



The age of the Lower-Middle Riphean boundary on South Urals is 1350 ± 10 Ma or older?

Y. Ronkin (1), S. Sindern (2), U. Kramm (2), A. Maslov (1), O. Lepikhina (1) and O. Popova (1)

1) Institute of Geology and Geochemistry of the Urals branch Russian Academy Sciences, Russia, (2) Institut für Mineralogie und Lagerstättenlehre, RWTH-Aachen, Germany (ronkin@r66.ru / Fax: +7 3432 3715252)

As it is known deposits of the South Urals Bashkirian anticlynorium are a stratotype of Riphean Time Scale, and granite-rapakivi and related rocks of the Berdyaush massif brecciated carbonate deposits of Satka suite in fact, determine the upper boundary of Lower Riphean dated as 1350 ± 10 Ma. This age was obtained as results dating by complex isotopic methods in the end of 80th years of last century: K-Ar on minerals, Rb-Sr on rocks and U-Pb on zircons from different rocks [1]. Thus, according to analytical possibilities of that time, it has been fulfilled U-Pb dating milligram quantities (hundreds, thousand individual zircons grains) by "classical" way. Successful application of the executed way of the isotope dating is significantly determined by a degree of "homogeneity" (color, the sizes, the form, the contents of inclusions, etc.) released by a zircon "monofractions". It is obvious, that the results of dating of such "community", even after labor-consuming selection of grains with the help of a microscope, are characterized by certain "averaging" which in its turn, can not be described within the frames of rather unitary graphic models used during at interpretation of U-Pb isotope data. This problem is overcome by using single zircon analyses with conventional ID-TIMS procedures or by using ion probe techniques (SHRIMP).

The first results on U-Pb to dating of individual grains of the zircon from Berdyaush nepheline syenites were published in [2] and are characterized by ages 1368.4 ± 6.2 Ma (ID-TIMS) and 1373 ± 21 Ma (SHRIMP) [3], that considerably older before published [1]. In connection with above-stated in the present work are given the subsequent results of U-Pb zircon "in situ" dating of the Berdyaush's gabbro, quartz syenite-diorite and granite-rapakivi by ion microprobe SHRIMP-II.

The obtained U-Pb SHRIMP data for different rocks of the Berdyaush Massif are: 1388 ± 28 Ma for zircons from gabbro (MSWD=0.74, probability=0.48); 1372 ± 12 Ma for zircons from quartz syenite-diorite (MSWD=0.15, probability=0.15); 1374 ± 13 Ma for zircons from granite-rapakivi (MSWD=0.31, probability=0.30).

The obtained ages, in combination with trace element data is interpreted by us as time of within plate magmatism that led, in turn, to the formation of the Berdyaush Massif rapakivi granites and related rocks. The results indicate that the upper boundary of the Lower Riphean may have an older age than previously assumed [1].

[1] Krasnobaev, A.A., (1986): Zircon as the indicator of geological processes. Nauka. 148 p. [2] Sindern S. et al. (2003): U-Pb dating of single zircon crystals from nepheline syenites of the Berdyaush Massif, Southern Urals, with application of a $^{205}\text{Pb}/^{233}\text{U}$ spike. II Russ. Conf. on geochronology .S.Petersburg, p. 461-465. [3] Ronkin Y. et al. (2005): "In situ" U-PB SHRIMP dating of the zircons from nepheline syenites of the Berdyaush Massif, Southern Urals. Lithosphere, N1, p. 135-142.