AGE OF POST-COLLISIONAL EVENTS IN THE DANUBIAN DOMAIN (SOUTH CARPATHIANS, ROMANIA): MOTRU DYKE SWARM

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This study is aimed at providing a better understanding of the emplacement age and genesis of Motru Dyke Swarm (South Carpathians, Romania) using geochemical and radiogenic isotope data.

The metamorphic basement of the Alpine Danubian nappes of South Carpathians (Romania) consists of Neoproterozoic high grade metamorphic rocks and several granitoid plutons also of Neoproterozoic age (LIÉGEOIS *et al.,* 1996; BALINTONI *et al.,* 2011), underlying low grade Ordovician to early Carboniferous formations (*e.g.,* IANCU *et al.,* 2005). The entire sequence is intruded by late Variscan post-collisional granitoid plutons (BALICA *et al.,* 2007). An extensive system of dykes, known as the Motru Dyke Swarm (MDS), penetrates through the whole Danubian basement in a presumed pre-Ordovician thermo-tectonic event (BERZA & IANCU, 1994). According to FÉMÉNIAS *et al.* (2008), this system is characteristic for a sub-volcanic event occurred in the early Palaeozoic (Cambrian-Ordovician). The MDS crosscut the Variscan post-collisional granitoid plutons and are covered by low grade metamorphic sediments. New zircon U/Pb ages on some components of MDS together with already published data reported by BALINTONI *et al.* (2011) does not confirm any Variscan or Late Variscan age, since the entire zircon population is inherited. Yet the cross-cutting relation of MDS with proven post-collisional late Variscan plutons constrain the age of these dykes to Upper Paleozoic, most likely Carboniferous. Age distribution patterns of these inherited zircons indicate a Pan-African origin and a peri-Amazonian provenance for the possible crustal source of MDS.

The distribution area of these dykes is of about 2000 km². They are characterized by heterogeneous geochemical composition and are represented by the calc-alkaline, medium-K to shoshonitic suites (*e.g.,* FÉMÉNIAS *et al.,* 2008). Furthermore this dyke system consists of numerous subvolcanic dykes defining a complete differentiation series, ranging from basaltic andesites to rhyolites (50–72% wt% SiO_2). Petrologically the MDS is comprised mainly of andesitic, trachiandesitic and dacitic dykes. Basaltic andesites with porphyry texture (euhedral amphiboles and zoned plagioclase phenocrysts) are the most common type in the MDS composition (*e.g.,* FÉMÉNIAS *et al.,* 2008).

In what concern the mineralogical aspects of the MDS, their main feature is represented by the absence of olivine and the presence of brownish amphibole phenocrysts. The primary minerals observed are: plagioclase, green hornblende and resorbed quartz**.** The Mn-enriched ilmenite is the main oxide present.

Based on the trace elements distribution and REE patterns, and also on U/Th, Nb/Ta and Zr/Hf ratios constant throughout the MDS, an ocean arc setting was inferred, dominantly sourced in an unique and homogeneous enriched mantle reservoir (subduction related and the absence of any upper/lower crustal contamination, FÉMÉNIAS *et al.,* 2008). Our Rb/Sr and Sm/Nd isotope data does not fully confirm this assumption, yet indicate a heterogeneous source of mixed mantle and crustal origin, the latter being the most prominent. The involvement of a crustal component is also suggested by the large presence of inherited zircon grains in MDS.

Therefore, we can conclude that MDS was emplaced during a Late Paleozoic (Carboniferous) post-collisional extensional event. The post-collisional tectonic setting in relation with a possible delamination could have triggered the partial melting of the uppermost mantle, which in turn could have induced the partial melting of crustal components.

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