



3D time-lapse seismic travelttime tomography for detecting near surface velocity variations: a case study from the Ketzin CO₂ storage pilot site

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Time-lapse seismic methods are an important tool for monitoring CO₂ migration and storage in geological formations. Near surface variations are one of the major problems which may introduce time-lapse noise in the application of land based seismic monitoring. Conventional reflection seismic methods have difficulties in imaging near surface structures (10-30 m depth) due to the limitation of the methods themselves. Travelttime tomography is a commonly used method to reconstruct the subsurface velocity model. It can often provide extra information on near surface structures which is difficult to obtain by the conventional reflection seismic method. In this study, we apply travelttime tomography to 3D time-lapse seismic data sets acquired from at the Ketzin CO₂ storage site. We also test different inversion strategies for travelttime tomography to investigate which one is more suitable for this case study. The results show good correlation with near surface variations obtained by other studies.