

Interannual variability in abundance and distribution of various zooplankton size fractions in Spitsbergen waters at the Polar Front during five summer seasons

Ostaszewska K.^{1,2}, Trudnowska E.¹, Wichorowski M.¹, Blachowiak Samołyk K.¹

¹ Institute of Oceanology Polish Academy of Sciences, Powst. Warszawy 55, 81-712 Sopot, Poland

² Centre for Polar Studies, Leading National Research Centre, 60 Będzińska Street, 41-200 Sosnowiec, Poland

Since plankton is a key component of the marine Arctic ecosystem the reconstruction of its size structure will have most probably negative consequences for the higher trophic levels. We tested spatial zooplankton variability on the West Spitsbergen Shelf using optical measurements collected during five summer seasons (2010-2014). Measurements were performed within the 0-50 m and 20-30 m depth layer across frontal zone with Laser Optical Plankton Counter, Conductivity-Temperature-Depth sensor and Fluorometer (LOPC-CTD-F) platform towed along several transects on Hornsund foreground. We grouped plankton into three size fractions: small particles, medium zooplankton and large zooplankton and analyzed their abundance and distribution, as well as percentage in total measured abundance. Differences in water temperature in each year were noticeable in conjunction with different front position, which was the nearest to the shelf during warmer years (2013 and 2014). Our data showed high abundances of medium zooplankton size fractions in warm years within Arctic waters in contrast to cold years, when their abundance peaks were located in the Atlantic waters. The highest availability of large zooplankton for planktivores (little auk) was observed in Arctic waters, especially in colder years. Our data was supported by similar results conducted inside the Hornsund fjord, which confirmed the strong link between the processes that occur outside and inside the fjord. This interannual study definitely will provide high-resolution data for modeling and predicting the effects of climate change on the pelagic ecosystem in the warming Arctic.

Keywords: zooplankton distribution, LOPC, Polar Front, West Spitsbergen Shelf, climate change

Contact author:

Name: Kaja Ostaszewska

Affiliation: Institute of Oceanology Polish Academy of Sciences, Powst. Warszawy 55, 81-712 Sopot, Poland

E-mail address: kajao@iopan.gda.pl