Transboundary Aquifers in Hungary

Ministry of Environment and Water

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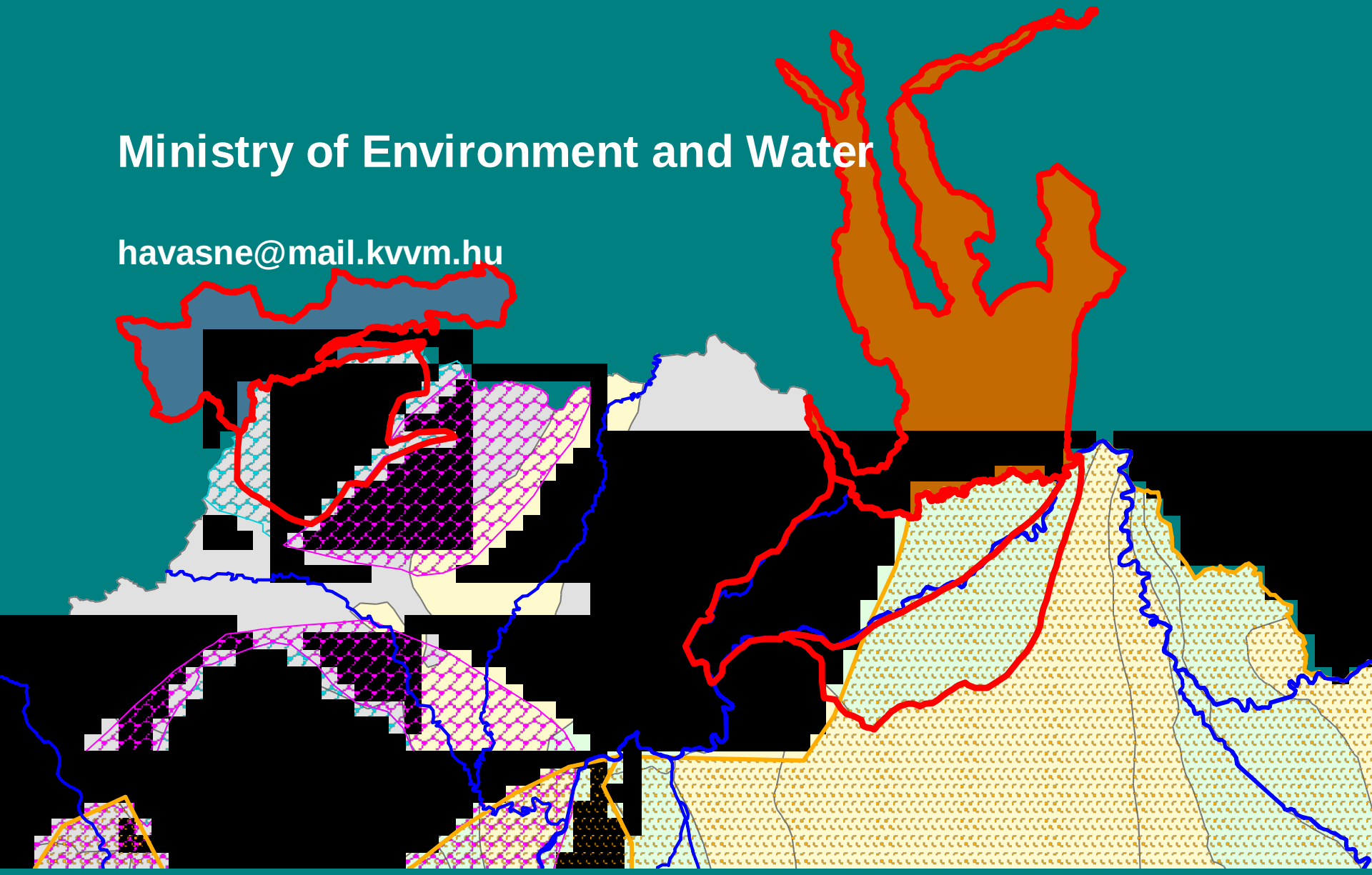
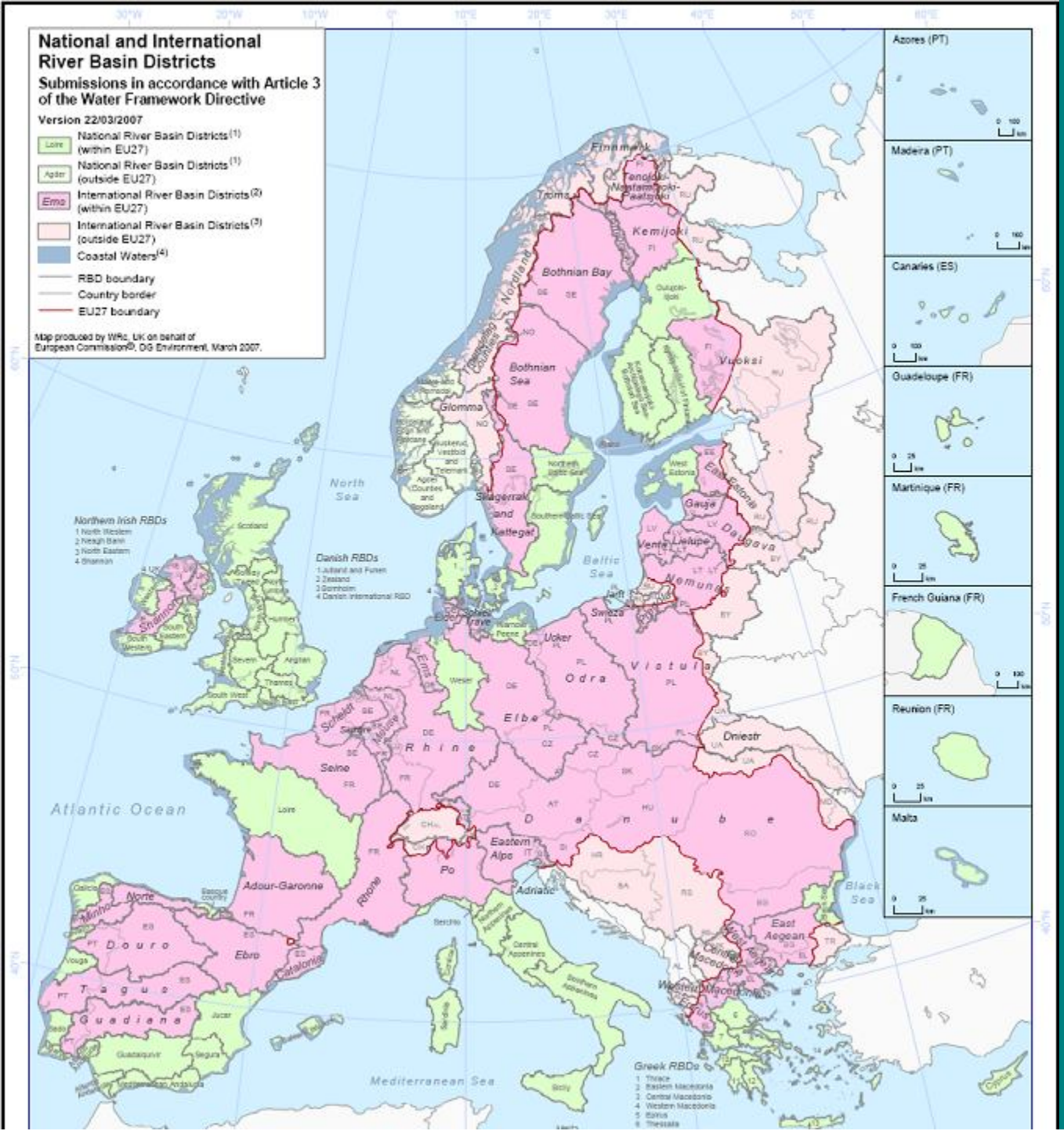


Paris, UNESCO 29-30 May 2007

River basins in the EU



River basin districts In the EU

(international RBDs:pink)

