GROUNDWATER BODIES IN CR

Hana Prchalová

T.G. Masaryk Water Research Institute, Prague

**2nd Workshop on Groundwater Bodies in Europe,
Berlin, 15. – 16. 12 2011**

CR - Natural conditions and significance of groundwater

Hydrogeology:

- Mapping and investigation, a lot of information about hydrogeological structure and quantity and quality of groundwater

Situation in CR:

different types of hydrogeological structures:

- About 60% of area – Czech massive, old Crystalline, Paleozoic and Proterozoic rocks + Paleogene and Mesozoic of Carpatians, less productive, fractured, local aquifers (short and relatively fast pathway between infiltration and recharge – to a nearest tributary), heterogeneous lithology; water supply for villages and small cities, almost untreated water

Natural conditions and significance of groundwater

- Mesozoic and Tertiary sediments, Upper Cretaceaus sediments and Permian-Carboniferous sediments: deep basins, high productive aquifers, porous-fractured sandstones and limestones (Upper Cretaceaus sediments), confined groundwater, very good water quality; large abstractions for cities, almost untreated water
- Fluvial quaternary deposits: porous, high productive aquifers, shallow, connected with surface water, high vulnerability, very often polluted water, water supply for cities, sometimes mixed with surface water, treatment necessary

History of water management planning

- Long tradition in CR – from 60-ies
- Groundwater was a part of plans (almost half of drinking water originates from groundwater)
- Focused mainly on water quantity and water use (groundwater was reserved for drinking water in preference)
- From the end of 70-ies – groundwater quantity balance, inventory of all abstractions above 6000 m3 per year or 500 m3 per month, reporting of month volume of abstracted water
- Units for groundwater quantity balance: hydrogeological zones

Hydrogeological zones and groundwater bodies

- Delineation of hydrogeological zones in CR: 1965, 1973, 1986 and 2005
- Last delineation – in compliance with Water Framework Directive, base for groundwater bodies – main difference – hydrogeological zones are based on natural conditions only (= they are more stabile than 6 year period)

Methodology for hydrogeological zones delineation:

- Simplification of hydrogeology
- Large zones in old crystalline rocks
- Several aquifers in one zone, but not all existed ones – only used for water supply
- Projection of boundaries on surface

Hydrogeological zones and groundwater bodies

Three horizons:

- Upper horizon: Fluvial quaternary deposits, only significant for groundwater abstractions (37 zones), boundaries: geological, but simplified, average area: 130 km2
- „Main“ horizon: all types of hydrogeological zones except quaternary deposits and 3 cenoman zones, Upper Cretaceous zones – more aquifers (1-3), coniak, turon and cenoman;
  boundaries:
  - ✓less productive zones – catchments of surface waters and RBDs, large zones (about 1000 – 5800 km2)
  - ✓deep basins – hydrogeological and hydraulic boundaries

Hydrogeological zones and groundwater bodies

- Deep horizon: 3 cenoman zones with different boundaries, used for abstractions or significantly affected by human activity – former uranium mining (acid discharge in 100 m deep boreholes)

