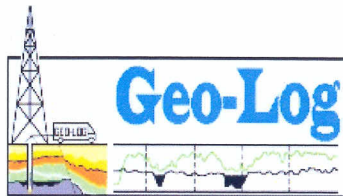


Támogatóink



Magyar
Bányászati
és Földtani
Hivatal



Eötvös Loránd
Geofizikai Alapítvány



ELGOSCAR-2000
Környezettechnológiai és
Vízgazdálkodási Kft.

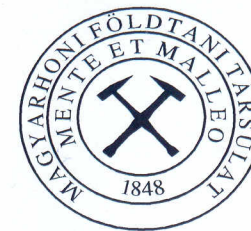


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MAGYAR GEOFIZIKUSOK EGYESÜLETE

MAGYARHONI FÖLDTANI TÁRSULAT

XLV.

Ifjú Szakemberek Ankétja

2014. március 28-29.

Balatonföldvár

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examined 39 samples containing main-, and trace element data from trace analyses for our investigations.

Our project presents results from paleoproductivity evaluation and the analyses of enrichment factors and detrital element quantity comparisons. Enrichment factors were compared with previous data regarding the utilization of trace elements in biological systems. According to paleoproductivity and enrichment factor values we can assume that biological activity played a certain role in the formation of the manganese ore deposit, the proportion of which can be quantified across the manganese succession.

Lóránt Biro's research was supported by the European Union and the State of Hungary, co-financed by the European Social Fund in the framework of TÁMOP 4.2.4. A/2-11-1-2012-0001 'National Excellence Program'.

Features of reservoir rock and pore water in Szolnok Formation

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Poster

CO₂ capture and storage in geological reservoirs is a suitable method for reduction of CO₂ emission. According to the previous studies [1] in Hungary, the best candidates to store CO₂ are deep saline aquifers. The purpose of this study is investigation of the potential storage rock–pore water system beneath the Great Hungarian Plain. This area was being subsided and filled by prograding delta system during the Late Miocene. The potential storage rock is a fine-grained sandy turbidite interlayered by thin argillaceous beds in the deepest part of the basin. This permeable sandstone, called Szolnok Formation, has great spread and thickness. The low permeable clayey caprock above the sandstone layer prevents the leakage of CO₂. The rock-pore water system equilibrated in geological timescale. This balance will be disrupted when CO₂ is injected into the system. In this study we analyzed drilling core samples and pore water data from Szolnok area, which is a potential region to CO₂-storage.

Several thin sections were made from the core samples to determine their modal compositions, grain size, pore distributions and

geometry. Furthermore SEM, XRD, TA and FT-IR measurements were carried out. The water compositions of the studied depth originate from the well log database. Information used from these archive documents were supervised and unified. This information may contribute to better understand of the natural, equilibrated reservoir system and be a base of further investigation in relation to CO₂ storage.

[1] Falus, Gy., Szamosfalvi, Á., Jencsel, H., Hámor-Vidó, M., Török, K. (2011): Assessment of the national geological structures for carbon dioxide reinjection (in Hungarian). *Hungarian Science* **4**, p. 450-458.

Petrographic study on jacupirangite from Kerimasi volcano, Tanzania

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Poster

Carbonatites and associated silicates are one of the most fascinating rocks that have inspired many petrologists. These igneous rocks has an outstanding significance as they are important mineral sources of rare earth elements and most high field strength elements (Zr, Nb, Ti, Ta).

The Kerimasi volcano is located in the Gregory Rift Valley along the East African Rift System, in the northern part of Tanzania, near to Oldoinyo Lengai. Our major goal is to provide a petrographic study in order to have a strong base for further petrogenetic investigations.

We carried out optical microscopy, SEM and Raman microanalyses on the samples. The jacupirangite is a plutonic rock showing cumulate texture and consisting of clinopyroxene, magnetite, olivine and calcite. Accessory minerals are phlogopite, apatite, perovskite and pyrrhotite. Based on the optical microscopic and SEM observations, both the clinopyroxene and magnetite are abundant in crystal and melt inclusions. Clinopyroxene contains magnetite, apatite, calcite, phlogopite, badelleyite and Na-Ca-K carbonates, whereas magnetite contains diopside, apatite, phlogopite, calcite, dolomite, badelleyite, perovskite and Na-Ca-K carbonates as crystal inclusions. Furnace technique was applied on magnetite-hosted melt inclusions to reproduce the melt phase at the time of entrapment. The quenched melt inclusions were analyzed by SEM. These contain Na-Ca-K

The challenge of the geophysical researches is to give more and more accurate estimation of rock physical parameters. The examination of the pressure dependence of most of these parameters (acoustic velocity, elastic moduli, porosity, permeability, etc.) is in the focus of scientists for a long time. One can find several qualitative conceptions in the literature which show the behaviour of acoustic velocities under varying load, but the calculations of their parameters are based only on mathematical regression methods. Somogyi Molnár [1] developed a rock physical model for the longitudinal wave velocity, which gives the physical meaning of the process.

In this paper this method is extended for the transversal wave velocity. In the rock physical model it is assumed that the change in acoustic wave velocities is caused by the closure of pores. This process follows often exponential relationship: it is more intensive in the beginning phase, where we start to increase the load and the larger pores are closing. The model is restricted only for uniaxial stress state and valid in the elastic domain of the medium. The joint inversion process delivers the five model parameters: α_0 and β_0 are the velocities at zero pressure, $\Delta\alpha_0$ and $\Delta\beta_0$ are the velocity drops caused by the presence of pores and λ_V is a common petrophysical parameter. With the utilization of velocities the pressure dependence of Lamé-constants (μ , λ) can be easily determined. The method is tested on literature data sets to confirm its applicability. The results show a very good correlation between measured and calculated data.

[1] Somogyiné Molnár, J. (2013): Rugalmas hullámok terjedési jellemzőinek nyomásfüggése - új közetfizikai modellek. *Miskolci Egyetem, PhD értekezés.*

Reducing anthropogenic CO₂ emissions is one of the greatest goals nowadays. 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 geologically trapped CO₂, behavior of CO₂-reservoir rock-pore water system should be predictable on geological timescales.

Natural CO₂ occurrences are important in studying the results of long term CO₂-fluid-rock reactions. Furthermore, we can verify the results of geochemical models widely accepted. In this study we created a geochemical model to the potential reservoir rock-pore water-CO₂ system and this result was compared to the results of natural reservoir rocks analysis.

The studied natural CO₂ reservoir (Mihályi-Répcelak area in western Hungary) is the oldest known and produced CO₂ occurrence in Hungary. Many of the data from the field and the wells are publicly available. Using these information we can build a comprehensive picture about the composition of the fluid system, which is essential to understand the interactions within the given rock-fluid system. The reservoir rock was studied with polarization microscopy, SEM, XRD, RAMAN, TG and FTIR.

In the Pannonian Basin the best candidates for future CO₂ storage are Lower Pannonian sequences similar in lithology to those from the Mihályi Répcelak area. We studied the Szolnok area, where the available water chemistry data sources used in this study are well log databases. The collected rock samples were analyzed in the same way as above. Using these data we created a geochemical model by PHREEQC-3 to predict the reservoir behavior in response to future CO₂-injection.