

Ref.#: Ma_13
kajao@iopan.gda.pl

ABSTRACT

Interannual distribution of various zooplankton size fractions vs. front position along West Spitsbergen Shelf during five summer seasons (2010-2014)

Kaja Ostaszewska¹ Emilia Trudnowska² Marcin Wichorowski² Katarzyna Błachowiak-Samołyk²

¹*IO PAS - Centre for Polar Studies KNOW (Leading National Research Centre) , Marine Ecology, Poland,* ²*Institute of Oceanology Polish Academy of Sciences, Powst. Warszawy 55, 81-712 Sopot, Poland,*

European Arctic pelagial is strongly affected by intensified inflow of warm Atlantic waters. Changes in ocean circulation and the hydrographic regime will consequently lead to a restructuring of zooplankton communities between cold Arctic waters, with a dominance of larger zooplankton species, and Atlantic waters in which smaller species predominate. 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, especially planktivores. We tested spatial zooplankton variability on the West Spitsbergen Shelf using optical measurements collected during five summer seasons (2010-2014). Our research area included frontal zone, where waters of two, separated by density gradient currents; cold Sørkapp Current (SC) and warm West Spitsbergen Current, converge, mix and are exchanged. Described above oceanographic conditions are strongly related to both spatial distribution and size structure of zooplankton, which is still not well enough characterized and understood. Measurements were performed within the 0-50 m and 20-30 m depth layer crosswise frontal zone with Laser Optical Plankton Counter, Conductivity-Temperature-Depth sensor and Fluorometer (LOPC-CTD-F) platform towed along several transects located near Hornsund (southern Spitsbergen). Using abundance estimates and size structure data from LOPC we grouped plankton into three size fractions: small particles (S: 0.1-0.3 mm ESD - Equivalent Spherical Diameter); medium zooplankton (M: 0.3-0.8 mm ESD) and large zooplankton (L: 0.8-4.0 mm ESD) and analyzed their abundance, distribution and percentage in total abundance. We observed differences in front position in each year, with the nearest location to the shelf in the warmer 2013 and 2014 years, when maximum temperatures reached 9.2 and 8.3 °C, respectively, compared to colder 2010, 2011 and 2012 years, when maximum temperatures were approximately 2 and 1 °C lower, respectively. Our data showed high abundances of small and medium zooplankton size fractions in warm years (2013 and 2014), found within cold SC waters in contrast to cold years, when abundance peaks of these fractions were located in the Atlantic waters. The patches of Large size fractions, which included mainly *Calanus* spp. individuals, were observed on

both sides of the front. Our investigation suggests that potentially their availability for planktivores was the highest in 2010 and 2012 and the lowest in 2011 and 2014. This interannual study definitely will improve our knowledge on the impact of currently observed Arctic warming on the reconstruction of zooplankton size structure.