

Seasonal and short term fluctuations of iceberg flux from Hans Glacier Spitsbergen

Jacek Jania (1), Malgorzata Blaszczyk (1), Michal Ciepły (1), Mariusz Grabiec (1), Tomasz Budzik (1), Dariusz Ignatiuk (1), Aleksander Uszczyk (1), Patrycja Tymrowska (1), Elzbieta Majchrowska (1), Agnieszka Prominska (2), Waldemar Walczowski (2), Tadeusz Pastusiak (3,1), Michal Petlicki (4), and Dariusz Puczko (5)

(1) Faculty of Earth Sciences, University of Silesia, Centre for Polar Studies, Sosnowiec, Poland (jam.jania@gmail.com), (2) Institute of Oceanology, Polish Academy of Sciences, Centre for Polar Studies, Sopot, Poland, (3) Faculty of Navigation, Gdynia Maritime University, Gdynia, Poland, (4) Institute of Geophysics, Polish Academy of Sciences, Centre for Polar Studies, Warszawa, Poland, (5) Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Warszawa, Poland

Glacier iceberg flux due to calving might be an important source of freshwater delivered to Arctic fjords. Mass loss due to calving gives also significant contribution of glacier mass budget. Seasonal changes of dynamics of tidewater glaciers is generally known. After advance of glacier front during winter, summer recession occurs thanks to higher calving in the warmer period of the year. Nevertheless, annual course of iceberg flux intensity is not calculated frequently. Observations and survey of glacier dynamics were conducted on Hans Glacier a polythermal glacier ending down into Hornsund Fjord in Southern Spitsbergen. They provide information for discernment of seasonal calving intensity and iceberg supply to the fjord as a source of freshwater seasonally and in shorter periods of time. Source data on glacier front geometry, bathymetry of the fore bay, seasonal fluctuation of ice-cliff position and glacier velocity were obtained by different field survey and remote sensing methods. Time lapse photos, repeated terrestrial laser scanning and measurements of sea water temperature, salinity and dynamics as well, together with record from meteorological stations were used to determine factors of calving intensity. Calving flux from the glacier to Hornsund Fjord was calculated for short-period events and selected summer seasons between 2007 and 2015. Interannual differences in calving flux were also estimated. Ratios of meltwater to iceberg freshwater supply to the fjord was preliminarily estimated as well.