

Regional and inter-annual variability in Atlantic zooplankton en route to the Arctic Ocean: potential effects of multi-path Atlantic water advection through Fram Strait and the Barents Sea

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The Arctic is among the regions where the climate change effects on ecosystem will be the most rapid and consequential, with Arctic amplification recognized as an integral part of the process. Great part of the changes are forced by advection of warm waters from the North Atlantic and the expected modifications of Arctic marine ecosystem will be induced not only by changing environmental conditions but also as a result of introducing Atlantic biota. Thus, the knowledge of physical and biological heterogeneity of Atlantic inflow is requisite for understanding the effects of climate change on biological diversity and ecosystem functioning in the Arctic. The complex and variable two-branched structure of the Atlantic Water flow via Fram Strait and the Barents Sea most likely has a strong influence on the ocean biology in these regions, especially in the pelagic realm. Zooplankton are key components of marine ecosystems which form essential links between primary producers and grazer/predator consumers, thus they are important for functioning of the biological carbon pump. Changes in zooplankton distribution and abundance may have cascading effects on ecosystem functioning, with regulatory effects on climate.

Based on data collected in summers of 2012-2014, within the scope of the Polish-Norwegian PAVE research project, we investigate zooplankton distribution, abundance and selected structural characteristics of communities, in relation to water mass properties in the Atlantic Water complex flow to the Arctic Ocean. The main questions addressed here are: what are the differences in zooplankton patterns between the Fram Strait and Barents Sea branches, and how does the inter-annual variability of Atlantic Water advection relate to changes in zooplankton? The results of the investigation are precondition for foreseeing changes in the pelagic realm in the Arctic Ocean and are necessary for constructing and tuning plankton components of ecosystem models.