ENHANCING SUSTAINABLE GROUNDWATER MANAGEMENT IN AN ARID AREA BY THE APPLICATION OF REAL-TIME AND HIGH TEMPORAL MONITORING SCHEMES (AWSA WELL FIELD IN AZRAQ)
1. Understand the salt water movements related to the extractions and recharge
2. Discriminate the geological layers contribution to the salinization process
3. Validate two different salinization assumptions given by previous studies
4. Deliver solution to extend aquifer lifespan

**Project** budget: 275 k€ - **Project** length: 28 months
3 GMD were installed at south of AWSA wellfield.
Two salt origins

**Local:** Since exploitation beginning, at eight wells, rocks dissolution process occurs and create salinity increase.

**Global:** Since 1993, due to a reverse groundwater flow, groundwater from Qa’ Al-Azraq flow to AWSA well field. This phenomenon is continuous, increasing, and contaminates all the well field except the 4 northest wells.

At all wells, salinity is seriously and continuously increasing: more and more brackish water is coming into the total extracted water reservoir.

Soon, this exploitation will be not sustainable anymore.
Different scenarii regarding of Azraq groundwater conductivities in 2022

![Graph showing groundwater conductivities over time]

1000 µS/cm
Objective of operative actions:

- Restrict the extension of the brackish water plume and prevent its migration to the northern wells
- Define operating rules able to concurrently preserve the water quality and make energy savings

3 steps:

1. Logging in all production well
   => Define each well fresh water production capacity compare to each other

2. Improving monitoring tools (all AWSA Well)
   ⇒ Knowledge of salinity process into the north
   ⇒ Water quality evolution knowledge

3. 3D Modeling & Improvement of the wellfield management rules
   ⇒ Test different exploitation scenarii = > from passive to predictive management
   ⇒ Set up an active hydraulic barrier
   ⇒ Improve well field management
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