

**MANTLE VERSUS CRUSTAL PROTOLITHS IN POST-COLLISIONAL MAGMATISM:  
THE VARISCAN FURCĂTURA PLUTON, ROMANIAN SOUTHERN CARPATHIANS**STREMTAN, C.C.<sup>1\*</sup>, RYAN, J.<sup>1</sup>, ATUDOREI, V.<sup>2</sup>, SAVOV, I.<sup>3</sup> & CHERATA, I.<sup>4</sup><sup>1</sup> Department of Geology, University of South Florida, Tampa, USA<sup>2</sup> Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque, USA<sup>3</sup> School of Earth and Environment, University of Leeds, Leeds, UK<sup>4</sup> Department of Geosciences, University of Poitiers, Poitiers, France

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Numerous granitoid plutons intruded the Neoproterozoic basement of the Danubian domain (Romanian Southern Carpathians) during the Variscan orogeny. The age distribution recorded from the plutons indicates that this essentially granitic/granodioritic (lacking associated basic rocks almost completely) activity is of post-collisional origin.

The Furcătura (317.1±2.8 Ma) pluton, albeit volumetrically small, is remarkably heterogeneous, showing wide ranges for most of the petrological and geochemical parameters. These metaluminous to strongly peraluminous (A/CNK of 0.76 to 1.91) granites, granodiorites, and quartz monzonites are calc-alkaline to high-K calc-alkaline (with some excursions in the shoshonitic field) and are characterized by a wide range of Mg# (15 to 84). They lack significant Eu anomalies (average Eu/Eu\* of 0.94) and have sub-parallel REE patterns, with REE ranging from 51.11 to 203.7.

The heterogeneous character of the Furcătura pluton is further reflected in the  $\delta^{18}\text{O}$  values of the mineral separates. Isotopic values of quartz separates range from

7.37 to 11.59‰, with the highest values measured in the late magmatic aplitic veins. Radiogenic isotope ratios ( $^{87}\text{Sr}/^{86}\text{Sr}$  ranging from 0.707428±8 to 0.722204±6 and  $^{143}\text{Nd}/^{144}\text{Nd}$  from 0.512075±11 to 0.512331±5) are indicative of discrete sources contributing to the formation of the melts, with both crustal and mantle-like signatures. In conventional discrimination diagrams, as well as reflected by their trace elemental compositions, Furcătura granitoids show both I- and S-type granites features, with no particular geographic zonation.

Geochemical evidence suggests the pluton was derived from a heterogeneous, primarily (lower?) crustal source, with subordinate additions of mantle-generated melts (*e.g.*, low Nb/U and Ce/Pb, low  $\delta^{18}\text{O}$  values and  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios). The presence of mantle signatures in post-collisional magmas requires mechanisms that allow mantle melts to pond on the interface or to intrude the lower crust. These mechanisms generically referred to in the literature as delamination, have played an important role in the Variscan post-collisional magmatism preserved in the Romanian Southern Carpathians.