

iSTAR: UK ice sheet traverse across Pine Island Glacier drainage basin

Andy Smith

British Antarctic Survey

iSTAR is a UK NERC-funded programme of ice sheet research in West Antarctica. Its emphasis is in the Amundsen Sea and on Pine Island Glacier and it aims to improve our understanding of key ice sheet and ocean processes and enable incorporation of this into models. To achieve these, the iSTAR Programme is studying the whole system, from the ocean, through the ice shelf, up the glacier and into the catchment basin.

The ocean and the ice parts of iSTAR are equally important, but here I will concentrate on one aspect of the latter, the first iSTAR oversnow traverse on Pine Island Glacier. This was carried out in 2013/14 and is noteworthy as a new logistics capability and method of supporting fieldwork in Antarctica, for the UK. I will present more of the practical side of the activity, rather than details of the science achieved, which will be for the individual science projects to report on.

The iSTAR Traverse comprised a 900 km tractor-train journey across the Pine Island Glacier drainage basin. From the inland ice divide it followed the main glacier trunk as far downstream as crevassing allowed, then visited a number of tributaries and inter-tributary ridges, finally ending up almost overlooking the ice shelf and the Amundsen Sea coast. Glaciological and geophysical measurements were carried out along the traverse route and at 22 specific sites. These included deep-radar sounding of the glacier bed, shallow-radar sounding of the snow and firn, high resolution density measurements in the upper ~10 m of the glacier, and the installation of GPS stations measuring the ice movement. This work was achieved by scientists from BAS and the universities of Edinburgh, Bristol, Leeds and Reading.

Key to the operation of the traverse was the major infrastructure, deployed over the previous two years, including two *Pisten Bully* tractors, a living caboose and bulk fuel in large bladders mounted on plastic sledges.

It is worth emphasising that the amount of science completed, and the geographical area covered, would have taken many years to complete with traditional UK field operations. On the second iSTAR Traverse (2014/15) we will reverse the route, repeat some measurements, recover the GPS stations, drill ice cores and acquire seismic data. The 2013/14 iSTAR Traverse was highly successful and demonstrated a mode of operation that opens up many more possibilities for UK and collaborative research in Antarctica.

Theme: Changes in WAIS from observations (*The Times They are a-Changin'*)