

Gondvana-Derived Micro-Plates in the Construction of the Caucasus Collisional Orogen

Avtandil Valerian Okrostsvardze¹, Sun Lin Chung², Daniel Tormey³, David Ilia Bluashvili⁴

¹Ilia state University, Faculty of Natural Sciences and Engineering, 0162 Tbilisi, Georgia

²Institute of Earth Science, Academia Sinica, 11529 Taipei, Taiwan

³Cardno ENTRIX, CA 90024 Los Angeles, California, USA

⁴Georgian Technical University, Faculty of Mining and Geology, 0137 Tbilisi, Georgia

The Caucasus Phanerozoic collision orogen is accreted to the south margin of the Eurasian continent and was formed at the closure of Proto-, Paleo- and Meso- Tethys oceans. Currently it represents the complex segment connecting the Mediterranean and Iran-Himalayan Tethyan orogenic belts, between the Gondvana-derived Arabian plate and East European platform. Its northern border runs along ophiolite zone of the Greater Caucasus foothills, which is an eastern continuation of the Trans-European suture zone and the southern border - along the Bitlis-Zagros suture zone.

Currently Caucasus orogen is constructed by terranes, which are separated from each other by ophiolitic suture zones or powerful tectonic faults [1]. Modern research shows that in the North Mediterranean crust formation significant role was played by Gondvana-derived micro-plats, which formed after the destruction, in the ordovician period, of the Gondvana southern edge [2]. Large part of the them started moving towards the North and accreted at the S -E edge of the Baltic continent. Actually they created the skeleton, which underwent significant thermal recycling and composition evolution, and gradually formed the modern crust of the Caucasus orogen [3]. Despite the multiple tectonic, metamorphic and thermal processing (Variscan, Cimmerian and Alpine), they have still preserved Gondvanian relicts, which are considered as pre-Variscan "crystalline basement" [3]. The complex geological and isotopic (Sm-Nd, U-Pb, Rb-Sr and 40Ar-39Ar systems) data of these relicts, enabled us to restore the history of their evolution. Recent work also confirmed the existence of Gondvana-derived micro-plates and its important role in the construction of the Caucasus orogen crust. The Caucasus Carboniferous granitoids (330-305 Ma; U-Pb, Rb-Sr and 40Ar-39Ar age) contain numerous inherited zircons of a major Hf isotopic age distribution at ca. 700-500 Ma and strongly various Hf isotope composition, indicating an affiliation with magmatic activities that produced the juvenile Arabian-Nubian Shield crust and reworked Neoproterozoic materials in the Northern Gondvana [4].

According to our data, Gondvana-Derived micro-plates were organically involved in the processes of the Caucasus orogen construction formation and they have created vertically and horizontally accretion skeleton, which partial conversion (metamorphism, ultrametamorphism, recycling), basement of the Caucasus orogen continental crust was formed at the southern edge of the East European platform. Currently, Gondvana-Derived micro-plates are represented in the pre-Variscan and Variscan formations, outcrops of which are regarded as the pre-Alpine massifs [3]. In the resent construction of the Caucasus collisional orogen they are: (from N to S) Dzirula, Khrami, Loki, Akhum, Asric-Chai and Takhkuniats.

References

[1] Gamkrelidze (1997) Bull. Georg. Ac. Sci. 155(3):75-81; [2] Raumer et al. (2003) Tectonophysis 365: 45-58; [3] Okrostsvardze & Thormey (2014) Episodes 36 (1): 31-39; [4] Chiu et al.,(2015). Goldschmid Abstract.

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