

Changes of sedimentation processes in the Klaipeda strait

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Introduction: Klaipeda Strait is characterized as very extensive water and sedimentary matter transit area between the Curonian lagoon and the Baltic Sea. It is not only a geochemical barrier, separating fresh and saline waters, but also a very specific sedimentation zone of high anthropogenic pressure, occupied by Klaipeda port with intensive, dredging and shipping activities. Dredging works are carried out in order to maintain the operational depth, also to deepen particular areas. During the last twenty years the depth of the port navigation channel was increased from 8-10 to 12-14,5 m. These capital dredging works changed significantly sedimentation conditions, distribution and composition of bottom sediments in the strait area. Previous detailed sediment studies have been done in 1998 [1] after that was concluded that fine sand is prevailing type of bottom sediments in Klaipeda strait.

Sampling & Methods: New full-scale sediment mapping of Klaipeda Strait was completed in 2012. The scope of investigations included sediment sampling with Van Veen grab and hydrographical measurements (multi-beam echo sounder GeoSwath combined with side scan sonar). Sediment samples were collected in 197 stations, located in different parts of the strait. In most cases location of stations corresponded to 1998 survey. Grain-size of sediments was analyzed by laser diffraction method (Laser particle analyzer Analysette22 Micro Tec Plus, Fritsch). Based on the grain-size analysis upon the proportions of sand, silt and clay sized particles, the bottom sediments were classified according to Shepard's diagram [2].

Results: Sediment types of the Klaipeda Strait vary from gravel to clayey silt. Sandy silt is prevailing type in the accumulation zones of the strait. But also in the strait are few moraine outcrops, indicating erosion of the bottom. Klaipeda strait according bottom sediments distribution, hydrological conditions and bottom morphology could be divided in three parts: northern, central and southern.

In the southern part of strait is very clear differentiation of sediment material displayed by variation of sediment types and quite successive transition from coarse material (in the very intensive transportation zone) to very fine (founded in closed bays of strait or next to berths). Sedimentary material to this zone comes from Curonian lagoon, so this zone could be called like Curonian lagoon accumulation zone.

The central part of Klaipeda strait is like transitional zone of sedimentary material. The prevailing type of sediments in this area is sandy silt mostly brought from Curonian lagoon.

In the northern part of Klaipeda strait is different situation than in both zones mentioned above primarily because here is sediment transport from the Baltic Sea. Then the main influence for this part bottom sediments composition is accumulation of sea sedimentary material. The prevailing type of sediments in northern part of Klaipeda strait is sand and silty sand.

Discussion: Deepening of the port have determined accumulation volumes and changed sediment composition. In comparison of studies made in 1998 and now, it is clear, that sediments size is going to fine part. It shows that because the natural and anthropogenic changes in the system Curonian lagoon became more dominating factor for Klaipeda strait bottom sediments composition.

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References: [1] Trimonis & Gulbinskas (2000) *Geologija* 30:20-27; [2] Shepard (1954) *Journal of Sedimentary Petrology* 24:151-185.