Geophysical Research Abstracts
Vol. 20, EGU2018-18648, 2018
EGU General Assembly 2018

Geochronological calendar of A-type granites from NE Poland

Michał Ruszkowski (1), Janina Wiszniewska (2), Ewa Krzemińska (3), and Bogusław Bagiński (4)

(1) University of Warsaw, Institute of Geochemistry, Mineralogy and Petrology, Department of Geology, Warsaw, Poland , (2) Polish Geological Institute - National Research Institute, (3) Polish Geological Institute - National Research Institute, (4) University of Warsaw, Institute of Geochemistry, Mineralogy and Petrology, Department of Geology, Warsaw, Poland

The crust along the south-western margin of the EEC, particularly that in Poland and Lithuania, underwent deep deformations, attendant melting, between 1.53 to 1.48 Ga. The AMCG (anorthosite-mangerite-charnockite-granite) Mesoproterozoic Mazury magmatism has been considered as E-W trending beltiform zone of post-collisional provenance or rejuvenation of an older lineaments / terrane boundary (Skridlaite et al. 2003), with strong reworking the way down to the upper mantle. There are distinguished numerous ductile shear zones in the area, while the most pronounced extensional deformations are related to the Mazury Complex.
Several intrusions of A-type character and bimodal composition: mostly rapakivi type granites, charnockites and anorthosite-norite massifs (Suwałki, Sejny, Kętrzyn) have been found. The rapakivi-like granitoids are rather differentiated with variable density, but higher then anorthosie-norite massifs.
Geochronology by U-Pb methods (TIMS,NORDSIM,SHRIMP and CHIME) on single zircons, monazite and titanite fractions from granites allow to separate several magmatic episodes overlapping each other, lasting ∼50 Ma. The first magmatic episode is represented by monzodiorite (jotunite) rocks of the Sejny intrusion, dated with an concordant zircon at 1548±7 Ma, which is in accordance with earlier dated Re-Os ages of the ore deposits in the SAM massif. Next episode is dated with a concordant zircon at 1525±4 Ma (207Pb/206Pb age) and with subconcordant titanite at 1525±25 Ma (207Pb/206Pb age) from a monzodiorite-tonalite of Krasnopol 6, which proves a rapid cooling below 550°C (Doerr et al 2002). The Bartoszyce quartz monzonite is dated with 3 concordant zircons at 1522±2 Ma. The following episode is represented by the Boksze diorite intrusion (east cover of the SAM), which is dated with a concordant zircon at 1513±4 Ma. A similar rapakivi-type intrusions from Lithuania, the Kabeliai Complex, yielded a zircon U-Pb age of 1.505±11 Ma.
The westernmost granite massifs representing Kaszuby region (Malbork, Nowa Kościelnica, Kościerzyna boreholes) have given ages: 1497±21 Ma, 1495±13Ma, 1495±9Ma respectively. U-rich aplite and pegmatite samples from S-type granite veins crosscutting older AMCG suite, contain zircon xenocrysts which suggest low-temperature, likely hydrous (e.g.pegmatite) crustal melting, in contrast to the AMCG main suite.
Veins of post AMCG peralumionous S-granite and pegmatite yielded a crystallization age in range of 1493-1489 Ma, which partially overlaps in time with last pulses of successive generations of the AMCG plutons (between 1.53 to 1.48 Ga). This undoubtly disturbs a gradual cooling and crystallization of previously emplaced A-type granites.
The 1548 to 1513 Ma protoliths of the Mazury Complex are coeval with those of the other AMCG complexes of western Russia, southern Finland, Estonia and Latvia and central Sweden.

The research was funded by NCN project 2015/17/B/ST10/03540 and project Nr.21April2017 awarded by the Foundation of the University of Warsaw

References:

1.Dörr W.,et al., 2002. U–Pb and Ar–Ar geochronology of anorogenic granite magmatism of the Mazury Complex, NE Poland. Precambrian Research, 119, 101–120.
2.Skridlaite et al., 2003. Ferro-potassic A-type granites and related rocks in NE Poland and S Lithuania: west of the East European Craton. Pracambrian Res. Special Issue (J. Vander Auwera ed.), 124, 305–326.