



Sustainable monitoring system for dense water production on polar shelves

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Monitoring of the flow of dense water from its formation area towards the abyss of the world oceans is a key issue for climate research. In the Weddell Sea, Antarctica, formation of high salinity shelf water (HSSW) takes place on the Ronne shelf. Underneath the floating Filchner-Ronne ice shelf the HSSW is transformed to Ice Shelf Water (ISW, $t < -1.9$). The ISW cascade towards the deep Weddell Sea, and its fate in connexion with the formation of the WSBW, and finally AABW, are key issues. The North Atlantic is separated into two basins by the Greenland Scotland Ridge (GSR). Most of the ventilation in the northern basin, the Arctic Mediterranean, occurs by formation of HSSW on the Arctic Ocean shelves and by open ocean convection. Cold dense waters pass southwards as a deep overflow across the GSR at a number of sites and together with entrained water feed most of the NADW.

In our IPY project the Bipolar Atlantic Thermohaline Circulation (BIAC) we will define and operate an optimal ocean observing system for the lower polar limb of the Atlantic component of the THC. This observation system, consisting of in-situ stations with self contained instruments supported by ship- and space-borne measurements, will provide accurate time series of mass, heat and salt fluxes at key locations, allowing us to assess the strength of the bipolar Atlantic THC. The stations (moorings) will be constructed so that they only need to be serviced at ~ 5 year intervals, and the data are planned to be extracted by ships of opportunity, acoustic communication and via satellites. The running costs will therefore be low, and these climate stations should be operative for several decades.