



Subglacial lake drainage and outlet channel detection on Mercer and Whillans ice streams

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Localised elevation changes detected on ice streams by ICESat and satellite image differencing have recently been described as the surface expression of subglacial lake activity. Using these techniques, four active subglacial lakes were identified on Mercer and Whillans ice streams, West Antarctica: subglacial lakes Conway, Mercer, Whillans and Engelhardt. The largest of these lakes, Subglacial Lake Conway, drained throughout 2007, discharging around 1.8 km³ of water. ICESat analysis suggest that some of this water was directed to Lake Mercer and some was channeled along a surface depression lying along the suture zone between ice streams Mercer and Whillans. A new, higher-resolution hydropotential map for the region predicts pathways for the floodwater and confirms our observations. Mapping subglacial water movement in space and time is important for improving models of ice stream behaviour. Monitoring subglacial outflows from the ice sheet margins is also important for quantifying freshwater flux to the ocean and understanding ice-ocean interactions.