

BOZEȘ SEDIMENTARY UNIT (APUSENI MTS., ROMANIA) – GEOCHEMICAL CONSTRAINTS ON PROVENANCE AND TECTONIC SETTING

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The Upper Cretaceous Bozeș Formation is a sedimentary unit located in the south-eastern part of the Apuseni Mts. Lithologically it consists of rhythmically alternating clays and sandstones, deposited in a turbiditic facies, with an overall thickness of 3000 m (GHÎȚULESCU & SOCOLESCU, 1941). Based on macro- and microfauna, its age was defined as Santonian–Campanian (BĂLC *et al.*, 2012 and the references therein).

Sixteen samples of various sandstones were collected and analyzed for whole-rock geochemistry in order to investigate the source area of weathering, sorting effects and to constrain the provenance and tectonic setting.

The chemical compositions are similar for all investigated samples, with limited ranges for both, major oxides and trace and RE elements. The sandstones are potassic ($\text{Na}_2\text{O}/\text{K}_2\text{O} < 1$) and can be classified as arenites and greywacke. The $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratios, ranging between 2.63 and 11.24, as well as the high values of Sr/Rb indicate a high immaturity of the samples. Lack of hydraulic sorting during transportation is supported by the constant REE and Th contents (which usually vary according to the preferential accumulation of heavy minerals). The chemical index of alteration (CIA) (NESBITT & YOUNG, 1982) has values between 56 and 81, pointing out a weak to medium chemical weathering/alteration of the source rocks, the process including only feldspar transformation.

A dominant intermediate igneous provenance is constrained based on the major oxides petrology, but with a consistent contribution from a quartzose sedimentary source. Trace elements (La, Th and Hf) indicate an acidic arc as source for Bozeș sediments.

On various tectonic discrimination diagrams based on trace and RE elements, developed by BHATIA & CROOK (1986), Bozeș sediments are grouped within the continental arc source (Fig. 1), showing that their deposition took place on a convergent margin in a continental volcanic arc setting. Thus, Bozeș unit was

originally a sedimentary basin located in an environment of a volcanic arc developed over thin continental crust (as inter-arc, back-arc or fore-arc).

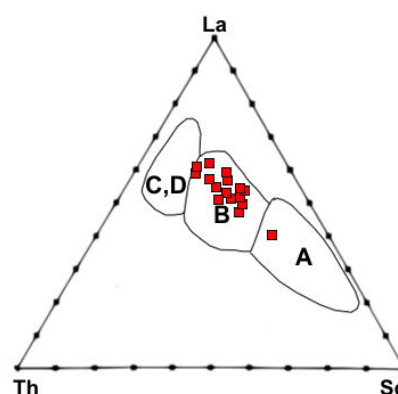


Fig. 1. Tectonic setting discrimination diagram for the Bozeș sediments based on trace elements (A – oceanic island arc; B – continental island arc; C – active continental margin; D – passive margin) (after BHATIA & CROOK, 1986).

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References

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