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MINERAL COMPOSITION OF CENOZOIC SANDS AND SANDSTONES IN HUNGARY

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The evaluated data of references published before 1984 represent more than 8500 Cenozoic sand and sandstone samples of Hungary, mainly the 0.1–0.2 mm fraction of them. The mineral composition was measured by counting the grains under microscope.

The samples contained 80 different mineral species, 15 mineral groups, 140 mineral varieties, 34 types of rock fragments. On an average, 4–6 different light minerals and 7–15 different heavy minerals occurred in a sample. The older the samples are the higher sandstone ratio they have, the smaller heavy mineral content they have, the more mature they are on the basis of the most resistant heavy minerals (zircon, tourmaline and rutile), and the fewer types of minerals they contain. This fact may be caused by diagenetic processes and by the climate, which was warmer and more humid in the older ages of Cenozoic in this area. The average number of heavy mineral species in the samples representing different ages is similar to the data published by PETTIJOHN (1941).

Quartz is the most frequent light mineral in the samples of different ages, followed by the more rare feldspars and rock fragments or muscovite, except the Eocene sandstones, which contain more rock fragments than feldspars. The garnets are the most frequent heavy minerals in the samples of different ages. They are followed by magnetite in the Paleogene, pyrite in the Miocene, chlorites in the Pannonian (Upper Miocene–Pliocene), and amphiboles in the Quaternary samples. Biotite, limonite, epidotes and tourmalines are also among the most frequent heavy minerals.

The degree of similarity of the source rocks or source areas of the samples was pointed out by cluster analysis of the detrital heavy minerals. According to this, the samples of the Eocene, Oligocene and Miocene sands and sandstones are similar to each other. It is because of having similar source areas in the Alps and in the Western Carpathians and having less material from metamorphic rocks. The Pannonian and Quaternary samples are different from the older ones and slightly similar to each other. This may be due to their higher metamorphic component and the fact that their source areas were located not only in the Alps and in the Western Carpathians, but in other parts of the latter and in the Transylvanian (Apuseni) Mountains as well.

The cluster analysis seems to be an effective tool in this case, for example the Quaternary sands brought by the Danube are well distinguishable from the sands brought by the Tisza and Körös rivers, and it also helps to recognise the recycling of sedimentary rocks.

Reference
PETTIJOHN, F.J. (1941). J. Geol. 49: 610–625.