New Data on the Timing of Mafic Magmatism in the New Siberian Islands From 40Ar/39Ar Isotope Dating

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ABSTRACT

The New Siberia Islands is located at the border between the Laptev and East Siberian seas, where Paleozoic and Mesozoic strata are exposed. Here we present the results of new 40Ar/39Ar dating of mafic dykes and basalt. Jeannette Is. The dykes of W-NW and more rarely NE strike intrude into the Uppermost Cambrian–lowermost Ordovician(?) folded strata, and locally are deformed by the low-amplitude faults and brittle-ductile shear zones. The 40Ar/39Ar isotope age of plagioclase from one of the dykes is estimated to 497.23±1 Ma (Late Cambrian). Henrietta Is. Uppermost Cambrian–lowermost Ordovician(?) volcanoclastic rocks are overlain by a thick basalt sequence in the southwest of the island. The 40Ar/39Ar isotopic age of plagioclase from the basalt is 491.22±2.2. Ma (Late Cambrian). 40Ar/39Ar dating of plagioclase from two W-NW- striking deformed dolerite dykes cutting the lowermost volcanoclastic rocks yielded 562.15±0.82 Ma and 562.71±8 Ma) (Ediacaran). These values overlaps with the age of 553.6±10.3Ma obtained by Matushkin et al. (2016) for the dolerite dykes from Jeannette Is. Bel’kovsky Is. Devonian-Permian sedimentary rocks are cut by dykes and large plutons of dolerite striking mainly to NW. 40Ar/39Ar ages of plagioclase from the dolerite dykes in the south of the island are 245.57±3.94 Ma and 235.25±0.95 Ma (Early-Late Triassic). U-Pb zircon dating of single mafic dyke in the northwest of the island yielded age at ca. 250 Ma (Kuzmichev, Pease, 2007). NW Kotel’nyi Is. Devonian to Triassic succession is cut by rare dolerite dykes of NW strike. The 40Ar/39Ar age of amphibole from one of the dykes is 128.88±20.77 Ma (Early Cretaceous). Thus, new 40Ar/39Ar dates point to the occurrence of several events of mafic magmatism across the New Siberian Islands. The earliest Ediacaran dykes are identified in the Henrietta Is. This suggests no younger than Neoproterozoic age for the lower part of the volcanoclastic succession of Henrietta Is. Then the Late Cambrian dykes and basalt were formed. Since the upper part of the section in Henrietta Is. comprises relatively thick basalt unit, therefore the volcanoclastic rocks are not younger than Late Cambrian. Early-Late Triassic and Early Cretaceous mafic dyke have been dated within Bel’kovsky and Kotel’ny Is., the latter may be related to HALIP. This research was supported by RFBR grant 16-55-20012, DPMGI SB RAS XI.124.1.6, Project N 53 (program of Russian Academy of Sciences N 32P).