



Early results from first sulphur hexafluoride measurements in the Weddell Sea

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The Weddell Sea is a key area for the formation of deep and bottom water. It is hence a major driver of the deep part of the global ocean's conveyor belt. It provides a sink for atmospheric gases like anthropogenic carbon and is sensitive for changing atmospheric conditions. During the last decades time series of anthropogenic transient tracers (namely chlorofluorocarbons, CFCs) were obtained and used to determine pathways and formation rates of locally formed or imported deep and bottom water and to estimate the content of anthropogenic carbon.

During the RV POLARSTERN expedition from November 2010 to February 2011 we will for the first time measure sulphur hexafluoride (SF₆) in addition to CFC-12 along the Prime Meridian from the Mid Atlantic Ridge to the Antarctic continental margin and on a section crossing the Weddell Basin from Cape Norwegia to the northern tip of the Antarctic Peninsula. The onset of the atmospheric SF₆ history starts some decades after the CFCs, and will, hence, provide a better constraint for the quantification of very recently ventilated deep and bottom water for the estimates of transit times.

From the extended CFC time series combined with the additional tracer SF₆ that acts on a shorter time scale we expect to constrain transit times of recently ventilated deep and bottom water more accurately, to assess more realistic formation rates and - possibly - their temporal variability on a decadal time scale, and more robust estimates of the anthropogenic carbon content in the deep Weddell Basin.