



Mapping groundwater data and indicators at EU-scale in support to the evaluation of the WFD and SDG implementation assessment

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1. Description of **GeoERA**



- GeoERA project: Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe
 - By contributing to the optimal use and management of the subsurface
 - Through four pillars: geo-energy, raw material, Information platform and **groundwater**
- **P**rovide and disseminate spatial information (**data and indicators**) on their respective resources through the platform EGDI
- Based on common methodologies shared by all EU countries **represented in EGS**

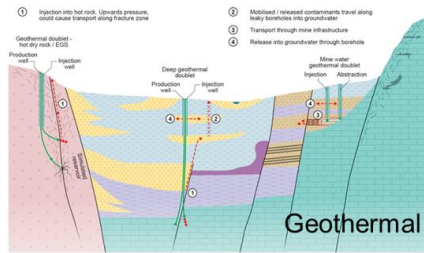
Funded by EGS and European Union Horizon 2020 programme (grant agreement n° 731166)



1. GeoERA Groundwater projects

Research and information products from local to Pan-European scale

Conceptual models and decision support tool for assessment of groundwater vulnerability to energy-related activities



Reports from pilot study sites in BE, HU, NL & UK

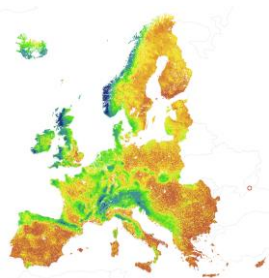


Groundwater vulnerability to deep energy related activities

Investigates salt water intrusion into coastal aquifers at local scale



Groundwater recharge at local to Pan-European scale

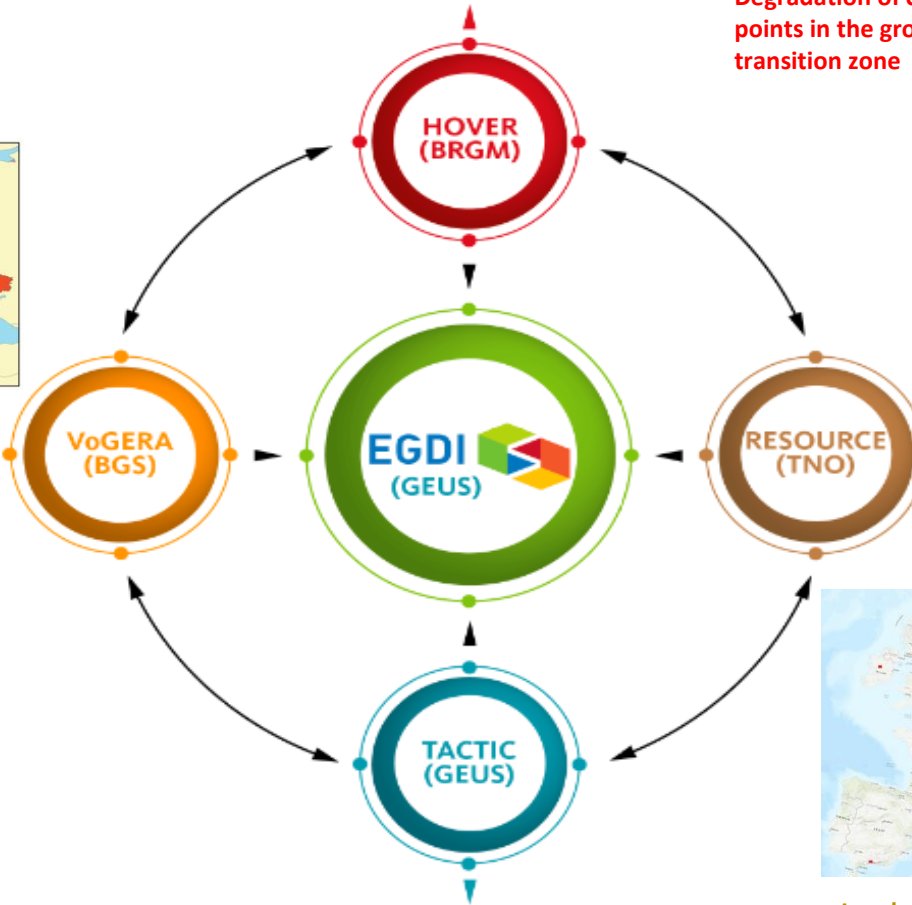
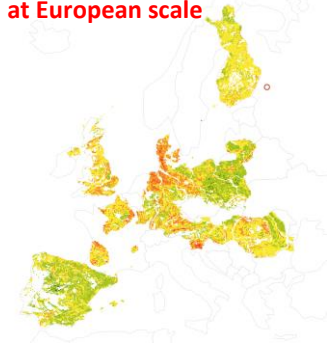


