

## GEOLOGICAL AND GEOPHYSICAL RESEARCHES ON MENDELEEV RISE

V.V. Butsenko, V.A. Poselov  
e-mail: vicb@vniio.nw.ru

All-Russia research institute of geology and mineral resources of World Ocean  
(VNIIOkeangeologia), St. Petersburg, Russia

In an effort to found the outer limit of the continental shelf of Russia in Arctic Ocean, in 2005 VNIIOkeangeologia has carried out the geological and geophysical researches along the crest of deep-water Mendeleev Rise and within zone of its junction with adjacent East Siberian shelf. Researches included DSS observations (with offsets up to 250 km) from ice along 600 km profile as well as seismic reflection soundings and gravity measurements (by means of helicopters based on research ice-breaker "Akademik Fedorov") and bottom sampling from vessel. In addition, researches included air-magnetic survey (scale 1:1000000) within a belt of DSS profile by means of flying laboratory (air base — Pevek).

The preliminary results of the researches are briefly presented below.

The top of the mantle is characterized by 7.7...7.9 km/s lateral changes of boundary velocity.

Southern part of DSS profile crossed the oceanward prolongations (beyond shelf edge) of two shelf structures of N-W trend — the outside part of North-Chuckchi Trough (10 km thickness of sedimentary layer and 25 km general thickness of Earth's crust) and North-Chuckchi Rise (5...6 km thickness of sedimentary layer and 34...35 km general thickness of crust).

Northern part of DSS profile exceeded the bounds of the shelf — Mendeleev Rise junction zone and is situated in area where the upper crust ( $V_{int} = 6.0 \div 6.45$  km/s), growing in some places up to 9 km thickness, is comparable with the thickness of the lower crust ( $V_{int} = 6.7 \div 7.0$  km/s). Such ratio is typical more likely for the shelf than of deep-water rises. While the Earth's crust is characterized by 26...28 km general thickness in this area, the thickness of sedimentary layer oscillates within the 2...6 km limits.

The sedimentary layer is subdivided into three sequences with interval velocities (from above to downwards) 1.7...1.9, 3.1...3.3, 4.2...4.5 km/s; the lower sequence occupies more than half of whole thickness of sedimentary layer both on Mendeleev Rise and within junction zone.

The dredging of the psephytic material was successful only on the bottom scarps where the samples are represented (70 %) by the sharp-edged fragments of the sedimentary rocks (speckled sandstones, laminated siltstones and silty mudstones, black shales, weathered limestones).

The international chart of magnetic anomalies was essentially detailed in a belt air-magnetic survey. The Wrangel Uplift, North-Chuckchi Trough of N-W trend as well as Mendeleev Rise are well-mapped on the refined magnetic anomaly grid.

The junction zone is characterized by an alternation of troughs and rises that is accompanied by terraced subsiding of sea bottom. Reducing to the minimal 5 km thickness in North-Chuckchi Trough, the layer of the upper crust is traced through all structures of junction zone to oceanic part of Mendeleev Rise where it again grows in some places up to 9 km thickness.

Confirming continental nature of Mendeleev Rise, preliminary results of researches make it possible to interpret Mendeleev Rise as a subsided in Neogene block of East Siberia.

**Keywords:** Arctic Ocean, Mendeleev Rise, junction zone, shelf, depth seismic soundings (DSS), seismic reflection, Earth's crust, sedimentary layer.

**Pages** — 6, **figures** — 4.