

## 03

### **Large-scale repeated DC geoelectric surveying for CO<sub>2</sub> monitoring at the Ketzin pilot site, Germany**

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At the Ketzin pilot site, Germany, CO<sub>2</sub> has been injected into a deep saline aquifer since 2008. Before and during the CO<sub>2</sub> injection phase, a comprehensive geophysical monitoring programme has been conducted including seismic and geoelectric measurements. The main part of the geoelectric monitoring is a permanent electrode installation (VERA-vertical resistivity array) with 45 electrodes deployed in the three Ketzin wells to monitor subsurface resistivity changes associated with the migration of the CO<sub>2</sub> in cross-hole configuration by the GFZ German Research Centre for Geosciences (see presentation by C. Schmidt-Hattenberger et al.). Surface-downhole measurements using current injection at the surface on two rings centered around the injection well completed the monitoring concept on a periodic basis to yield additional information outside the volume of the crosshole investigations.

As a complementary part of the monitoring programme, large-scale 2D surveys on two profiles of 4.8 km length were performed aiming at the exploration of the geological structure surrounding the wells and their influence on the crosshole and 3D surface-downhole measurements. So far, these measurements have been carried out thrice (2009, 2011 and 2012) in periods that followed the start of the CO<sub>2</sub> injection. The survey method includes a special instrumentation and measurement concept with independent transmitter and receiving units as well as an adapted data processing including 2D and 3D tomographic inversion approaches. The results reveal a complex structure due to the Ketzin anticline including disturbed zones and a former gas storage zone above the CO<sub>2</sub> reservoir. Although large-scale ERT on long profiles is challenging in the noisy environment of the storage site and near industrial plants a good repeatability from the first to the following surveys is shown. In the later surveys a better spatial resolution is reached by an enhanced data acquisition scheme including adaptive current injection and potential registration using non-polarizable electrodes.