

## Time-lapse simulation for the Ketzin (Germany) CCS site assuming a single seismic ACROSS and multi-seismic receivers

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Time-lapse-studies of the physical state of the injection zones or fractured zones is a key component in the CCS, CO<sub>2</sub>-EOR and shale-gas development. Monitoring systems using the seismic-ACROSS can be one of the most suitable methods for these purposes. We have made simulations assuming a single ACROSS source and a multi-seismometer- array installed at the Ketzin pilot site for CO<sub>2</sub> storage in Germany. At Ketzin, CO<sub>2</sub> has been injected since July, 2008. About 62 ktons of super-critical CO<sub>2</sub> have been injected to date at about 630-650 m depth, and injection will continue into 2013. To monitor how the injected CO<sub>2</sub> behaves after injection is extremely important for studying the long term behavior of a storage site. The objectives of this study are to find the most suitable locations for an ACROSS-source and receivers at the Ketzin site given infrastructure constraints. Preliminary results using the velocity-density structure site model shows that a rectangular injection zone 200 m wide and 10 m thick at 665 m depth is well imaged. This result encourages us to plan for using an ACROSS-source for time-lapse-studies to monitor the migration of injected CO<sub>2</sub> at Ketzin, even after injection has finished.

Keywords: Time lapse, CCS, ACROSS, monitoring, seismic waves, timerevesal method