Monazite dating of Precambrian metamorphic events in the western East European Craton (Lithuania)

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The western part of the East European Craton (EEC) consists of several terrains finally accreted at c. 1.80 Ga [1]. The Lithuanian part experienced a complicated geological evolution with orogenic events at c. 1.85-1.80 Ga, 1.70-1.60 Ga and 1.53-1.50 Ga. Major magmatic events were dated by conventional and SIMS zircon geochronology, however it ceased to explain the complicated metamorphic history. Monazite investigations by Cameca SX-100 electron microprobe (EPMA dating) at Warsaw University enabled us to date *in situ* metamorphic reactions and decipher the metamorphic evolution.

In the metasedimentary granulites from western Lithuania (Lk2, 5, Bl150 boreholes), high-Y monazite grew prior garnet at 1.85-1.83 Ga. The peak of metamorphism of 850° C and 8 kbar was attained c. 1.80-1.79 Ga ago when new monazite started to grow together with garnett. Numerous overgrowths on older grains and a new low-Y monazite, mostly in cordierite, at 1.72-1.70 Ga may indicate garnet breakdown and cordierite growth corresponding to the second metamorphic event of 700-600°C and 6-5 kbars. The newly grown garnet and monazite of 1.63-1.62 Ga indicate the latest retrogression to 500° C and 3 kbar.

In the charnockitoids (Pl1, Vd 1 and Sp 3), c. 1.85-1.80 Ga zoned monazite is likely of magmatic origin. It grew prior garnet, in presence of xenotime, as indicated by elevated Gd and Dy contents. Zones and new grains of c. 1.61-1.60 Ga monazite (Pl1 and Vd1) crystallized together with garnet produced at the expense of pyroxene and plagioclase at 750-700° C and 7-6 kbars. The 1.59-1.56 Ga monazite (Vd1), appearing mostly in garnet rims and enriched in Y and Th, may indicate the second metamorphic event.

To sum up, the monazite study confirmed the peak metamorphism of c. 1.8 Ga and allowed to date two metamorphic events at c. 1.70 and !. ô Ga. The 1.7-1.6 Ga Gothian orogeny in SW Fennoscandia and 1.58 Ga Riga rapakivi magmatism may be responsible for the latter events.

[1] Bogdanova *et al*. (2006) *European Lithospere Dynamics*, 599–625.

Geochemistry and U- Pb age of zircons from the Salma eclogites (Belomorian mobile belt, Baltic Shield)

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In the northern part of the Belomorian Mobile Belt there were found many bodies as tectonic blocks of eclogitic rocks, which were named Salma eclogites [1]. A local geochemistry and U-Pb age of zircons from eclogites (Kuru-Vaara quarry) were investigated using ion probe. Ancient cores of zircon grains have geochemical characteristics of magmatic zircons (Fig. 1). Their age 2.9 Ga corresponds to crystallization time of magmatic protolith of eclogites. More young 1.9 Ga light colored in CL rims and grains are of principal differ from zircon cores because of irregular low content of Th и Th/U ratio, fall of general REE content to 10 ppm, reduced Ce-anomalies and Eu-anomalies, flat profile of HREE distribution and trough-shaped profile of LREE distribution with negative Nd-anomaly. Such signs characterize eclogitic zircons of different regions of the world [2]. Our data have not proved previously published the Archean values of eclogite metamorphism age.

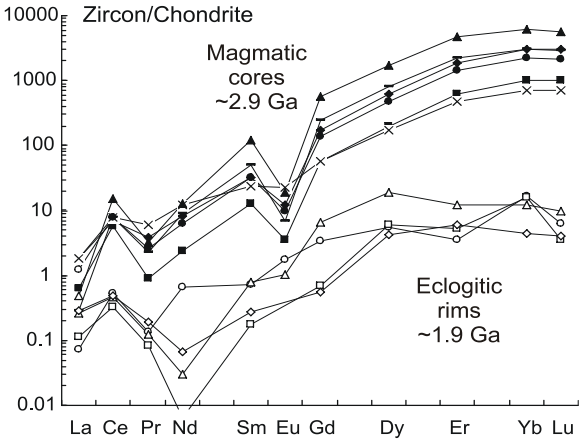

Figure 1: REE distribution in zircons from eclogite.

[1] Konilov *et al*. (2004) 32nd IGC Abstracts (pt. 1) 108.
[2] Liati *et al*. (2009) *J. Geol. Soc*. **166**, 797–810.