



Arctic weather conditions in winter season: nowadays and 36-years ago.

Paulina Aniśkiewicz (1,2)

(1) Instytut Oceanologii PAN, Sopot, Poland (aniskiewicz.paulina@gmail.com), (2) Centre for Polar Studies, Faculty of Earth Sciences, University of Silesia, Sosnowiec, Poland

Global warming is brightly visible around the World. These changes are even stronger in the Arctic, where the Arctic Amplification phenomena occurs. That is why studies in the Arctic should be based on the local interactions between ocean, atmosphere and land, and only after these processes are well understood, the analysis can be extrapolated to a larger scale.

In this research we have focused on the comparison of winter weather conditions in 1983 and 2018 in the two high-latitude fjords, based on the Weather Research and Forecasting Model (version 4.0) with the Advanced Research core (ARW). The Hornsund fjord (Hr) is located in south-western part of the Spitsbergen Island and the second, Porsanger (Pr) – in the innermost part of Norway.

The analysis were done using WRF model. The spatial resolution of the domain was set to 1 km. Because of very high grid cell resolution, the initial conditions were based on reanalysis data with very high spatial resolution (0.125°), provided by ECMWF (www.ecmwf.int). In this research we used Planetary boundary layer scheme with simple turbulence and mixing to distribute surface fluxes through the boundary layer.

The results showed significant differences between the fjords and also in weather conditions in 1983 and 2018. Actual weather in Hornsund is under the influence of marine climate. The weather in Porsanger is modified by continental and marine conditions. It significantly affects the differences between the fjords. Because of the fact that only in Hr the weather depends on glacier melting and permafrost thawing, the differences in winter weather conditions are clearly visible.

Main support comes from the Institute of Oceanology (IO PAN). Work has been also supported with the funds of the Leading National Research Centre (KNOW) received by the Centre for Polar Studies for the period 2014-2018.