Geophysical Research Abstracts
Vol. 14, EGU2012-10738, 2012
EGU General Assembly 2012


# The Palaeoproterozoic accretionary crustal growth: implications from new age data on the crystalline basement in Lithuania, NW Belarus and N Poland (the East European Craton)

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A southwestward younging of Palaeoproterozoic terranes in the crystalline basement in the western part of the East European Craton has been recently suggested by numerous isotopic datings (TIMS, SIMS zircon, EPMA monazite and 40Ar/39Ar). Along with geochemical and geophysical data this allows to decipher a multistage accretionary history.

In the east, the Belarus-Podlasie Granulite belt (BPG) is dominated by 1.88 Ga dioritic-granodioritic (calc-alkaline) magmatism in Belarus (Claesson et al., 2001). Remnants of c. 1.89 Ga metadiorites, c. 1.90 Ga magmatic zircon cores in c. 1.80 Ga granites (Vejelyte, 2011) in S and E Lithuania and 1.88 Ga metagranodiorites in E Poland (Radzyn area) confirm the c. 1.90 Ga accretion-related magmatism in the BPG and the East Lithuanian domain. Together with the coeval juvenile granitoids in the adjacent Okolovo terrane this indicates the formation of the Lithuanian-Belarus composite terrane at 1.90-1.88 Ga.

At c. 1.86-1.84 Ga, abundant gabbro-diorite-granodiorite-granite intrusions were emplaced further southwest in Lithuania, NW Belarus and N Poland. In Lithuana, within the Polish-Lithuanian terrane the TTG suite of deformed and metamorphosed in amphibolite facies calc-alkaline tonalitic, quartz dioritic and dioritic rocks is characteristic for the Randamonys massif. The strongly deformed granitoids in the adjacent NW Belarus, mafic granulites and gneissic granites of igneous origin in central Lithuania, garnet-cordierite bearing granites further north display similar c. 1.84 Ga magmatic age (Motuza et al., 2008). This shows that various tectonic settings including island and continental magmatic arcs were possible. They were accreted to the Lithuanian-Belarus terrane sometime at 1.84-1.81 Ga while voluminous charnockitic magmatism took place in W Lithuania (e.g. Claesson et al., 2001; Vejelyte, 2011). A chain of younger c. 1.83 Ga volcanic arcs was developed in W and S Lithuania and N Poland (Wiszniewska et al., 2005).

The widespread c. 1.80-1.76 Ga metamorphism and tholeiitic magmatism related to post-collisional extension constrain the maximum age of the final accretion of the terranes. It is evidenced by numerous 1.80-1.79 Ga gabbro-noritic, dioritic and granitic intrusions in NE Poland and elsewhere in Lithuania and Belarus (Claesson, 2001; Vejelyte, 2011). The later reworking at c. 1.70-1.45 Ga and c. 1.60-1.45 Ga AMCG magmatism affected the already accreted craton.

Evolutionary, a 1.90-1.87 Ga continental margin was established in present-day E Lithuania and NW Belarus, while younger volcanic arcs were still forming to the west and south at 1.86-1.84 Ga. They had been subsequently accreted to the c. 1.89 Ga continental margin in the time span of 1.84-1.80 Ga, and a new continental margin emerged. After the youngest c. 1.83-1.80 Ga island arcs were docked, the ocean was closed and the crust was finally cratonized. The younger 1.70-1.45 Ga events were intracratonic reflections of active geological processes further west.

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 (the Swedish Institute), Lithuanian Science Council grant MIP-034/2011 and SYNTHESYS project SE-TAF-1535

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