Relationship between functional and isotopic diversity of coastal benthic communities (ISOFUN)

Benthic invertebrates affect many processes essential for the proper functioning of marine ecosystems. The functional diversity of benthic animals, associated with their biological characteristics, like feeding behavior, way of movement, as well as body size, affect *e.g.* sediment mixing, which enhance the oxygen supply to sediments, and modify the exchange of nutrients at the sediment-water interface. Coastal zones of the seas are characterized by high biodiversity of benthos, as well as diverse sources of food for animals. The food (organic matter) in the form of microalgae (phytoplankton) and plant debris (detritus) is produced directly in the sea or transported to the sea by rivers. It is well known, that the source and the amount of food shape marine food webs and biochemical structure of animals consuming it, and in particular their isotopic composition of carbon and nitrogen. In consequence, relations among animals and organic matter shape the trophic (isotopic) diversity of benthic communities. However, little is known about how these relations influence the functional diversity of benthos. Thus, the main aim of this project is to study the relationship of isotopic and functional diversity and to answer the question of how different sources and amounts of organic matter (among other environmental gradients) influence this relationship on the example of the southern coast of the Baltic Sea.

The main hypothesis of the project assumes that in the area with lower food availability (open Polish coast near Łeba), benthic community will be characterized by greater diversity, caused by competition for limited food. In turn, in the area with greater access to food (Gulf of Gdańsk near the Vistula outflow), invertebrates population will be larger, while due to lack of interspecies competition, it will also be relatively less diversified. Because in temperate regions, the amount of organic matter changes seasonally, samples were collected in two contrasting seasons (winter and late summer). To address the research questions, an innovative approach of combining both functional and isotopic indices of diversity will be used. Furthermore, we will assess the influence of organic matter properties among other environmental variables (depth, water mass characteristics, sediment characteristics) on the diversity and structure of coastal benthic communities. The results of the study will improve our understanding of organic matter influence on benthic biodiversity and functioning of marine coastal ecosystems and will be an important contribution to science in the face of climate change and eutrophication of marine environments, caused by humans.