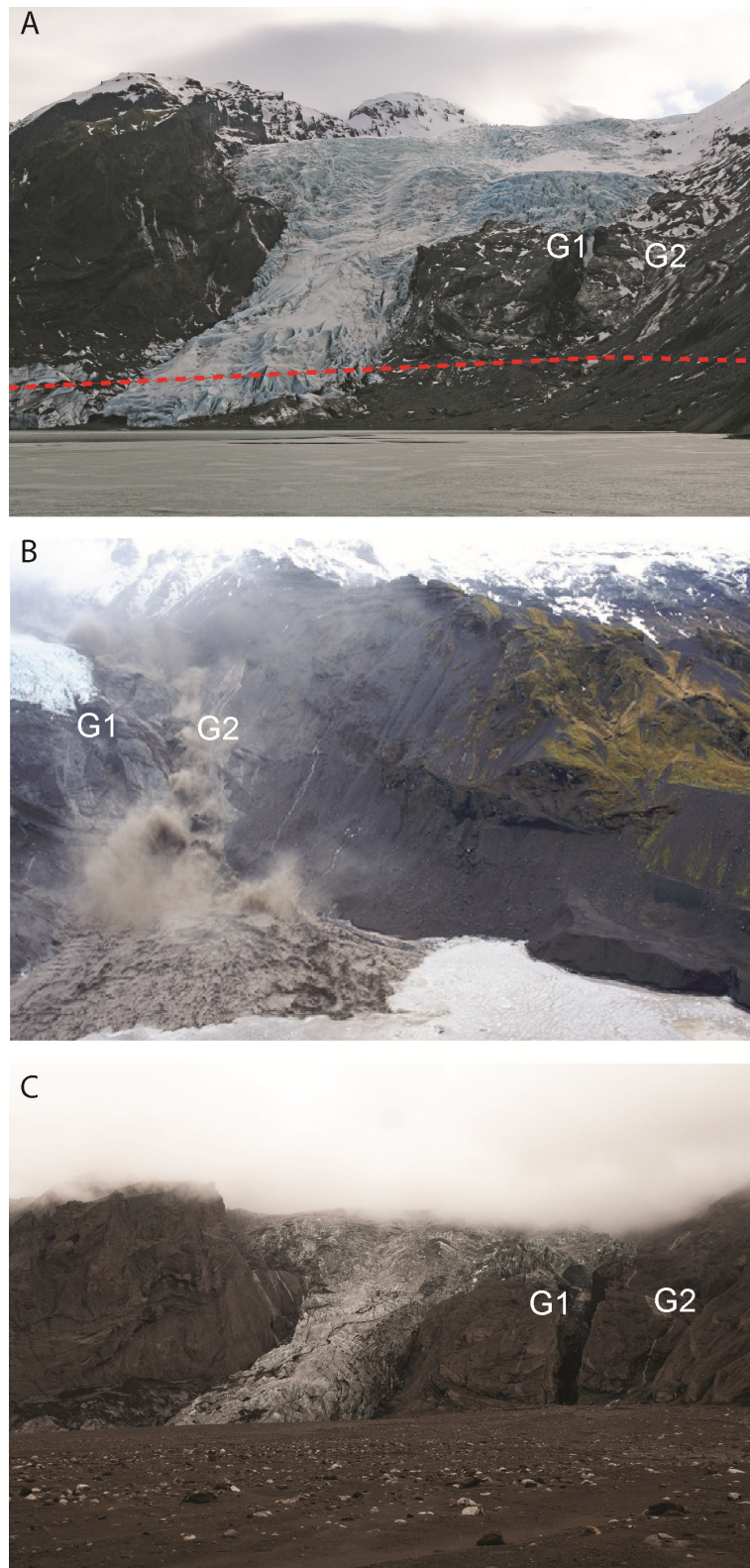
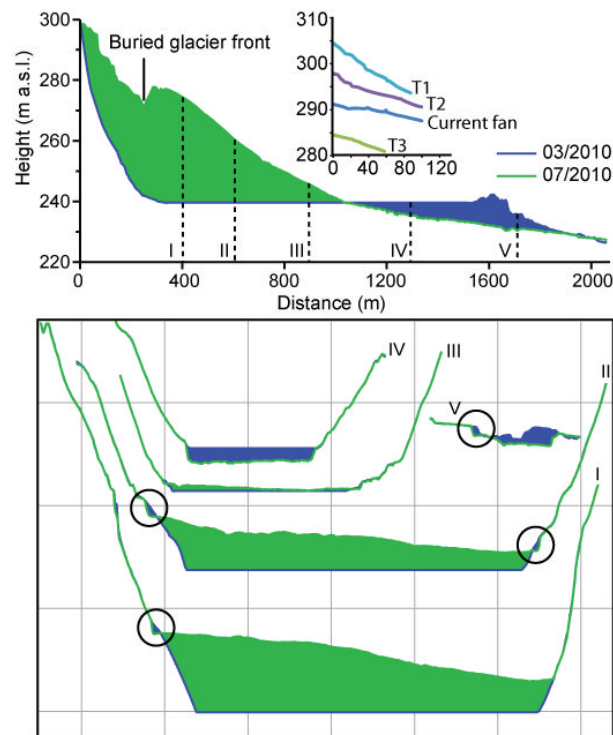




