

Study Reveals When West Antarctica's Largest Glacier Started Retreating



In a report in the 23 November 2016 edition of the journal *'Nature'*, an international team led by British Antarctic Survey (BAS) explains that present-day thinning and retreat of Pine Island Glacier, one of the largest and fastest-shrinking glaciers of the West Antarctic Ice Sheet, is part of a climate trend that was already underway as early as the 1940s.

It is already known that Pine Island Glacier - which is roughly two-thirds the size of the UK - has been thinning and retreating at an alarming rate since 1992 when satellite observations first started. The ice lost from this glacier and its neighbours has added significantly to sea-level rise, and this area is currently one of the biggest single unknowns in future projections. However, until now it was not known when the retreat of Pine Island Glacier started, or its underlying cause.

Seabed Sediment Cores

In this study, seabed sediment cores obtained from beneath the floating part of Pine Island Glacier have revealed that a cavity started to form beneath the shelf prior to the mid-1940s. This allowed warm sea water to flow under the shelf, and cause it to lift-off from a prominent sea-floor ridge which held it in place. This strongly suggests that current retreat was initiated by strong warming of the region associated with El Niño activity.

Lead author, marine geologist Dr James Smith from British Antarctic Survey, says the finding provides the direct evidence of the timing of glacier retreat even before satellites were available to measure them. The sediment cores were obtained through a 450m deep hole in of ice, and up to 500m of ocean. The sediment reveals climate events that initiated the current thinning of Pine Island Glacier. They show how changes half-way across the planet in the tropical Pacific, reached through the ocean to influence the Antarctic ice sheet.

Quantify Sea Level Rise

A new joint programme recently announced by the UK Natural Environment Research Council (NERC) and the US National Science Foundation will allow a more focussed study of Pine Island Glacier and provide a new opportunity to understand West Antarctica and quantify how much sea level rise it might cause in the coming century .