RESCUE: RESources in Coastal groundwater Under hydroclimatic Extremes (2024-2027)

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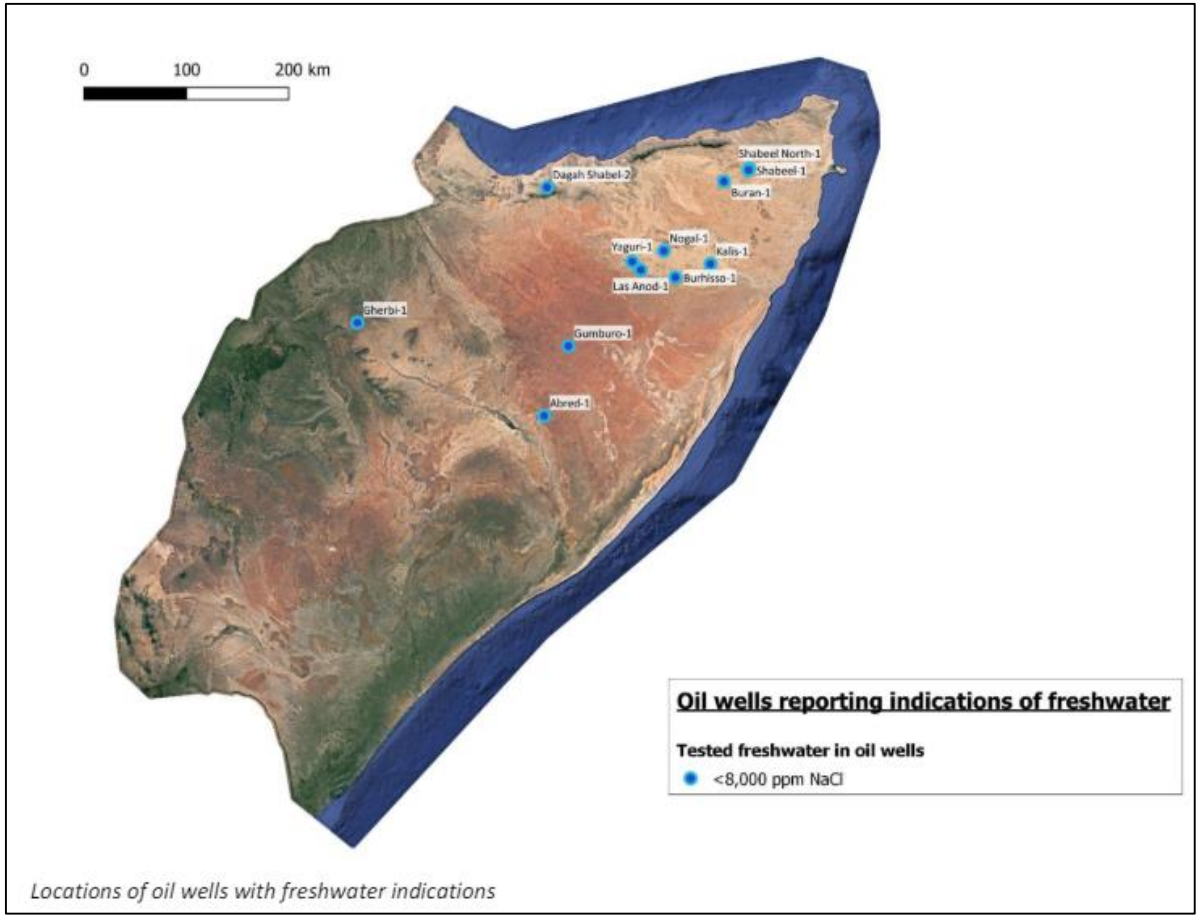
Water4All 2022 Joint Transnational Call - EU Horizon program
Management of water resources: resilience, adaptation & mitigation to hydroclimatic extreme events & management tools

