It is predicted that climate induced changes will be first observed and especially severe in Arctic marine ecosystems. One of the main drivers of the climate related changes in the polar ecosystems is the **increased advection of warm water** masses transporting nutrients, organic matter and pelagic biota from the lower latitudes. Ecosystems localized at the southern edge of Arctic Ocean are especially sensitive to climate changes. Climate change induced fluctuations of sea ice extent and ocean currents, and hence in amount of organic matter reaching to the sea floor, are already observed in the North Atlantic and southern part of Arctic Ocean. 15-year monitoring studies conducted in the Fram Strait showed that between 2004 and 2008 so-called **Warm Water Anomaly** occurred and left strong footprint in ocean productivity and organic matter fluxes to the sea floor, evidenced even in the deep-sea sediments.

The **aim** of the project is to assess the **effects of changes in hydrological regime** (warm water advection) and corresponding shifts in **organic matter supply** to sea bottom **on functioning (**secondary production, respiration and carbon demand) **of benthic communities (meiofauna and macrofauna)** in coastal and deeps-sea habitats in Fram Strait.

The studies will be performed in the Svalbard fjords and in the Hausgarten area. Benthic communities in fjords differing in terms of hydrological conditions (‘cold’ fjords under influence of cold Arctic waters and ‘warm’ fjords under influence of warm Atlantic waters) as well as those sampled in one fjord before (1997/8) and after (2018) WWA will be compared. Hausgarten is a long term deep-sea observatory, led by Alfred Wegener Institute in Bremerhaven (Germany), localized in Fram Strait in Marginal Ice Zone. Within the project samples collected before (2000 and 2003) and after (2010 and 2017) occurrence of WWA will be analyzed and compared. Materials for the project will cover: hydrographic measurements (temperature and salinity), sediment properties (defining quantity and quality of organic matter) and samples of meiofauna and macrofauna. All organisms will be measured with use of digital image analysis. Biomass will be estimated based on individual body size measurements and benthic biomass size spectra will be constructed. Thereafter, secondary production, respiration and carbon demand of zoobenthic organisms will be calculated.

Results of the study will provide information inevitable for predicting and monitoring changes in functioning of marine Arctic ecosystems. We hypothesize that increased advection of warm Atlantic waters and increased ocean productivity will cause increase of benthic biomass and carbon consumption. This could influence re-introduction of detrital organic matter to the food web, deposition (burial) of organic carbon in deeper sediment layers and food availability for higher trophic levels (benthivorous fishes, seabirds and mammals).