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THE OCEANIC INFLUENCE ON GLACIERS CALVING IN HORNSUND FJORD, SPITSBERGEN

Agnieszka Prominska (aaa Institute of Oceanology Polish Academy of Sciences / ccc Centre for Polar Studies - Leading National Research Centre (KNOW), Poland)

Dariusz Ignatiuk (aaa University of Silesia, Faculty of Earth Sciences / ccc Centre for Polar Studies - Leading National Research Centre (KNOW), Poland)

promyk@iopan.gda.pl

Approximately 36 600 km² of Svalbard area is covered with ice which means that Svalbard belongs to a list of the largest glacierized areas in the Arctic¹. As about 60% of glacierized area constitute glaciers terminating in fjords¹, the oceanic factor plays a crucial role in a fate of tidewater glaciers.

Investigations in Hornsund, the southernmost fjord of West Spitsbergen, include a rich collection of hydrographic measurements obtained every summer since 2001 by the Institute of Oceanology Polish Academy of Sciences. Moreover, the database has been enlarged by measurements conducted under Polish-Norwegian projects "Arctic climate system study of ocean, sea ice and glaciers interactions in Svalbard area" (AWAKE) and AWAKE 2 during spring/summer expeditions between 2010-2014. Results of analysis were supported by observations of Hans Glacier Cliff position performed by the University of Silesia.

Data on temperature and salinity significantly differ from summer to summer and in general reveal warming up of waters in the Fjord. The shift between winter and summer water conditions usually occurs in June/July leading to intensified glacier mass loss due to calving. However, the process can be interrupted by cold events. The above situation was observed in July and August 2011, when fjord was occupied by the frequent inflow of sea ice carried from Storfjorden by the cold and fresher Sorkapp Current. Despite of, comparable to previous ablation seasons, observations of Hans Glacier show that calving processes have been almost completely stopped. Calving has been intensified after the area were free of ice and increased influence of ocean occurred. Significant changes of the glacier front speed were also observed, what cannot be explain only by glaciological investigations.

¹ Błaszczuk M, Jania J.A., Kolondra L., 2013, Fluctuations of tidewater glaciers in Hornsund Fjord (Southern Svalbard) since the beginning of the 20th century, Polish Polar Research, vol. 34, no. 4, 327-352, doi:10.2478/popore-2013-0024.