

# Tracer tests and DC resistivity measurements

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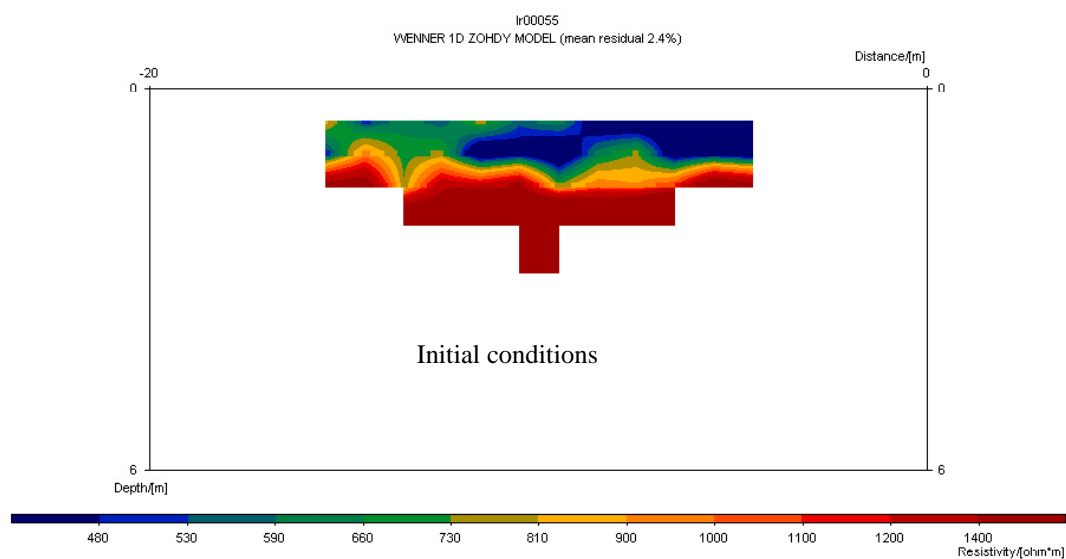
The need of better evaluation tools for groundwater investigations has increased during the last years as aquifers become more and more exploited. Tracer tests has been used for many years to clarify the picture of for instance groundwater flow directions. However, the method is based on groundwater sampling in few groundwater tubes, giving an unsatisfying picture of the flow conditions, especially in heterogenous geological environments.

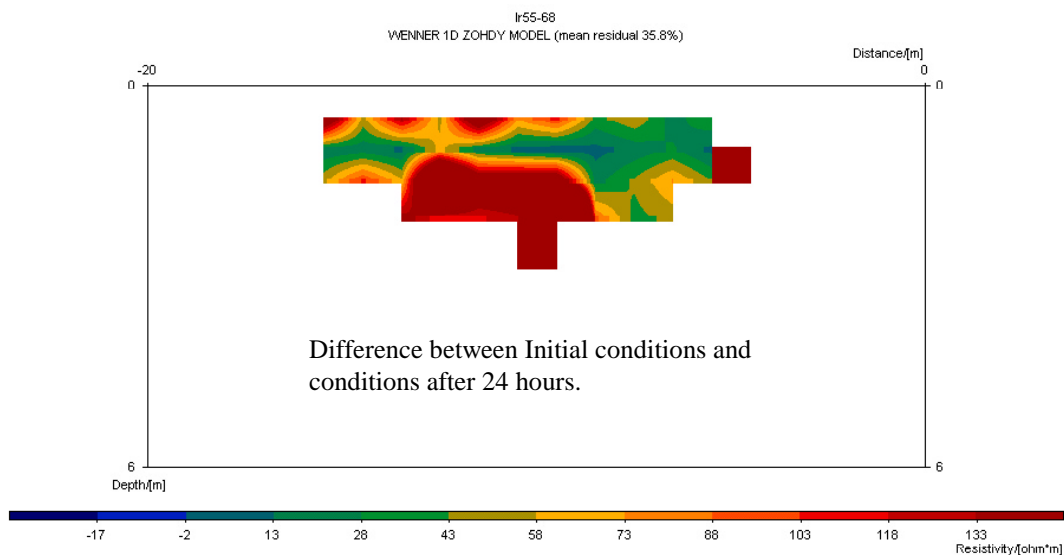
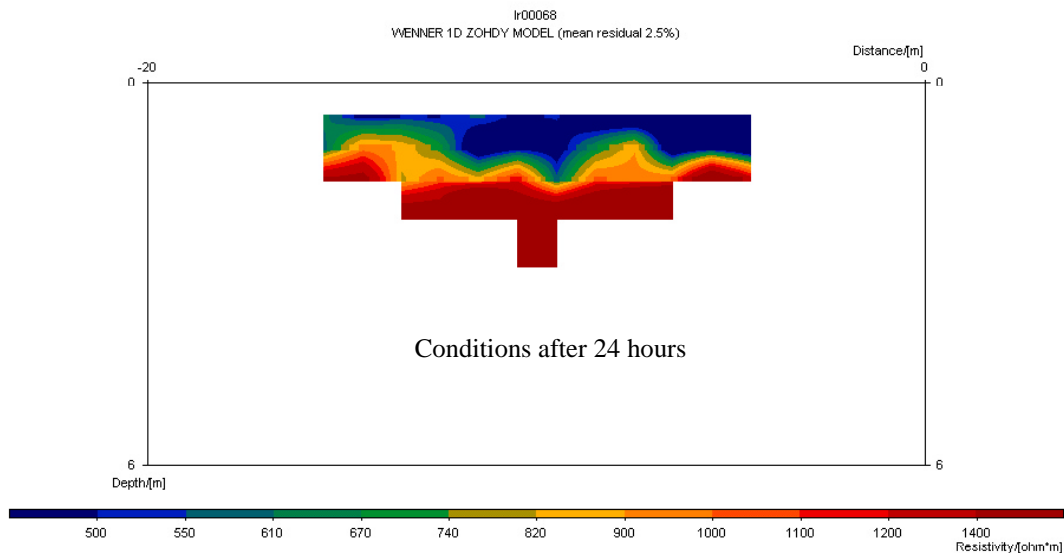
Research has now started (during the summer 2000) to investigate if DC resistivity measurements can be an aid to follow the tracer in an more spatial way. And by that determine the groundwater flow direction and velocity. The project is carried out using SAS4000 and the LUND Imaging System from ABEM.

Below, one example is given of a small scale tracer test in a stone quarry with 1-2 m of unspecified filling material. The groundwater level is very shallow and fluctuating. The application of the tracer (NaCl-solution) were done 10 m up-streams the shown profile.

The top picture represents conditions prior application of the tracer and the pictures below the conditions after 24 h together with the difference between the initial resistivity condition and the conditions 24 h after application.

The top picture shows a very shallow bedrock (approx. -2 m) overlain by a heterogenous material, with a large variation in water content. Most of the overburden (up to approx. -30 cm) is however water filled.





As seen the largest differences appear in the left/mid part of the profile, just above the bedrock surface, where the major flow of tracer occurs. In the last profile, showing the difference, the affect of rain falling during the test period is also clearly seen. The resistivity difference is large at the ground surface due to the heavy rain before and during the measuring.

The research work is continued with similar small scale tests in different geological environments.