



## Supplement of

## **Optimising 4-D surface change detection: an approach for capturing rockfall magnitude–frequency**

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## **Supplementary Information**



Sup. Fig. 1: Edge-Hole values across the cliff with values  $> 5 \times 10^{-4}$  coloured red and removed from each point cloud prior to change detection. Edge-Hole values above the applied threshold occur predominantly around occluded areas but also along protruding sandstone at the cliff top. Areas of the cliff face that appear blue (i.e. low *EH* values) correspond with bedding that is draped with silt from the interbedded siltstones and carbonaceous mudstones above. (a) Aerial perspective. (b) x-z plane directly viewing the cliff. Holes in the point cloud are now apparent, with their edges delineated in red. (c) View from the scanner position.



Sup. Fig. 2: Waveform deviation across the cliff, with values > 25 coloured red and removed from each point cloud prior to change detection. (a) Aerial perspective showing high deviation returns at the cliff top and on top of the buttress, which has both steeper
incidence angles, high surface roughness from fallen boulders and in some areas vegetation growth. (b) x-z plane directly viewing the cliff. (c) View from scanner position.

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