



Radar surveys of the Rutford Ice Stream onset zone, West Antarctica: Indications of flow stability and intermittent storminess.

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We present 1, 10 and 100 MHz ground-based radar data from the onset region of Rutford Ice Stream, West Antarctica, which indicate the internal structure of isochrones. In common with other West Antarctic ice streams, the pattern of isochrones appears to depend on an interaction between basal topography, flow-induced surface topography and wind-induced variability in accumulation. Assuming overall stability in flow in the onset region of the Rutford Ice Stream during the last 200 years, a comparison between modelled and observed isochrones suggests some local variability in accumulation through time around a baseline accumulation of $0.43 \text{ m w.e. a}^{-1}$. However in areas close to the ice stream margin there are noticeable scour and fill episodes. Current accumulation appears to be controlled by katabatic winds that blow towards the east at the study site, approximately parallel to the ice stream flow. Storm winds, which blow towards the northwest, at an oblique angle to the ice flow, do not have a strong influence on current accumulation. The scour and fill structures indicated by the radar profiles can be explained by increased storminess such that areas of enhanced accumulation and scour have been produced by stronger and/or more frequent storm winds. Near surface isochrones have been dated by tracing prominent radar reflectors to ITASE drill site 01-5. Strong periods of scour correlate to periods of time when there was a change in the frequency of the El Nino-Southern Oscillation (ENSO) phenomenon. Thus there may be a link between a perturbation from steady state accumulation on Rutford Ice Stream and the frequency and strength of cyclonic systems generated over the Southern Ocean. These results have implications for modelling ice sheet accumulation patterns through the Holocene.