



Continuous passive seismic monitoring of the Ketzin CO₂ injection site

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Since July 2008 CO₂ is injected into a saline aquifer near Ketzin, in Germany. The reservoir used for CO₂ injection is the Stuttgart Formation of Triassic age, located at a depth of about 650 m. Close to the injection well, TNO designed and implemented a permanent seismic monitoring system. The system consists of 3C-geophones and hydrophones at locations along a line of 130 meters and at depths up to 50 meters. Since September 2009 up to date the array has recorded passive seismic data continuously. A procedure has been developed to automatically detect and locate very low magnitude seismic events.

The approach consists of spectral-ratio data pre-processing and back-projection of identified seismic events. This approach is data-driven and allows handling of variations in data quality caused by temporal and spatial changes in environmental site conditions. In previous publications we focused on a detailed analysis covering two months of data. Results showed that a large majority of the identified events originates from a single location at the surface whereas only a small number of weak events seems to originate from the subsurface.

In this study we focus on the analysis of data acquired during periods when CO₂ injection was stopped or resumed, in an attempt to validate whether CO₂ injection induced pressure changes will generate microseismic events at reservoir depth at this site. One would expect the strongest microseismic activity during these periods, since the start or termination of CO₂ injection induces the largest pressure variations with associated possible microseismic events at reservoir depth.