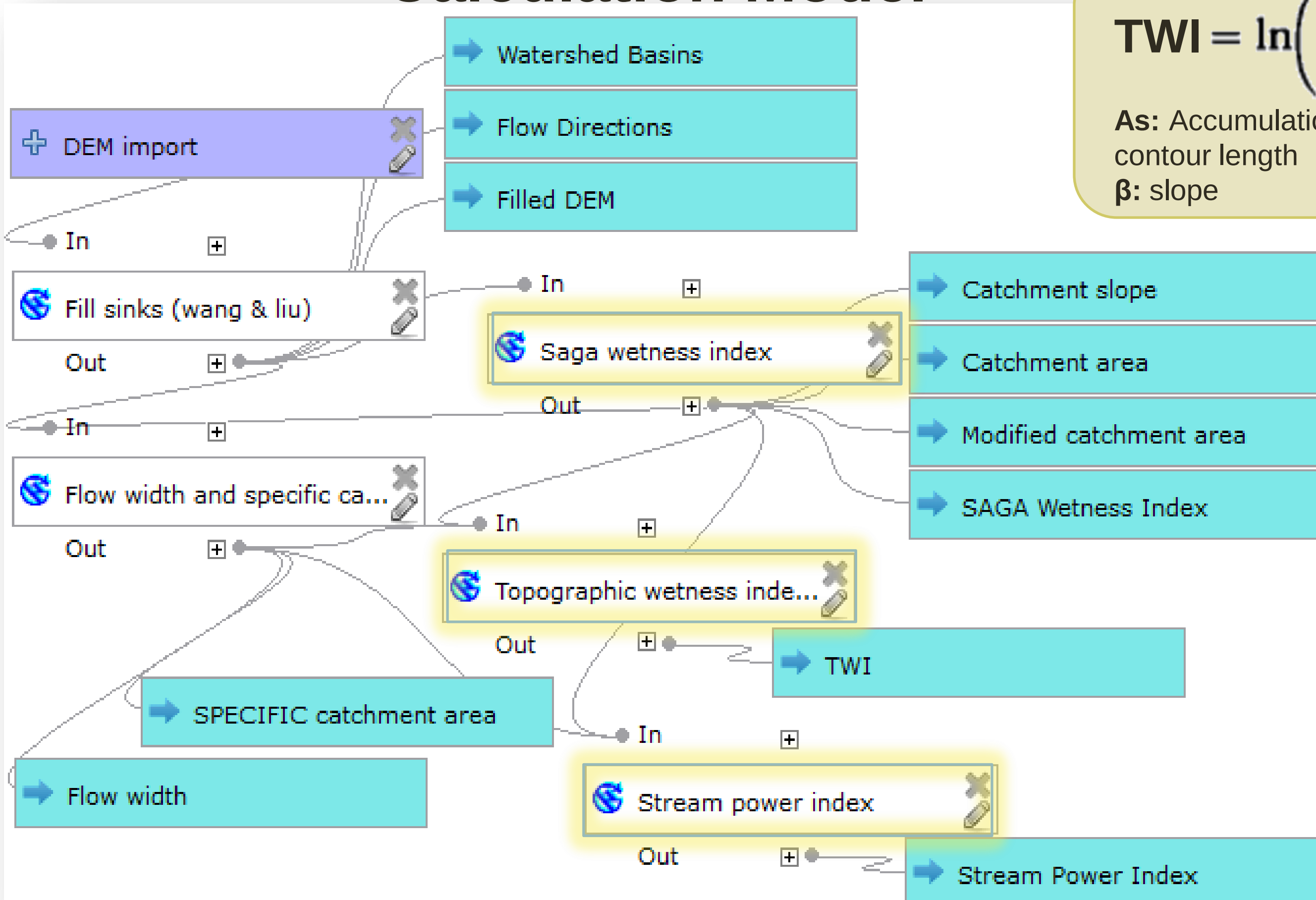
Mapping the flood prone area



Geomorphological Model

Topographic Wetness Index (TWI) & SAGA Wetness Index (SWI)