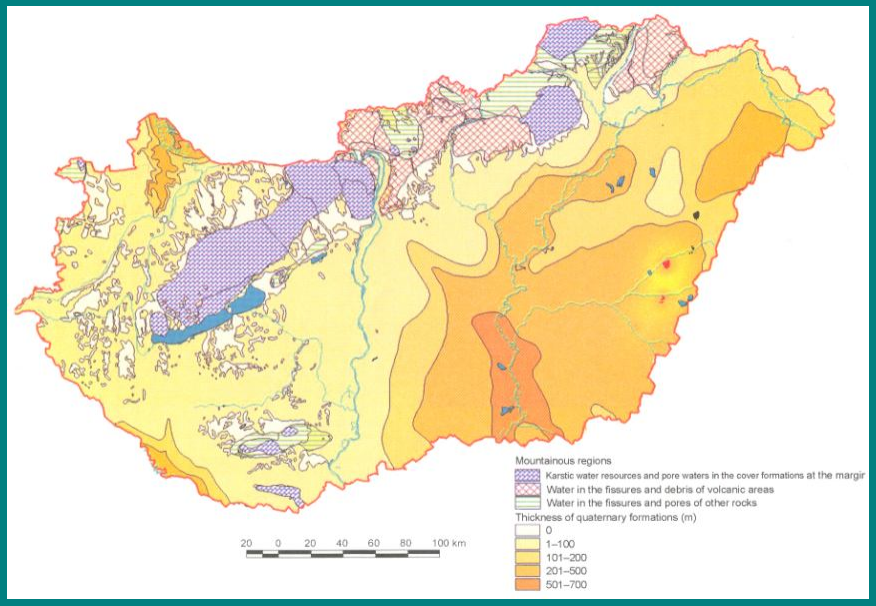
Danube River Basin District:

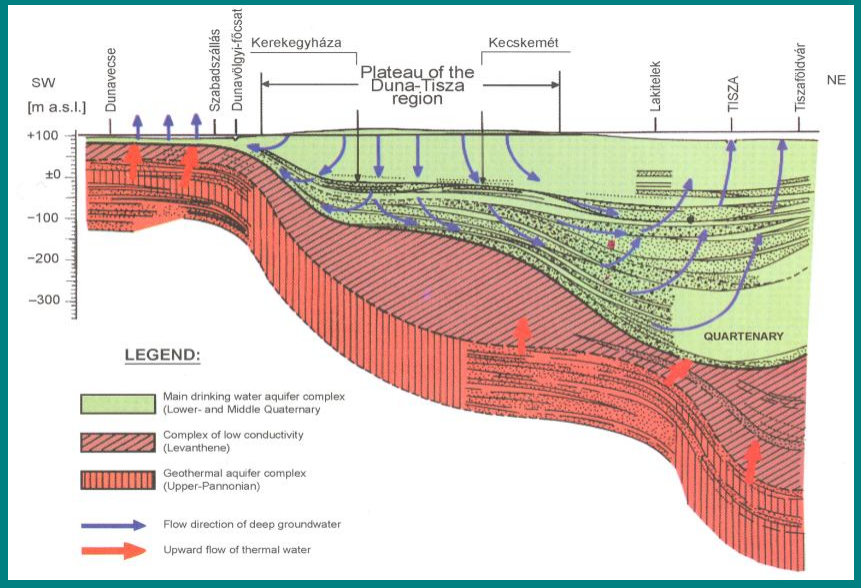
(13 +6 countries: EU member states, others)

Germany
*Austria
Chech Rep.
*Slovakia
Hungary
*Slovenia
Bosnia-Hercegovina
*Croatia
*Serbia
Bulgaria
*Romania
Moldova
*Ukrain
Switzerland
Italy
Poland
Albania
Macedonia
Montenegro

800.000+ km2
81 millió inhabitants

Porous aquifers





Groups of excellent aquifers:

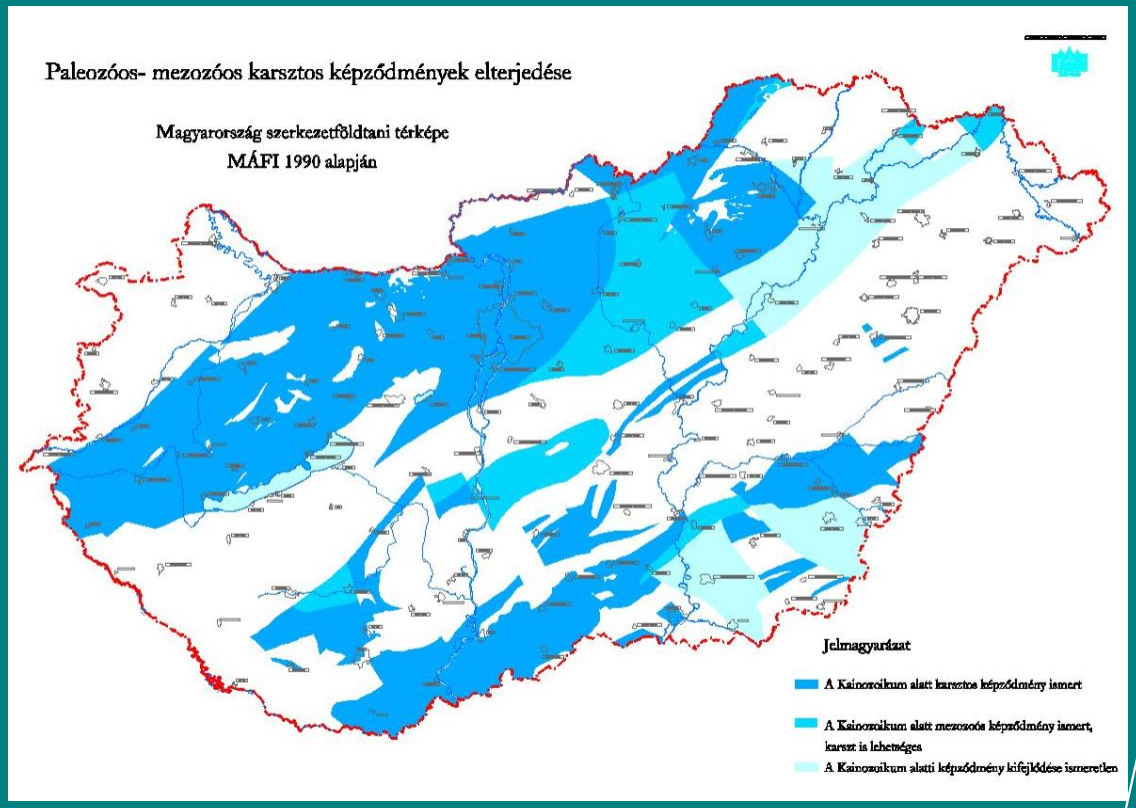
•**clastic basin-deposits** – coarse sand and gravel sediments – in more than three quarter of the country's area – containing drinking water and in greater depths (usually more than 500 m) thermal water,

• **bank-filtered water** – naturally filtered water from the river through the shallow, gravel aquifers along the riverbanks,

• **shallow groundwater –** porous formations to the depth of 10 to 20 m

• **deep groundwater** – deeper clastic sediments (when the temperature of the water is lower than 30 °C)

Karstic aquifers



Important groundwater reservoirs are the **karstic rocks**. These limestones and dolomites (mostly Mesozoic) may conduct the water well along faults and fractures. Precipitation mainly infiltrates directly and quickly into the outcrops of karstic rocks.

