

Dynamic significance of the flat-ice terrains in the mouth of Kamb Ice Stream

Ginny Catania

Dept. of Earth and Space Sciences, Campus Box 351310

University of Washington, Seattle, WA 98195

Ice-penetrating radar reveals several unusual characteristics in the internal layers of the flat-ice terrains that surround the lower end of Kamb Ice Stream, Antarctica. Our data show upper layers that are continuous but lightly disturbed overlying numerous line-diffractors oriented parallel to the edge of the terrains several hundreds of meters below the surface. At the boundaries of these terrains (where they meet the inter-ice stream ridges) layers are strongly downwarped and truncated by the bed. A simple kinematic ice-flow model is used to predict the spatial pattern of isochronal layers in order to match observations. Model results suggest that the downwarping pattern is caused primarily through focused basal melting. We develop a hypothesis that these features represent the limits to ungrounded conditions implying that most of the lower end of Kamb Ice Stream was once floating. Through this hypothesis we explain other characteristics within these terrains including the numerous line-diffractors which are thought to be basal crevasses similar to those seen in floating ice shelves. Using estimates of ice thickness change in this area over the last few hundred years we believe that floatation last occurred $\sim$ 400 years prior to ice stream stagnation. It is likely that grounding throughout this area played some part in the stagnation of Kamb Ice Stream as is currently happening in the mouth of Whillans Ice Stream.