

SOIL – WATER INTERACTION EXEMPLIFIED IN THE SLOVAKIA-AUSTRIA MORAVA REGION: EFFORTS TO USE SOIL PROFILES IN FLOOD MANAGEMENT AND FLOOD PROTECTION

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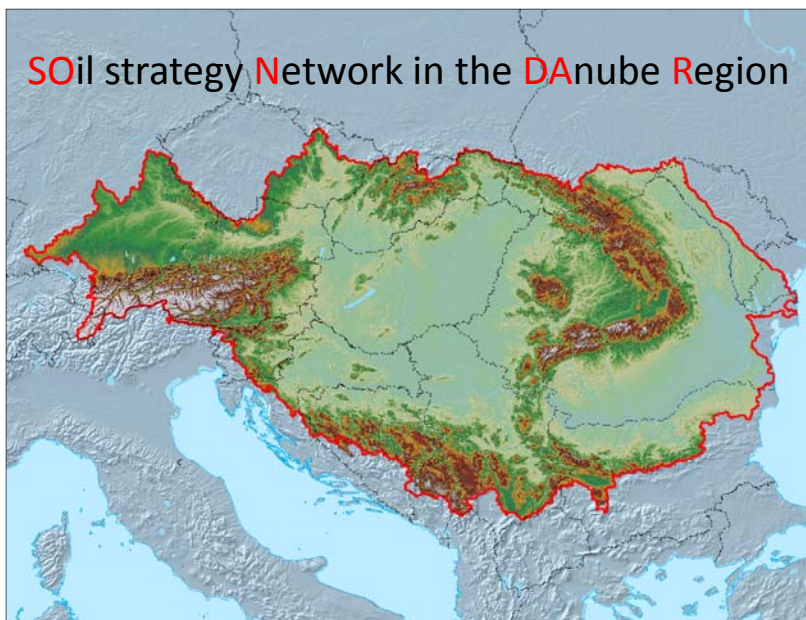


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SONDAR

SOil strategy Network in the DANube Region



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What is SONДАР?

- An interface between soil science and soil practice at the local and regional level throughout the Danube River Basin
- The transfer of soil knowledge to a general public that needs it and has not yet an appropriate level of awareness
- A network supported within the „ARGE Donauländer“ of regions and provinces along the Danube River.
 - <http://www.argedonau.at/neu/index.htm>
- Supports the Danube Strategy of the EU with particular concern of Activity 6 that explicit mentions „soils“
 - http://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum_u._Region/4.Europ-Raumentwicklung/Makroregionen/EUSDR/Docs/2010-12_EUSDR_Communication_EN.pdf



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How does SONДАР work?

- Builds on long established contacts of soil and environmental scientists within the Danube region.
- SONДАР rises soil awareness through out the region
 - E.g. with projects like „Colors of the Earth“ where school children paint with soil colors of their region
- Close cooperation with the European Land and Soil Alliance ELSA (established in 2001) and with ENSA (established in 2009)
- Since 2010 until 2015 three projects in the European Regional Development Fund
 - In total € 2 million for soil related projects including 18 partners
 - BIENE is the lead partner and coordinator of these activities



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SONDAR SK-AT Project (2010 to 2013)

- Is one project in the European Regional Development Fund
 - Covers four partners, two each from SK and AT:
 - Soil Fertility Research Institute VUPOP,
 - VODOHOSODÁRSKA VÝSTAVBA, ŠTÁTNY PODNIK Water Ways Construction Institute VVB,
 - BOKU - University of Life Sciences, Vienna
 - BIENE – Soil and Bio-energy Network of European Countries
 - Scientific aspects of project are covered in WP3 related to soil-water interaction



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What is Activity 3 of SONDAR SK-AT?

