Geophysical Research Abstracts
Vol. 14, EGU2012-10102-1, 2012
EGU General Assembly 2012

New SHRIMP zircon age constraints on the evolution of crystalline basement in Eastern Lithuania (East European Craton)

I. Vejelyte (1), S. Bogdanova (2), K. Yi (3), and M. Cho (4)

(1) Vilnius University, Vilnius, Lithuania (irma.vejelyte@gf.vu.lt), (2) Lund University, Lund, Sweden (svetlana.bogdanova@geol.lu.se), (3) Korean Basic Science Institute, Ochang, South Korea (kyi@kbsi.re.kr), (4) Seoul National University, Seoul, South Korea (moonsup@snu.ac.kr)

The crystalline crust in Lithuania was formed between ca. 1.9 and 1.8 Ga during the Svecofennian orogeny. Major tectonic domains include the West Lithuanian Granulite Domain and the East Lithuanian Domain occupying either side of the Mid-Lithuanian Suture Zone, and in the southeast the Belarus-Podlasie-Granulite Belt. The study area is situated within the Drūkšiai-Polotsk Deformation Zone (DPDZ) in the East Lithuanian Domain, which is well defined by gravity and magnetic linear anomalies. In this study, zircons separated from two deformed granitoids of the DPDZ were dated using the Sensitive High-Resolution Ion Microprobe (SHRIMP IIe) at the Korea Basic Science Institute (KBSI).

The Novikai-1 granite defines two age groups of zircon. One group represents the inherited zircon cores dated at 1907, 1900, and 1887 Ma, respectively. The other comprises the magmatic age of metamictized cores and overgrowth rims that yielded a mean 207Pb/206Pb age of 1793.2±6.5 Ma (n=19, MSWD=2.4). The latter is broadly similar to the zircon 207Pb /206Pb age (1830±20 Ma) of charnockitic rocks in the West Lithuanian Granulite Domain (Claesson et al., 2001) and to 1.81-1.77 Ga of TIB-1 type granitoids in Sweden (Åhäll & Larson 2000; Andersson et al., 2004). This felsic magmatism suggests the development of an active continental margin of the East European Craton in the late Palaeoproterozoic.

The Tverečius deformed grandiorite contains well-preserved and oscillatory-zoned zircon grains, which yielded a mean 207Pb/206Pb age of 1542±17 (n=20, MSWD=1.8). This age is consistent with that of the rapakivi granitoids in the Svecofennian domain and of the Mesoproterozoic AMCG granitoids in the Mazury complex, NE Poland (Wiszniewska et al., 2007).

Taken together, magmatic activities in the crystalline basement of eastern Lithuania thus correlate well with those in the Baltic Shield, defined by both the Paleoproterozoic orogenic event and the Mesoproterozoic intracratonic extension.

This is a contribution to the project “Precambrian rock provinces and active tectonic boundaries across the Baltic Sea and in adjacent areas” of the Visby Programme of the Swedish Institute.

References

Åhäll K. I. and Larson S. A. 2000. GFF. 122. 193-206 p.

Andersson, U.B., Sjöström, H., Högdahl, K. & Eklund, O. 2004. In: Högdahl, K., Andersson, U.B. & Eklund, O. (eds.): The Transscandinavian Igneous Belt (TIB) in Sweden; a review of its character and evolution. Geological Survey of Finland, Special Paper 37: 104-112.

Claesson S., Bogdanova S. V., Bibikova E. V, Gorbatschev R. 2001. Tectonophysics. 339. 1–18.

Wiszniewska J., Kusiak M.A., Krzemińska E., Dörr W., Suzuki K. 2007. Granitoids in Poland, AM Monograph No. 1. 31-39.