

Is anomalous vertical motion in WAIS ice streams linked to subglacial water transport?

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RADARSAT data from the 1997 Antarctic Mapping Mission are used interferometrically to solve for the 3-dimensional surface ice motion in the interior of the West Antarctic Ice Sheet (WAIS). An area of ~ 125 km² in a tributary of the Kamb Ice Stream slumped vertically downwards by up to ~ 50 cm sometime between September 26 and October 18, 1997. Adjoining areas in the Bindschadler Ice Stream also exhibited comparable upward and downward surface displacements. As the inflation and deflation features correspond to sites at which the basal water experiences a hydraulic potential well, we suggest transient movement of pockets of subglacial water as the most likely cause for the vertical surface displacements. These results, and related lidar observations, will be discussed in the light of the exciting possibility that imaging the change in ice surface elevation may help understand the key role of water in the very-difficult-to-observe subglacial environment, and its important influence on ice dynamics.