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Spatial and temporal variability in distribution of water masses in Hornsund, Spitsbergen

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Arctic fjords constitute an important part of many recent investigations because this is the place where different water masses meet, mix, and transform, influencing the stability of glaciers.
Hornsund, the southernmost fjord of West Spitsbergen, has been studied during the past 15 years. Observations were based primarily on high resolution measurements of water temperature and salinity along fixed sections, that have been performed every July between 2001-2015. Research carried out in years 2010 – 2015 under Polish – Norwegian projects AWAKE and AWAKE-2 allowed for expansion of the database with data covering the period from spring to autumn. During this time measurements were also conducted from a small boat in the vicinity of glaciers with a time resolution of 1-2 weeks in addition to a mooring system deployed in the fjord and on the shelf just outside Hornsund.
Synthesis of our measurements give an overview of water masses observed in the fjord. From summer to summer observations reveal high variability in water temperature and salinity giving a distinct division into an area influenced by oceanic factors (Main Basin) and an area which is more influenced by local factors (Brepollen). The chronology of water mass transformation has been obtained indicating a time of transition between winter (Arctic type), additionally interrupted by temporary inflow of waters of Atlantic origin, and summer (Atlantic type) conditions.