



## **Glacial history of the Ellsworth Mountains, Weddell Sea embayment, West Antarctica**

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We report preliminary results from a programme to establish the timing and rate of thinning of the West Antarctic Ice Sheet (WAIS) in an area inland of the Weddell Sea embayment, to help constrain models of Quaternary ice sheet change.

Geomorphological investigations carried-out during the Ellsworth Mountains Project (1979-80), demonstrated that there is a clear record of former ice expansion and subsequent retreat in the Ellsworth Mountains. The evidence takes the form of a prominent ice sheet trimline over 1000m above the modern WAIS surface, etched into an earlier alpine topography. Below this trimline there are striations, erratics and drift patches recording the flow of thicker West Antarctic ice over and around the mountain range and into the Weddell Sea. George Denton and co-workers mapped this evidence in detail but were unable to provide any firm chronological constraints. Instead, two broadly different age models for the ice expansion were presented. The first model suggested that the ice expansion occurred at the Last Glacial Maximum (LGM). The second model suggested that the expansion was pre-Late Quaternary, possibly even Tertiary, in age. These models remain untested, but an LGM age for the Ellsworth trimline is central to all contemporary reconstructions of WAIS volume and extent at the LGM.

Cosmogenic exposure analysis combined with detailed geomorphological mapping provides a means to test these hypotheses, and add important constraints to future ice sheet reconstructions of the WAIS during the Quaternary. We present preliminary data supporting Denton's second age model for the formation of this major trimline in the Ellsworth Mountains, and demonstrate the complex pattern of ice moulding and

landform preservation recorded below this feature.