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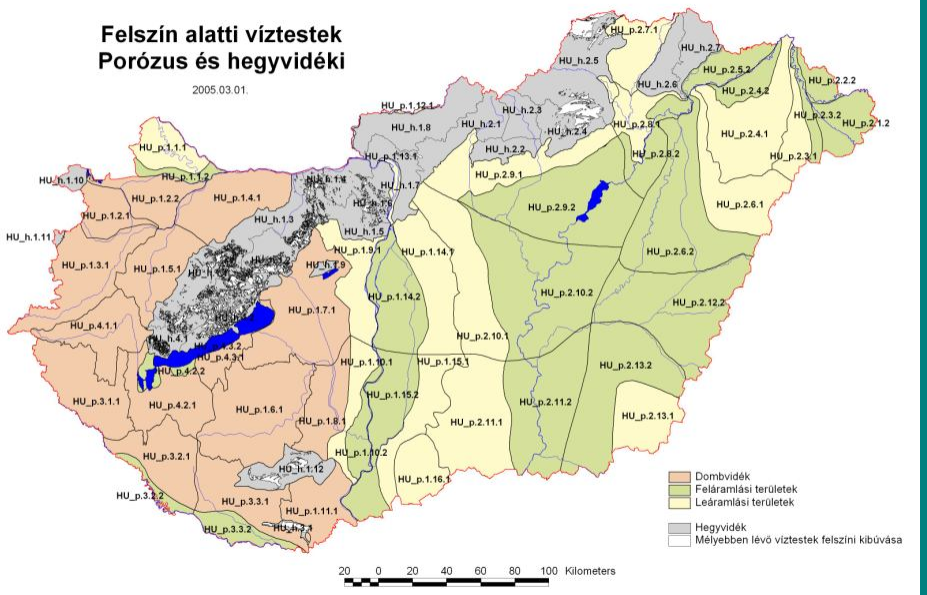
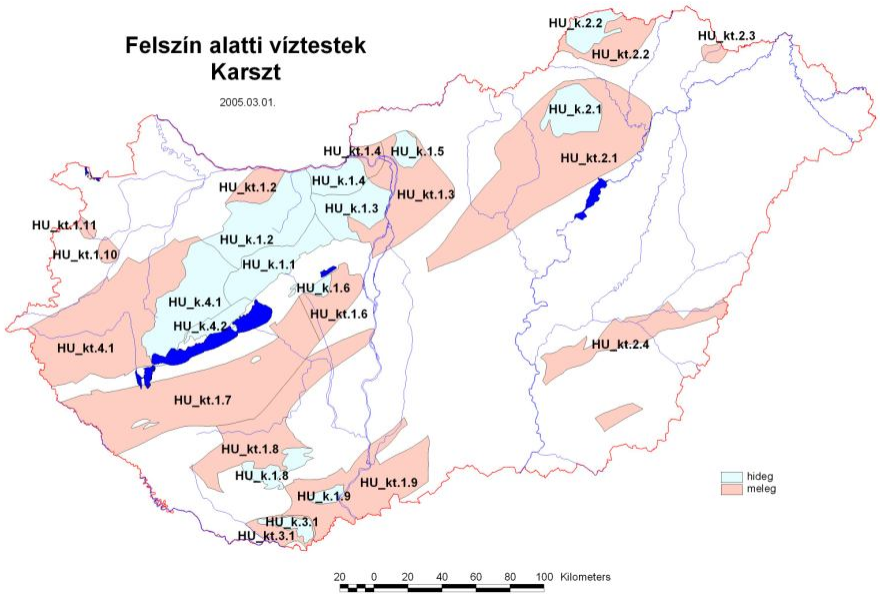
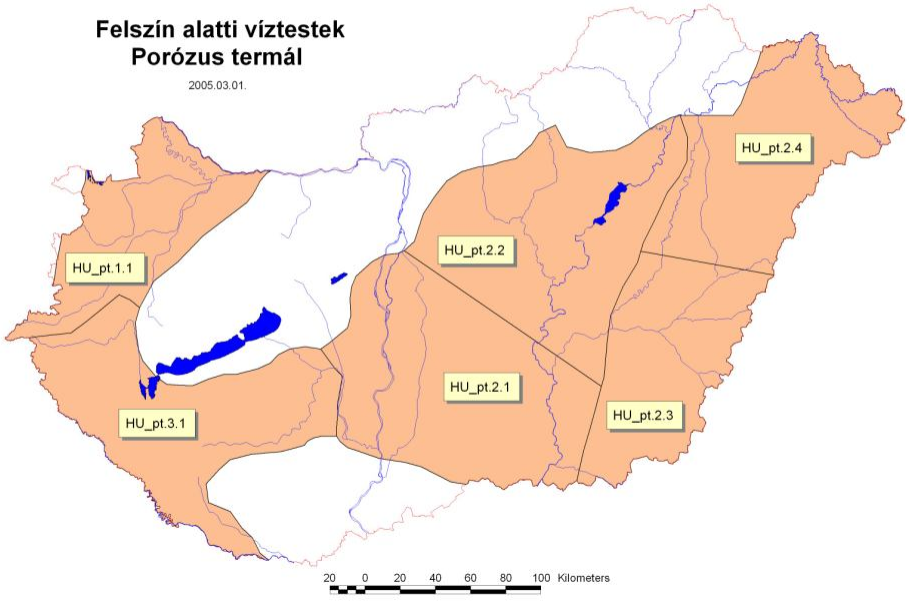
Thermal karst water occurs **at the margins of mountains and in large depth** below the ground surface in the basin-regions (for example: Héviz, Budapest, Eger).

Karst water flow in the former mine at Tatabánya; at present, this is a waterwork



