Geophysical Research Abstracts,
Vol. 11, EGU2009-2926, 2009
EGU General Assembly 2009

The planning of a passive seismic experiment: the Ketzin case

G. Rossi and L. Petronio

OGS - Istituto Nazionale di Oceanografia e Geofisica Sperimentale, Trieste - Borgo Grotta Gigante 42c, 34010 - Sgonico (TS), Italy; grossi@ogs.trieste.it, lpetronio@ogs.trieste.it

In the last years, it has been recognized the importance of using microseismic activity data to gain information on the state and dynamics of a reservoir, notwithstanding the difficulties of recording, localizing the events, interpret them correctly, in terms of developing fractures, or thermal effects. The increasing number of CO2 storage experiments, with the necessity of providing efficient, economic, and long-term monitoring methods, both in the injection and post-injection phases, further encourage the development and improvement of recording and processing techniques. Microseismic signals are typically recorded with downhole sensors. Monitoring with surface sensors is problematic due to increased noise levels and signal attenuation particularly in the near surface. The actual detection distance depends on background noise conditions, seismic attenuation and the microseismic source strength.

In the frame of the European project Co2ReMoVe and of the European Network of Excellence Co2GeoNet, a passive seismic experiment was planned in the Ketzin site for geological storage of CO2, a former gas store near Potsdam, object of the CO2SINK European project and inserted also in the European project Co2ReMoVe. Aim of the survey is to complement the CO2-SINK active seismic downhole experiments, adding precious information on the microseismicity induced by stress field changes at the reservoir level and in the overburden, due to the CO2 injection.

The baseline survey was done in May 2008 by the Istituto Nazionale di Oceanografia e di Geofisica Sperimentale-OGS (Italy), with the support of the Deutsches GeoForschungsZentrum-GFZ (Germany) and the collaboration of the Institut für Geowissenschaftliche Gemeinschaftsaufgaben-GGA (Germany), shortly before the starting of the CO2 injection (June 30th 2008). A continuous monitoring (about 5 days) was performed by 2 downhole 3C geophones, and 3 surface 3C geophones located around the wells. This paper, based on the analysis of the baseline data, is focused on the design and planning of the next seismic passive surveys, optimizing the recording geometry and instrumentation, to record the microseismic events that could be induced by the redistribution of the stresses following the injection, and help the understanding of the injected CO2 behaviour.