Glacial-geomorphological evidence for post-LGM thinning of Pope Glacier, western Amundsen Sea Embayment

Joanne S Johnson[1], Stephen J Roberts[1], Dylan H Rood[2], Joerg M Schaefer[3], David Pollard[4], Pippa L Whitehouse[5]

[1]British Antarctic Survey, Cambridge, UK
[2]Department of Earth Science & Engineering, Imperial College London, UK
[3]Lamont-Doherty Earth Observatory, Columbia University, New York, USA
[4]Earth & Environmental Systems Institute, Penn State University, Pennsylvania, USA
[5]Department of Geography, Durham University, UK

Reliable model predictions of the future evolution of the Amundsen Sea sector of the West Antarctic Ice Sheet are currently hindered by a lack of terrestrial data that would provide evidence for past magnitude and timing of ice sheet thinning. This is particularly the case for the westernmost part of the Amundsen Sea Embayment, despite its proximity to three major ice streams (Pope, Smith and Kohler Glaciers). Our project aims to fill this critical gap by acquiring a high density of terrestrial glacial-geological data that record ice sheet changes since the Last Glacial Maximum in the western Amundsen Sea Embayment.

We present results from the first of two field seasons in the region, which focused on collecting glacial-geomorphological evidence and geological samples for cosmogenic surface exposure dating from nunataks around Mount Murphy, adjacent to Pope Glacier. Numerous rounded granite and gneiss cobbles and boulders perched on bedrock ridges and terraces up to 885 m above sea level attest to ice cover of these nunataks in the past. Above 885 m, no erratics were found, but extensive striated bedrock surfaces observed up to 1518 m above sea level on Mount Murphy itself indicate that ice reached to at least this elevation. ^{10}Be and *in situ* ^{14}C exposure dating of these nunataks is ongoing; we present results from >30 erratics, which have so far yielded ^{10}Be ages in the range 4.9 ± 0.4 to 22.4 ± 2.3 ka for sites at 325-885 m above sea level. The majority of those ages fall between 6-16 ka, implying that the ice sheet thinned by at least 450 m during that period. High-resolution ice sheet modeling of this region over the last deglacial period is planned, comparing results with the new cosmogenic dates.