

Detailed basal topography of the floating portion of Pine Island Glacier, West Antarctica

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In January 2009 the underside of Pine Island glacier's floating ice shelf, in West Antarctica, was imaged along three 30 km tracks using an upward-looking multi-beam echo-sounder mounted on an autonomous underwater vehicle. At 4-m resolution with a 300-m wide swath, these observations reveal with unprecedented detail the presence of channels oriented along and across the direction of ice flow. Many of these channels are characterized by basal crevasses above their apex and successive 200-500 m wide, 10-20m high terraces on their flanks. A near coincident, high resolution airborne radar survey confirm the widespread nature of these features. The oceanographic and glaciological conditions of Pine Island glacier are discussed to shed light on the processes leading to their formation and maintenance. For comparison, observations of terraces in a different setting, but in a similar oceanographic context in Greenland are also presented.