- WP3 of the SONDAR SK-AT project investigates „soil as indicator of flood occurrence“
 - Exemplified at Morava River, one of the 15 major tributaries of the Danube River,
 - Additionally Morava River is the border between Slovakia and Austria
 - And on two villages situated in the border region of Slovakia and Austria, Zahorska Ves and Angern, our core target area in the region
 - Can soil profiles become an indicator for flood risk also in other parts of the Danube Region?
 - How to share the findings with other regions in the Danube region?



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The expected products: from science to public

- Risk maps
 - To indicate risks of floods based on soil maps
 - To allow prevention of flood natural hazards
 - To provide protection to the citizens and stakeholders
- Hand books
 - Training opportunities on how to use soil risk maps
 - Fire brigades & Rescue teams
 - Local NGOs
 - Planning divisions
- Train the trainers seminars



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Agenda 2010 to 2013

- Selection of the target area (2011)
- Providing documentation materials (data, maps for the cross-border target area 2011/12)
- Harmonized methodology and approaches in terms of soil maps (2012)
- Target area definition (2012)
- Selection of model approaches and verification (2012)
- Involvement of fire brigades, local NGOs (2012/13)
- Transmissions of results to other regions of Danube Region (2013)



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The Project Region: Angern - Zahorska Ves



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Slovak National Data Archive

Assumptions and Method

- Fluvial sediments may indicate flood events during the last 1000 years
- In the soil profile these sediments are well diagnosed.
- In Morava river the last major floods were registered in 1996, 2002 and 2006
- Identifying of such areas could be made on the basis of soil units mapping (Fluvisols and Gleysols)



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Slovak National Data Archive

Fluvial sediments indicate floods

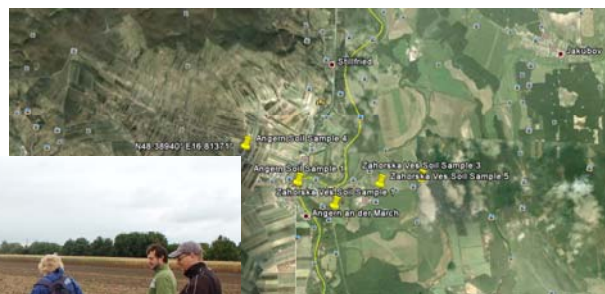


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SNDAR
Soil Network Data and Reporting

Taking soil samples in project area: 4 points of investigation in each country



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Soil Network Data and Reporting

Analysis of soil profiles in Austria



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Analysis of soil profiles in Slovakia



Haplic Phaeozem



Gleyic Fluvisol



Endogleyic Arenosol



Gleyic Phaeozem

Flood event of 2006 from the air



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Flood event of 2006 from the ground



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Soil maps/GIS layers available in Austria

- Soil types overview maps (1:100,000)
- Large scale soil maps (1:25,000)
- Agricultural taxation map (1:1,000)
- Ortho-photo maps and aerial photos
- Maps produced by digital elevation model
- High river stage assessment HQ 300
- Historical maps (different scales)



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Soil maps/GIS layers available for Slovakia

- Soil types and subtypes maps (1:5,000)
- Soil-ecological units maps (1:5,000)
- Remote sensing maps (orthophoto maps) and satellite images for flooding events identification
- Land use map (1:5,000)
- Digital terrain map (DTM) (1:5,000)
- Flooding zones according to modelled hydrophysical data
- Soil water retention capacity map