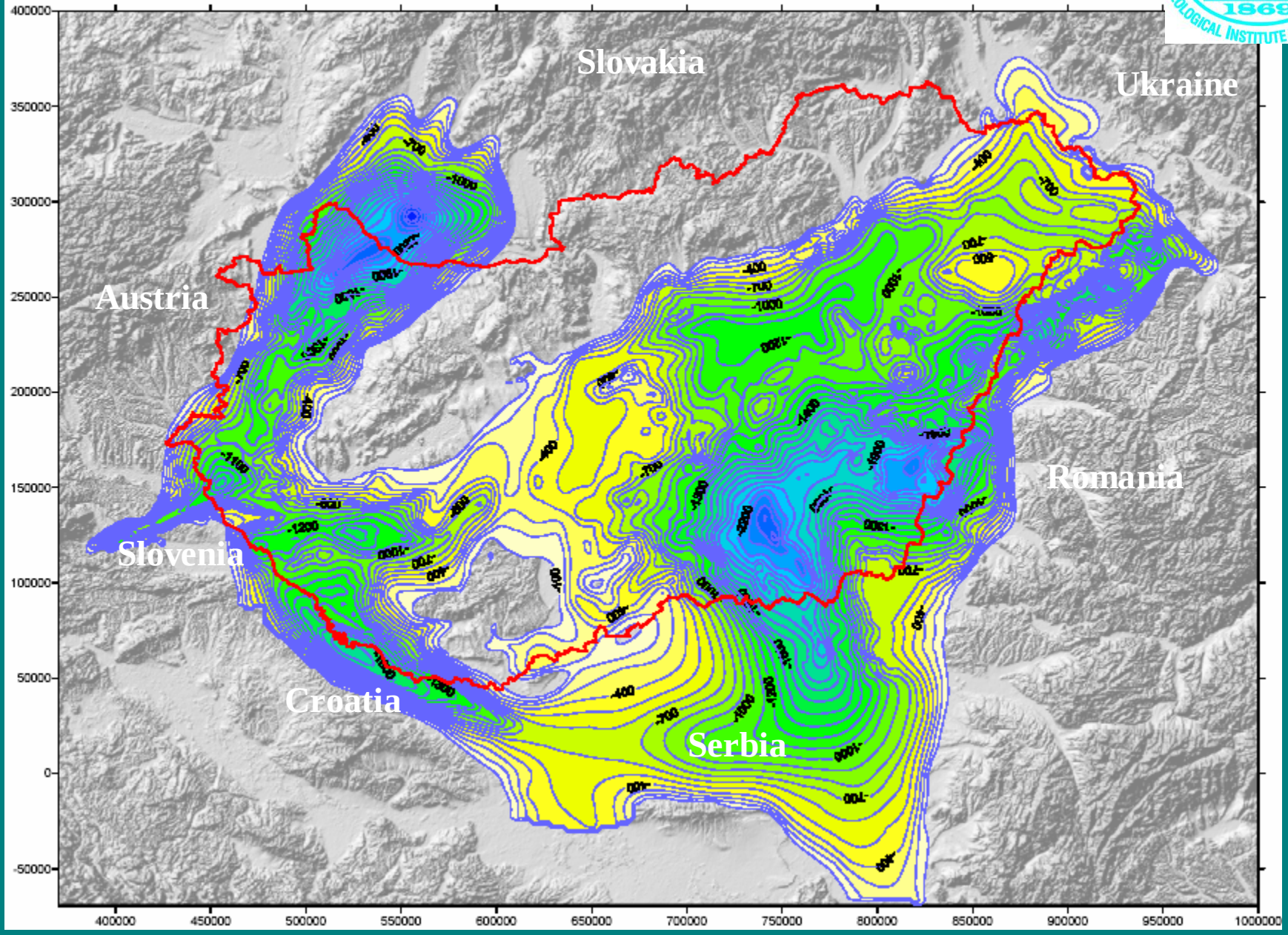




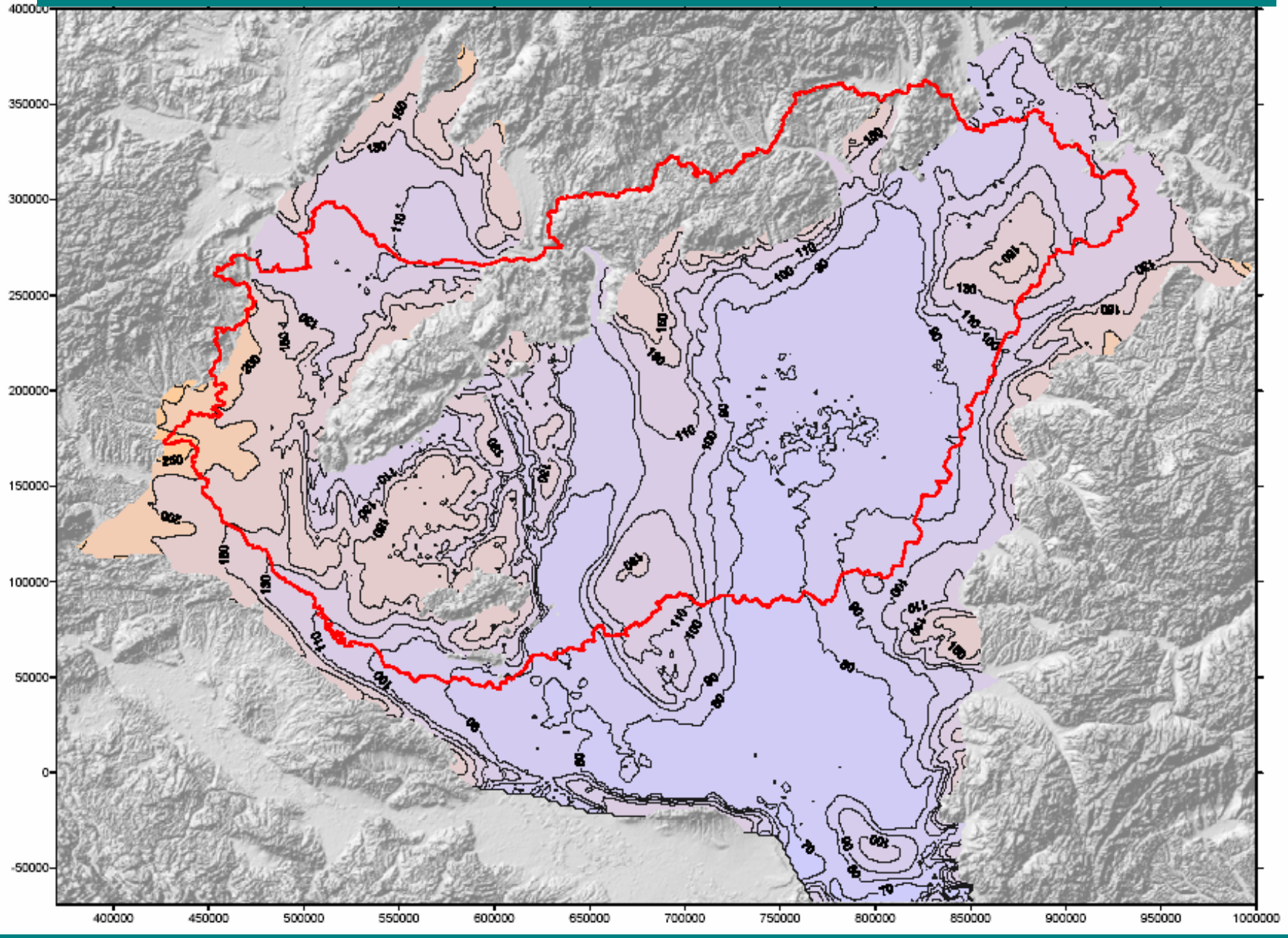
Groundwater bodies: 108 (porous, karstic, thermal)

Transboundary: 60

Base of the Mio-Plioce-Quaternary aquifer complex



Computed groundwater table (isolines in m asl), (natural, pre-exploitation phase)



Needs for bilateral and multilateral cooperations to solve management issues

- Bilateral water agreements since decades with each neighbouring countries (focusing on floods, and surface water quality)
- Helsinki Convention: Existence and importance of the transboundary groundwaters, (Guidelines, ISARM, UNESCO-IAH-FAO)
- extending the bilateral agreements on groundwaters
- Water Framework Dirctive (obligation for cooperation)

10. 26.2005 expert meeting under the bilateral water agreement:

(from the protocol)

Agenda:

… Review of the preliminary status assessment of transboundary water bodies within the Danube Roof Report (ICPDR)

…Review and (harmonistaion) of all transboundary water bodies within the National Reports

…agreement on data exchange, finalisation of the Annex = 7 a,b,c, (to the Protocol on meteorological, hidrological data and information exchange)

„…Parties agreed on the deadline for the data exchange

- **for Annex 7c is 30 June 2006.**

- **for Annexes 7a and 7b. data exhange is once a year, first time 30 June 2007. (data for the year 2006)**

7.a.

Characteristic data on the groundwater level in the year 2006

(Table)

Name and No. of well
Water levels/ Jan, Febr, March….Dec, Year

average
maximum
day
minimum
day

Groundwater quality data for the year 2006

(Table)
No. of well and settlement
Date of sampling

dissolved O, PH, conductivity, Temp. NO_3, NH_4, COD, Fe, Mn, Na, K, Ca, Mg, PO_4, NO_2, Cl, SO_4, HCO_3, hardness, alcalinity

Annex 7.c.

Constant parameters of the monitoring wells:

(Table) :

No.
Water body code
No. Of well
Settlement
Land use
Co-ordinates (X,Y WGS’84 Z: maBs)
Depth of the well
Screen (m-m)
Starting of monitoring (year)
Frequency

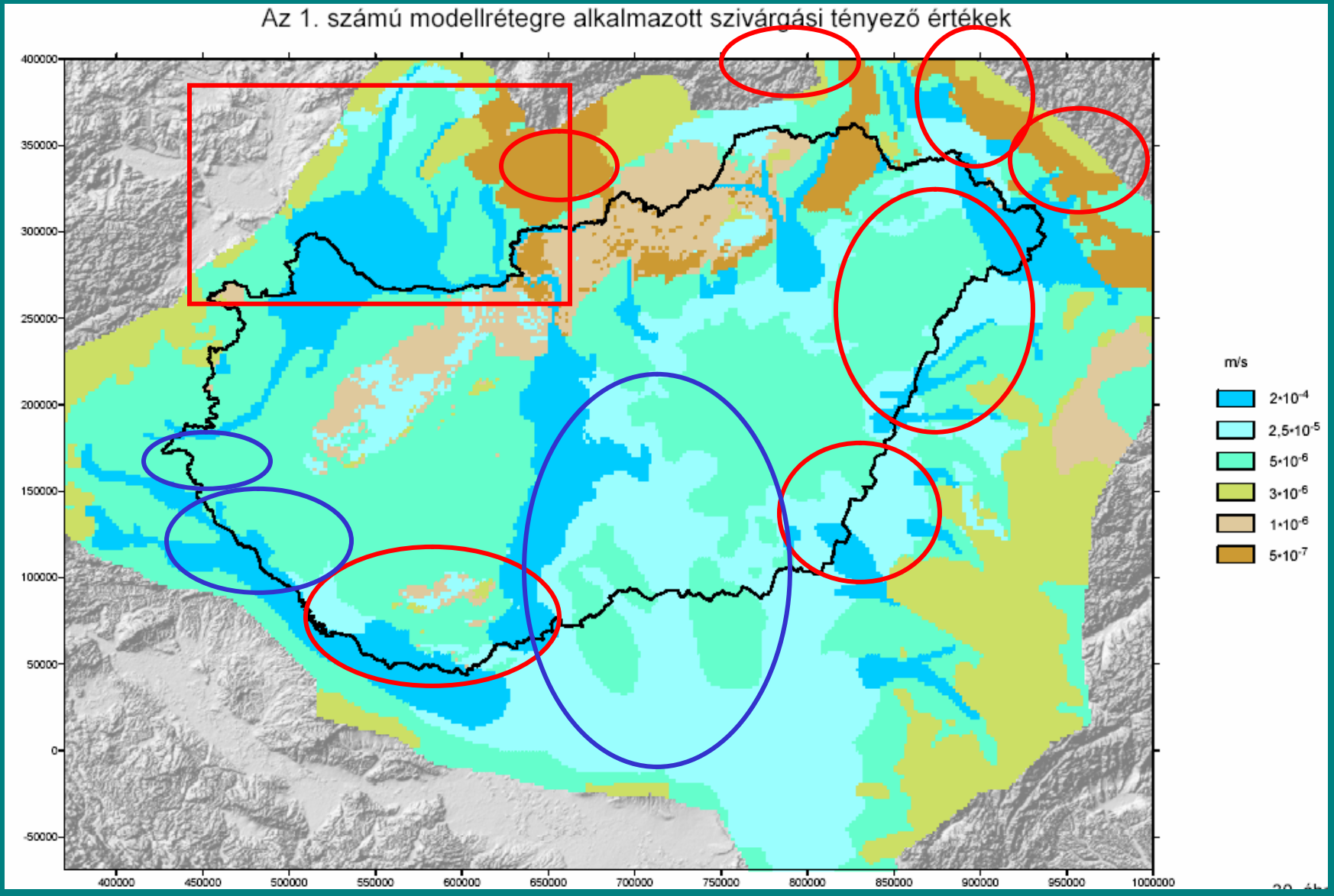
Projects on transboundary aquifers:

1: DANREG „Danube Region Environmental Geology Programme”
Austrian, Slovakian, Hungarian border region (GBA, GUDS, MAFI) 1989-1999, harmonised maps, including hydrogeolocgical and geothermal potential maps, hydrogeochemical evaluation

2: UN/ECE Guidelines on Monitoring and Assessment, 2000.
Aggtelek – Slovak Karst Pilot Project