Hydrogeological zones

Use of hydrogeological zones and groundwater bodies in RBMPs

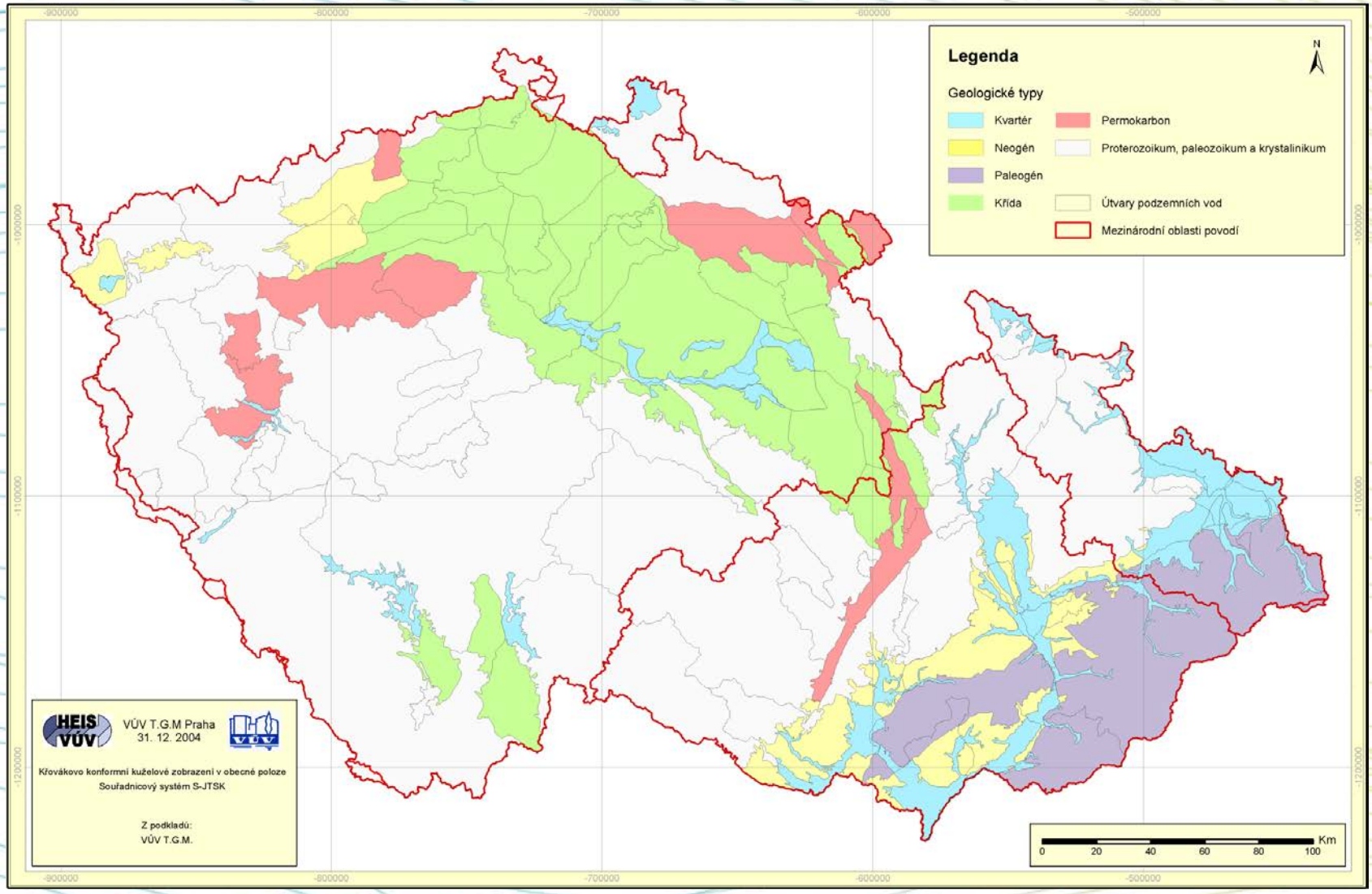
- Large hydrogeological zones with local aquifers (groups of groundwater bodies) – distinguished on smaller „working units“ (boundaries: catchments of surface water bodies – rivers); risk assessment and status assessment separately for working units – results used for final delineation of groundwater bodies – e.g. four different groundwater bodies from one hydrogeological zone

