

Provenance analysis of the Miocene pebbles of borehole Ib-4 in W-Mecsek Mts., SW Hungary

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The fluvial weathering and transport played the main role in the formation of the Early Miocene conglomerates at the western, northern and eastern edges of the Mecsek Mountains. A statistical and petrological investigation were started to reveal the provenance of the Miocene pebbles and determine the geological settings of the source area.

The Miocene conglomerates create a coherent stripe at the western and northern parts of the Mecsek Mountains, but at the eastern sides of the mountains they occur only in smaller, independent spots. The most of them form the Szászvár Formation, they can be found on the surface and further from the mountains in deeper basins covered with younger sediments as well. The borehole Ib-4 is located close to Ibafa, Western Mecsek. The sequence starts with 11.8 m thick Quaternary clay beds, overlying the Miocene Szászvár Formation. The thickness of the conglomerate is 165.6 m; it is deposited on the Triassic Lapis Limestone.

According to earlier studies (Józsa *et al.*, 2010) the western part of the Szászvár Formation – where the borehole is located – is polymict. The pebbles which were transported from the south are well-rounded; the grain size is often 10-20 cm in diameter. The most common rock types of the gravels are the members of the Upper Carboniferous siliciclastic assemblages (conglomerate-sandstone-aleurite-clay), Permian rhyolite and Mesozoic limestone. There can be found also some “exotic” rocks such as mica schist, gneiss, amphibolite and the very rare eclogite; they occur in the basement of South-Transdanubia. The importance of the white, two-mica granite, contact-metamorphic sandstone and pencil gneiss is outstanding, because these rock types are unknown in the environment of Mecsek Mountains – even in the basement.

A new method was used to specify the geological background of the Szászvár Formation in borehole Ib-4. The precision of determination of the petrology of particular rock types and variability of rock series depends on the size and number of the grains. Although the researchers of earlier studies investigated the rock types microscopically in detail, the number of the investigated

pebbles was too low for statistical treatment. A several times higher amount of individual rock grains would be enough for accurate statistics but the microscopic description of hundreds of singly pebbles would be ineffective. The solution is to choose the smallest possible grain size of the individual rock grains, which provides well visible texture for microscopic rock determination. In most of the cases the appropriate grain size is between 1-2 mm.

There are two types of samples for this research from the Ib-4 borehole: samples with 2-20 cm pebbles appropriate to identify the different rock types, and the 1-2 mm very coarse sand grains for the statistical investigation. The sand fraction was sieved dry and wet. The separated grains were mixed with tile adhesive and filled into a brick shaped form with 4 x 4.5 cm basic area. The completed bricks were used for making 5 x 5 cm thin sections. These preparations contain about 400 grains each. In some depths of the borehole the coarse grained sand fraction was hardly cemented. Such formations have not been considered for further investigations.

During the description of the 2-20 cm pebbles the same types were observed as in the earlier studies, only the amphibolite and the eclogite were not found. The investigation of the small-grain preparations shows that there is a significant rock-type change between the different periods of the Szászvár Formation. However, for the exact determination of the Miocene geological background a correction of possible re-sedimentation needs to be applied. For this it is necessary to know the petrological composition and possible quantitative proportion of all the older siliciclastic assemblages clasts of which could have re-sedimented into Miocene sediment. This study can help to reconstruct the regional tectonics and determine the geological settings and unroofing of the eroded area.

Józsa S., Szakmány Gy., Máthé Z., Barabás A. (2010): A Mecsek és környéke miocén konglomerátum összetételének felszíni elterjedése és a kavicsanyag összetétele. in: M. Tóth T. *ed.*: Magmás és metamorf képződmények a Tiszai Egységben. GeoLittera, p. 195-217