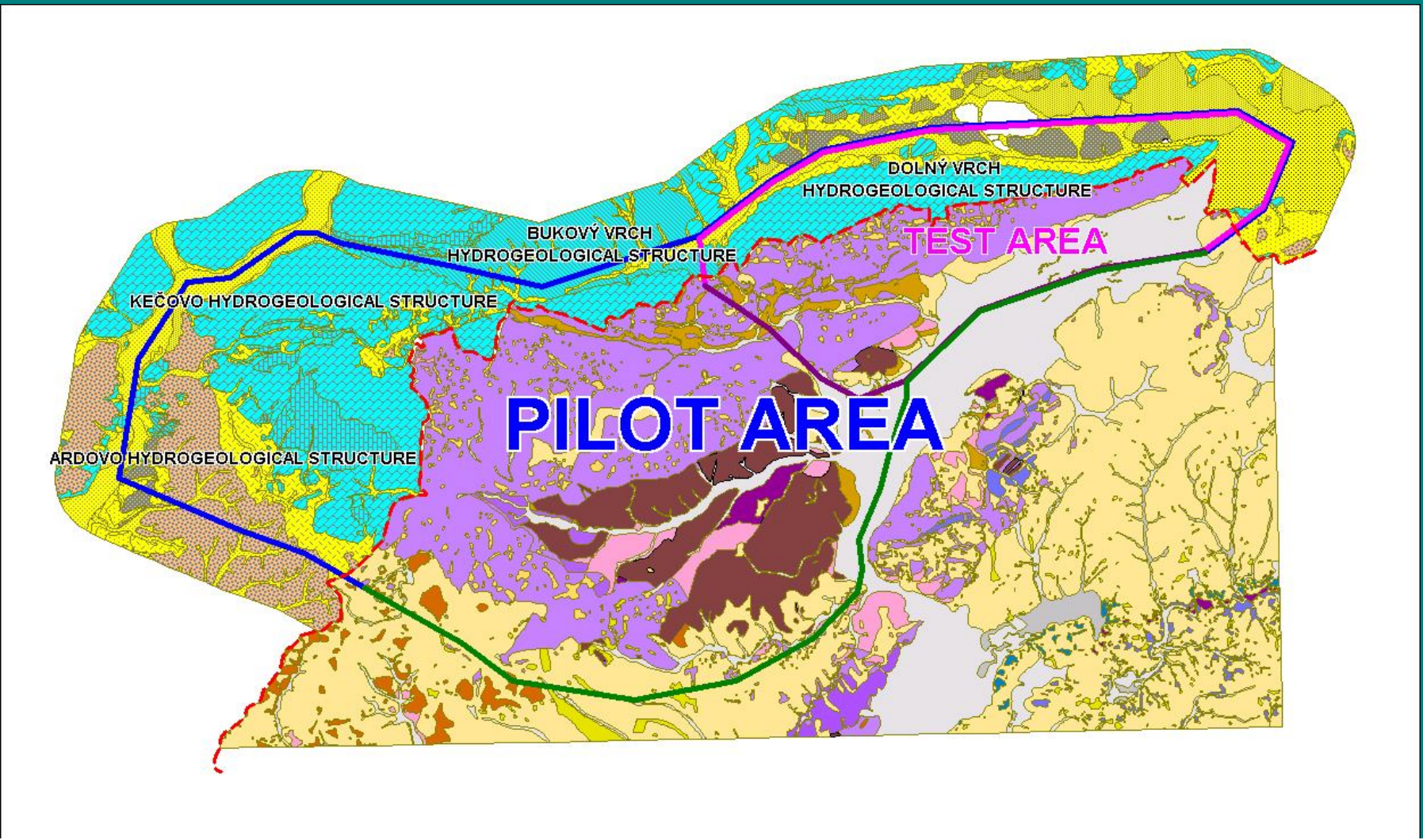
3. Projects for the implementation of the WFD

