

1

SEARCH FOR GROUNDWATER

STAGES, TASKS AND RESULTS OF TVT IN THE SEARCH FOR ENDOGENOUS WATERS.

At the regional and detailed stage, geothermal features are determined in the formation of deep sources of fluid zones and endogenous water exchange between land and sea (discharge of submarine fresh water and penetration of sea salt water into the depths of the continent).

Numerous maps, sections and models of block-fault structures are formed in order to predict the migration and accumulation of free water, and the preservation of fluid at different depth levels.

An analysis of natural reservoir traps of gravity waters (volumetric, linear and complex chambers) and contouring of reservoir rocks (permeable horizontal and vertical zones) is being carried out. Establishment of rupture disorders through the tracing of deep water discharge zones and their impact on the safety of the deposit.

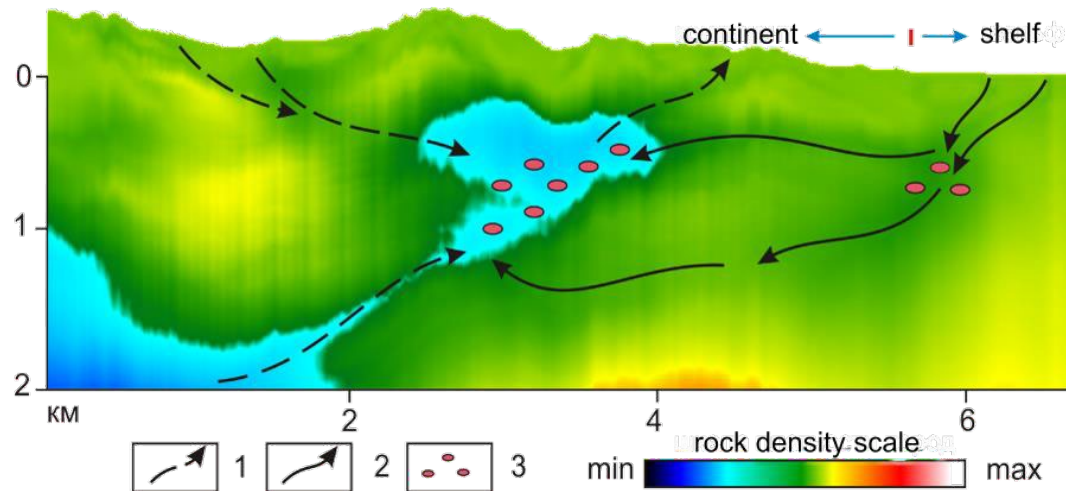
Recommendations are made for optimizing further exploration work with reference to endogenous water deposits in depth and in geographic coordinates WGS-84.

2

SEARCH FOR GROUNDWATER

SEARCH FOR SUBMARINE WATERS, SPAIN

TVT model of block-fault structures along the continent and the sea shelf



Legend:

- 1 - fresh groundwater runoff;
- 2 - penetration of marine intrusion;
- 3 - zone of accumulation of sea water in the karst cavity

The model of the groundwater pumping system in this region is due to two endogenous processes :

- Filtration mode in collectors of complex structure – water migration occurs through highly permeable zones due to the difference in heights under the influence of gravity.
- ElySION mode - the pressure is created by squeezing out water from the sealing medium.

Natural conditions for the penetration of sea water into the continent and aquifers, identified in the surveyed area :

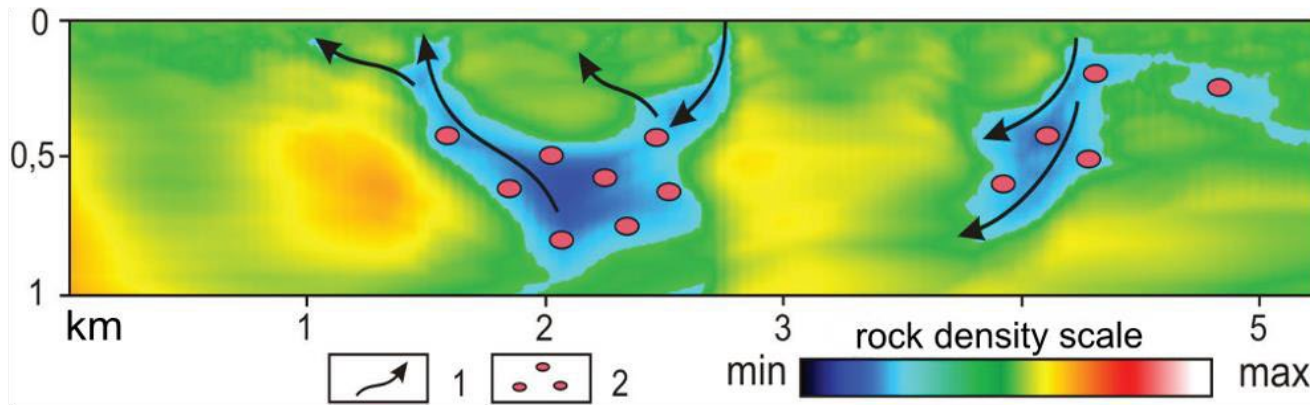
- excess of the specific gravity of sea water over fresh;
- the presence of fracturing in rocks below sea level, creating natural channels for fluid migration into the depths of the aquifer;
- weak pressure gradient of coastal aquifers (land - sea);
- technogenic impact on the reservoir, associated with the intensive extraction of fresh water on land, leading to a significant pressure drop of the fluid, while intrusion itself can cause salinization or contamination of wells

3

SEARCH FOR GROUNDWATER

SEARCH FOR HYDROTHERMAL AND UNDERGROUND MINERAL WATER SOURCES, SPAIN & INDONESIA

Vertical profile. Block-fault structures

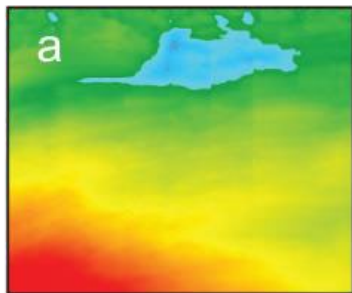


Thermovision Tomography allows:

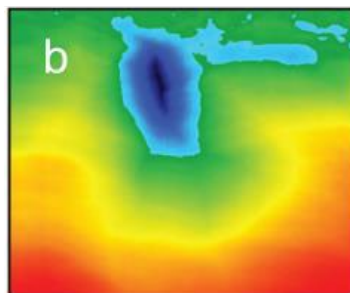
- 1. Check of underground water traps quality;
- 2. Detection of ruptures via monitoring of discharge spots of deep waters, and its effect on the integrity of a deposit;
- 3. Detection of fluid accumulation areas and areas with increased permeability based on developed geothermal criteria.

Vertical profile. Block-fault structures

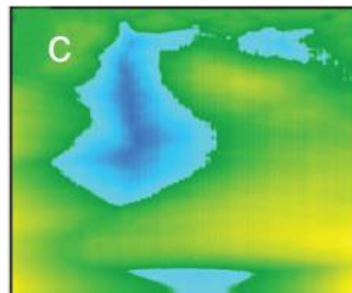
Horizontal flat chamber



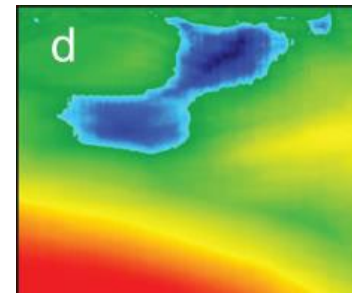
Volumetric chamber



Vertical flat chamber



Complex chamber



Vertical profiles. Block-fault structures