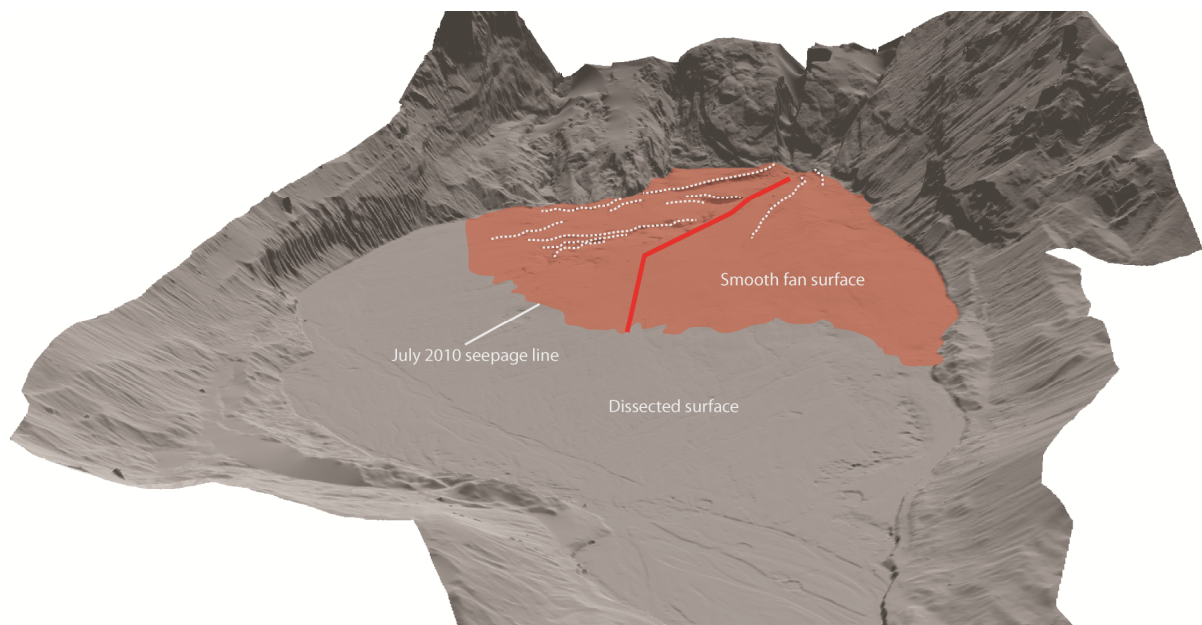
Supplementary Figure DR1: July 2010 panoramic view from the western lateral moraine of the jökulhlaup sediments that in-filled Gígjökulslón.