Finished, ongoing or planned transboundary projects

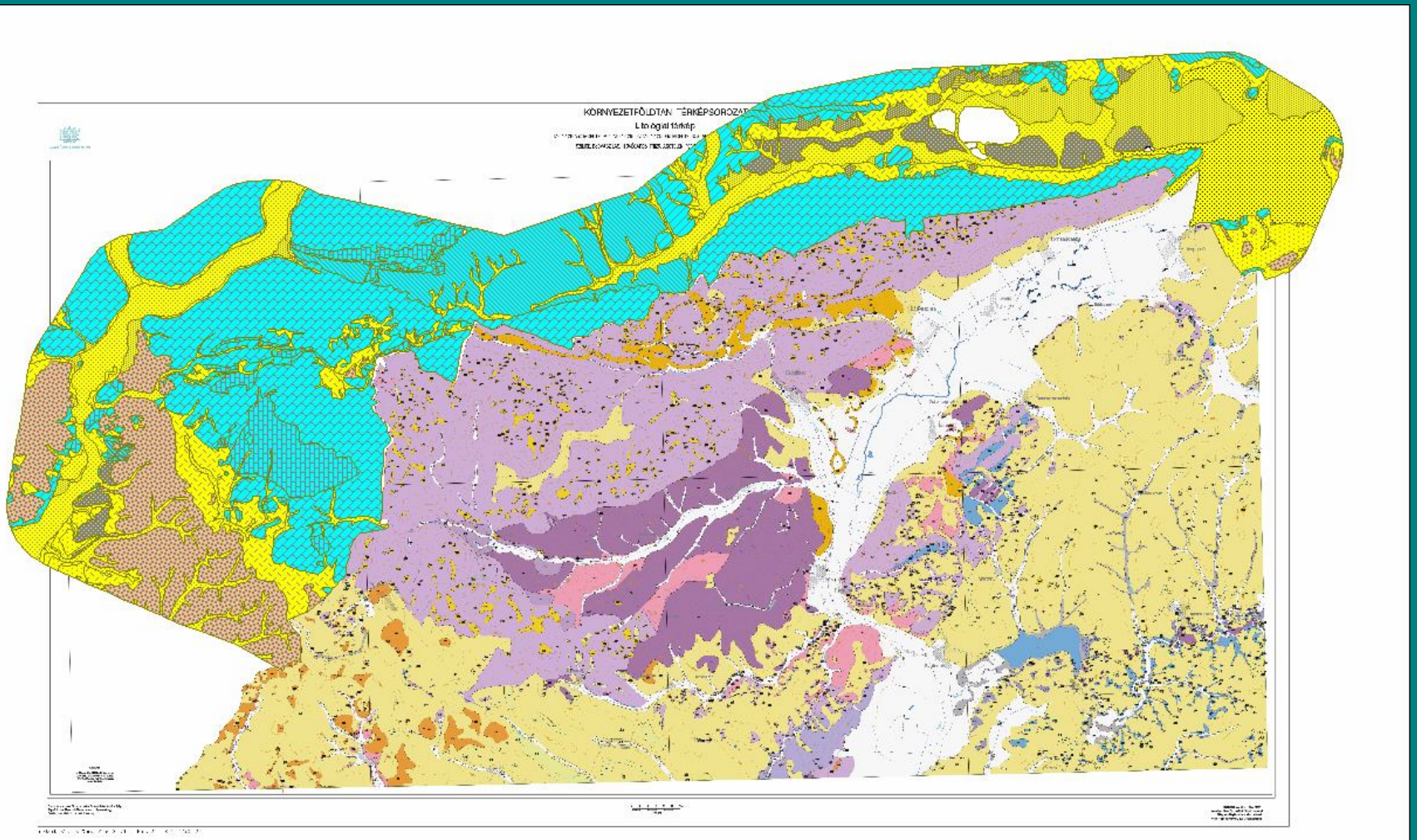


Aggtelek-Slovak Karst pilot project

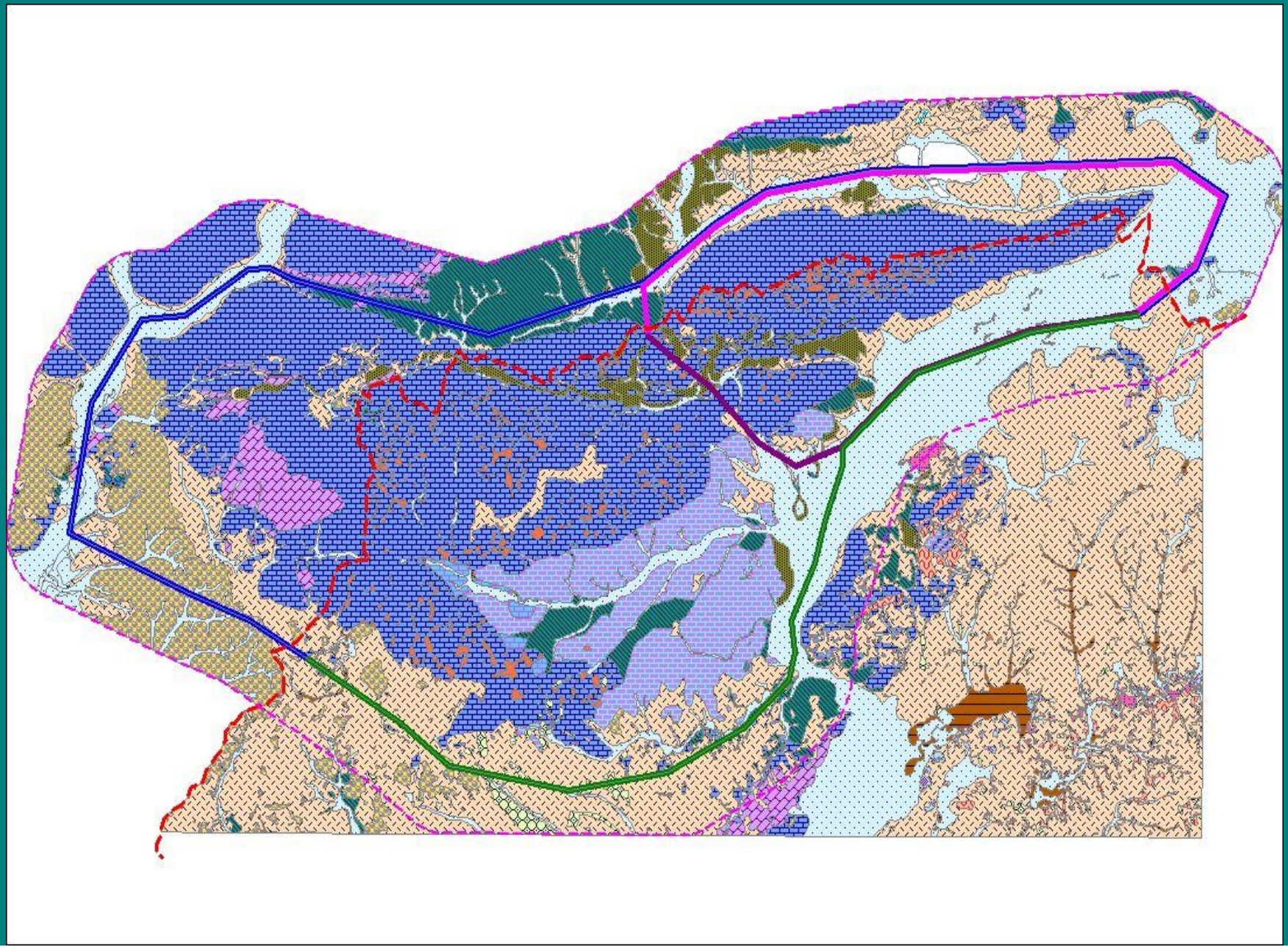
Delineation of Project Area



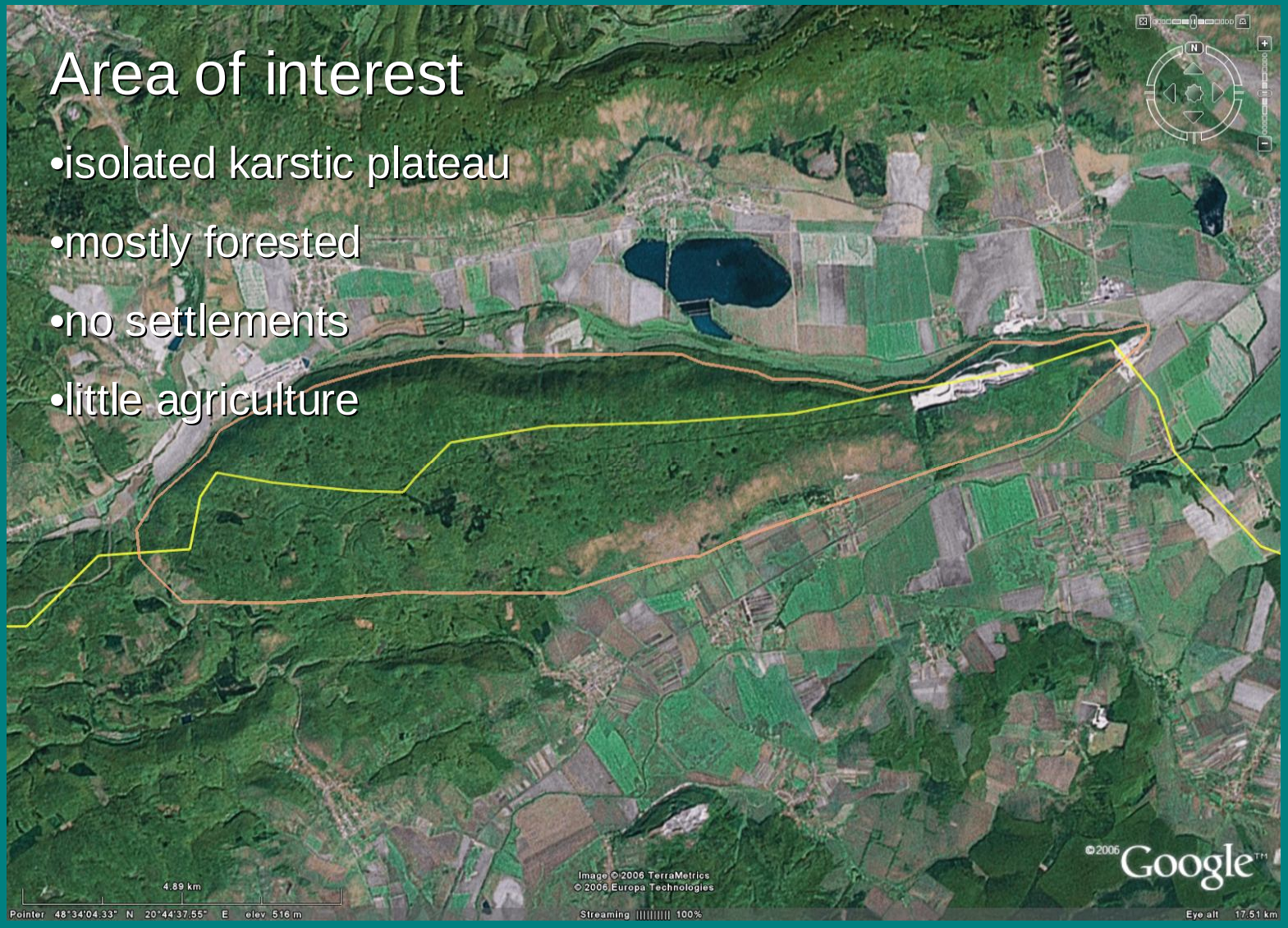
Problems of methodical approach on creating geological maps

