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Title: *Submarine trenches in the West Spitsbergen shelf – their role for the Atlantic water advection over the shelf break*

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The warm and saline Atlantic water carried north into the Arctic Ocean by the West Spitsbergen Current with the main core over the Spitsbergen slope (about 500 m) occasionally upwells on the shallow shelf and reaches the fjords systems. It has a strong impact on the local hydrography, sea-ice conditions, glaciers cycles, nutrients supply and also ecosystem. Warm water upwellings result from the superposition of several factors: wind direction, strength of the incoming flow, the Coriolis parameter, stratification, and primarily – the bottom topography (expressed by the Rossby and Burger numbers).

In this study, the hydrographical datasets (salinity, temperature, depth) collected during two summer cruises (2011 and 2012) of the RV “Oceania” and time series (temperature, salinity, pressure and sea currents) from two moorings deployed by the Institute of Oceanology PAS in different locations of the West Spitsbergen shelf (in a distance of 60 km between each other) were analyzed in order to estimate the topographical contribution to the local circulation.

The first moored system was located south-west of the South Cape – the southernmost area of the Spitsbergen at the edge of relatively flat South Cape Plate area (at 111 m). Two instruments (RDI ADCP and SBE37 MicroCAT) were attached to the bottom frame. The current meter finished recording in June 2012, while the CTD sensor worked for the whole year - between July 2011 and July 2012. The second moored system was deployed in the Hornsund mouth at the end of the extended Hornsund Deep (at 101 m) which is a passage for the water originating from the continental slope. Two instruments (Aanderaa RDCP600 and SBE37 MicroCAT) collected data on the bottom and at 46 m, respectively. The current meter finished its survey in May 2012, while the CTD sensor worked for nearly a whole year - between the end of July 2011 and the beginning of July 2012.

Time series from both instruments recovered from the Hornsund Deep show massive advection of the warm, saline water in February 2012. At the bottom temperature was above 3°C. Temperature recorded by the upper instrument was even higher. Subsurface salinity reached values above 34.9 which indicate advection-driving upwelling. At the South Cape, temperature values above 4°C recorded by the bottom instrument occurred in the same period, however, salinity was much lower - ca. 34.5 at that time. Unfortunately, there are no data from the upper layer.