New data on burial and exhumation within Orava-Nowy Targ Intramontane Basin (Western Carpathians): results of vitrinite reflectance studies

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The aim of the study was to determine the maturity of organic matter in the Neogene sediments of the Orava-Nowy Targ Intramontane Basin and to estimate, according to vitrinite reflectance (Ro), maximum paleotemperatures affecting studied sediments. The area of research is located in southern Poland and northern Slovakia, on the boundary between the Inner and Outer Carpathians. The Neogene and Quaternary deposits, which are filling the basin, discordantly overlie folded strata of the Magura Nappe (Outer Carpathians), Podhale flysch (Inner Carpathians) and Pieniny Klippen Belt (Birkenmajer 1979).

The analysis was performed on eleven miocene claystone and coal clay samples collected from four outcrops in Polish part of the basin and one outcrop in Slovak part of the basin. Microscope analysis of organic matter in reflected white light was carried out for each sample. Random reflectance of huminite was measured under oil immersion on randomly oriented grains using Zeiss Axioplan microscope in reflected monochromatic non-polarised light. The values of Ro were converted into paleotemperatures according to Barker & Pawlewicz (1986) equation.

It was not possible to calculate paleotemepratures in ten samples due to low maturity of organic matter and to low carbonization degree of coal. Only for one claystone sample from Chochołów reflectance of vitrinite measurement was positive. The value of Ro for analyzed sample was 0.366%, which indicate paleotemeprature of about 25°C (early stadium of diagenesis). Previous analysis of the organic matter in the studied area was carried out by Nagy (1996). Comparison of the results of the measurements of the vitrinite reflectance in the mentioned article match the values described in this study. However the temperatures associated with the burial history proposed by Nagy (1996), do not correlate with the temperatures calculated from the equation of Barker & Pawlewicz (1986). Due to the temperature differences it is problematic to correspond with the burial history of studied area proposed by Nagy (1996).

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