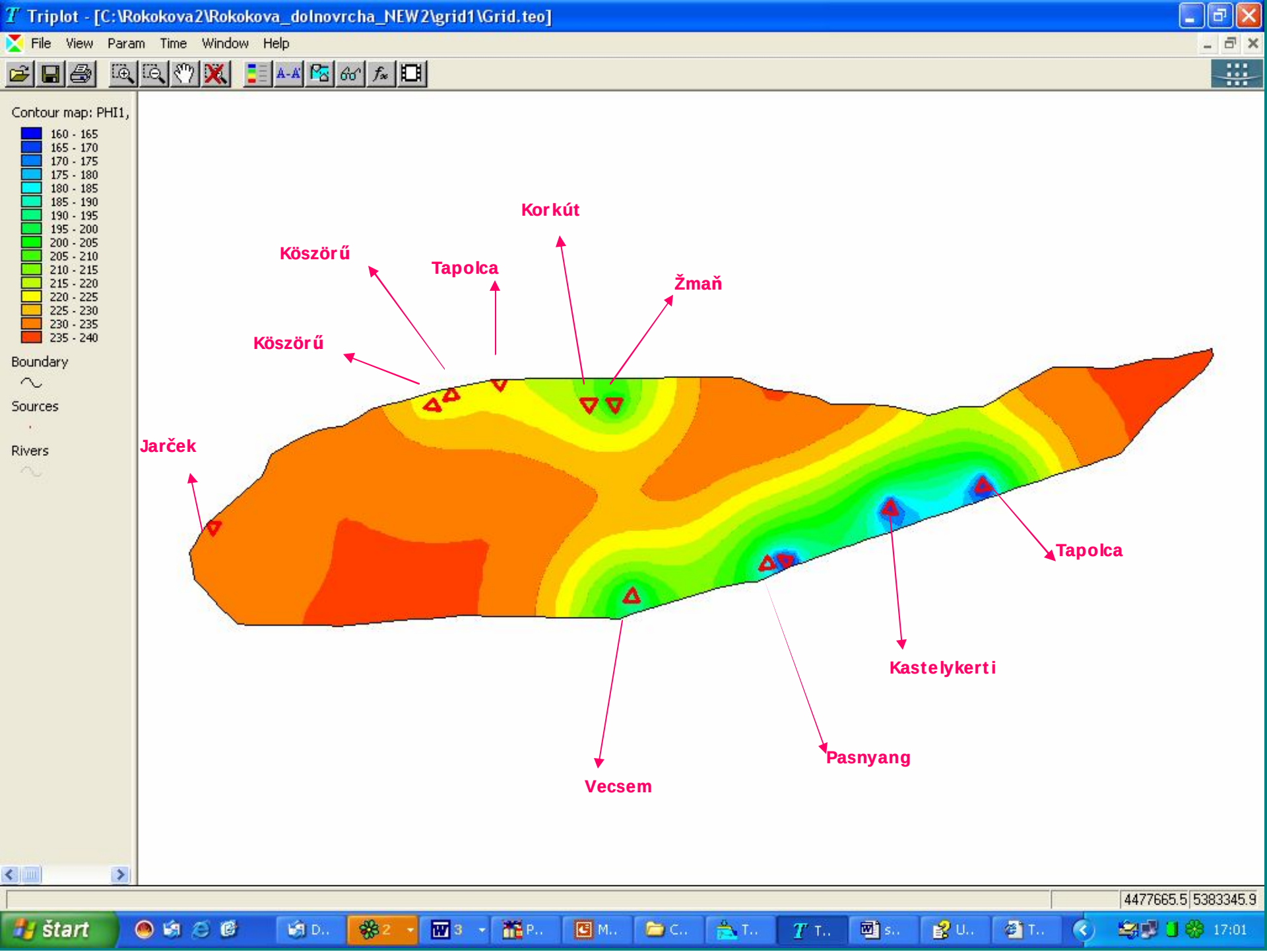


Final map draft with unit legend



Delineation of test area

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230 - 235
235 - 240
Boundary
Sources
Rivers
Korkút
Köszörű
Tapolca
Žmaň
Köszörű
Jarček
Tapolca
Kastelykerti
Pasnyang
Vecsem
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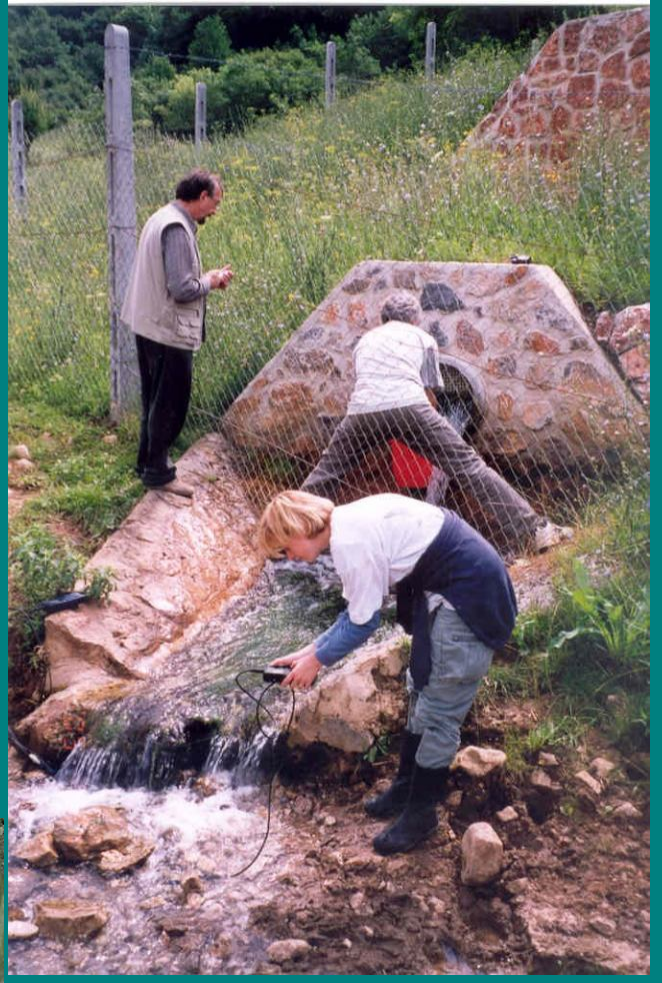
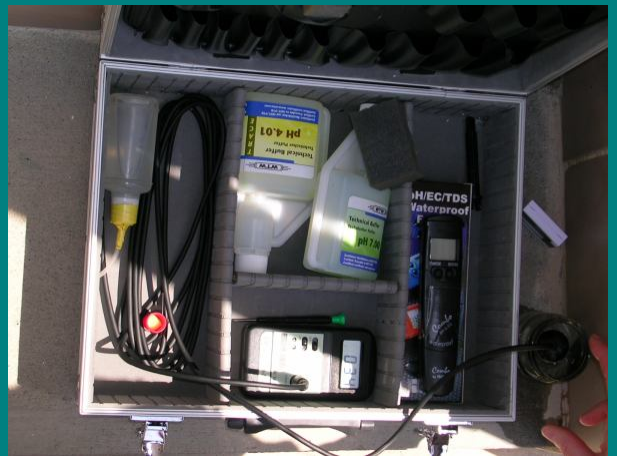
štart
17:01

PHARE project on groundwater quality (1,8 millió EURO, 2005-2006)

Common sampling on the Aggtelek-Slovak Karst pilot area





Joint Report No 2 and 3

1. Introduction
2. General characterisation
3. Uses, function and issues of GW – quality
4. Inventories
5. Summary of GW-related environmental legislations
6. The Water Management Analysis in view of the EC-Water Framework Directive
7. Final recommendation for improvement
8. Conclusions
9. References

Szamos/Somes river, alluvial aquifer (Hungary/Romania)

Finished NATO SQUASH project. (Database, GIS, Regional models, additional tracer tests)

Environmental state and sustainable management of Hungarian-Slovakian transboundary groundwater bodies (ENWAT)

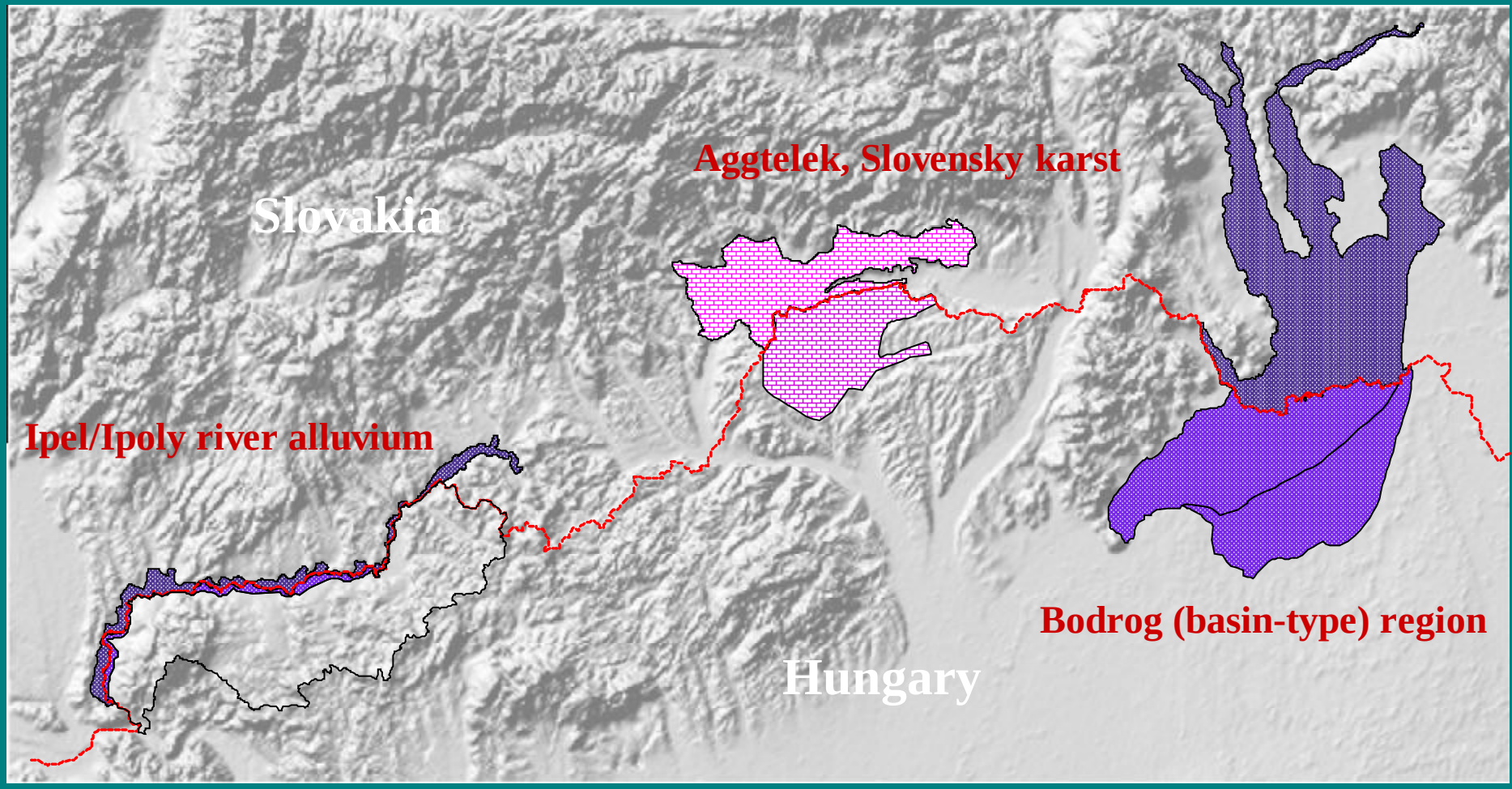
Objectives

To prepare a water management plan for the three transboundary groundwater bodies for supporting safe and healthy water supply of the studied regions;

