



Age (U-Pb zircon) and isotope-geochemical characteristics of bedrocks from New Siberian islands and its tectonic implications

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New Siberian archipelago (Anjou, De Long, Lyakhov's islands) is a crucial impact into the interpretation of the geological structures and ages of the basement of the East Siberian shelf rises along with the problem of the ancient Arctida continent existence [Zonenshain et al., 1990; Sokolov et al., 2002], the dating of igneous events in the Eastern Arctic, and estimation of possibility and the extent of mafic melts of High Arctic Igneous Provinces (including HALIP) crustal contamination.

More than 80 samples of gabbro-dolerites, picrodolerites, basalts, volcanic tuffs, terrigenous clastic rocks and granitoids collected during 2011-2013 International high-latitude expeditions to the Henriette, Jeannette, Bennett, Zhokhov, Kotel'ny, Bel'kov and B.Lyakhov islands have been studied. Sr and Nd mineral isochronous, U-Pb zircon (SIMS) ages and isotope-geochemical signatures (Sr-Nd-Pb-Os) of magmatic melts sources were performed.

Precambrian (Late Proterozoic) crystalline basement has been clearly identified for the New Siberian islands: granitoids, 550-600 My old, gabbro and dolerites (600-650 Ma). All of them contain inherited Paleoproterozoic and Archean zircons, while older (2.8-3.0 Ga) zircons are found in the rocks from the northern (De Long) islands, and in the rocks of the southern islands (Anjou and Lyakhov's) the most ancient zircons are of 1.7 Gy old. Moreover, in the De Long islands rocks Caledonian (460-490 Ma) reworking of Precambrian rocks is definitely fixed. Thus the rise of New Siberian archipelago most probably is a fragment of an ancient Arctida continent.

Dating of the mafic rocks and granitoids revealed also three Phanerozoic magmatic events: (1) 230-253 Ma - basic magmatism associated with the activities of the Siberian plume (developed on the southern islands – Kotel'ny and B.Lyakhov), (2) 165-185 Ma - ophiolite complex of B.Lyakhov and gabbro-dolerite intrusions of Kotel'ny island, and (3) 111-122 Ma - collisional granitoid magmatism within the Mesozoic sequence of the B.Lyakhov island.

The most primitive sources according to isotope-geochemical data (Sr-Nd-Pb-Os) are the mantle sources of the pillow basalts and serpentinites from B.Lyakhov island, but strontium isotopic composition indicates a significant contamination by the crustal material and metasomatic transformation of the underlying mantle. Also radiogenic strontium enrichment is a typical for the sources of the parental mafic melts for dolerites of Bennett and Bel'kov islands. Such contamination clearly indicates the presence of mature sialic crust and its active recycling in the region of the New Siberian archipelago.