



Impact of temperature on seismic data at the Ketzin site using fluid flow simulations

Alexandra Ivanova (1,2), Christopher Juhlin (2), Ursula Lengler (1), Peter Bergmann (1), and Stefan Lüth (1)
(1) GFZ, Potsdam, Germany (aivanova@gfz-potsdam.de), (2) Uppsala University, Uppsala, Sweden

Temperature is one of the main parameters influencing the properties of CO₂ during storage in saline aquifers because it controls the phase behavior of the CO₂/brine mixture. When the CO₂ replaces brine as a free gas it affects the elastic properties of porous media considerably. In order to monitor the migration of geologically stored CO₂ at the Ketzin site, 3D time-lapse seismic data were acquired by means of a baseline(pre-injection) survey in autumn 2005 and a first monitor survey in autumn 2009. During this period the temperature in the storage reservoir near the injection well increased from 34°C to 38°C.

This increase led us to investigate the potential impact of temperature on the seismic response to the CO₂ injection and on the CO₂ mass estimations based on the Ketzin 4D seismic data. Two temperature scenarios in the reservoir(34°C and 38°C) were simulated by multiphase fluid flow modeling. These simulations show that the impact of temperature on the seismic response is minor, but that the impact of the temperature on the CO₂ mass estimations is significant.