To serve as environmental basis for decision-making process involving major cross-border investments;

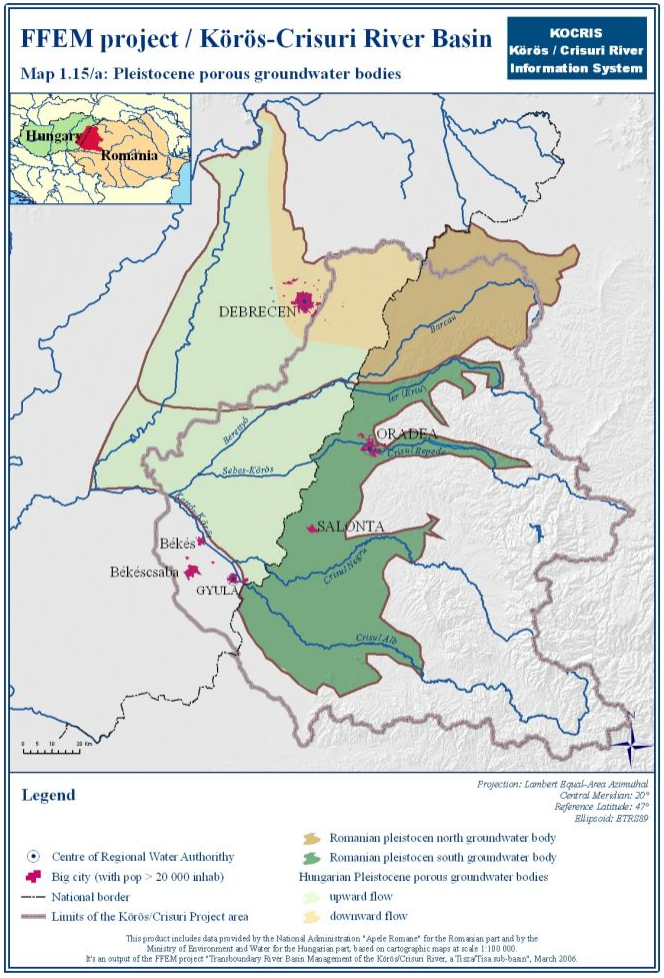
To supply information on quantitative and qualitative status of groundwater concerning potential negative health impact of the use of groundwater;

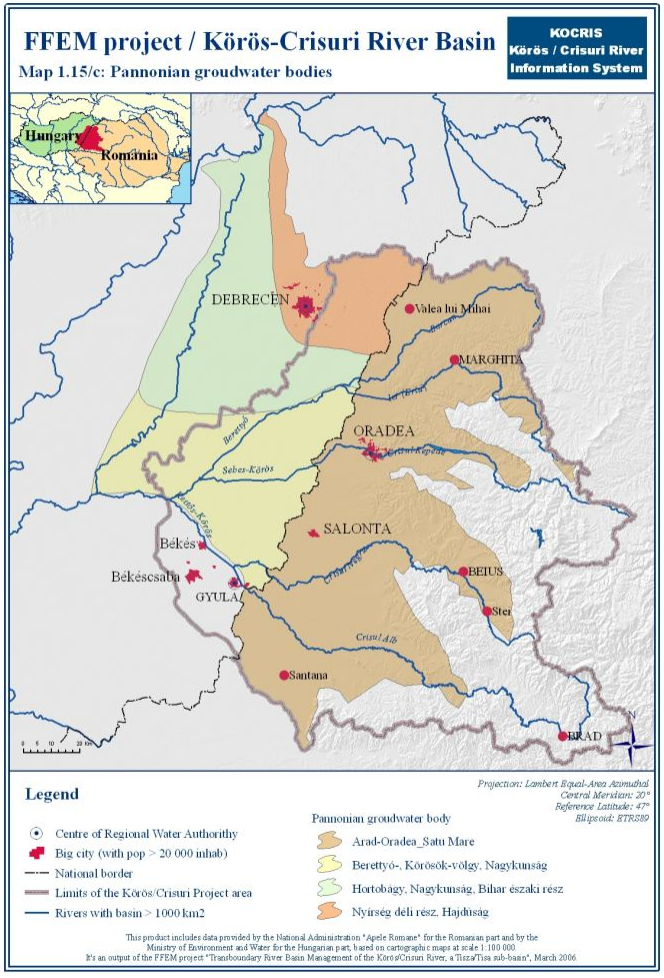
To inform and educate the population of the region for rational use of water


Aggtelek, Slovensky karst
Slovakia
Ipel/Ipoly river alluvium
Bodrog (basin-type) region
Hungary

Körös/Crisuri river, alluvial aquifer complex (Hungary/Romania, France)

Ongoing project, harmonisation of GWbodies, joint cross-section, harmonised monitoring system





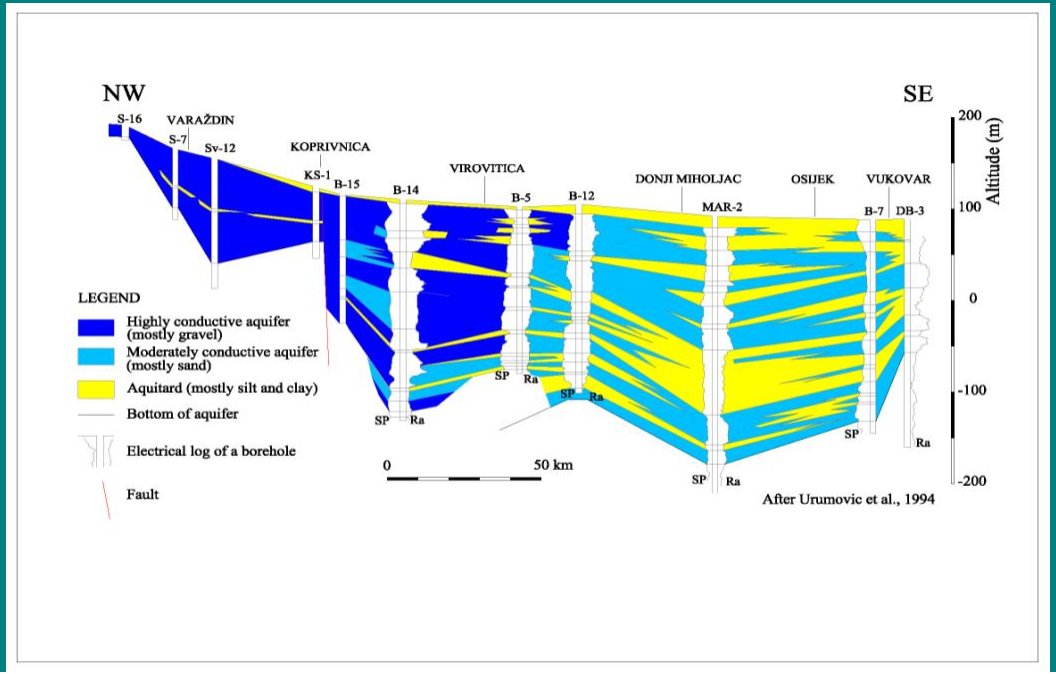
Maros/Mures river alluvial aquifer complex, Hungary/Romania, LIFE project,

(high arsenic in groundwater)

Drava river alluvial aquifer complex, Croatia/Hungary, negotiation phase

High vulnerability, high bank filtration potential (mainly in the Croatian side)

Low vulnerability, no or low bank filtration potential, GW dependant ecosystems, high arsenic content



Lessons

A. The goals of the WFD are good inspiration for transboundary joint activities

B. Cooperation on national level (e.g. geological surveys, national institutes and regional-local level)

- harmonisation of data base,
- harmonisation of geologic-hydrogeologic maps and models,
- harmonisation of sampling and analytical methods and methods,
- living international and bilateral connections,

C. 1D local modeling combined by vulnerability mapping and

3D regional flow and transport modeling combined by additional hydrogeological, chemical surveys should be the key activities

Best way forward:

Common projects