Geophysical Research Abstracts
Vol. 14, EGU2012-5638-1, 2012
EGU General Assembly 2012

Protholithic age and geochemistry of magmatic rocks from the Serbo-Macedonian massif (south Serbia, southwest Bulgaria and east Macedonia)

M. Antić (1), I. Peytcheva (2), A. von Quadt (3), A. Kounov (1), B. Trivić (4), T. Serafimovski (5), G. Tasev (5), and I. Gerdjikov (6)

(1) Geologisch-Paläontologisches Institut, Universität Basel, 4056 Basel, Switzerland, (2) Geological Institute, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria, (3) Institute of Geochemistry and Petrology, ETH-Zürich, 8092 Zürich, Switzerland, (4) Faculty of Mining and Geology, University of Belgrade, 11000 Belgrade, Serbia, (5) Faculty of Natural and Technical Sciences, University "Goce Delčev" - Štip, 2000 Štip, Republic of Macedonia, (6) Faculty of Geology and Geography, St. Kl. Ohridski University of Sofia, 1504 Sofia, Bulgaria

The Serbo-Macedonian Massif (SMM) represents a complex crystalline terrane situated between the two diverging branches of the Eastern Mediterranean Alpine orogenic system, the northeast-vergent Carpatho-Balkanides and the southwest-vergent Dinarides and the Hellenides. It is outcropping from the Pannonian basin in the north, to the Agean Sea in the south, along the central and southeastern Serbia, southwestern Bulgaria, eastern Macedonia and southern Greece. It's affiliation to European and/or African plate basement is still questionable due to the lack of reliable geochronological data and a detailed structural investigation. The SMM is the key area for understanding the bipolarity of the Alpine orogenic system, as well as the interaction of the Pannonian and Aegean back-arc extension during the Cenozoic time.

The SMM is generally considered to comprise an Upper (low-grade) and a Lower (medium to high-grade) unit (Dimitrijević, 1959). The protoliths of both units are reported as volcano-sedimentary successions, which have been later intruded by magmatic rocks during several pulses. On our mission to discern the main magmatic episodes and the geodynamic evolution of the SMM; we have analysed zircon grains of metamorphic rocks from both units, as well as undeformed igneous rocks. LA-ICP-MS analyses were carried out on zircon grains in order to obtain the protolith ages and geochemical analyses were carried out on the total of nineteen samples from different magmatic rocks.

Our first results reveal the presence of the Permo-Triassic (253±13 Ma) and a late Variscan magmatism (Carboniferous; 315±9 Ma) in the Serbian part of the SMM; additionally, the Ordovician (490-440 Ma) and the Cadomian (Cambrian; 505 Ma and older) event complete the magmatic evolution in the Serbian part of the SMM. The new geochronological constraints, together with the field relationships, allowed us to conclude: a) The Lower SMM consists of a Cadomian (Ediacaran-early Cambrian) volcano-sedimentary sequences and magmatics, which were intruded by Ordovician magmatic rocks; b) The Upper SMM (Vlasina and Morava unit) contains a volcano-sedimentary sequence, which is intruded by the Cadomian magmatic rocks; c) In contrast to the Lower complex, no Ordovician age magmatics were documented in the Upper unit, and d) Lower and Upper SMM were covered by Silurian-Devonian sedimentary sequence. The youngest magmatic event in the SMM occurred in the late Eocene, it is related to the intrusion of Surdulica granodiorite and subsequent latitic volcanism.

REFERENCES

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