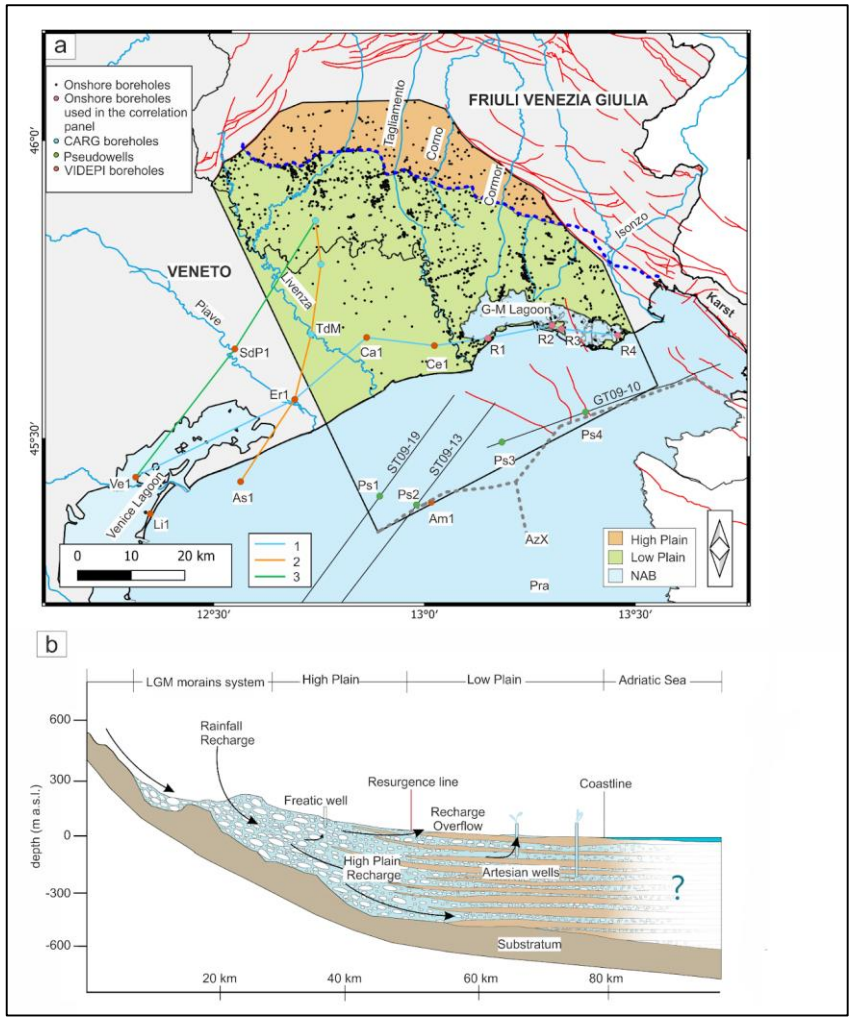
OBJECTIVES

RESCUE aims to better understand deep-coastal and offshore aquifers, to provide new information that will enable local and regional policy makers to lay the foundations for the evaluation and utilization of new freshwater resources.