Calculation Model



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

As: Accumulation per unit contour length

β: slope

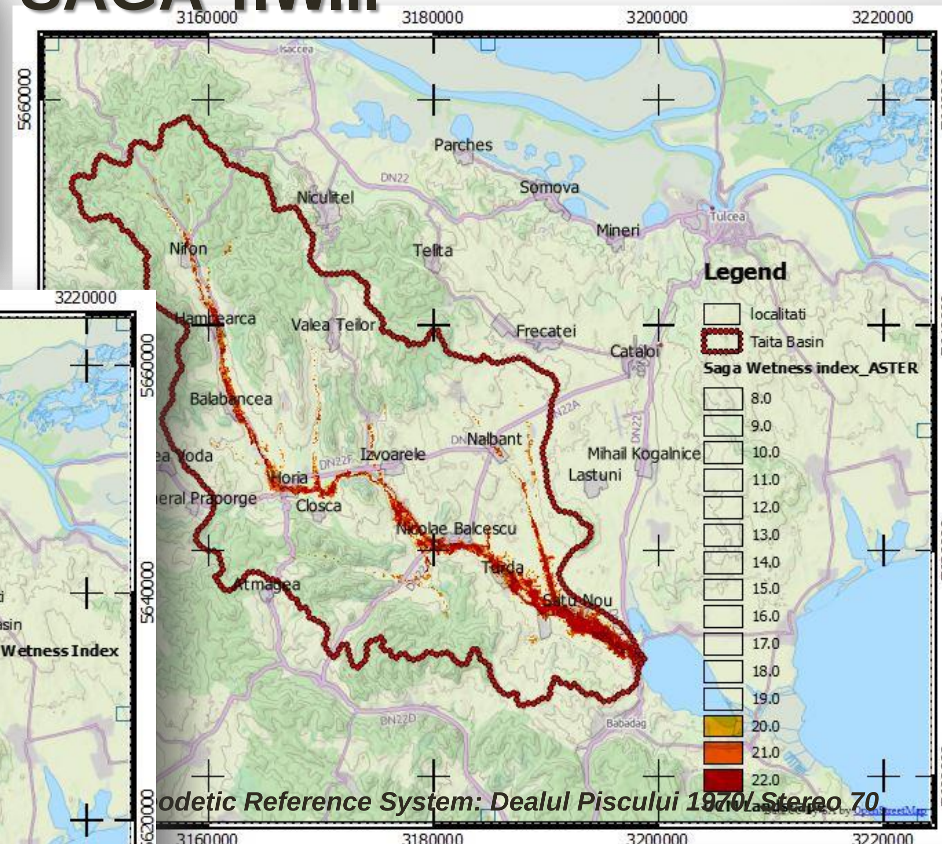
Software Used

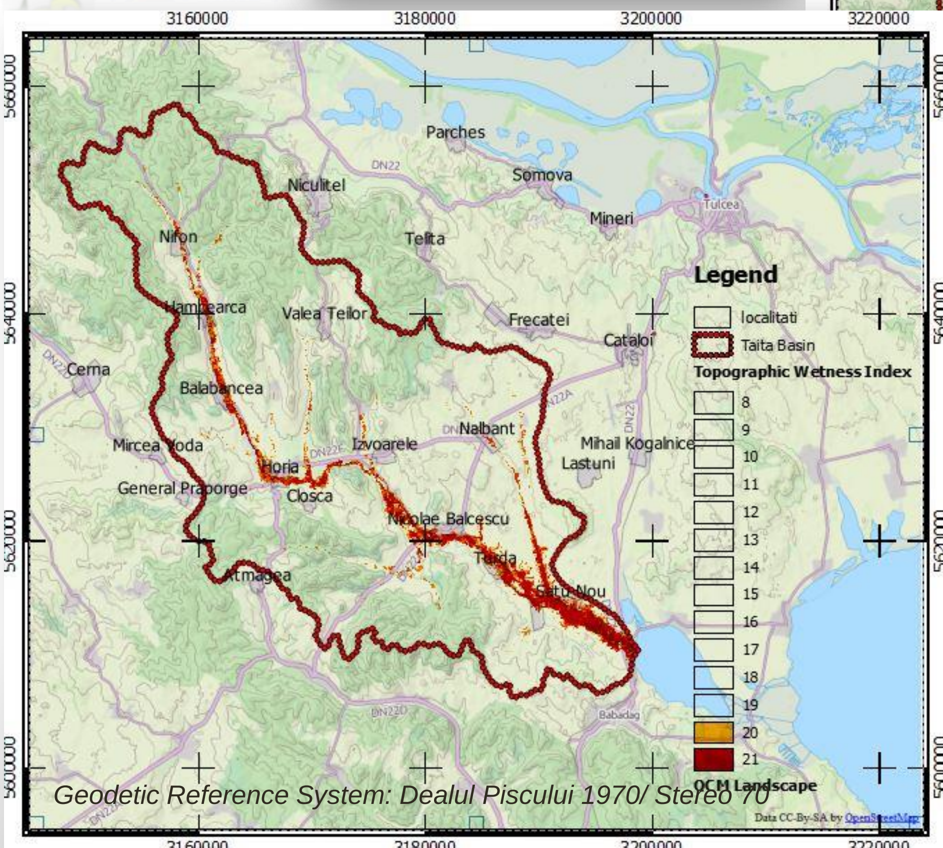
- **Beven, K. and Kirkby, M.** : A physical variable contributing area model of catchment hydology, Hydrolog. Sci. Bull., 24(1), 43– 69, (1979).
- **Moore, I. D., Burch, G. J., and Mackenzie, D. H.**: 'Topographic effects on the distribution of surface soil water and the location of ephemeral gullies', *Trans. Am. Soc. Agr. Engrs.*, 31, 1098- 1107, (1988).
- **Sørensen R., U. Zinko, and J. Seibert**: On the calculation of the topographic wetness index: evaluation of different methods based on field observations. Hydrol. Earth Sys. Sci. Discuss., 2, 1807–1834, European Geosciences Union, (2005).
- **Boehner, J., Koethe, R. Conrad, O., Gross, J., Ringeler, A., Selige, T.**: Soil Regionalisation by Means of Terrain Analysis and Process Parameterisation. In: Micheli, E., Nachtergaele, F., Montanarella, L. [Ed.]: Soil Classification 2001. European Soil Bureau, Research Report No. 7, EUR 20398 EN, Luxembourg. pp.213-222, (2002)

