

Cone Penetration Tests with electrical conductivity for fresh-salt water investigations

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ABSTRACT

For fresh – salt water investigations in river deltas and other coastal areas, geophysical methods, based on contrasts in the electric conductivity of salt - and fresh water are commonly used. Ground truth is often derived from borehole logs and chemical analysis of groundwater samples obtained from monitoring wells. Cone Penetration Tests with simultaneous measurement of the soils electrical conductivity offer a cost effective alternative for investigations in areas with a soil profile consisting of unconsolidated sediments, providing an almost continuous profile with a resolution that does not diminish with depth. The technique has recently been applied in several projects ranging from groundwater exploration studies, ASR projects for storage of fresh water in salt water aquifers to environmental impact studies related to large scale coastal protection projects. In these case studies the CPT data have been compared to data from different geophysical techniques obtained from measurements carried out at the surface, airborne measurements, lithological and geophysical borehole logs and chemical analysis from monitoring wells, proving the accuracy of the in situ CPT measurements and added value for the interpretation of the data obtained by other geophysical techniques.



Figure 1. CPT investigation on the beach at the Dutch coast.

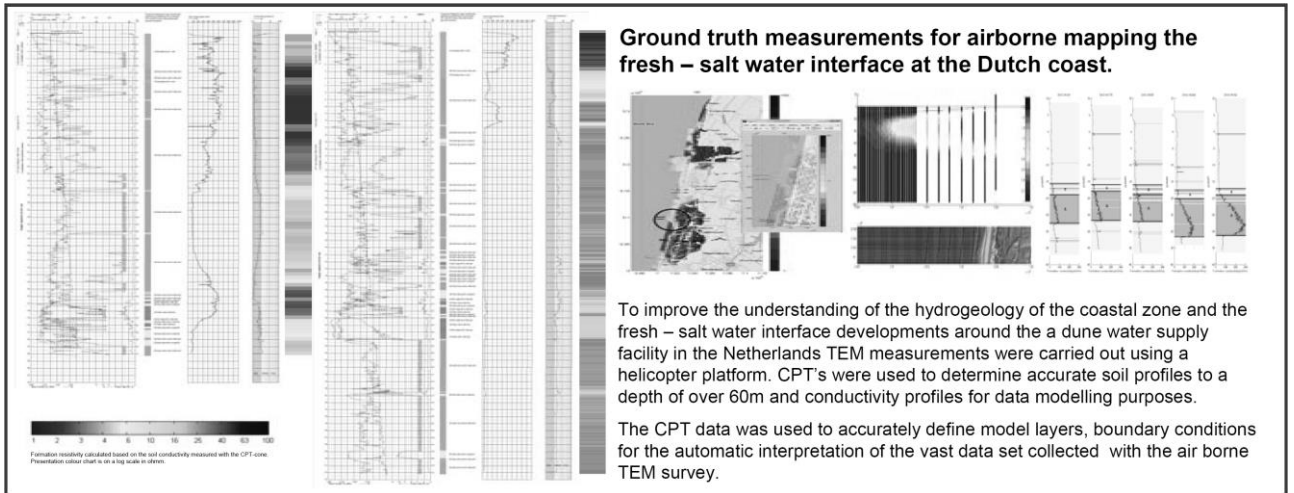


Figure 2. CPT results including soil conductivity to 60m depth with a resolution of 2cm.

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