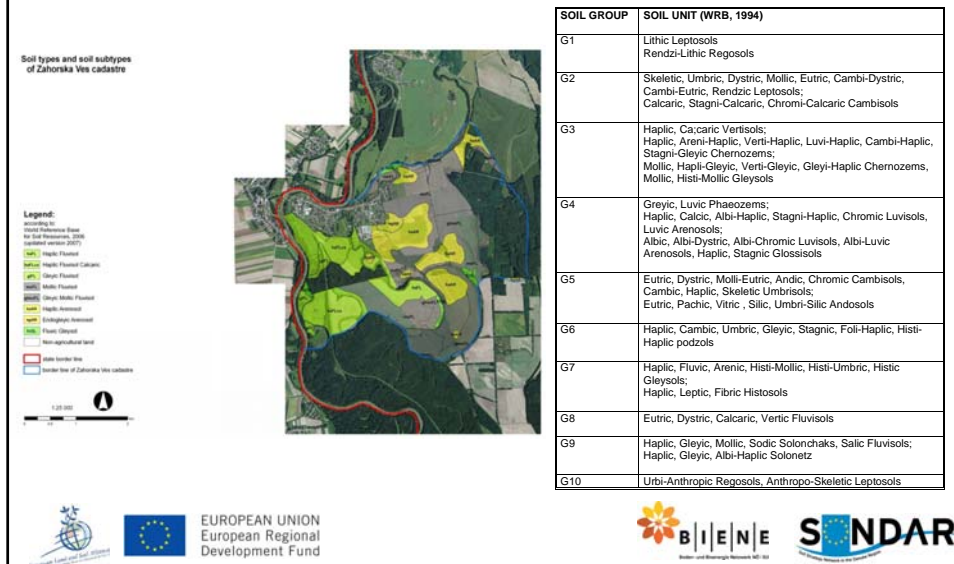
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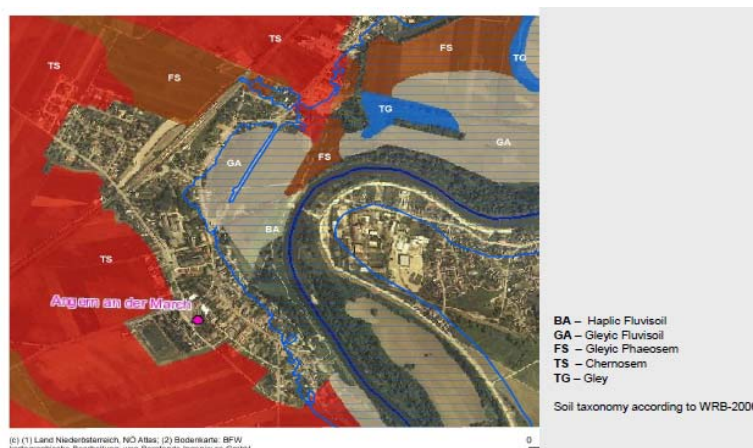
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Slovak classification and typical soil groups of Danube River Basin based on WRB



Austrian classification transferred to FAO-WRB typical soil groups



Modeling of 300 years flood event based on hydrological models



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Risk Maps in Project Area

- Generation of Project Region Maps „Soils Indicating Flood Risk“ (Work in progress)
 - Two kinds of floods
 - Surface water/river run-off flood influence on soil type
 - Ground water flood influence on soil type
 - Interaction of surface- and ground water system in relation to soil type
- Examination with experience of recent flood events
- Expert judgement on the weight of influence in relation to each soil type



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Feed back to „history line“ in soil profiles

- Verificaitons needed (work in progress)
 - Indication of floods is not equal in each soil type
 - Soil profiles are disturbed in case of agricultural use.
 - Ground water influence has to be considered
 - Weighting of disturbances in relation to each soil type
- Each soil type will tell the history in a slightly modified way.



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Evaluation of flood risks in larger region(s)

- The border area SK-AT along Morava River
 - will be analyzed with regard to flood risk based on soil maps
 - Zahorska Ves/Angern is a smaller part of this region
- The Danube River Basin (DRB)
 - In how far our findings can be used throughout the DRB?
 - An outlook for the regional use will be provided by the project
 - The project results should be verified at other regions in the DRB– this however is not subject of the project here.



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Summary

- A methodology based on the combination of soil profile analysis and soil maps was developed to assess flood risks
- The information of soil profile analysis is extracted by scientists to inform people having access to soil maps but no hazard zoning planning.
- Soil maps will become more important for local stakeholders in assessing flood risks.



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Thank you!

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