

Post-glacial thinning history of the Foundation Ice Stream, Weddell Sea embayment, Antarctica

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The Antarctic ice sheet is the largest on earth and any instability is likely to dominate global sea level change. We therefore require models of the ice sheet to make more reliable and robust predictions of future change. One problem in meeting this challenge is the lack of past data on deglaciation with which to initialize and calibrate the models. This problem has been particularly acute in the Weddell Sea embayment and in particular its eastern part where the Foundation - Thiel Trough has been a principal drainage route for the West Antarctic Ice Sheet (WAIS), and its southern extension may be a potential location for future instability. Two significantly different models of glacial history have been proposed for the trough. The first, based largely on marine geology suggests that grounded ice extended to the continental shelf at the Last Glacial Maximum (LGM), filling the Foundation-Thiel trough. The second, based largely on terrestrial glacial geology suggests a much more restricted advance of ice in the trough with relatively minor or even zero thickening of the ice sheet onshore. Here we present new glacial geologic data from the margins of the Foundation Ice Stream, which currently occupies the southern extension of the trough. We sampled erratic clasts from several nunataks along > 100km transect of the ice stream, and will present the ^{10}Be ages on these clasts. The data show several hundred metres of thinning occurred along the lower Foundation Ice Stream and its tributary the Academy Glacier in the Holocene. We also present preliminary results from flowline modelling of the Foundation Ice Stream through the LGM. We discuss the implications of the data-modelling comparison for the competing models of LGM and post-LGM glacial history.