RESOURCE Resources of groundwater, harmonized at cross-border and pan-European scale

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Objectives

- demonstrate the potentials of the harmonization of information about Europe's groundwater resources
- provide good practices for harmonized data and information across borders
- involve regional and national stakeholders
- maximize dissemination using easy-access tools



Figure 1 Overall structure of the RESOURCE project





Challenges



State of the art at the start of the project

- Rock types
- What are the volumes of fresh water?









Zhow



33 partners





WP3 H3O-PLUS cross-border pilot

2 cross-boundary webviewers available (groundwater quality and quantity)





WP4 Polish-Lithuanian cross-border pilot





Fig. 2. Distribution of infiltration recharge in the GIS layer, second (main usable) aquifer





WP5 – Karst and Chalk characterization











Memory Effect

Karst GW Resource Availability Index

100%



WP5 – XL Karst Tool



WP6 – Pan-EU Groundwater Resources map

Groundwater storage (km³) Transmissivity (m² d⁻¹)

Aquifer type (UNESCO legend)

Brasend and tey chtograg fairies Quatternarguiferalferage(km³) • Intergranular aquifers (blue)

- Fissured aquifers (green)

Quantitative assessment:

If transmissivity < 200 m2/d, or if volume < 0.1 km3 -> locally productive, else highly productive



WP6 – Pan-EU Groundwater Resources map



Groundwater storage in Cretaceous aquifers (km³) Groundwater storage in unconfined aquifers (km³) Groundwater storage in confined aquifers (km³) Occurrence of paleowater



RESOURCE products on EGDI GeoERA Nitrate (mgNO3/l) « GeoERA - Groundwater Reports Links to Pan-EU Gro GeoERA Base lavers Layers Laver s - H3O-PLUS Dutch/Flemish-German Transb study (WP3) Sweden Dutch/Flemish-German Transbounda Y 🗄 🚯 For the H3O-PLUS area, data is enclose * Hydraulic properties of the cross-borde Fig. 2. Distribution of infiltration recharge in the GIS layer, second (main usable) aquifer hydrogeological units 5 - 25 25-50 50 - 100 ■ > 100 fine rol - Brakish-salt wat * Groundwater quality patterns * Water balance terms and fluxes * Trends in groundwater heads * Management strategies on different sides of borders. The data on groundwater guality and groundwater Belaru: heads are made accessible through two groundwater viewers which enable maps and cross-sectional views and dedicated visualization options. Poland Download dataset Germany Links to the Reports, article \sim database is available by cl **UK: Esse Borehole** in the map. \sim -Karst and main characteristics: Outlet Dominant Average Maximum Yearly Hungary altitude lythology* flow rate discharge precipitation France TRANSFLUX Transboundar [m a.s.l.] [m3/s] [m3/s] [mm/yr] ithuania (WP4) ~ 50 Chalk 0.048 0.155 ~950 Hydrodynamic model ar 7 🗉 O Management issues: The TRANSFLUX project + Large abstraction borehole with average daily groundwater flow patterns abstraction of 4.11 MI/d, reaching a maximum of distributions for the cross-t 13.43 Ml/d (1995-2019) Poland and Lithuania. The extensive tracer suggests that groundwater can hydrodynamic model can t traverse the catchment at velocities up to 5.8 km/day, Mangin's c assification (1975) reports and contour maps primarily recorded from surface solution features. SYria and flow directions. Monitoring status: Generally weekly measurements of parameters Links to Report, Template on medium time scales (7-24 years) available by click inside the (ags 130000 = ----Pecina Ursult Ca 5 - Pan-FU Groundwater Resources Mans 0 ZOOM: shift + Drag SELECT: Ctrl + Drag Brig FdNok EPSG 3034 : Eaiar: 0.4 WU 0.3 Byc 0.2 3 0.1 Δ Geoe 0 0.01 0.1 1 10 100 **RESOURCE GROUNDWATER** k (in years, El Hakim et Bakalowicz, 2007)



A look at the webviewers



https://www.grondwatertools.nl/gwsinbeeld/geoera (User: GeoEra, Passwd: H3OPlus)

https://www.grondwatertools.nl/gwatlas/login (User: GeoEra, Passwd: H3OPlus)



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GeoERA Concluding Conference to be held 19 January 2022 online. Read more here.

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45 national and regional Geological Survey Organisations (GSOs) from 32 European countries have joined forces to develop an ERA-NET Co-Fund Action:

Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe (GeoERA)

The main objective of GeoERA is to contribute to the optimal use and management of the subsurface. In 2018 15 research projects started and they will support 1) a more integrated and efficient management and 2) more responsible and publicly accepted, exploitation and use of the subsurface. The projects cover the applied geosciences, addressing the following four themes:

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Groundwater resources sustainability & vulnerablity

- First estimate of Water Balance
 - combining TACTIC and RESOURCE
 - Placing the fresh groundwater volume in context of the water _ balance: recharge and abstractions
 - Interpretation in terms of sustainable water use and turnover _ times

Deliverable 6.5

800

400

Water balance terms for the EU fresh groundwater grid

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Shallow groundwater storage / groundwater recharge within Nuts region (years)







RESOURCE is also

- Publications 1 in WRR, 2 on Zenodo (3 in preparation)
- Conferences 14 @ majors scientific events (AGU,EGU, IAEA, IAH, LuWQ, EuroKarst), 7 @ policy conferences,
- Webinars and stakeholder meetings (>20)
- Interactions with other organisms USGS, IAEA, JRC, EEA, CIS/WGGW
- General public communication– Facebook blogs, LinkedIn post, WordPress blog, twitter post, webpage

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Thanks to the complete RESOURCE team



And thank you for your attention!

