

Determination of thermodynamics in a CO₂ injection well using pressure and distributed temperature sensing

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Abstract The injection of CO₂ into the subsurface at the Ketzin pilot site, Brandenburg (Germany), is monitored simultaneously by distributed temperature sensing (DTS) and two pressure sensors located at the wellhead and at 550 m depth. The data is used to recalculate a continuous pressure profile along the entire length of the injection well. The data allow calculation of the thermodynamic properties of the CO₂ inside the injection well, as well as potential phase transitions during the injection process. Due to compression a heat flux establishes between the injection well and the subsurface that can be quantified based on the thermodynamic state.

Key words CO₂; injection; distributed temperature sensing; heat flux