

## Proposal to monitor deep water fluxes in the Southern Ocean

### Background

Oceanographers are now realising that the Southern Ocean might play an active role in the Global Thermohaline Circulation (GTHC), rather than being merely a foil for North Atlantic Deep Water production.

Determining the true contribution of the Southern Ocean to the GTHC has traditionally been plagued by the scarcity of wintertime survey data and long-term oceanographic datasets from appropriately located instruments.

### Proposal

To establish a sequence of benthic observatories, distributed from Antarctic Bottom Water (AABW) production sites in the southern Weddell Sea, along AABW pathways through the Scotia Sea, and north through channels into the Argentine Basin in the South Atlantic. The aim is to initiate a Southern Ocean study that would complement the work that has now been funded to detect variability in the production of North Atlantic Deep Water (part of the UK NERC-funded thematic programme, RAPID).

### Approach

The simplest form of "benthic observatory" would be an array of routinely replaced moored instruments. More sophisticated systems with remote data recovery, for example, might also be envisaged. Small-scale surveys (CTD and swath bathymetry) might be required to optimise locations.

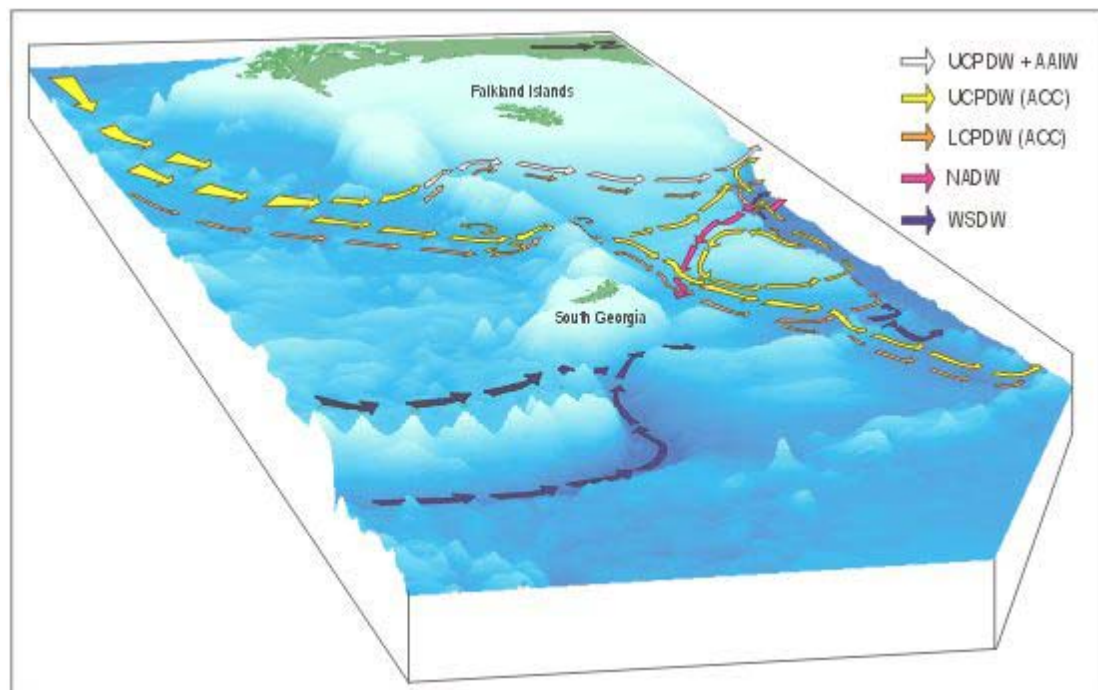


Figure 1 Deep water flows through gaps in topography

**Contact names:**

Dominic Hodgson, British Antarctic Survey, daho@pcmail.nerc-bas.ac.uk

Keith Nicholls, British Antarctic Survey, kwni@pcmail.nerc-bas.ac.uk

**Wider significance**

The Global Thermohaline Circulation is the ‘ocean conveyor belt’ driven by differences in the density of the sea water which is controlled by temperature (thermal) and salinity (haline). As the oceans store and transport an immense amount of heat energy, GTHC plays a crucial role in the regulation of the global climate system. GTHC is driven by changes in the rate of deep water formation, both in the Nordic Seas and in the Southern Ocean along the Antarctic continental shelf in the Weddell and Ross Seas. One of the compelling reasons for attempting to better understand these phenomena is that *some* climate models have predicted global warming could lead to significant changes in the GTHC, with tremendous negative consequences for northwest Europe - not in terms of dramatic *warming*, but in terms of the dramatic *cooling* that would follow quickly on the heels of the Gulf Stream adopting a more southerly route. IPY presents a timely opportunity to set up an Antarctic benthic observatory to complement similar monitoring in the Nordic Seas and thereby initiate a truly bi-polar study of GTHC.