



New geological data of New Siberian Archipelago

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The area of New Siberian Archipelago (NSA) encompasses different tectonic blocks is a clue for reconstruction of geological structure and geodynamic evolution of East Arctic.

According to palaeomagnetic study two parts of the archipelago – Bennett and Anjou Islands formed a single continental block at least from the Early Palaeozoic. Isotope dating of De Long Islands igneous and sedimentary rocks suggests Neoproterozoic (Baikalian) age of its basement. The De Long platform sedimentary cover may be subdivided into two complexes: (1) intermediate of PZ-J variously deformed and metamorphosed rocks and (2) K-KZ of weakly lithified sediments. The former complex comprises the Cambrian riftogenic volcanic-clastic member which overlain by Cambrian-Ordovician turbiditic sequence, deposited on a continental margin. This Lower Palaeozoic complex is unconformably overlain by Early Cretaceous (K-Ar age of c.120 Ma) basalts with HALIP petrochemical affinities. In Anjou Islands the intermediate sedimentary complex encompasses the lower Ordovician –Lower Carboniferous sequence of shallow-marine limestone and subordinate dolomite, mudstone and sandstone that bear fossils characteristic of the Siberian biogeographic province. The upper Mid Carboniferous – Jurassic part is dominated by shallow-marine clastic sediments, mainly clays. The K-KZ complex rests upon the lower one with angular unconformity and consists mainly of coal-bearing clastic sediments with rhyolite lavas and tuffs in the bottom (117-110 Ma by K-Ar) while the complex's upper part contains intraplate alkalic basalt and Neogene-Quaternary limburgite. The De-Long-Anjou block's features of geology and evolution resemble those of Wrangel Island located some 1000 km eastward.

The Laptev Sea shelf outcrops in intrashelf rises (Belkovsky and Stolbovoy Islands) where its geology and structure may be observed directly. On Belkovsky Island non-dislocated Oligocene-Miocene sedimentary cover of littoral-marine coal-bearing unconformably overlies folded basement. The latter encompasses two sedimentary units: the Middle Devonian shallow-marine carbonate and Late-Devonian-Permian olistostrome – flysch deposited in transitional environment from carbonate platform to passive margin. Dating of detrital zircons suggests the Siberian Platform and Taimyr-Severnaya Zemlya areas as the most possible provenance. The magmatic activity on Belkovsky Island resulted in formation of Early Triassic gabbro-dolerite similar to the Siberian Platform traps. Proximity of Belkovsky Island to the north of Verkhoyansk foldbelt allows continuation of the latter into the Laptev Sea shelf.

The geology of Bolshoy Lyakhovsky Island is discrepant from the rest of the NSA. In the south of Bolshoy Lyakhovsky Island the ophiolite crops complex out: it is composed of tectonic melange of serpentinitized peridotite, banded gabbro, pillow-basalt, and pelagic sediments (black shales and cherts). All the rocks underwent epidot - amphibolite, glaucophane and greenschist facies metamorphism. The ophiolite is intruded by various in composition igneous massifs – from gabbro-diorite to leuco-granite, which occurred at 110-120 Ma. The Bolshoy Lyakhovsky Island structure is thought to be a westerly continuation of the South Anui suture of Chukchi.