Geophysical Research Abstracts
Vol. 16, EGU2014-683-1, 2014
EGU General Assembly 2014

Properties of a natural CO_2 analogue reservoir in Hungary

Csilla Király (1), Ágnes Szamosfalvi (2), Eszter Sendula (1), György Falus (2), Csaba Szabó (1), István Kovács (2), Judit Füri (2), Péter Kónya (2), and Réka Káldos (1)

(1) ELTE, Geography and Earth Sciences, Petrology and Geochemistry, LRG, Budapest, Hungary (csilla.kiraly.hu@gmail.com, (+36-1) 381 2212), (2) Geological and Geophysical Institute of Hungary

Reducing anthropogenic CO_2 emissions is one of the greatest goals of the present and future environmental scientists. Carbon capture and sequestration is considered to be an efficient technology in eliminating carbon-dioxide at large, stationary carbon-emitting industrial sources. To ensure the long term stability of the geologically trapped CO_2, behavior of the CO_2-reservoir-porewater system should be predictable on geological timescales.
Natural CO_2 reservoirs are very important in studying the safety of geological storage of industrial CO_2. In these natural occurrences we can study long term rock-fluid reactions, which cannot be reproduced in laboratories or with computer models. Nevertheless, this information is essential to assure the long term safety of CCS-technology.

The Mihályi-Répcelak area (Western Hungary) is the oldest known and produced CO_2 occurrence in Hungary. In this area there are dozens of CO_2 sites that are suitable for industrial production. As a consequence many of the data are publicly available. We have studied 28 wells from the area of Mihályi-Répcelak (10 wells from the area of Mihályi and 18 wells from Répcelak area). We have rock samples from the CO_2 reservoirs and from their caprock and underlying rock layer, too. Furthermore, the fluid composition and the well log database are also known.

In this study we discuss our first results of the core samples from the study area. The rocks were selected in order to represent CO_2 reservoir lithologies, their caprocks and underlying sedimentary sequences. We have used conventional methods, i.e. petrographic microscope and also applied SEM, XRD, DTA to obtain control of the major mineralogical composition and textural feature of the reservoir rocks. Detailed analysis of samples on the caprock and underlying rock layers with XRD, SEM, FTIR and DTA are also done. The applied methods are expected to show the mineralogical and textural changes in the lithologies as a consequence of CO_2.

We have also studied archive geophysical data from the same wells, for example mono (resistivity) and dual logs (resistivity and SP). There by, the two methods for clayeyness and effective porosity could be compared. We have traced the formations within the Lower Pannonian (Late Miocene) sedimentary sequence. The carbon-dioxide is mostly trapped in the stratigraphically lowest formation at Répcelak and in a stratigraphically higher formation at Mihályi area. We have calculated the porosity, permeability, clayeyness, depth and thickness of the formations using well log information.