- 152 hydrogeological zones
- 173 groundwater bodies

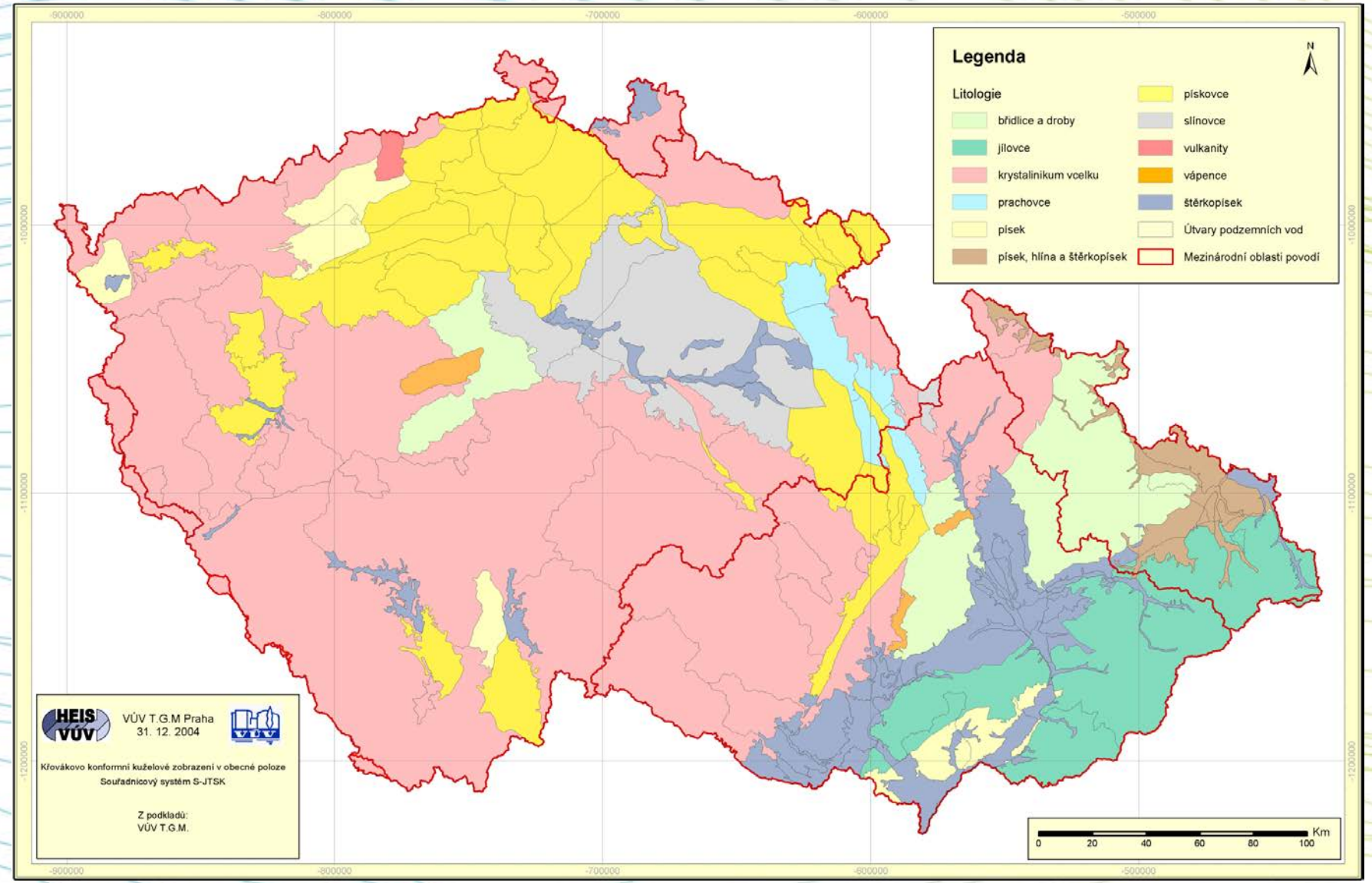
Natural and hydrogeological characteristics for zones

- Geological unit
- Lithology
- Stratigraphy
- Thickness
- Confined, unconfined
- Permeability (Geological Formation)
- Chemical type of groundwater
- Mineralization

