

Ref.#: Ph_36

promyk@iopan.gda.pl

ABSTRACT

Observations of water mass evolution in Hornsund Fjord

Agnieszka Promińska¹ Agnieszka Beszczyńska-Møller¹ Anna Przyborska¹ Jaromir Jakacki¹ Szymon Kosecki¹ Jacek Jania² Dariusz Ignatiuk²

¹*Institute of Oceanology Polish Academy of Sciences - Centre for Polar Studies KNOW (Leading National Research Centre), Physical Oceanography Department, Poland,* ²*Faculty of Earth Sciences University of Silesia - Centre for Polar Studies KNOW (Leading National Research Centre), Poland,*

More and more scientific projects are devoted to the Arctic fjords, which constitute a good field laboratory to study climate change. Fjords boundary conditions are set by the oceanic (Atlantic Water from the West Spitsbergen Current and Arctic Water, carried by the Sørkapp Current) and terrestrial realms (freshwater input from melting and ablation of glaciers, river runoff), as well as by the atmospheric factor. Thus, the hydrographic conditions are dependent on the interaction and balance between particular components.

Hydrographic measurements in Hornsund fjord, located south of Spitsbergen, span the period 2001 - 2014. Data on water temperature and salinity were collected every July during summer Arctic cruises onboard RV Oceania, the ship belonging to the Institute of Oceanology PAS. Moreover, field expeditions realized under the AWAKE and AWAKE-2 projects allowed to obtain a unique data collection including time series from mooring systems and measurements conducted every week along fixed sections starting from April/May until late August. Observations were supported by data from the hydrodynamic model, which main core is MIKE 3D engine.

Analysis and synthesis of hydrographic, glaciological data and model results made possible to obtain a chronological view of transformation of water in the fjord and response of surrounding glaciers. In general, winter conditions starts in late Autumn and remain until the beginning of June when the shift between Arctic and Atlantic type is observed. The highest water temperature is observed in August. However, modelling results reveal continuous warming of water in the fjord until October. This is the period of intensified glacier ablation and calving and thus increased input of freshwater into the fjord.