Locations of oil wells with freshwater indications

Quiroga et al., 2022



Corradin et al, submitted; Zini et al., 2011

DEFINITIONS

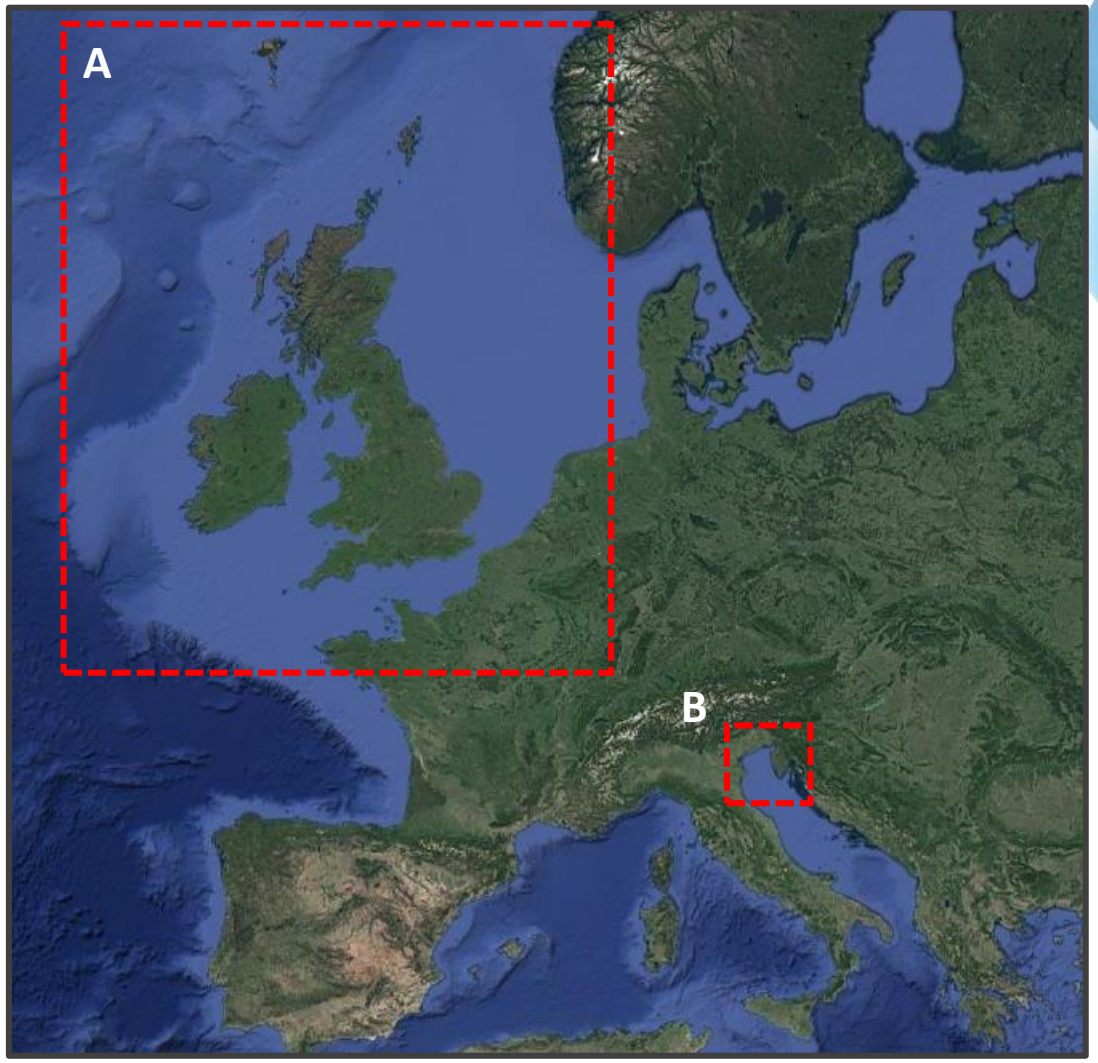
- Deep groundwater is water hosted in aquifers > 400m below surface

- Offshore Freshened Groundwater is water hosted below the seabed, with salinity < than seawater

The RESCUE project covers two study areas in Europe:

A. United Kingdom and surrounding North Sea

B. North Adriatic Sea



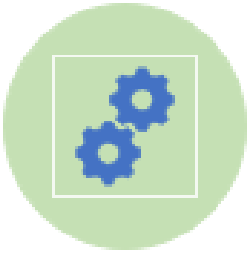
The study area is chosen to explore deep and offshore fresh groundwater at two different scales:

- Continental scale, including UK and surrounding waters, where a rich repertoire of seismic and well data is available, mostly from Oil & Gas exploration.

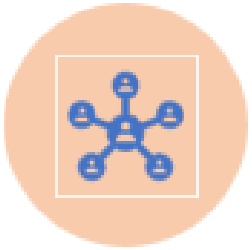
- Regional scale in the Northern Adriatic, a region with good hydrogeological data, and which is also affected by water scarcity.

