

The morphology and nature of the East Arctic ocean acoustic basement

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As the result of the thorough interpretation and cross-correlation of the large seismic dataset (>150000 km and >600 seismic lines), the depth structure map of the acoustic basement was constrained. Tectonic framework, basement surface morphology and linkage of the deep basin structures with shelves ones, was significantly clarified based on the map. It becomes clear that most morphostructures presently located within deep-water basin are tectonically connected with shelf structures. Acoustic basement contains a number of pre-Cambrian, Caledonian and Mesozoic consolidated blocks. The basement heterogeneity is highlighted by faults framework and basement surface morphology differences, as well thickness and stratigraphy of the sediment cover. The deepest basins of the East Arctic – Hanna Trough, North Chukchi and Podvodnikov Basins form a united mega-depression, wedged between pre-Cambrian continental blocks (Chukchi Borderland - Mendeleev Rise – Toll Saddle) from the north and the Caledonian deformation front from the south. The basement age/origin speculations are consistent with paleontological and U-Pb zircon ages from dredged rock samples.

Most of morphological boundaries in the modern Arctic differ considerably from the tectonic framework. Only part of the Arctic morphostructures is constrained by tectonic boundaries. They are: eastern slope of the Lomonosov Ridge, continental slope in the Laptev Sea, upper continental slope in the Podvodnikov Basin, southern slope of the North Chukchi Basin and borders of the Chukchi Borderland. The rest significant part of modern morphological boundaries are caused by sedimentation processes.