



## **High-temperature metamorphism and its relation with magmatism (Svecofennian Belt, the Ladoga region, Russia)**

Shauket Baltybaev  
(shauket@mail.ru)

The Ladoga region, situated in the south-eastern part of the Fennoscandian shield, is subdivided into the Archean (ARD) and the Proterozoic (PRD) domains. The boundary between them is a wide shear-zone. The ARD consists mostly of AR-PR middle-low temperature gneisses and the PRD consists of turbidites, pelites, volcanics metamorphosed under HT-conditions (granulite facies). Metamorphism within the PRD is culminated at  $T=800-900^{\circ}\text{C}$  and  $P=5-6$  kbar.

The peak of metamorphism of granulite facies is dated at 1881 Ma by Pb-Pb stepwise leaching method of rock-forming minerals of the granulites. Pb-Pb results are within error limits coeval with the U-Pb ages of metamorphic monazites. The same (1881Ma) age has gabbro-enderbites. Next stage of metamorphism lasts from 1881 to 1860 Ma under conditions of amphibolite facies. It was restricted with U-Pb, Pb-Pb, Sm-Nd data based on the closure temperature of zircon, monazite, garnet, sillimanite from gneisses, leucosomes of migmatites and synmetamorphic diorites and tonalites. The lowermost point of the trend shows P-T:  $\sim 3-4$  kbar,  $600^{\circ}\text{C}$ . By the time 1860 Ma K-rich granites were emplaced and the uppermost limit for granulite metamorphism comes from the ages of the aplitic/pegmatitic veins (1860-1850 Ma), which cut the K-rich granites.

Thermal and tectonic settings can be described based on spatial and temporal changes during magma emplacement. The granulites of the PRD were produced by the emplacement of the extensive basic intrusion (gabbro-enderbites) into the lower-middle crust. A prolonged thermal flux over all area was supported by new generated dioritic and tonalitic melts, which were intruded into the middle crust. The final stage of tectono-metamorphic evolution was marked by emplacement of the K-rich granites.

Numerical simulation of the process of magma emplacement (sequences: gabbro-enderbites, diorites and tonalites) and related heat production shows good correlation between intrusive activity and metamorphism of the surrounding rocks.

Baltybaev Sh. K., Levchenkov O. A., Levsky L. K., Eklund O., Kilpeläinen T. 2006. Two metamorphic stages in the Svecofennian Domain: evidence from the isotopic geochronological study of the Ladoga and Sulkava metamorphic complexes. *Petrology*, 14(3), 247–261.