

The deep sea ecosystem (depths below 2000 m) cover more than 60% of the Earth's surface, yet **it remains the least known ecosystem on the Earth**. ACIA report (2006) predicted that global warming effects will be first observed and especially severe in Polar Regions, and the climate related fluctuations of the polar sea ice extent and hydrological regimes in polar and subpolar waters are already reported. Deep-sea benthic communities are dependent on organic carbon produced and delivered from surface waters, thus they are sensitive to interannual fluctuations in surface waters productivity controlled by sea ice conditions and hydrological regime. Both, sea ice conditions (spatial and temporal sea ice extent) and hydrological parameters (distribution of currents and water masses) in North Atlantic are strictly connected with climate. Related to climate changes fluctuations in sea ice extent and sea currents and also in quantity and quality of organic matter which reaches to the sea floor, are already observed in North Atlantic. Warm Water Anomaly (WWA) was noted in HAUSGARTEN area between 2004 and 2008. It had significant influence on the whole region – from changes in pelagic zone to the deep sea bottom.

The **aim** of the project is to **determine the influence of observed changes in hydrological and sea ice conditions** and related ocean productivity **on basic properties of deep sea benthic assemblages** – taxonomic composition, biodiversity and biomass of meio and macrofauna. The research will be conducted in the HAUSGARTEN area, where international, multidisciplinary research program was established by Alfred Wegener Institute in Bremenhaven (AWI, Germany). HAUSGARTEN area is localized in Fram Strait, between Arctic Ocean and North Atlantic, in the Marginal Ice Zone. Such localization makes HAUSGARTEN an area sensitive to fluctuations of environmental conditions related to climate changes. It is, by now, the only long-term (since 1999), interdisciplinary monitoring program of structures and functions of deep sea ecosystem. The elevated levels of standing stocks of benthic communities can have profound effects on functioning of the Arctic deep-sea sedimentary systems, including the increased intensity of bioturbation, metazoan organic matter mineralization and redefinition of carbon flow dynamics and food webs structure.

The **main task** of the project is to determine the influence of changes in environmental conditions caused by occurrence of WWA (changes in organic matter flux to the sea floor, water temperature, microorganism biomass and sea ice conditions) on structure (species composition, biodiversity, biomass) of meio and macrofauna in deep sea and continental slope sediments in HAUSGARTEN area.

Research carried out in the project will be **the first which describe the temporal variability (connected with Warm Water Anomaly) of the structure** (distribution of species, biomass and biodiversity) **of the whole zoobenthic communities** (across meio and macrofauna) **in sediments of the deep Arctic Ocean**. Moreover, they are one of the few studies on deep-water macrofauna in the Arctic. Also **methodological aspects** examined in the project, has not been assessed in deep sea research till now. Therefore, this project will be an important element of international, interdisciplinary **program for monitoring the Arctic deep sea ecosystem** conducted by the Alfred Wegener Institute. Study results will be presented at international conferences on studies of deep ocean and the latest developments in the field of marine ecology and published in highly impacted international journals.