Case Study - Mapping Aquifer Invasion by Sea-water

Location

The location of this survey was near the coast at Marathon in Greece. (it was the site of the famous battle in 480 BC when the Greeks finally expelled the Persian invaders).

Geology

Neogene and Quaternary deposits of clay, silt and sand cover the area at surface. Beneath this, as determined by drilling, is an aquifer with water at 2 metres depth, which is underlain by clay, 30-50 metres thick and then bedrock of Marble.

terraTEM Survey Specifications

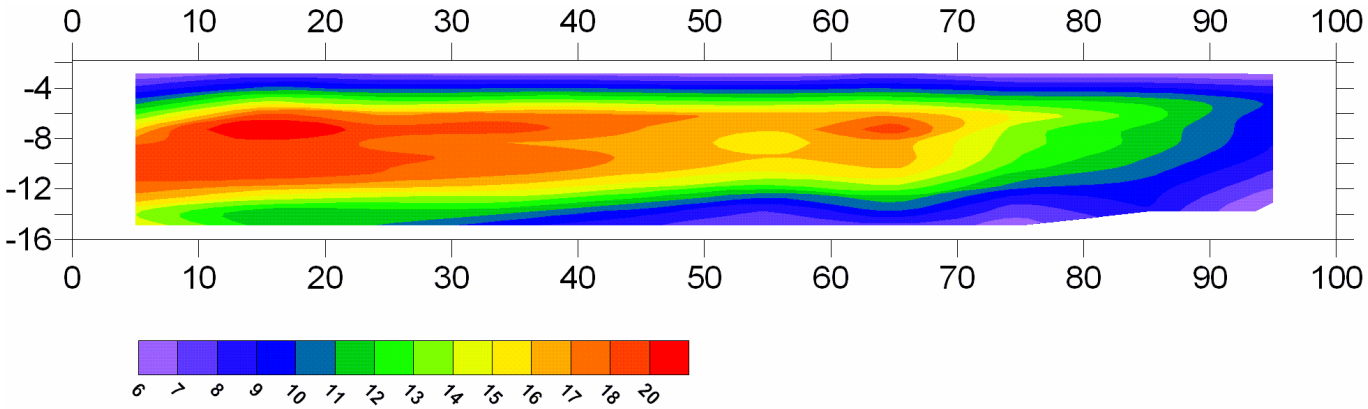
- In-loop configuration.
- Tx loop – 10m x 10m
- Rx loop – 3m x 3m, in centre of Tx loop
- Station Interval – 10m.

Description of Result

The resistivity-depth section shows depth in metres from 2-15m and distance from 0-100m. The lowest resistivity values in the aquifer (6-10 ohm-m or 0.10 to 0.17 Siemens/m) represent saline water which is invading the fresh water from the right-side of the section (the end near the sea).

The values measured by terraTEM are in the range of measurement of water samples at the site – generally 0.13 S/m.

This suggests that the varying values of conductivity are indicating the varying amount of mixing of sea-water throughout the aquifer.



Conclusion

The conductivity values as measured by the fast and easy terraTEM survey give a close estimate of the conductivity of the water throughout the aquifer and show the extent of the invasion by sea-water.

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