Geophysical Research Abstracts,
Vol. 11, EGU2009-9637, 2009
EGU General Assembly 2009

Simulations of Breakthrough Time for CO$_{2}$ Injection at Ketzin

Y. Pamukcu (1) and S. Hurter (2)

(1) Schlumberger Carbon Sevices, La Defense, France (YPamuku@slb.com), (2) Schlumberger Carbon Services, Den Haag, Netherlands (SHurter@slb.com)

Since the 24^{th} of June 2008, CO_2 is being injected in the Stuttgart Formation at Ketzin (Germany). This injection well and 2 observation wells, roughly 50 and 100 m distant from the injection well, are part of the European CO2SINK project. CO_2 was detected at the closest observation well on the 14^{th} of July, approximately 20 days after injection start. Here we report on dynamic simulations of the injection and flow of CO_2 into the subsurface at Ketzin. The 3D geological model obtained from the CO2SINK project coordination was built based on seismic and logging data and is reported elsewhere. This model represents the reservoir (fluvial sandstone channels within a muddy flood plain) at mean depth of 650 m and covers the complete anticlinal structure.

A blackoil commercial streamline simulator was used for the dynamic simulations. The CO_2 is allowed to dissolve into the brine. Salinity of the brine is represented by the appropriate density. Fluid properties (density, viscosity) are pressure dependent and isothermal (at reservoir temperature). Diffusivity can be accounted for. The outcome of the simulation is the time for injected CO_2 to arrive at the first observation well, 50 m distant from the injection point. These results are compared to simulations made with conventional dynamic simulators (blackoil or compositional). A full reservoir-scale CO_2 injection simulation into saline aquifers is computationally expensive and takes long times. Because of the strong effect of bouyancy, very fine vertical gridding may be necessary. The approach using streamlines allows first estimates at a fraction of the time needed by conventional simulation approaches, although less accurate than those.