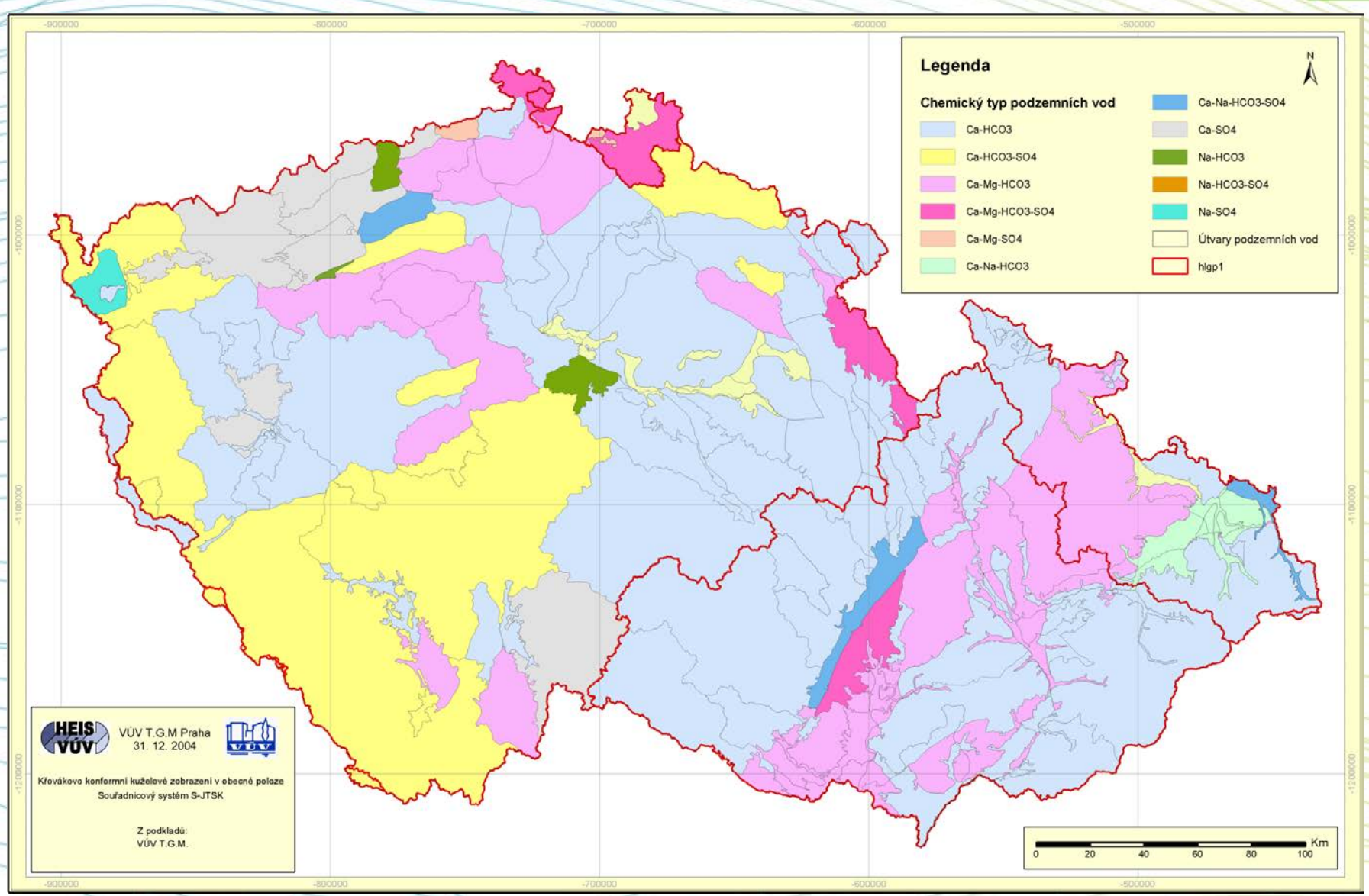
Geological units



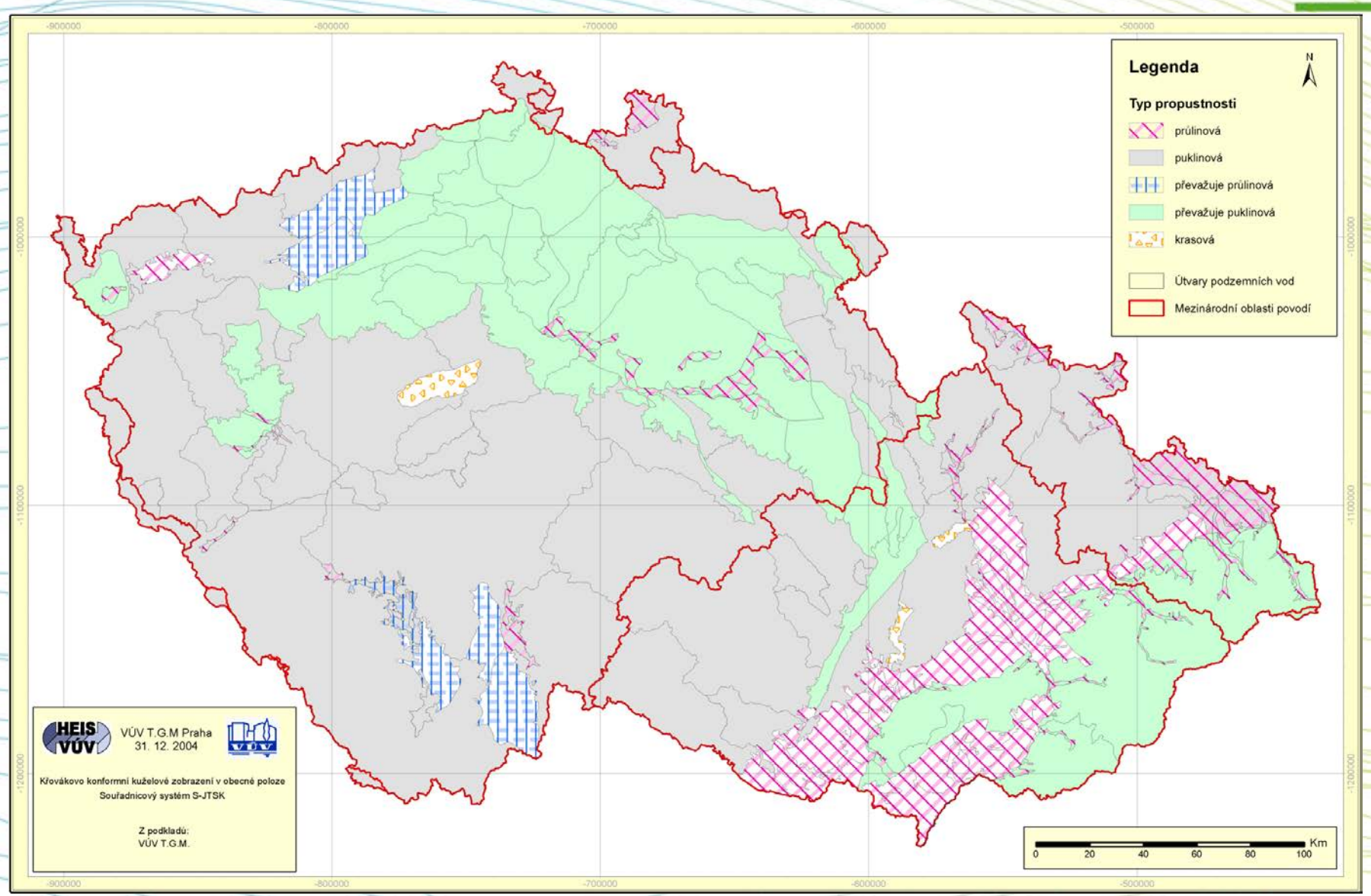
Lithology


Legenda
Litologie
břidlice a droby
jílovce
krystalinikum vcelku
prachovce
písek
písek, hlína a štěrkopísek
pískovce
slínovce
vulkanity
vápence
štěrkopísek
Útvary podzemních vod
Mezinárodní oblasti povodí
N
HEIS VÚV
VÚV T.G.M Praha
31. 12. 2004
Křovákovo konformní kuželové zobrazení v obecné poloze
Souřadnicový systém S-JTSK
Z podkladů:
VÚV T.G.M.
Km
0
20
40
60
80
100

