Project description

Circulation of warm oceanic water and glacier melt water in the Amundsen Sea – Ross Sea shelf region, Western Antarctica

Göran Björk, Anna Wåhlin, Lars Arneborg and Bengt Liljebladh

The mass balance of the large ice sheets bounded on the Antarctic continent is of global significance since they have the potential to alter the sea level. Only the West Antarctic Ice sheet, which makes up 10 % of the continental area, has a volume that corresponds to a sea level rise of 5-6 m. The West Antarctic ice shelves are vulnerable to melting by the heat contained in the relatively warm Circumpolar Deep Water (CDW) that crosses the shelf and circulates below the ice shelves (floating tongues of glacier ice). The offshore movement of glaciers which drain into the Amundsen Sea area are accelerating rapidly, presumably due to melting and thinning of the ice shelves. The low salinity melt water eventually leaves the shelf and becomes an important ingredient in the freshwater budget of the southern ocean. In the present project we will study cross shelf flow of dense CDW and buoyant melt water by hydrographic sampling along several sections and mooring work in the Amundsen Sea region. The specific objectives are:

1. Trace and characterize the inflow of warm CDW across and along several deep channels at the Amundsen Shelf.

2. Trace the flow of glacier and sea ice meltwater along the Amundsen Sea and Ross Sea shelf region and off the shelf break.

3. Characterize the time variability of the temperature, vertical extent and flow of CDW from moorings.