Groundwater quality travel times, vulnerability and age

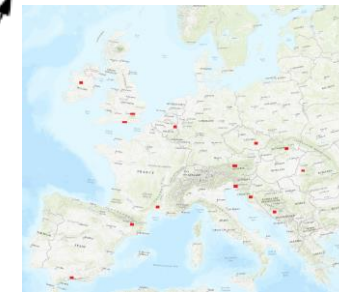
Degradation of contaminants at selected points in the groundwater – surface water transition zone



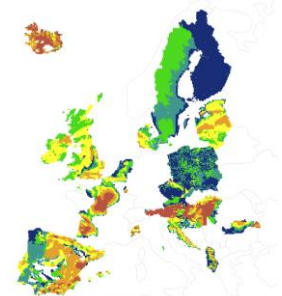
Groundwater vulnerability to pollution from the surface at European scale



Groundwater quantity Pan-EU groundwater resources map



Depth and volume of groundwater resources at European scale



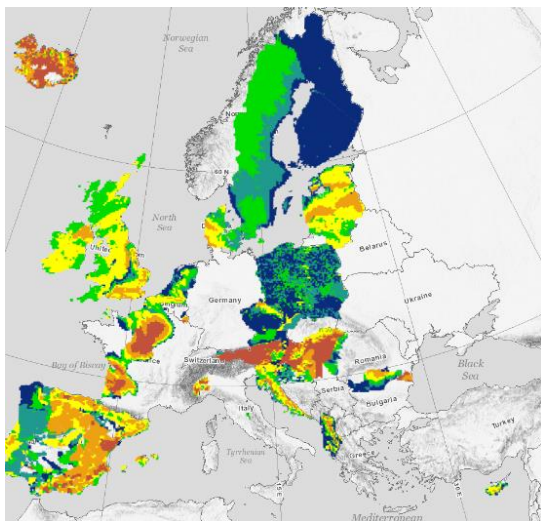
Groundwater and climate change impacts and adaption

Local studies of karst and chalk springs and aquifers

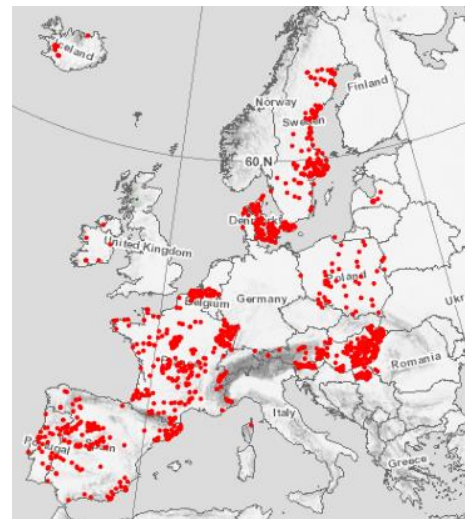
1. Description of the project

Example of contribution to GEOERA platform

1) Improved access to downloadable groundwater quantity and quality data at local to Pan European scale – examples :

