Nuclear magnetic resonance (NMR) and mercury porosimetry measurements for permeability determination

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Permeability, the most important reservoir property of rock can be directly measured on samples and determined using various statistical relationships between petrophysical parameters. We tested usefulness of Swanson parameter obtained from the mercury porosimetry results and T2 relaxation time from the Nuclear Magnetic Resonance (NMR) to find adequate formulas to improve permeability determination. We used the Devonian carbonates and the Carboniferous mudstones from the Western Carpathians and the Rotliegend sandstones from the Foresudetic Monocline in Poland. New factors as Swanson parameter or T2 relaxation time in NMR are effective in creating empirical relations describing reservoir parameters of rocks. Precision of measurements and features of rock decide about quality of the relations and their effectiveness.

Statistics to improve results of well-logging interpretation in reservoir rocks: Two cases from the Carpathian Foredeep

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Principal component analysis, cluster analysis, and discriminant analysis were applied to well-logging data from the Miocene clastic formation in the Carpathian Foredeep, Poland. The main goal was to improve the results of interpretation of well logging in terms of determining gas-saturated horizons. The presented examples illustrate how statistical methods help limit the number of log data while preserving sufficient information. In addition, the two cases illustrate the grouping of data into clusters to reveal sets of features attributed to reservoir horizons and sealing layers and construction of discrimination functions to distinguish between gas- or water-saturated beds of sandy-shaly lithology.

Preliminary results about a new locality with micromammals from the Early Miocene deposits of the Kazan Basin (Central Turkey)

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A new fossil micromammal locality was discovered within the framework of the EU VAMP (Vertical Anatolian Movements Project) Topo-Europe Project. The locality is an old quarry situated in the area of the village Gökler, in the southeastern part of the Kazan Basin, N of Ankara. The section is characterized by few coal horizons and by alternate whitish, greenish and pinkish silty mudrocks, partly laminated. During summer 2009 field campaign, the section was sampled for ostracodes, pollen, small mammals and for magnetostratigraphy. Unfortunately, the signal from paleomagnetic samples was weak, but few samples showed

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normal polarity. Ostracodes are abundant through all the section and they are typical for a lacustrine environment.

The testing samples for small mammals came from two horizons rich in organic material and yielded very promising content of small mammals. Both rodents and insectivores were recovered. The insectivores are not yet processed whereas here we present the first data about the rodents. The assemblage of rodents is characterized by the dominance of three species of *Eumyarion*. Very abundant is also *Democricetodon* aff. *franconicus*, whereas *Cricetodon* sp., and *Vallaris* sp. are not very common. Gliridae are represented by *Glirudinus* cf. *haramiensis*. The presence of three species of *Eumyarion* is very unusual. The only locality with so diversified genus *Eumyarion* is Sabuncubeli (lower part of MN3). During the MN4, in Anatolia, small forms of the genus *Eumyarion* were replaced by *Anomalomys*. The general composition of the fauna shows very close relationships with the Keseköy locality (lower part of MN3). Therefore, we conclude that the age of the Gökler assemblage best fits to the lower part of MN3. During the next field season we are planning to perform main sampling of the locality and we are expecting to recover more specimens and to get a more detailed frame of the Gökler assemblage.

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Evaluation of present day seismicity in the Aegean Region using Kaltek Method

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The relative size distribution of earthquakes is an essential input parameter needed to perform probabilistic seismicity analysis. In this analysis, the basic well-known equation of Gutenberg-Richter relation (LogN=a-bM), one of the well-fitted empirical relations in seismology, the frequency of occurrence of earthquakes as a function of magnitude is explained. Many researchers accepted that the b-value in this equation reflects the region seismicity. For the calculation of a and b parameters, many methods are used such as Maximum likelihood, least-square, weighted least-square, Kaltek method, etc. We used newly developed Kaltek method. This method is constituted one assumption and one hypothesis for the calculation of b-values. *Assumption*, The a-value in the Gutenberg–Richter relation demonstrated exponential distribution of the earthquakes that are zero magnitude. *Hypothesis*, Under this assumption; the a-value calculated from the whole region data set can be accepted as a constant value for the calculation of new b-value belonging to each subregion, which are included by the main region. On the other hand, the number of earthquakes that have zero magnitude is equal to the constant value for each subregion or every point of the whole region.

In this study, the spatial distributions of seismicity and seismic hazard were assessed for Aegean Sea and its surrounding area. For this purpose, earthquakes that occurred between 1964 and 2010 with magnitudes of M≥4 were used in the region (32–42°N and 20–30°E), selected from International Seismological Centre (ISC) catalogues. For the estimation of seismicity parameters and its mapping, the Aegean Sea and surrounding area are divided into (0.25^0Nx0.25^0E, r=0.25^0) 1,681 circular subregions. The a and b-value from the Gutenberg–Richter frequency magnitude distributions is calculated by the classic way using the least-squares technique. In this calculation, the minimum, maximum and average a-values are found to be equal to a_{min}=1.08, a_{max}=10.98 and a_{avr}=5.22, respectively, in the 1,681 subregions. Variance and standard deviation of the a-value are estimated to be v=2.0 and q=1.4. we calculated new b-values for every subregion taking a constant a-value which is equal to a_{avr}=5.22 according to Kaltek procedure.

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