

#### CLIENT

For the Dutch water supply company, PWN, the consulting companies, Wiertsema & Partners and AR-TESIA Water, has conducted a groundwater-mapping project near the North Sea coast in the Northwestern part of the Netherlands. The project is a follow-up on an airborne TDEM SkyTEM survey carried out in 2013.

#### CHALLENGE

Close to the Dutch North Sea coast, fresh water is pumped up from Lake IJsselmeer and infiltrated in the dune area, then extracted from the dune subsurface and passed through a water treatment process before distributed as drinking water.

Naturally, infiltrating and extracting large amounts of water, has a significant impact on the hydrological environment under the coastal dune area. Thus, monitoring the fresh water / saline interface between the monitoring wells is essential in order to control and optimize the water extraction strategy and prevent saline water to pollute the delicate hydrological process.

The dune subsurface was mapped by a TDEM SKYTEM airborne survey in 2013, and the TDEM method proved very effective in locating the fresh water / saline interface. Therefore, a ground based TDEM system was proposed for this monitoring job.



#### SOLUTION

Wiertsema & Partners chose the ABEM WalkTEM for the survey because of the relative small transmitter loop even for deep soundings and the fast and easy field application. Further, the high sensitivity was an important factor as well, as it made it possible to map the interface between fresh and saline water interface with high resolution.

A TDEM system consisting of an ABEM WalkTEM instrument, RC-5 and RC-200 receiver antennas and a 40x40 m Tx loop was used for the job.

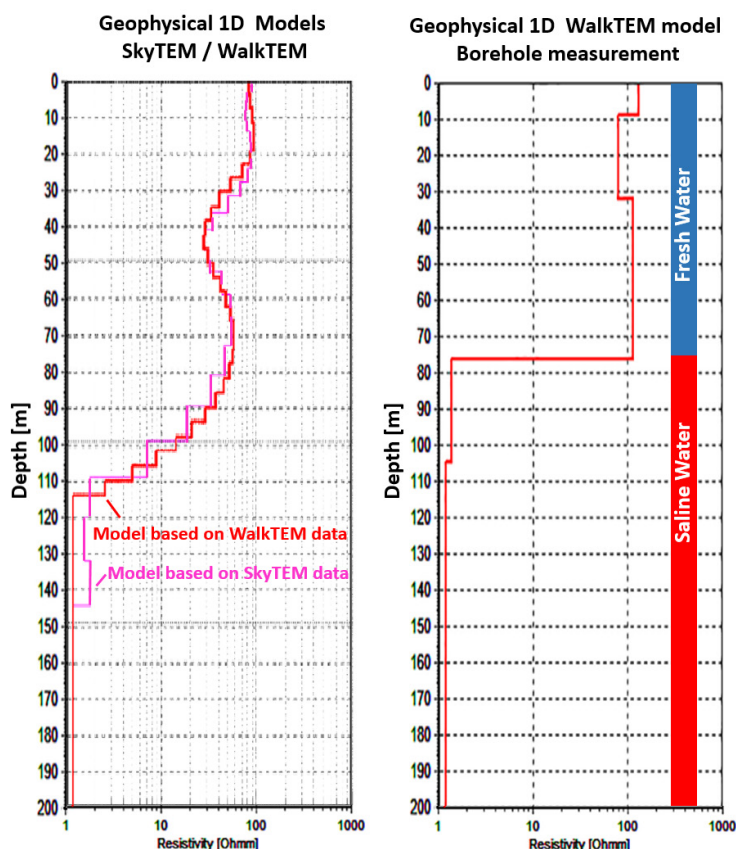
### RESULTS

First, the resolution of the fresh water / saline interface obtained by the ABEM WalkTEM instrument had to be tested. Therefore a WALK-TEM sounding was measured close to a monitoring well, where the interface was known to be at a depth of 75 meters.

According to the 1D few layer inversion performed in Aarhus SPIA software, a clear drop in resistivity is seen at a depth of approximately 75 meters, and thus the WalkTEM sounding is able to reproduce the result within one meter of accuracy (see the rightmost figure).

Secondly, it had to be verified that the Walk-TEM measurements are able to reproduce the data obtained with the SkyTEM system.

Soundings with the WalkTEM instrument were made coincident with several SkyTEM measurements and the comparison came out very successful (example shown at the leftmost figure).



### ACKNOWLEDGEMENT

Guideline Geo wishes to thank Michel Groen, Wiertsema & Partners for putting this case story together and to PWN and ARTESIA Water for making the project results available for sharing.

PWN: <https://www.pwn.nl/>

ARTESIA Water: <http://www.artesia-water.nl/>

Wiertsema & Partners: <https://www.wiertsema.nl>



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