Geomorphological Model - Results

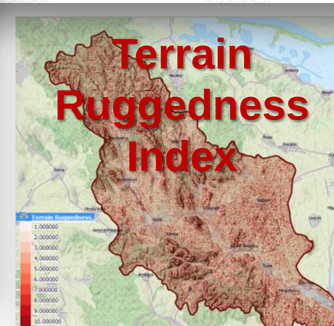
Software Used

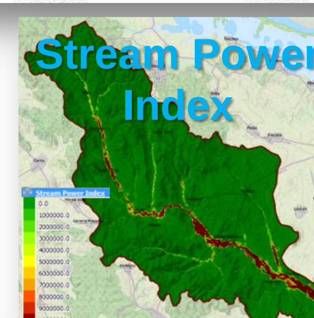
SAGA T.W.I.



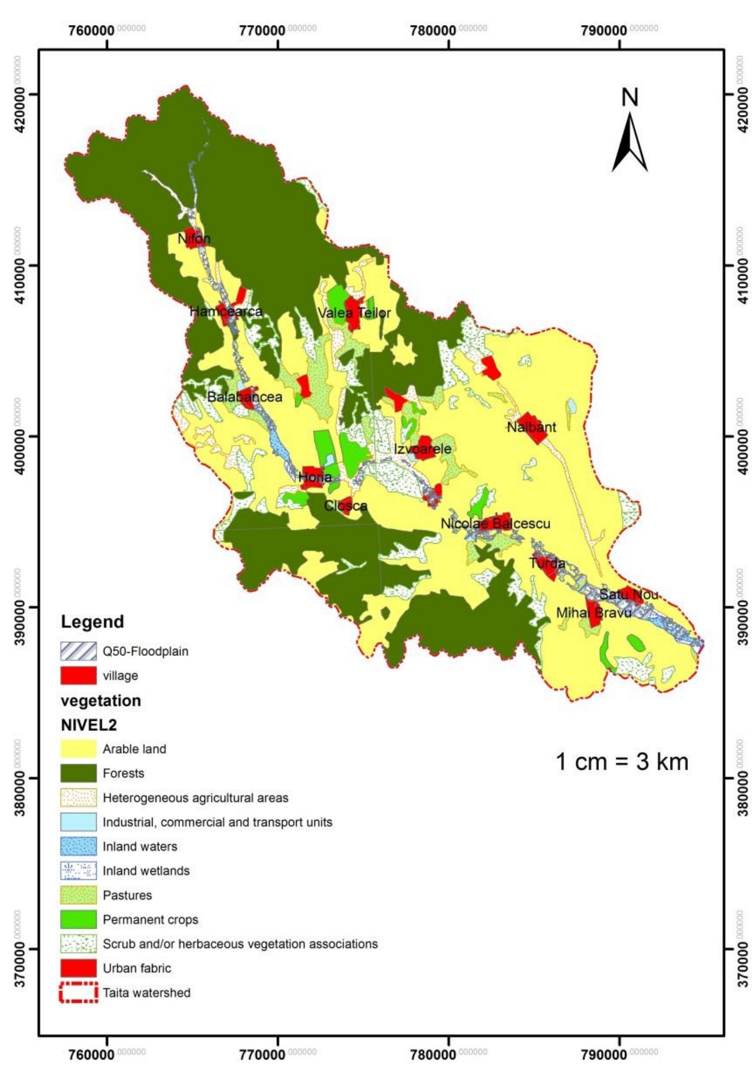


Topographic Wetness Index (TWI)