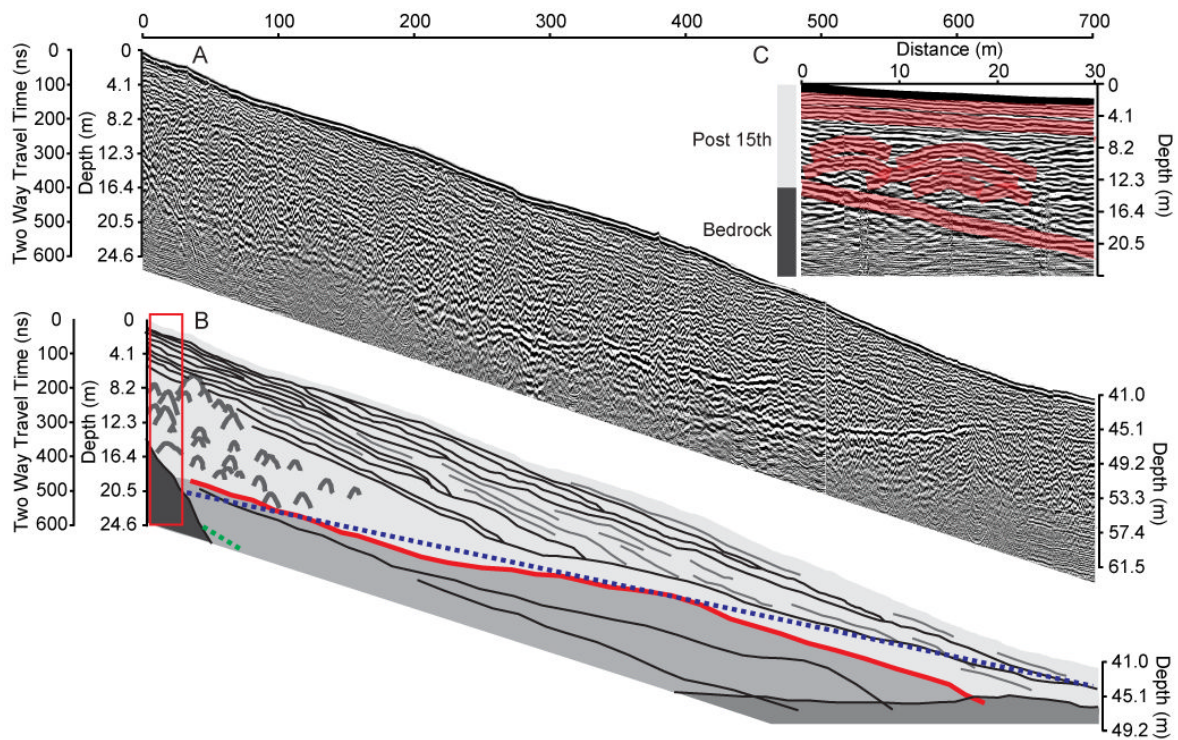
Supplementary Figure DR2. Gígjökulslón and Gígjökull glacier. A: pre-eruption ice-contact lake, G1 and G2 are gorges from where jökulhlaups emanated. G1 is the primary bedrock gorge referred to in the text that routed most floods, G2 was a pre-existing gorge that was fed supra-glacially along the glacier margin B: 14th April 2010 jökulhlaup fan progradation. C: Post eruption infill with debris forming a low relief fan.



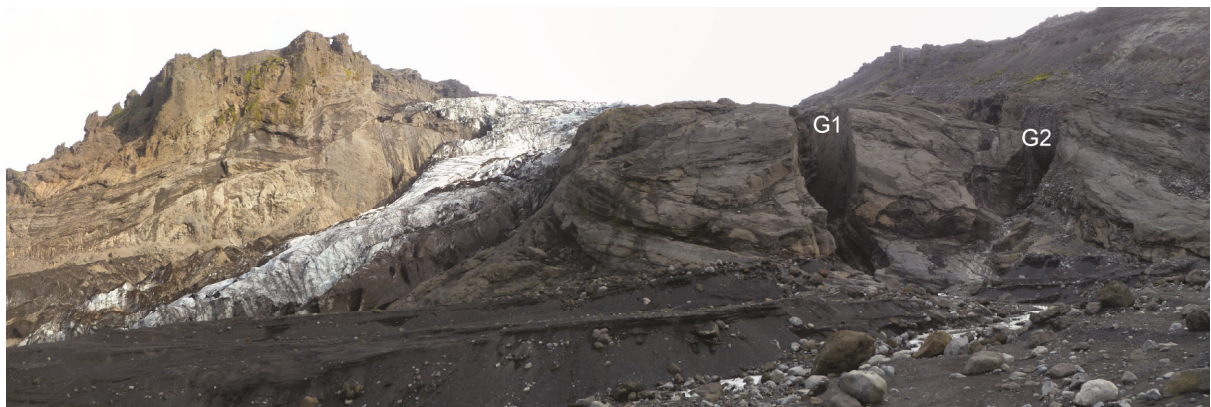
Supplementary Figure DR3: a) long profile of pre- and post-eruption TLS showing change relative to lake level. Inset shows profile of terrace surfaces in April 15th sediments, numerals relate to b) cross sections of pre- and post-eruption TLS through the basin infill relative to lake level, circles highlight toe-cutting of slopes. Grid squares are 200 m in X, 50 m in Y.