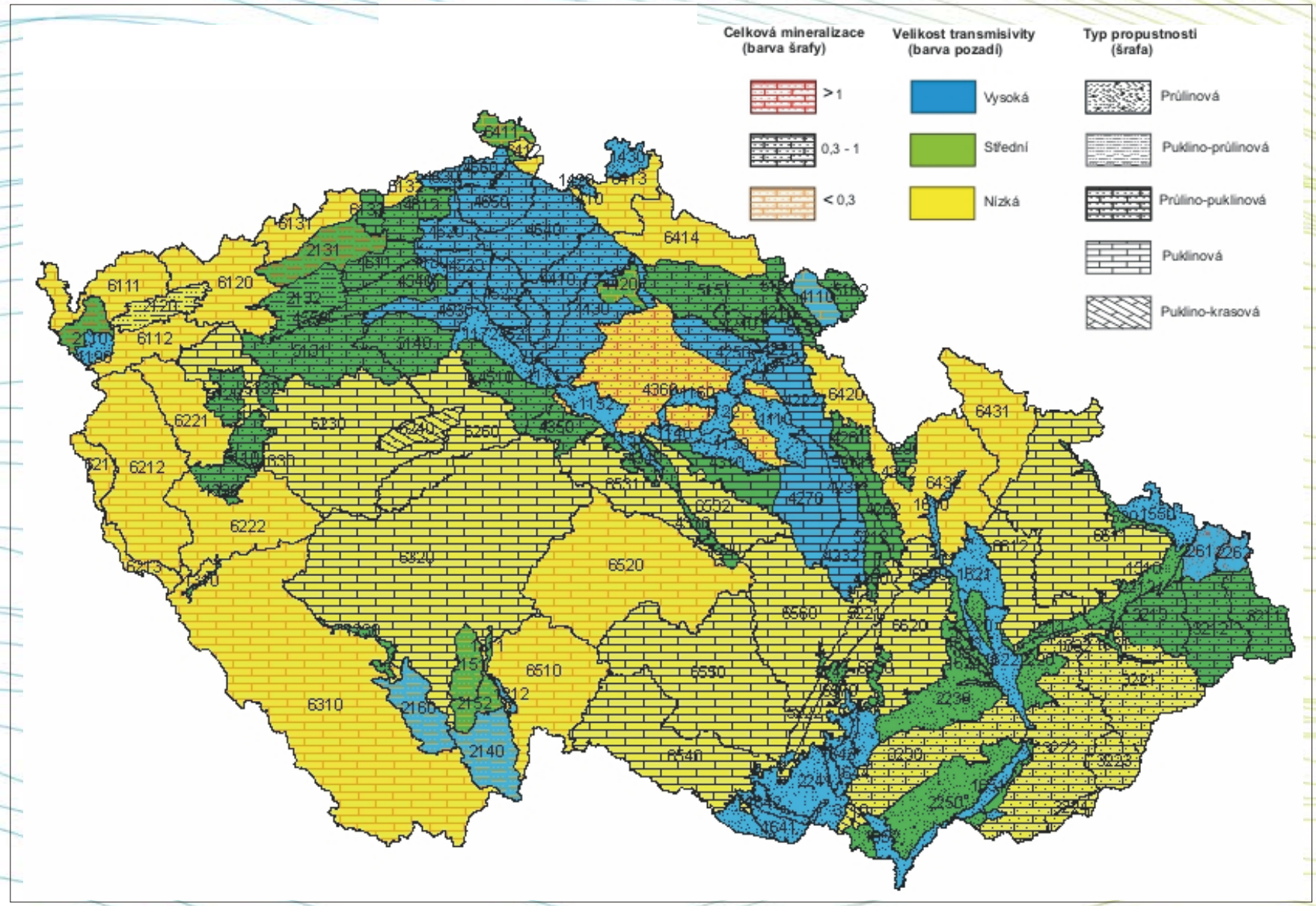
Chemical type of groundwater



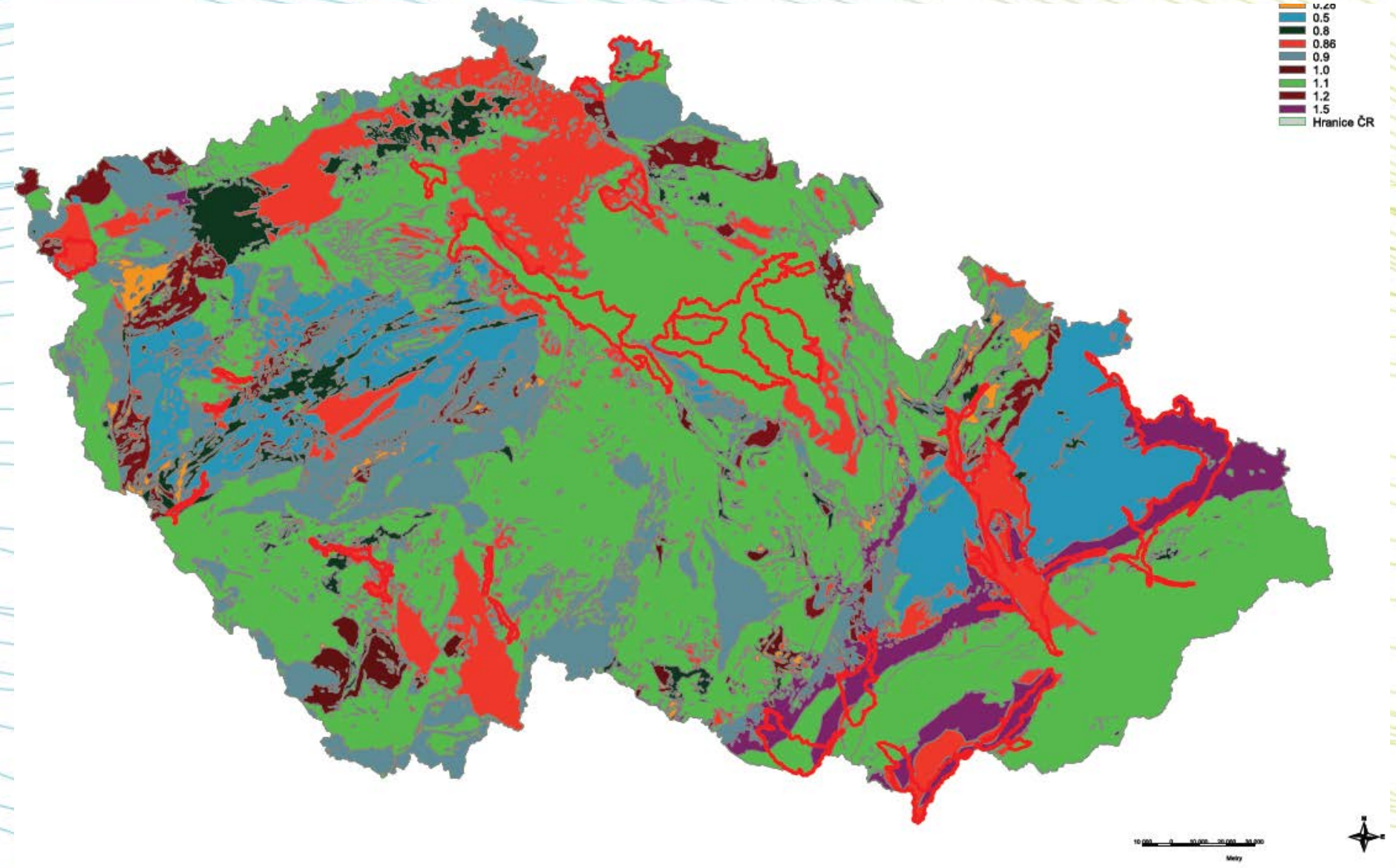
Permeability



Combination of characteristics – mineralisation, transmisivity and permeability



Natural background of arsenic (based on detailed lithology)



Thank you for your atention