



Lead Author e-mail: oglowacki@igf.edu.pl

Title: *Simulation of the sound propagation in an Arctic fjord: general patterns and variability*

Oskar Glowacki¹, Mateusz Moskalik¹, Agnieszka Prominska²

¹*Department of Polar Research, Institute of Geophysics Polish Academy of Sciences, Warsaw, Poland*

²*Ocean Circulation Laboratory, Institute of Oceanology, Polish Academy of Sciences, Sopot, Poland*

Underwater passive acoustic monitoring in the Arctic region is an object of increasing interest, mainly due to its wide application in a broad spectrum of research. Recently, several studies have been carried out to investigate underwater ambient noise generated by calving glaciers and oscillating icebergs. In this study, numerous simulation of the sound propagation were conducted to expand our knowledge of these phenomena.

A ray theory for acoustic wave propagation is used here, in order to calculate rays trajectories in different environmental conditions. Sound speed profiles are computed from CTD data, collected during scientific cruises performed in the Hornsund Fjord, Spitsbergen. Particular emphasis is placed on processes occurring in the vicinity of glaciers.

Our results show highly variable nature of the acoustic ray paths. As a result, significantly different scenarios are observed between seasons and individual days. Additionally, some common underwater sound channel locations are revealed. The influence of the presence of glaciers is also reflected. General patterns - obtained after all simulations - may be very valuable in the context of preparation for the future field work in Svalbard.