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Pre-ocean and post-collision intraplate basalts from Romania: A comparative study

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Abstract

In the present paper, the intraplate pre-ocean Triassic Dobrogean basalts and the post-collision Paleogene Transylvanian basalts have been comparatively studied. Although the two basaltic rock series show the same tectonic setting, they, nevertheless, display peculiarities in terms of their texture. The rocks of the first basalt series erupted along continental rifting faults during the distension period preceding the opening of the Carpathian Ocean, whereas those of the second basalt series erupted along the faults which appeared during the distension period that followed the collision of the Alpine tectonic plates. The first basalt series shows a WPB-to-MORB transition character, while the second series exhibits an IAV-to-WPB transition character. The parental magma of the first basalt series came from a depleted mantle source, while that of the second basalt series derived from an enriched mantle source, under the influence of a mantle plume. It seems that both parental magmas have been formed in the mantle, at a depth of about 30–50 kilometers. At the moment of the eruption, they had evolved as basaltic magmas, in which the olivine fractionation had already reached about 15%.

Keywords: intraplate basalts, pre-ocean basalts, post-collision basalts, geochemistry, origin.

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