



Seismic and radar observation of subglacial bedforms: active transverse moraine and drumlins beneath Rutford Ice Stream, Antarctica.

Edward C. King (1), John Woodward (2), Andy M. Smith (1)

(1) British Antarctic Survey, Madingley Road, Cambridge, CB3 0ET, UK, (2) School of Applied Sciences, Northumbria University, Ellison Building, Newcastle upon Tyne, NE1 8ST, UK. (ecki@bas.ac.uk)

We present seismic and radar data from the onset region of Rutford Ice Stream, West Antarctica, which show the form and internal structure of a variety of bedforms beneath an active ice stream. The ice flow speed in the area of our survey accelerates from 72 to $>200 \text{ m a}^{-1}$; the ice is between 2200 and 3200 m thick; and the bed of the ice stream lies up to 2000 m below present sea level. We observed a transverse moraine 2 km wide and 1.5 km long beneath the slower-flowing part of the ice stream that we interpret to be composed of unconsolidated sediment undergoing active deformation near the ice/sediment interface. We have imaged the internal structure of the bedforms with seismic reflection techniques and also observe radar reflections from below the bed in some circumstances. We observed drumlins of classical form with elongation ratios of between 1:1.5 and 1:4 where the surface flow speed exceeded 95 m a^{-1} . The conformity of the internal structure of the bedforms with the ice base suggests that the bedforms are active depositional features in congruence with the observation of a contemporary drumlin-forming episode in the distal part of the same ice stream. These observations provide the first direct evidence of the association between ice stream flow speed and bedform shape.