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On the issue of the Precambrian basement of the Arctic shelf

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Many researchers of the geological structures of the Russian Arctic concluded that the basements of the terranes composing the Arctic shelf and continental slopes have a Precambrian age. It is assumed that these terranes are actually fragments of the ancient Arctida paleocontinent [Zonenshain, Natapov, 1987] that broke up as a result of rifting and its separate plates and terranes either were overlain by continental margins sediments or included in the fold belts in the periphery of the ocean. In the western part of the Russian Arctic, a Grenvillian and Mesoproterozoic basement was demonstrated for Svalbard, Novaya Zemlya and Taimyr Peninsula, and at least a Neoproterozoic basement was established for structures in the basement of Severnaya Zemlya archipelago. In the eastern part of the Russian Arctic, such proofs were almost nonexistent. In recent years, new information was obtained concerning the continental nature and Precambrian age of the basement crust of the New Siberian Islands and De Long archipelagos as well as probably the Mendeleev Ridge. For the New Siberian Islands and De Long archipelagos, a whole series of geochronological evidence was obtained in addition to geological data (horizontally bedding Early Paleozoic passive continental margin sediments (Cambrian, Ordovician) at Bennett Island). In magmatic and tuffaceous-sedimentary rocks of Henrietta and Zhokhov islands we discovered zircons that had formed from magmatic crystallization in the Late Neoproterozoic. New U-Pb data for zircons from rocks of these islands do not contradict isotopic dating obtained earlier by other methods – Ar/Ar and Sm/Nd in different laboratories. Considering different closure temperatures for isotopic systems, these new results complement each other. On the islands of the eastern sector of the Russian Arctic, a Neoproterozoic complex of rocks is most certainly established in the basement of the mesozoides of Vrangel Island. Here were discovered metamorphosed volcanics and volcanic clastic rocks intruded by dolerite dikes, sills and small granite plutons having an isotopic age of 700-600 Ma, which probably allows to compare this Precambrian complex with rock complexes of Henrietta and Zhokhov islands. An Early Paleozoic age (Ordovician, 471-467 Ma) was obtained for the first time by Ar/Ar dating for dolerites and basalts of the submerged Mendeleev Ridge. These geochronological data in complex with new geological and geophysical data also lead to the supposition that the basement of this continental block is also Precambrian. This is in agreement with the latest paleogeodynamic reconstructions and confirms more and more the idea of the ancient paleocontinent.