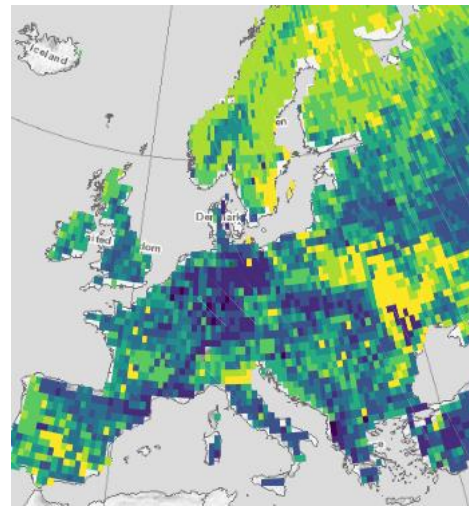


Water volumes and aquifer characteristics in European aquifers



Groundwater quality in European aquifers: here As > **Drinking Water Standard (HGT > 1)**

2) State-of-the-art tools to support sustainable decision making in relation to the water-food-energy-ecosystem nexus (interrelated resource systems) – examples:



Nitrate in the unsaturated zone infiltrating to groundwater

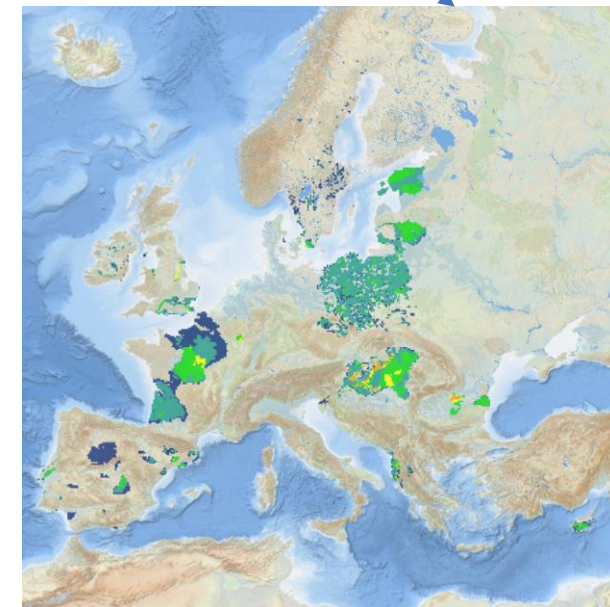
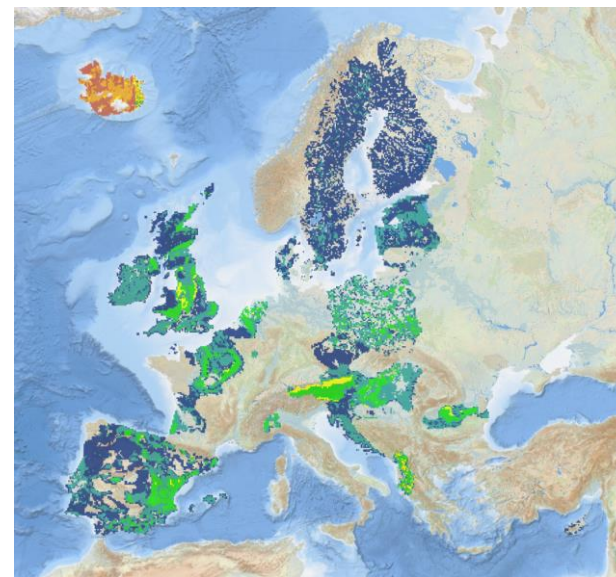
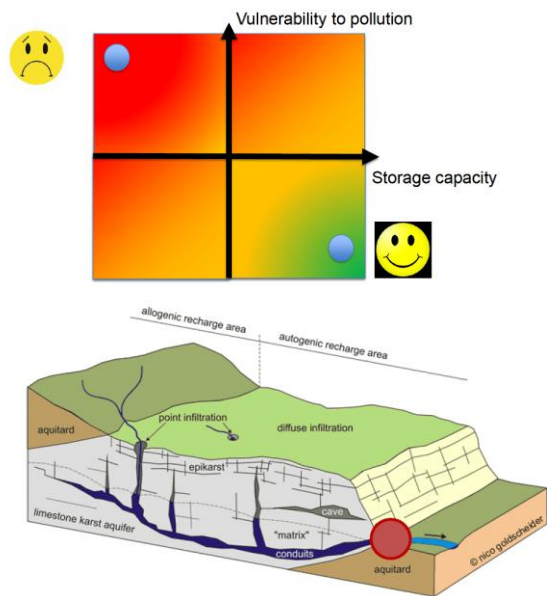


