*Calanus* copepods are key component of a short Arctic food web, delivering invaluable lipids bioavailable for marine predators. In the Arctic, zooplankton communities are strongly affected by increased presence of warm Atlantic Water that carries small copepods *C. finmarchicus* and *Oithona similis*. If the Arctic *C. glacialis*, that are usually larger and contain more lipid stores, are indeed replaced by its counterpart *C. finmarchicus* in the near future, transfer of energy from primary producers to higher predators may be balanced by shorter life cycle of *C. finmarchicus*. Also, *O. similis* is increasingly important in the Arctic and it is likely to play a key role due to flexible adaptive traits. However, Arctic marine food webs may not be resilient enough to climate-related shifts in the glacial bays. Higher air and seawater temperature implicate intensified discharge of turbid meltwater plumes from glaciers that hinder light penetration and thus primary production is often reduced in summer in the Arctic coastal zones. It results in dynamic, potentially difficult habitat especially for primarily herbivorous zooplankton such as *Calanus* spp. Consequently, copepods of the genus *Calanus* may not be able to accumulate sufficient lipid reserves to leave the productive surface layer and descend into deeper, more stable layers for the winter. *O. similis* seems to be less affected by glacial plumes.

**The aim of this project is to use dataset collected in summer seasons for more than a decade (2010 – 2023) in the European Arctic (West Spitsbergen) and train Artificial Neural Network to simulate past and predict future changes in *Calanus* spp. distribution under multiple scenarios of changes in environmental conditions, i.e. Atlantification, glacier melting, increasing seawater turbidity.** The dataset will include continuous, high resolution measurements of hydrography, particles or fluorescence performed within the upper 50/80 m water column along transects (around 900 hours of measurements), vertical profiles to the bottom (app. 250 stations) and over 350 zooplankton samples. The category of *Calanus* will be selected from optical measurements based on previously calibrated size and opacity parameters that will be verified by zooplankton sampling. Similar calibration will be adjusted for *O. similis*. Genetic analysis will be used to distinguish between *C. finmarchicus* and *C. glacialis* the glacial bays. Maps of *Calanus* spp. availability and accessibility will be prepared for planktivorous seabirds, fish and ctenophores based on parameters available in the literature such as underwater visibility, diving range, wind and distance from the colony for seabirds. Thus, the obtained results will have large impact on the broad scientific community focused on ecological consequences of progressively warming and darkening coastal Arctic waters.