

TESTING THE HEAVY MINERALS ACCUMULATION IN BOZEŞ SEDIMENTARY ROCKS (SOUTH APUSENI MTS., ROMANIA)

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Hydraulic sorting is an important factor which may influence the sediments during transportation and deposition, resulting in mineralogical and chemical differentiations due to the preferential accumulation of weathering-resistant heavy minerals, such as zircon, apatite, monazite and titanite (sphene) (NESBITT & YOUNG, 1996). These accessory phases are the main hosts for some trace and RE elements (e.g. Zr, Y, U, Th, Nb, Ta; MASS & McCULLOCH, 1991), thus their fractionation may produce irregular chemical variations in rock composition, and furthermore may complicate the interpretation of sedimentary provenance, mainly based on RE and selected trace elements contents (LA FLÈCHE & CAMIRÉ, 1996). Even more, in some cases the hydraulic sorting may indicate the way and the direction of the detrital flow.

Therefore, the evaluation of the intensity of sorting is a very important task, and can be performed either through the shape of rock fragments and quartz grains or through the geochemical composition of the rocks, by examining the abundances and co-variations of selected elements (e.g., LI *et al.*, 2008).

The studied area, located in the SE part of the Metaliferi Mountains (Apuseni Mts.), was part of a Late Cretaceous basin in which siliciclastic material was deposited in turbiditic facies. Now the detrital rocks, as rhythmical alternations of clays and sandstones, with an overall thickness of 3000 m, constitute the Bozeş Formation. Twenty two sandstone samples were collected and investigated in terms of petrography and whole-rock geochemistry in order to test the intensity of sorting and its effects on heavy minerals accumulations.

Under the microscope, most of the samples show angular to subangular lithic fragments and quartz grains. There are few exceptions, with more rounded grains, but these are not preferential to any part of the basin. Thus, a short-term transportation and consequently, a lower sorting degree are inferred for Bozeş sediments.

Geochemically, constant abundances, as well as weak and unsystematic co-variation of selected elements, show a low degree of sorting (LI *et al.*, 2008), and this is the case for Bozeş sediments, with constant Zr, Nb, Y and Ta abundances. Furthermore, very weak correlations are observed between LREE and Th, Ta/La and Ti or HREE and Hf (LA FLÈCHE & CAMIRÉ,

1996). No fractionation of the Ta/La ratios excludes any significant accumulation of zircon and titanite (Fig. 1), which may increase the Th, Hf, and Ta contents of the sediment, besides Zr. In the same way, a very weak accumulation of apatite is shown by the Tb/Yb ratios.

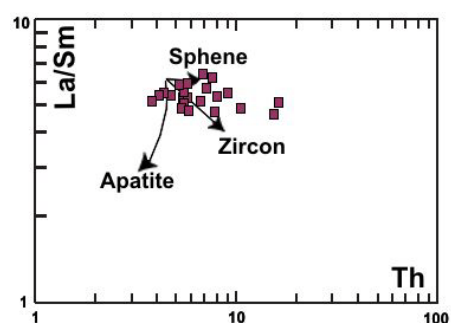


Fig. 1. Plot showing the effects of heavy mineral accumulation on Th and La/Sm ratios in Bozeş sedimentary rocks (after LA FLÈCHE & CAMIRÉ, 1996).

Therefore it can be concluded that heavy mineral accumulation did not influenced significantly the geochemical signature of the Bozeş sedimentary rocks, which can be used further for provenance interpretations.

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