Work Packages 1-4: DESCRIPTION

To better understand these potential new water resources in the focus regions, there are four project components:



Technical



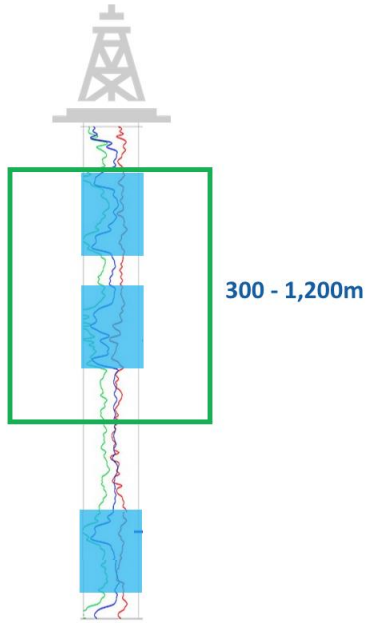
Social

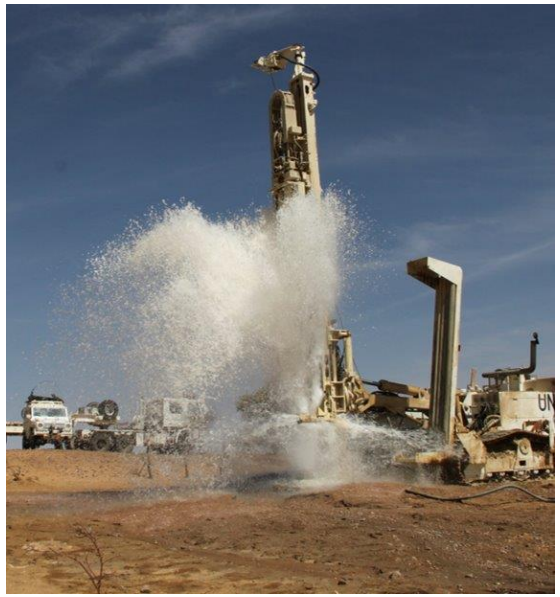
Economical

Legal

WP DESCRIPTION: WP1- Technical

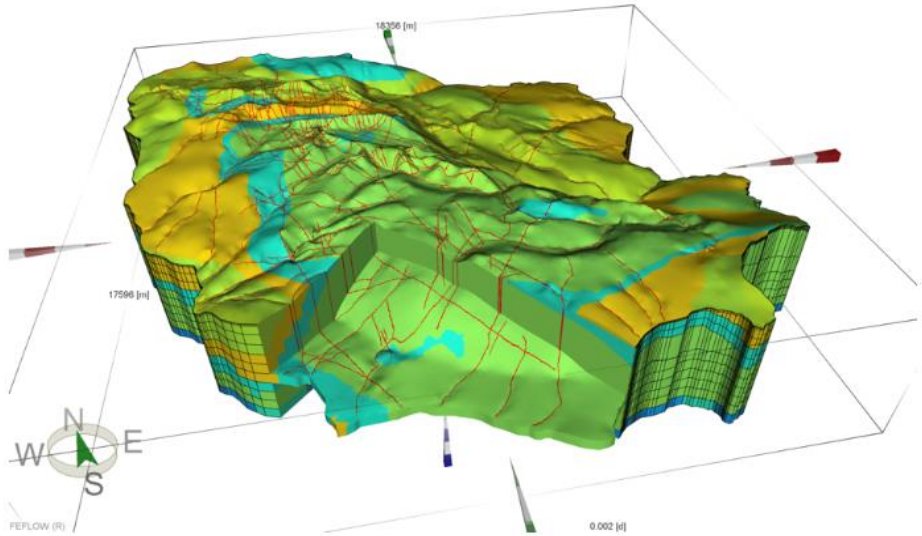
1-Data mining, acquisition, processing and analysis of aquifers in deep coastal and offshore settings.





2-Hydrogeological modelling and estimation of recharge.

3-Large scale groundwater flow simulations, using tools such as MODFLOW, MRST, FEFLOW and/or Python.