Decision Support Tool for assessment of groundwater vulnerability to deep energy related activity

2. How GeoERA can accelerate progress towards the objectives of the International Water Action Decade and SDG 6

SGD 6.1. Achieve universal and equitable access to safe and affordable drinking water for all

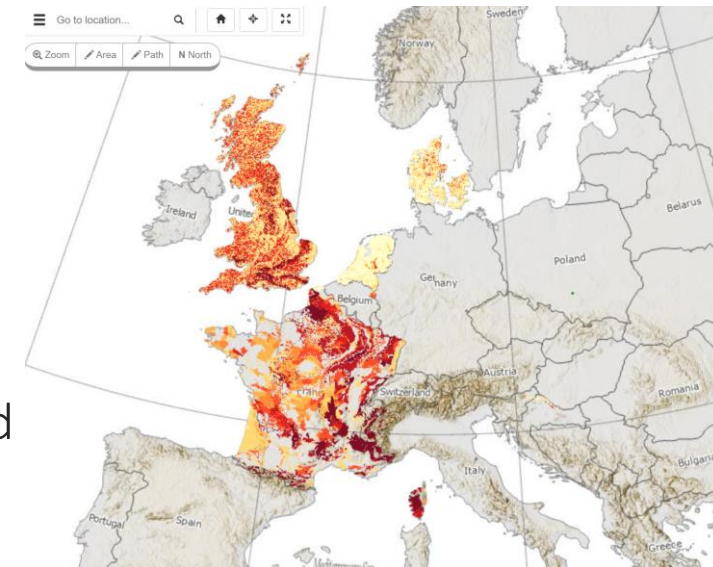
- GEOERA RESOURCE → data and indicators on groundwater availability
 - Fresh water storage under our feet (easy access) in unconfined and confined aquifers
 - Specific karstic area vulnerability and water availability assessment



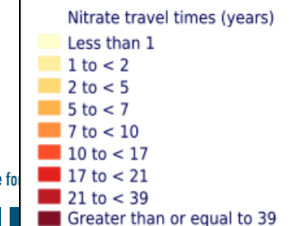
2. How the project can accelerate progress towards the objectives of the International Water Action Decade and SDG 6

SGD 6.3. Improve water quality by reducing pollution,...

- GEOERA HOVER → data and indicators for the quality assessment :
 - Delineating the natural quality of water bodies (e.g. arsenic, Cl,...), taking into account geological context
 - Making available quality data at point and by GW bodies – Usual and emerging contaminants
 - Taking into account natural attenuation processes such as denitrification and transfer time
 - needed for the assessment of progress and efficiency of policies programme



Gridded estimates of travel times for nitrate in the unsaturated zone in six European countries



