Atlantic zooplankton journey to the Arctic Ocean: how to get there?

Gluchowska M.[1], Kwasniewski S.[1], Dalpadado P.[2], Ingvaldsen R.[2], Olszewska A.[1], Beszczynska-Möller A.[1]

[1] Institute of Oceanology of Polish Academy of Sciences, Powstańców Warszawy 55, 81-712 Sopot, Poland

[2] Institute of Marine Research, P.O. Box 1870 Nordnes, 5817 Bergen, Norway

Atlantic water (AW) is carrying the largest amount of salt, heat and biological richness into the Arctic Ocean. The inflow of AW has a complex two-branched structure via Fram Strait and the Barents Sea, and the AW impact on the Arctic Ocean ecosystem depends on the entrance route. Despite the fact that the plankton dynamics has multiple consequences for ecosystem functions and biogeochemical cycles, the information on the spatial and temporal heterogeneity of plankton in the region is insufficient.

Here we present observations on distribution, composition, abundance and age-structure of the *Calanus* species, the key component of the AW zooplankton, in relation to the physical properties of waters in the two branches of the AW at the border of the Arctic Ocean. Data for the study were collected in summers of 2001-2014, during research cruises of IO PAN and IMR. The main goal of the study, done under the Polish-Norwegian PAVE project, was to evaluate the impact of variability of the complex AW flow in the Fram Strait and Barents Sea branches on *Calanus* populations.

The results suggest that in the long-term perspective, the characteristic of *Calanus* populations in both branches do not differ substantially. Then again, comparison of year-to-year Calanus abundances, age-structure and distributions, indicate pronounced fluctuations. The role of local and regional oceanographic factors in controlling the zooplankton dynamics is evaluated. The findings can be used in predicting changes in the pelagic realm in the warming Arctic Ocean, and in constructing and tuning plankton components of ecosystem models.

Keywords: Calanus, Zooplankton, Atlantic Water, Arctic Ocean,

Contact author: Marta Gluchowska, mgluchowska@iopan.gda.pl