Geophysical Research Abstracts
Vol. 12, EGU2010-10609, 2010
EGU General Assembly 2010

Collapse structures within a hydrogeothermal carbonate aquifer

Hartwig von Hartmann, Hermann Buness, Patrick Musmann, and Rüdiger Schulz
Leibniz Institute for Applied Geophysics (LIAG), Hannover, Germany (Hartwig.von-Hartmann@liag-hannover.de)

In hydrogeothermal projects karst is of special interest. In the vicinity of production and injection wells karst allows for a high hydraulic transmissivity. The solution process increases porosity and in the extreme leads to the formation of caves. There is no direct evidence by seismic methods to detect such processes, without well control. Increased porosity increase the impedance contrast to adjacent layers and leads to higher seismic amplitudes. It is questionable, whether caves still exist at a depth of more than 3000m. However, breccia caused by collapsed caves, also has higher porosities and should show high amplitude anomalies.
The Bavarian Molasse basin is one of most prospective hydrogeothermal provinces in Germany. An Upper Jurassic carbonate platform comprises the potential geothermal aquifer. Seismic data shows circular depressions at the top of the carbonate layer. Underneath the depressions high amplitude anomalies can be found. These features are interpreted as collapse structures within the carbonate platform. Pulldown effects at the base of the carbonate platform are caused by decreasing seismic velocity within the disturbed zone. Several of such features line up along prominent fault lineaments.
At the beginning of the basin development within Mid-Tertiary times the platform has been covered by relative thin layers of shale and clastic sediments. During this time the platform has been affected by small scale tectonic movements. This has established a topography, which could have induced the formation of karst. Larger caves collapsed during the ongoing basin development and resulted in the circular depressions. The process ceased during Rupelian, as can be deduced from seismic data.