COMPOSITION AND PROVENANCE OF THE PONTIAN SAND AT SUPURU DE JOS (ROMANIA)

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The studied sand formation at Supuru de Jos (Romania) is situated in the NE part of the Pannonian Basin, the NW area of the Şimleului Basin, which is surrounded by the Bâc, the Plopiş, the Meseş Mountains, and further by the NE-Carpathians. In the basin the Quaternary sedimentary rocks are underlain by alternating Pontian lignite and dark grey sand layers, their thickness varies between 150–200 meters (CHIVU *et al.*, 1966). The detailed examination of the minerals in this sand is very useful to determine its source rocks and the post-depositional processes, and to the study of the provenance of the Pliocene and Quaternary sedimentary rocks in the Great Hungarian Plain.

Methods

We used wet sieving, optical microscopic examination, X-ray diffraction, microprobe, chemical analysis and SEM.

Results

We studied the upper part of the Pontian sandy sequence at Supuru de Jos, borehole 123 H_2P, in the interval of 41.8–46.7 m. It comprises dark grey, very well sorted, medium sand. It is loose, but partly it is cemented to hard sandstone. The few pebbles and rock fragments (bigger than 2 mm) are max. 30 mm in size, and they are subangular quartzite, volcanic rocks (andesite) with different colours and roundness, metamorphic and sedimentary rocks.

Among the sand-size grains the most frequent minerals are quartz (some have characteristic pyroclastic origin), feldspars (plagioclases, and some K-feldspars, most of them are strongly altered), muscovite, pyroxene (hypersthene, clinoenstatite, augite), amphibole (green and brown hornblende) and opaque minerals. Garnet, spinel, biotite, staurolite and rutile appear too. On the bases of the earlier data sphalerite, galenite, tetrahedrite, melnikovite and native copper also occur in the sand (KOVÁCS-PÁLFFY *et al.*, 1986). Pyroxenes and sometimes the amphiboles have "hacksaw" terminations, which are produced by post-depositional dissolution. The grains are frequently covered by thin silica cement layer in patches, and sometimes small zeolite crystals can be seen on the cement layer too. In the fraction of 0.1–0.2 mm the sand has high heavy mineral content (19 wt%), low quartz / feldspar ratio (1.4), and it contains high amount of magnetic fraction (20 wt%).

According to the results of X-ray diffraction analysis, clay minerals (illite-sericite), zeolite (clinoptilolite), rhodochrosite, calcite, magnetite, zircon, chlorite, maghemite, ilmenite, goethite, chalcopyrite, jacobsite, bustamite, franklinite and ulvöspinel also occur.

By the microprobe analysis ferroan-enstatite and ferrohornblende were determined among the minerals, which have "hacksaw" terminations. In a ferrohornblende grain one gold inclusion appeared too. Ferro-actinolite and spinel (hercynite, ulvöspinel) also occurred in the sand. The cement contains mainly Si, and sometimes it has relatively high Mn content.

Conclusions

Facies: The studied Pontian immature, very well sorted, medium sand was formed in a littoral environment in the stringing lagoons of the Şimleului Basin, which subsided and uplifted from time to time, and the sand altered with swampy sediments.

Provenance: Most of the minerals in the sand originated from different Neogene volcanic rocks of the NE-Carpathians (e.g. volcanic pebbles and rock fragment, partly the quartz, feldspars, garnet, opaque minerals and most of the pyroxenes and amphiboles), and the nearest metamorphic formations (e.g. metamorphic pebbles and rock fragments, staurolite, muscovite, partly the quartz, feldspars, biotite, garnet, spinel). Jacobsite, rhodochrosite, and partly the magnetite came from Precambrian metamorphic carbonate rocks, because these minerals are described from the Răzoare Formation of the Preluca Mountains (HÂRTOPANU *et al.*, 1993). Some minerals and rock fragments originated from recycling of older sedimentary sequences.

Diagenesis: The strong etching of some minerals, the "hacksaw" terminations of pyroxenes and sometimes the amphiboles, and the cementation of the sand caused by post-depositional processes. Diagenesis was related to the swampy, organic material rich environment, the carbonate- and volcanic rock fragment content of the sand, and subsidence and uplifting of the basin from time to time.

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