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Glacier sliding reduced by persistent drainage from a subglacial lake

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We present velocity observations of a glacier outlet in Vatnajökull, Iceland, deduced from interferometric synthetic aperture radar (InSAR) data obtained during the ERS1/2 tandem mission in 1995-2000. More than 50% decrease in glacier motion was observed subsequent to a large jökulhlaup from the subglacial lake Grímsvötn in November 1996 and it had not reached its former flow rate at the end of our study period. The jökulhlaup damaged the lake ice-dam causing persistent drainage from Grímsvötn. InSAR observations of water accumulation within the lake suggest that a leakage of >3 m^3 s^{-1} prevailed throughout our study period. Our interpretation of the observed reduction in glacier motion is that the water drained underneath the whole length of the glacier outlet through tunnels at low water pressure. Further, the tunnel flow drained water from its surroundings lowering the water pressure of a linked cavity system, underneath the upper and centre part of the glacier, which prior to the jökulhlaup sustained basal sliding.