Towards an improved heat budget for the floating glaciers in Antarctica

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Project Description
The Antarctic shelf regions are currently experiencing large changes coincident with seaward surging of the West Antarctic Ice Sheet (WAIS). An important reason for the decline is warm salty ocean currents that accesses the floating glaciers through bathymetric troughs and melts the glacial ice from below. The most rapid melting is occurring in the Amundsen Sea. Due to limited in-situ data, in particular from the central part of this shelf, the main pathways of the warm deep water are poorly known. Budgets for ocean heat, salt and freshwater on the shelf and at the terminus of the ice sheet have not been quantified.

The aim of the project is to

(i) Quantify budgets for oceanic heat, salt and glacier melt water for the central Amundsen Shelf.

(ii) Quantify the variability of the oceanic heat transport on the shelf on time scales up to centennial

(iii) Determine the importance of winds and large-scale ocean circulation as forcing factors for the inflow of warm water onto the shelf

These aims will be met by acquiring and analysing data from autonomous moorings and hydrographic transects during two cruises with the Korean RVIB Araon to the region. From these measurements, the oceanic heat loss and glacier melt water production on the central Amundsen Shelf will be calculated and joined with existing estimates from other parts of the WAIS. The time series of the oceanic heat transport will be analysed and correlated to wind and large-scale ocean circulation in order to determine their relative importance in forcing the warm water onto the shelf.

Project Timeline
2014-2018

Key Deliverables
Mooring data from the deep trough in the central Amundsen Sea shelf area. Hydrographic transects across the deep trough. The data will be published in the National Oceanographic Data Centre (NODC, USA) .

Funding
Swedish Research Council

Linkages with Other Programmes
The international Amundsen Sea study (yet to be officially named)

Data Management
Data will be submitted to the NODC within two years of retrieval