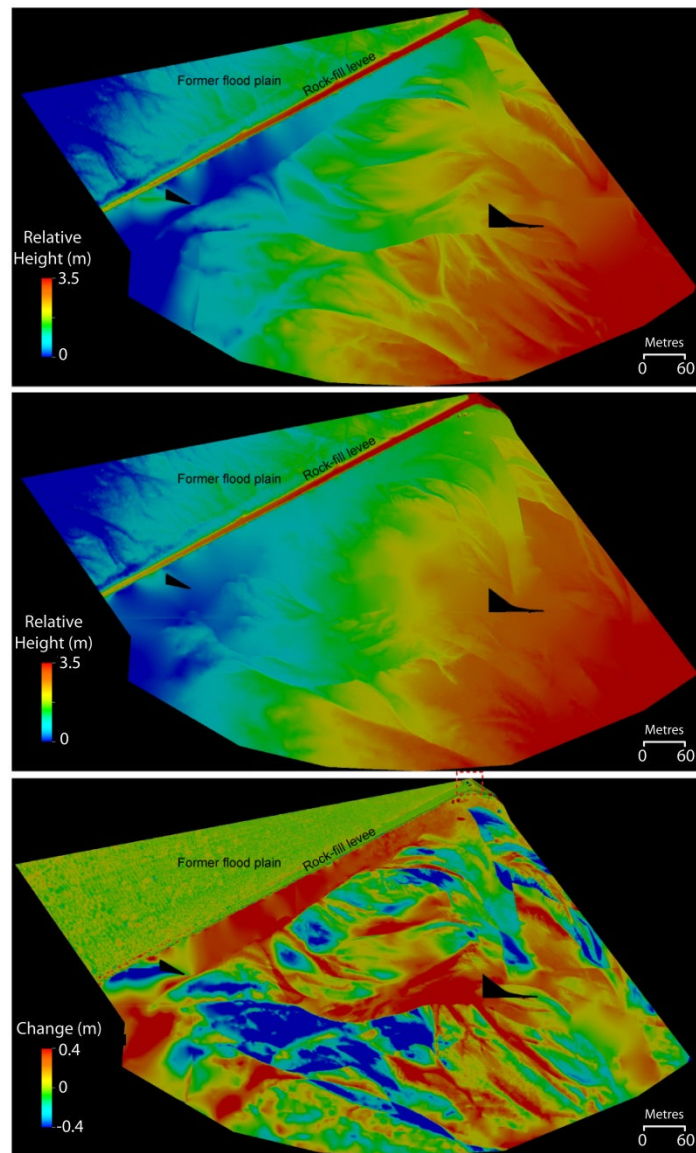
Supplementary Figure DR4: 3D render of July 2010 TLS data showing GPR profile for Supp Fig 5 (red line) and the extent of the late-stage, lower magnitude jökulhlaup fan (red shading) with prominent terraces marked (white dashed).



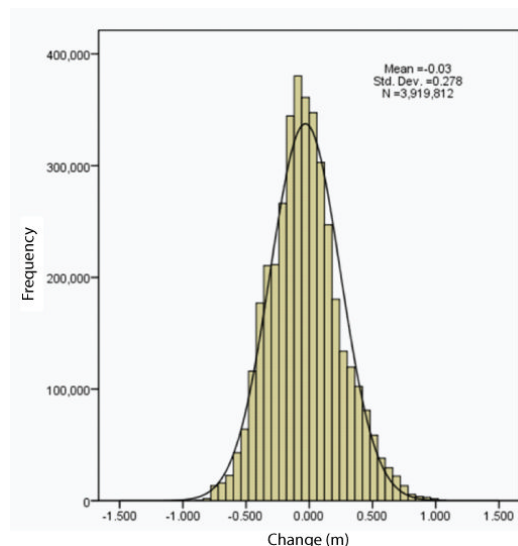
Supplementary Figure DR5: a) Processed GPR data (location shown on Supp Fig 4) interpretation of the radar facies showing upper unit of laminated deposits with buried point reflectors (ice or boulders) from waning stage jökulhlaups. This is underlain by more massive, poorly structured deposits interpreted to be from April 15th 2010 jökulhlaups. The boundary between the two (red) is coincident with the depth calculated from time-lapse imagery of fan building events (blue, dashed). The prominent sub-horizontal reflector is likely to be the water table which meets the surface spring-line; c) less-distorted view of boxed area in (b) showing bedrock gorge contact and point reflectors.



Supplementary Figure DR6: View of terracing developed in the post April 15th jökulhlaup-fan surface in front of the two bedrock gorges (G1, G2) from which many jökulhlaups emanated, and where post-eruption stream flow originates.



Supplementary Figure DR7: height coloured and surfaced elevation model from pre-eruption TLS data (upper) and post-eruption (middle) at OMB. Lower image is 2d change in Z between datasets, dashed box outlines different location of vehicle in surveys. The former flood plain is within the noise of the instrument, +/-vegetation changes. The change is typical of a braided river and shows no significant net-aggradation or incision.



Supplementary Figure DR8: Histogram of the change values per cell from the pre- and post-eruption TLS of the braided river at OMB. The mean (-0.03 m) change is negligible.