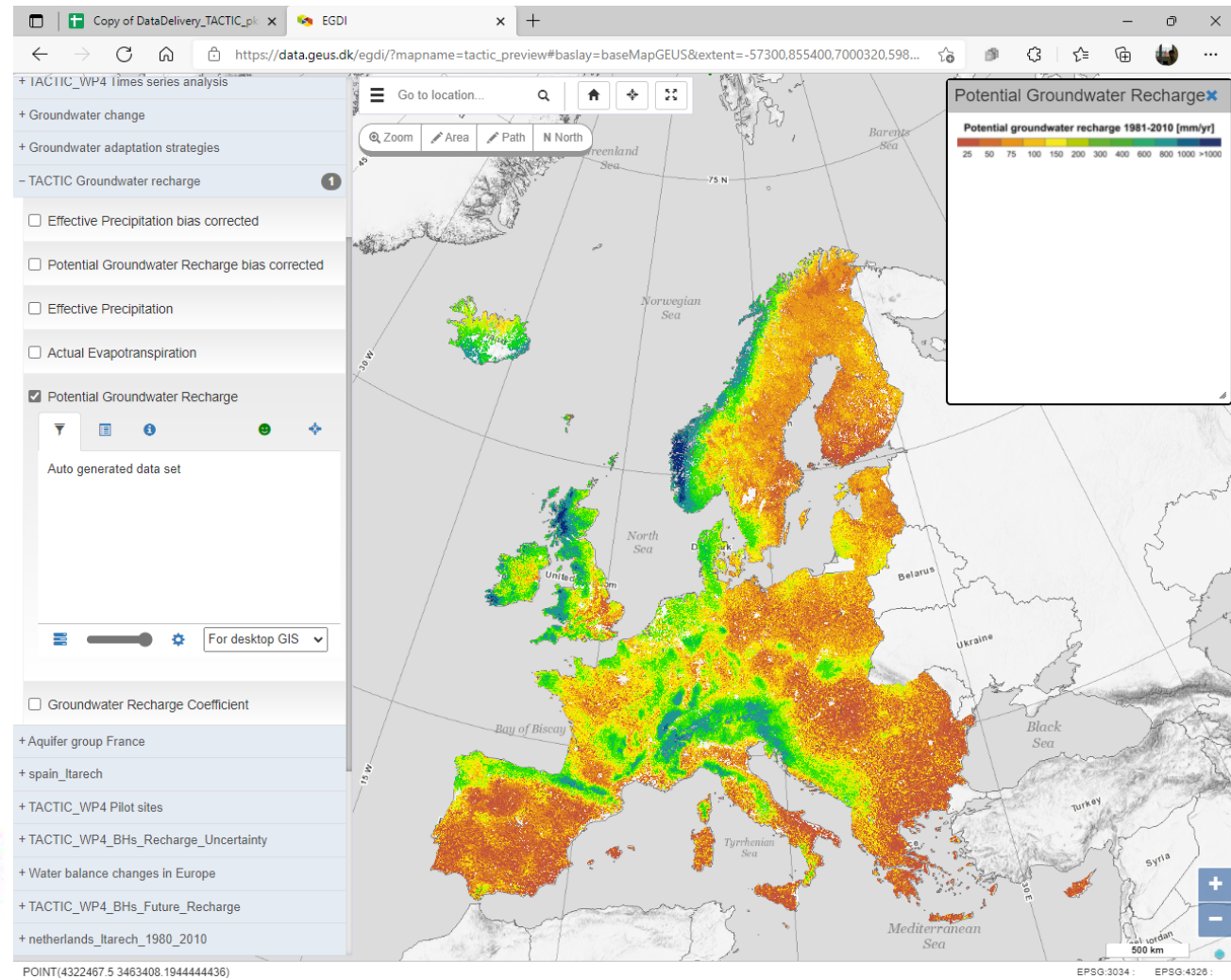
2. How the project can accelerate progress towards the objectives of the International Water Action Decade and SDG 6

SGD 6.4. substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity

- GEOERA provide data and indicators on groundwater availability (RESOURCE) taking into account climate change (TACTIC):
 - Demonstrate the use of tools to assess climate change impact and adaptation strategies
 - Elaborate a Pan-European potential groundwater recharge map



UNECE



3. Lessons learned and future work required to achieve the objectives of the International Water Action Decade and SDG 6

SHORT SUMMARY

The vast potential of groundwater and the need to manage it sustainably can no longer be overlooked

It is essential that countries commit themselves to developing an adequate and effective framework for groundwater governance

<https://www.unwater.org/publications/un-world-water-development-report-2022/>

Groundwater data collected with public funds should be freely accessible



- EU heterogeneous geological context leading to various characteristics of groundwater resources and availability
 - Adaptation to local conditions required
- EU framework policy providing a very good basis for an integrated management of resources
 - More a question of systematic implementation
- Knowledge and Evidence based: Make data FAIR (Findable, Accessible, Interoperable, Reusable)
 - Need for progressing and really implementing such principles
- For decision-making: necessity to translate data into indicators (integrated and self-explaining data)
 - Based on a Common Framework



Thank you



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