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Neoproterozoic-Ordovician Sebes-Lotru compozite terrane from South Carpathians, Romania

I. Balintoni (1), C. Balica (1), M. Ducea (2), H. P. Hann (3), and V. Sabliovschi (4)

(1) Babes-Bolyai University, Department of Geology, Cluj Napoca, Romania (ibalinto@bioge.ubbcluj.ro), (2) Department of Geosciences, University of Arizona, Tucson AZ, USA (ducea@geo.arizona.edu), (3) Institut für Geowissenschaften, Universität Tübingen, Germany (horst.hann@uni-tuebingen.de), (4) Department of Geology, Al. I. Cuza University, Iasi, Romania (vsabliovschi@yahoo.com)

The Romanian Carpathians pre-Alpine basement is formed of peri-Gondwanan terranes. They originated close to the north-eastern margin of Gondwana, together with other eastern Mediterranean terranes (Balintoni et al., 2008, submitted). The Carpathian terranes offered dominantly Ordovician U/Pb protolith ages (e.g. Balintoni et al., 2008 submitted and references therein), except the Sebes-Lotru terrane, the main constituent of the South Carpathians basement, which also shown Neoproterozoinc protolith ages (Balintoni et al., 2004). Meanwhile, we performed new high quality LA-ICP-MS U/Pb zircon dating on magmatic and detrital zircons extracted from the Sebes-Lotru terrane rocks, which are the subject of this contribution.

1. Neoproterozoic protoliths. We dated two Neoproterozoic protoliths, one of them representing a migmatitic vein crosscutting a paragneiss at the bottom of the Lotru metamorphic unit in Godeanu Mountains, and another one from the Frumoasa metagranites, intruded within amphibolites, in the Sebes Mountains, upstream of Oasa dam. First sample yielded a weighted mean age of 549.3±3.8 Ma and the other one of 587.5±3.8 Ma.

2. Ordovician protoliths. We dated also two Ordovician protoliths, the Capalna augen gneiss in the northern part of the Sebes Mountains and Latorita orthogneiss in the Lotru Mountains. The first sample yielded 458.9±3.5 Ma and the second 466.0±4.2 Ma.

3. Detrital zircon ages. A paragneiss sample, downstream of Oasa dam on the Sebes River furnished detrital zircon. Out of 75 detrital, 17 ages have been rejuvenated during the Variscan Orogeny and the rest of 58 ages arranged between 500 Ma and 2781 Ma. The main peak is Neoproterozoic, an important gap between 1.15 and 1.6 Ga, and significant age groups are visible between 1.85 and 2.8 Ga. The youngest ages indicate a maximum upper Cambrian age for the sediment deposition and the provenance model is similar with those of the other Carpathian terranes, suggesting a north-eastern Gondwanan origin (Balintoni et al., 2008, submitted). Thus it is quite clear, that the Sebes-Lotru terrane is a composite terrane formed by a Neoproterozoic lower part and an upper Paleozoic part, superposed probably during the Variscan Orogeny.

4. Variscan overprint. The high U grains recorded the Variscan thermo-tectonic event. Medaris et al. (2003) demonstrated that during the Variscan Orogeny, the Sebes-Lotru terrane suffered continental crust subduction, supporting an eclogite facies metamorphism during the 350Ma to 320 Ma interval. Three of our samples showed partial or complete resetting of their U/Pb zircon ages between 400 Ma and 320 Ma. In this way, we can constrain the Variscan Orogeny to the above time span with two periods: (i) between 400 Ma and 350 Ma, when the temperatures increased towards 650^{o}C, the lower limit of the zircon resetting by diffusion, and (ii) between 350 Ma and 320 Ma, when the temperature exceeded 650^{o}C causing some zircons to recrystallize, rare anatectic melts production and pegmatitic veins generation.

References

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