

ADAMANT: Arctic benthic ecosystems under change: the impact of deglaciation and boreal species transportation by macroplastic

The melting and retreat of Arctic tidal glaciers and ice disappearance from the coast (fast ice, ice foot) are the two most conspicuous effects of climate warming on Spitsbergen, the European Arctic. The expanses of seabed are free from glacial ice at the rate of 500m per year, and the coastal ice that use to cover shores for 7-9 months, is now reduced to the late winter 2- 3 months. The deglaciation of Spitsbergen cause formation of new habitats, not available before. The observed changes are increase of biomass and biodiversity and emergence of sublittoral communities to shallower waters, where ice scouring was a controlling factor before. The boreal flora and fauna comes to Spitsbergen with Atlantic waters from the Western Europe- UK area. The distance of over 1000km that separates Spitsbergen from the Europe is a challenge for the larvae of benthic organisms, that use to live in the water column few weeks only. The new way of migration emerged with the macroplastic litter, that drifts massively on ocean currents. The large plastic boxes, barrels, nets are easily colonised by adult organisms, that may travel for years on the sea surface, before stranding on the new coast. The aim of the project is to describe the processes of arctic coast colonisation by boreal organisms. Does it follow the principle of island biogeography theory – with random colonisation of the islands, where the species richness, stability of population and structure of communities depends on the island size and distance to the continent ? Or we have the scenario of the boreal biogeographical province shift North ? In the second case the populations would be similar to source area, communities are rich and stable, and structure similar to those from the boreal sites. In the first case scenario, drift on the macroplastic litter is very important for the islands colonisation, in the second scenario is of no importance, as the whole province shifts anyway. The way to understand which scenario most likely happens, is the comparison of recently ice free areas, those that are still partly iced and the same habitats still frozen. In addition we will study the most likely source areas – coastal habitats of Fareo- Shetland islands, to compare the genetics of species that are found on Spitsbergen as well.