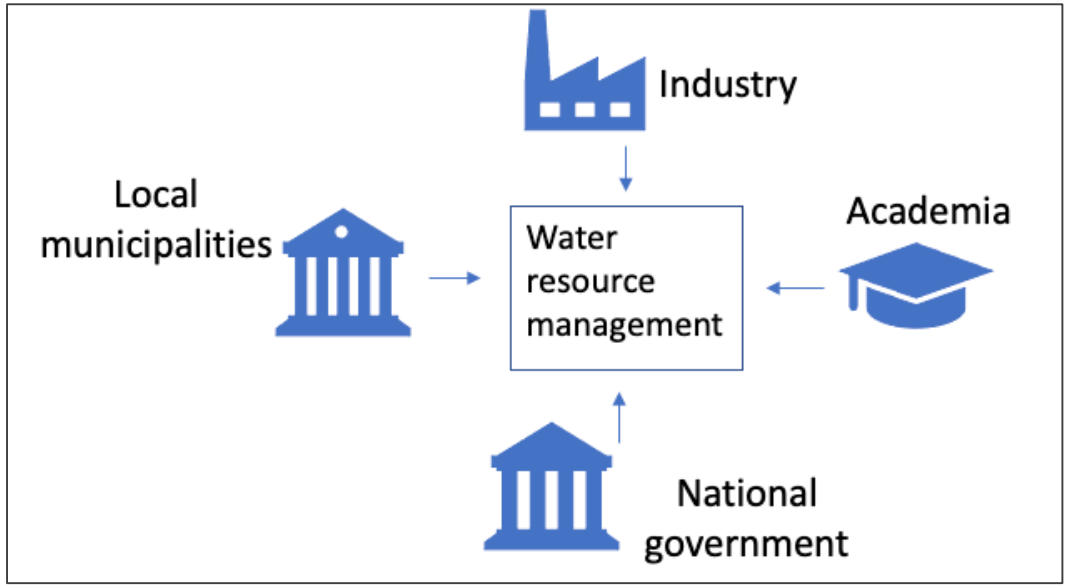


Current work: database compilation, semi-automatic workflow for well reports and data at national scale from repositories

source: Groundwater Project

WP DESCRIPTION : WP2- Economical

- Evaluate economic viability of alternative sources of freshwater including onshore and offshore deep groundwater resources.
- Economic viability, market potential and suitability.
- Capacity and community building.
- This involves:
  - 1-Mapping of stakeholders
  - 2-Cost-benefit analysis
  - 3-Identification of other potential sites



Economic value of water is a balancing act

Water Use

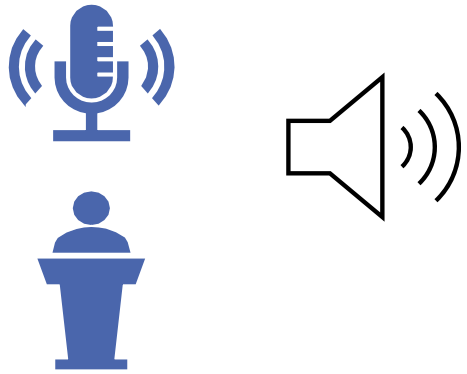
- Agricultural use
- Industrial use
- Electricity generation
- Municipal uses
- Population
- Trade in water

Water Availability

- Precipitation
- Runoff
- Evapotranspiration
- Groundwater availability
- Water recycling

WP DESCRIPTION: WP3- Social

- To develop frameworks for capacity and community building in relation to coastal aquifers, through outreach and communication.
- Provide scientific evidence for national/EU water strategic frameworks.
- Activities to include hosting podcasts and seminars to inform national water strategies and frameworks.