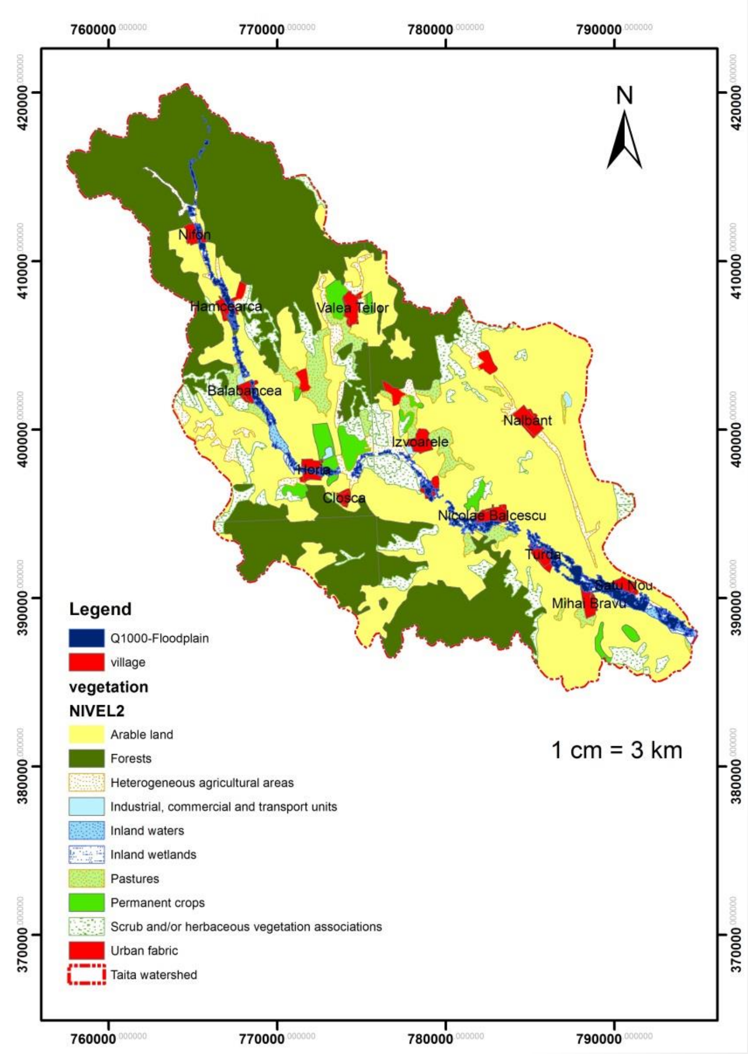




Results hydraulic model

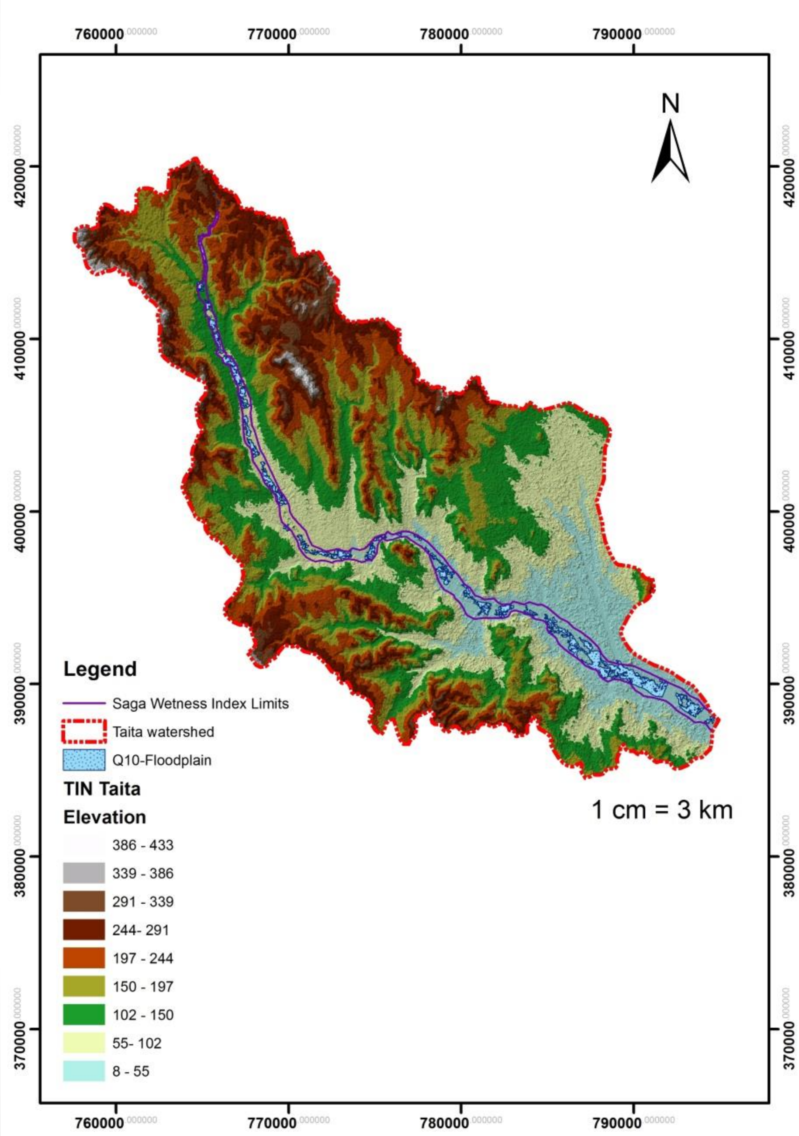


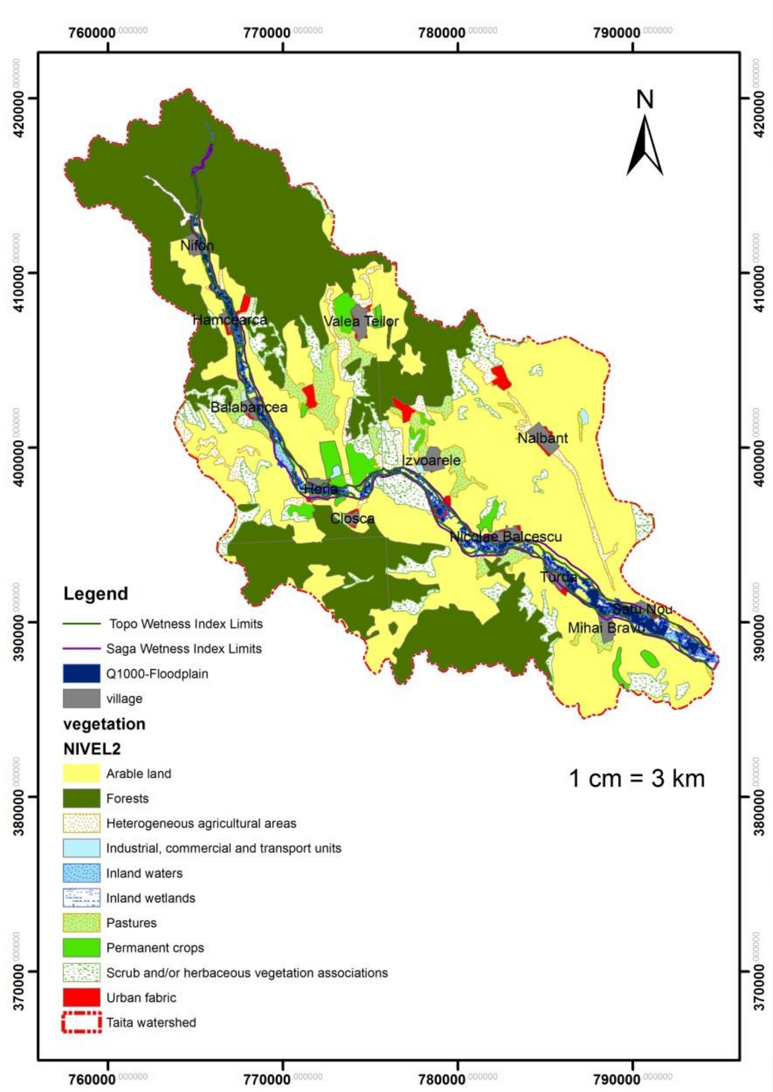
50 years return period



1000 years return period

Comparison of Results





Geodetic Reference System:
Dealul Piscului 1970/ Stereo 70

Conclusions (3/3)

- To demonstrate the broad applicability of the selected methodologies, open source software was used to store, process data and create maps.

- As resulted, **Quantum GIS (v.2.1), SAGA GIS (v.2.08) and HEC-RAS** can be effectively used to fully apply the proposed methodological approach as they **provide very reliable platforms at no cost**.

Project funded by the EUROPEAN UNION

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Acknowledgments:

The research was partially funded by the EU within the context of the Black Sea Basin Joint Operational Programme 2007-2013

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The Project

Thank You!