S1O25. Underwater landscapes of the Velikaya Salma Strait (Kandalaksha Gulf of the White Sea): formation, structure, and biota

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Velikaya Salma Strait is a part of fiard [1, 2], typical of features associated with Kandalaksha Bay of the White Sea [3, 5]. Bathymetry, subaquatic landscapes, and sediment were investigated within an area of 35.12 km^2, at depths ranging from 10 to 120 m by means of geophysical, geological, and visual observations. The set of geophysical methods utilized included multibeam echo sounding, side-scan sonar surveys and continuous seismoacoustic profiling. Geophysical data were "groundtruthed" by geological sampling and visual observations conducted by remotely operated vehicles (ROV). In addition, sediment grab samples, trawling samples, and ROV observations were collected to describe the composition and distribution of macro- and megabenthos. This combination of methods used for complex sea-bottom studies resulted in the first large-scale mapping and classification of benthic habitats on a typical glaciated shelf. Dominant physical parameters of bottom landscapes were evaluated along with the examination of their structure and hierarchy and the analysis of the relationship between environmental parameters and macro- and megabenthic communities' spatial distribution.

The main abiotic factors that form sea-bottom landscapes are the block-like structure of the Archean crystalline basement, moraine surfaces, bathymetric heterogeneity, and sediment composition and facies. Sediment ranges from pebble and boulder to sand and mud. Tidal currents that are influenced by bathymetry (dissected bottom relief) are the primary controlling process of modern sedimentation.

On the hierarchical level of "habitat types" [4], eight regions and twenty-two subregions were identified based on differing physical parameters such as geological cross-sections, meso- and microrelief forms, sediment composition, and sedimentary processes, and mapped at a scale of 10^3 to 10^6 m^2. The differing "habitat types" are based on uniform bathymetric gradients, which is disturbed in areas increased fragmentation of the basement, on mesoforms of glacial and relict gravitational relief (slumps), and zones of the highest and lowest modern sedimentation. Each region and subregion has an individual set of elementary facial units.

Inner structure of habitat types is determined by a combination of small-scale relief features, recent sediment composition, and facies type. Typical sizes of landscape units tend to decrease from 10^4–10^5 m^2 to 10^3–10^4 m^2 with increase of relief complexity. The minimum mapping scale for landscape units (microrelief), with similar (nearly homogeneous) sediment composition comprises the smallest areas, mapped at 10^1–10^2 m^2, and lie within the most heterogeneous (complex) localities of relief.

The depth and the content of sand and mud fractions in sediment significantly affect distribution of the macrobenthos. The community dominated by *Galathowenia oculata* and *Chaetozone setosa* occurs on muddy sediment while *Macoma calcarea — Scoloplos acutus* communities occupying more sandy areas. Correlations between abiotic factors and the composition of the communities are consistent within landscapes of smooth bottom relief, but less consistent on heterogeneous sites

because of variable sea-bottom currents, sediment composition. and species distribution.

The most important factor for the distribution of megabenthos is sediment composition. The community of *Balanus balanus — Ascidiacea gen. sp.* tend to inhabit sandy sediments (silty sands, fine sand, sandy-pebbles) and the community of *Mysis oculata* and *Urasterias lincki* occurs on fine sediment with a high silt ratio. Heterogeneity of the benthos communities reflects general patterns in sediment composition influenced by age of deposition and modern seafloor sedimentary processes.

Uncertainty in relations between benthos and their environment seems to be typical for glacial shelves of complicate bottom relief. Predictable changes in benthic communities occur usually on larger spatial scales along more extent gradients of factors (such as depth, temperature, salinity etc.). In scale of our study, high density of samples on complicate relief detects mostly the meso-scale patterns in a single or several benthic associations.

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