GROUNDWATER BODY SYSTEM IN CR

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Significance of Groundwater in CR

- **Drinking water**: 48.8% of groundwater (2011)
- **93.4%** of inhabitants connected on public water supply
- **Use of groundwater**: less than 30% of available groundwater sources
- **Most of groundwater** (82%) used for drinking water
Water management planning and protection of groundwater in CR

- Long tradition in CR – from 60-ies (20th century)
- Groundwater was a part of plans
- Focused mainly on water quantity and water use
- 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
- Systematic monitoring of groundwater quality - beginning of 80-ies
Groundwater in CR before WFD

- Detailed hydrogeological surveys, detailed maps
- Authorization of GW abstractions, obligatory of safeguard zones
- Water management balance (comparison of total abstractions in hydrogeological zone to groundwater long-term resources)
Groundwater in CR after Transposition of EU Law WFD


What was new:

• New units (groundwater bodies);
• Systematic collection of relevant data;
• Inventory of significant anthropogenic pressures;
• Focus on all groundwater;
• Different methods for monitoring and assessment (impacts for surface water ecosystems);
• Public participation;
• Clear and strong link between status results and measures
Hydrogeological zones and groundwater bodies

- 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 stable 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

Hydrogeologická rajonizace
České republiky
2005
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
Upper horizon

Upper Layer of Groundwater Bodies
Hydrogeological zones and groundwater bodies

• „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
Main horizon

Main Layer of Groundwater Bodies
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)
Deep horizon

Deep Layer of Groundwater Bodies
Hydrogeological zones and GWBs

Groundwater Bodies in the Czech Republic

- Upper Layer
- Main Layer
- Deep Layer
Natural Characteristics of Groundwater

- Conceptual model of groundwater bodies
- Significant information – e.g. mineralisation, transmisivity, permeability, natural background of selected metals in GW, link between groundwater and surface water, vulnerability of groundwater
Combination of characteristics – mineralisation, transmissivity and permeability
Natural background of arsenic (based on detailed lithology)
River Gauging Stations with Base-Flow Index
Vulnerability of groundwater (chloridazon)

Source: CHMI
Thank you for your attention