



## **New evidence for c.1.7-1.6 Ga metamorphism in western East European Craton from zircon and monazite study**

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The western part of the East European Craton (EEC) formed by the accretion of distinct terrains at c. 1.8 Ga. In the Lithuanian part, a major metamorphic event at c. 1.8 Ga (zircon and monazite age) is assumed to indicate the final accretion of the EEC. The possibility of a younger, 1.71-1.66 Ga geological event was indicated by hornblende  $40\text{Ar}/39\text{Ar}$  ages (Bogdanova et al., 2001) in eastern and southeastern Lithuania, along the Mid Lithuanian Suture Zone separating the West Lithuanian Granulite (WLG) and East Lithuanian (EL) Domains. A younger, c. 1.62 Ga metamorphic overgrowth on the c. 1.82 Ga magmatic zircon in the Vidmantai 1 (Vd1) charnockite in the westernmost WLG (Claesson et al., 2001) hints at the possibility of even younger metamorphism in western Lithuania. Charnockites, enderbites and opdalites, which clearly dominate the westernmost WLG, were chosen for the detailed isotopic study. U-Pb systematics of zircon from the Siupariai 3 (Sp3) and Palukne 1 (P11) charnockites was determined using a Cameca ims1270 instrument of the Nordic high-resolution ion-microprobe facility (NORDSIM); monazites of the Sp 3 charnockite were dated by Cameca SX-100 electron microprobe (EPMA dating) at Warsaw University. The Sp3 log consists of slightly deformed coarse-grained charnockites and opdalites. The c. 1.83-1.82 Ga magmatic zircons contain a few c. 2.1-2.0 Ga inherited cores. Thick rims and rounded sector-zoned metamorphic zircons are dated at c. 1.7-1.6 Ga. Most monazites record c. 1.60-1.59 Ga event, however some parts of monazites preserve c. 1.85 Ga and c. 1.7-1.65 Ga ages. The charnockites underwent 800°C and 7 kbar metamorphism. The metamorphism at 760°C and 7 kbar in P11 charnockites led to a growth of numerous garnet at the expense of hypersthene and plagioclase, decrease

of grain size and slight foliation. The majority of elongated and rounded zircons yield c. 1.7-1.6 Ga age with only some parts of rounded grains preserving c. 1.82-1.81 Ga magmatic age. It is not entirely clear what caused the c. 1.7 Ga and c. 1.6 Ga metamorphic events in western Lithuania. Further west, the 1.8-1.7 Transscandinavian Igneous Belt, 1.7-1.6 Ga Kongsbergian-Gothian Belt, the c. 1.7 Ga metamorphosed volcanites in Blekinge area (Johansson et al., 1989), just across the Baltic Sea are of similar age. It is possible that the subduction and compression further west triggered the c. 1.7 Ga and possibly c. 1.6 Ga metamorphism of charnockites and opdalites to the east of the Baltic Sea, in western Lithuania. The emplacement of voluminous rapakivi granites in southern Finland, Latvia and Estonia at c. 1.67-1.62 and 1.59-1.54 Ga (Ramo et al., 2005) may be another cause for the metamorphism of c. 1.7-1.6 Ga.

Bogdanova, S.V., et al, *Tectonophysics*, 339 (1-2), 39-66. Claesson, S., et al., *Tectonophysics*, 339 (1-2), 1-18. Johansson, A. & Larsen, O., 1989, *GFF* 111, 35-50. Rämö, O.T, et al, 2005, 1-115. Publication of the Department of Geology. Helsinki.