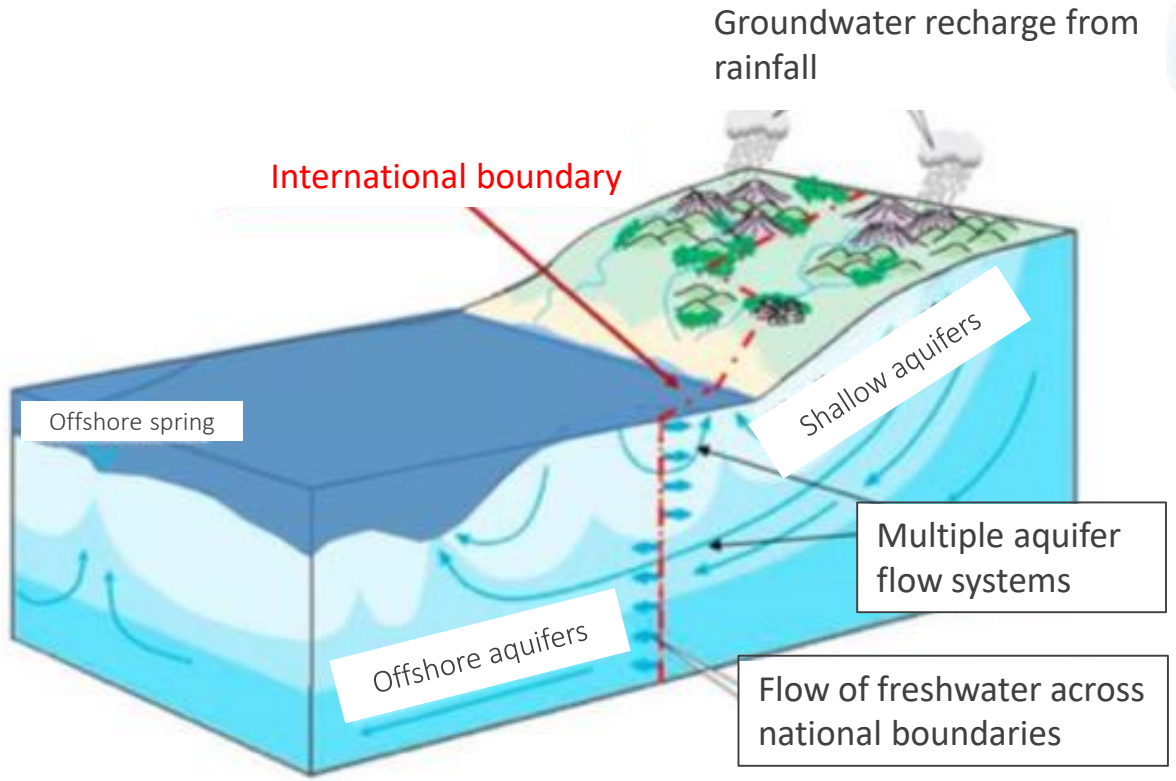
Coastal aquifers and the meaning of sustainability.

How do we secure water for all?

WP DESCRIPTION: WP4 - Legal

Onshore and offshore aquifers are transboundary- their extent may span several countries. The Legal component will include:

- Examining existing maritime-zone regulations for the Oil & Gas sector.
- Examining existing water regulations.
- Proposing regulations for coastal and offshore aquifer governance and management using inspiration from both existing regulations and from our research.



UNESCO, Transboundary Aquifers. Sanchez, R. (Ed). Paris. 2022.

Martin-Nagle, R. (2016). Transboundary Offshore Aquifers: A Search for a Governance Regime

Water policy and strategy at different geographical scales

Groundwater in International law

- UN Convention on the Law of the Sea
- O & G international framework

Groundwater in European law

- Water Framework Directive
- Marine Strategy Framework Directive

Water Governance at local scale

- National regulations
- Transboundary treatise

Summary

- As EU coastal countries are increasingly exposed to extended droughts, are there alternative or additional water resources, and can we use them responsibly?
- This is a vast topic, and we are in the early stages of the project, so new collaborations are particularly welcome
- Synergies with other programs such as COST (Off-source) and JPI Ocean will help building on database, modelling, network and impact
- Open access policy: essential water-related knowledge and data will be shared publicly, proposing best practices
- Aims:
  - Increase public knowledge of these unconventional freshwater resources.
  - Improve access to scientific information about the presence and management of these aquifers.
  - Reach policy, strategy & decision-makers in coastal European regions, to prepare the ground for regulation and management of the appropriate use of these potential resources.

Thank you!

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