



Monitoring of CO₂ injected at Ketzin using 3D time-lapse seismic data

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The Ketzin CO₂ storage site provides the experimental infrastructure to test established and new geophysical methods related to geological storage of CO₂. CO₂ is being injected and monitored using various methods. By the end of 2010 more than 44,000 tons of CO₂ had been injected into the Stuttgart Formation at approximately 650 m depth. Among the wide range of monitoring methods being applied at Ketzin, 3D time-lapse reflection seismic surveys comprise an important component. The first repeat 3D survey was acquired in Autumn 2009 after about 22000 tons of CO₂ had been injected. The time-lapse signatures of this CO₂ can be clearly observed within a radius of about 300 m from the injection well with this method. Results of seismic interpretation will be illustrated with synthetic seismic modelling and reservoir flow simulation of the migrating CO₂. A multiphase flow modeling has been performed and synthetic seismic data were generated based on the fluid flow simulation. Synthetic seismic modeling shows that the negative seismic impedance contrast between the shale and sandstone becomes stronger, when CO₂ is present. The velocity push-down effect is observed in the field data as well as in the synthetic seismic data.