

Accelerating glacier flow on the warming Antarctic Peninsula

*Hamish Pritchard and David Vaughan
British Antarctic Survey, High Cross, Madingley Road,
Cambridge, CB3 0ET, United Kingdom*

Over the decade from 1993 to 2003, glaciers on the west coast of the Antarctic Peninsula experienced a widespread and significant increase in flow rate. Using Synthetic Aperture Radar feature tracking, we measured flow on two 200 km-long sections of coast, one near the northern tip of the Peninsula (~64°S) and one north of Rothera (~67°S) for 1993, 1996, 1997, 1998 and 2003. From these measurements, we took 150 glacier long-profiles of flow and these yielded 3600 individual samples common to four of the years spanning 1993 to 2003. These samples show that the median increase in flow rate over this decade was $12 \pm 1\%$. The increase at the southern site was almost linear through time while at the northern site, the increase occurred between 1993 and 1996, after which flow remained 12 % faster.

Rapid warming of the Antarctic Peninsula climate has occurred over the past century and has been associated with a progressive retreat and ultimately collapse of ice shelves north of a southward-retreating -9°C mean annual isotherm. The effect of these shelf collapses on grounded glaciers has been studied intensively, but change in glaciers unaffected by shelf collapse has not. These results show that grounded ice is being lost from the Peninsula on a much larger scale than was previously realised. We tentatively attribute the acceleration in glacier flow to enhanced lubrication resulting from increased summer melt. This implies that the warming climate is raising sea level much more rapidly than would occur through increased melting alone.