Main Stages of the Tectonic Evolution of the Chukotka Peninsula and Adjacent Shelf

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Metamorphic rocks of the Chukotka complex are exposed in the east Chukotka uplift and granitic-metamorphic domes (Koolen, Senyavin, Alyarmaut and etc.). K-Ar and Rb-Sr dates of these metamorphic rocks range from 2565 to 764 Ma and suggest the Archean ages for granulite(?) and amphibolite facies rocks and the Proterozoic ages for greenschist facies rocks (Shul'diner & Nedomolvkin, 1976; Til'man, 1980; Zhulanova, 1990; Ivanov, 1995; Kotlyar et al., 2001). Recently, orthogneises from the Koolen dome core yielded the late Proterozoic U-Pb ages (650-540 Ma, Natal'in et al., 1999) and the Devonian Rb-Sr (395±24 Ma, Kotlyar et al., 2001) and U-Pb ages (369±1.2, 374±0.5 Ma, Natal'in et al., 1999). Greenschist facies rocks contain organic remnants assuming the Devonian and early Carboniferous ages (Til'man, 1980; Natal'in et al., 1999). The amphibolite facies metamorphism is dated at 104-94 Ma (Natal'in et al., 1999; Akinin, Calvert, 2002). Deformations that are older than 124 Ma are unknown. Thus, the metamorphic complex is diachronous, and an age of its crystalline basement is not clear. The Paleozoic sequence is composed of middle Ordovician - middle Devonian carbonate deposits that are overlain by upper Devonian-middle Carboniferous carbonate-terrigenous rocks and the upper Carboniferous - Permian carbonaceous shales with sandstones.

The Triassic sequences are dominated by turbidites of the passive continental margin (Tuchkova et al., 2007) and are cut by basic hypabyssal intrusions. One of them was dated at 252 Ma (U-Pb age, Sokolov et al., 2009). The upper Jurassic - lower Cretaceous clastic rocks are syn-collision and were deposited in the closing South Anyui oceanic basin (Sokolov et al., 2002; Miller et al., 2006).

Thus, the Chukotka Proterozoic basement overlain by the platform cover belonged either to the Hyperborean platform (Schatsky, 1935, etc.) or Arctida (Zonenshain et al., 1990) or Bennett-Barrovia block (Natal'in et al., 1999).

In the Carboniferous and Permo-Triassic time the continental crust of the Chukotka block experienced destruction. Its rifting and thinning preceded and predetermined the Amerasian basin formation. The opening of the Canada basin (Grantz et al., 1996) took place synchronously with the closure of the South Anyui basin (Sokolov et al., 2002). The collision of the North America and Siberian continents was terminated in the pre-Aptian time. The post-collision granites are dated at 117 Ma (Katkov et al., 2007).