



Long term variations of the Ice Shelf Water in the Southern Weddell Sea

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Antarctic Bottom Water (AABW) occupies large portions of the deep ocean and is the densest water mass in the world because of its cold temperature. The source water of the coldest AABW originating from the Weddell Sea is the cold, low-salinity Weddell Sea Bottom Water (WSBW). The low temperature and salinity of the WSBW is because of the contribution of the Ice Shelf Water (ISW) that got its characteristics by sea ice formation over the continental shelf of the southwestern Weddell Sea and the circulation underneath the Filchner-Ronne Ice Shelf. Water circulating in the ice shelf cavity is cooled by the contact with the ice due to heat conduction through the ice and by melting of the ice shelf itself.

Any changes to the ISW properties might therefore result in changes of the AABW, and an increased understanding of variability within the ISW may help us understand the sensitivity of the AABW in the deep ocean

A great effort has been put into monitoring the ISW plume over a long time period in order to gain knowledge of its role in the climate system. This study is focusing on long-term variations of the ISW formed in the southern Weddell Sea and to investigate its sensitivity to external forcing. The main data being used is mooring data from a long-term monitoring site, named S2, located at the Filchner Sill. The first mooring was deployed in 1977, then again in 1985, 1987, 2003, 2009 and present (2010), all containing at least one year of data.

Seasonal variations are seen from the data set, but no long-term trend is detected. The data from 1987, however, have a warming trend in the end of the time series, and might indicate inter-annual variations. One hypothesis explaining this warming is connected to the break-off of three huge icebergs of the Filchner Ice Shelf in late 1986, which grounded on the Berkner Bank in late 1987 or early 1988. Both Nøst and Østerhus (1998) and Grosfeld et al. 2001 have found changes in the hydrography due to this particular event.