[Earth Surface]

Supporting Information for

[The Fate of Sediment After a Large Earthquake]

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Introduction

This file including the supporting information for The Fate of Sediment After a Large Earthquake. These support and provide further details of the methods and results described within the main text of the manuscript.

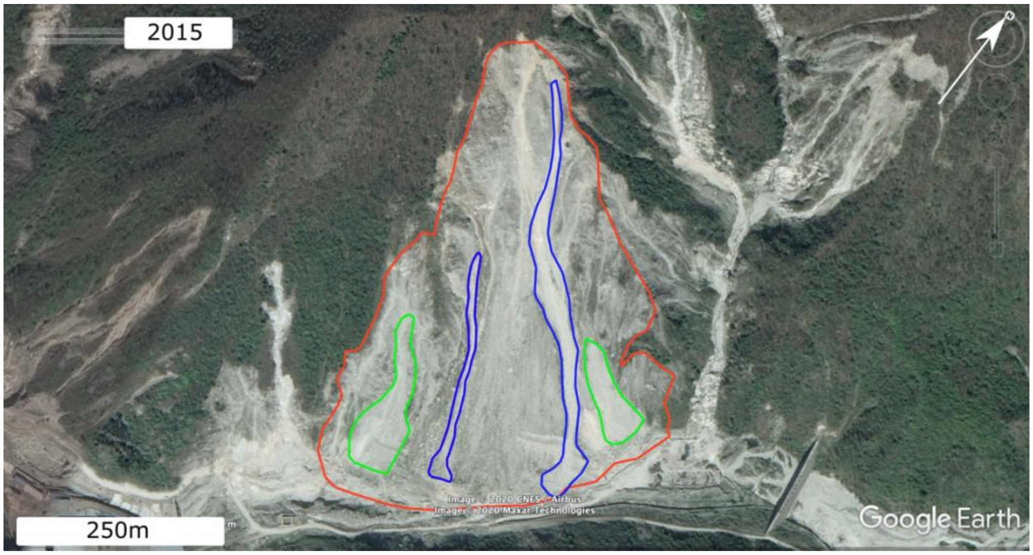

Figure S1: A subsection of a mapped catchment with examples of key mass movement types highlighted in different colours. A coseismic landslide is mapped with a red online and we can see it has been remobilised several times since the earthquake. Unchannelised remobilisations are outlined in green while channelized remobilisations are mapped in blue. Debris flows are mapped based upon the same criteria as channelised remobilisation.

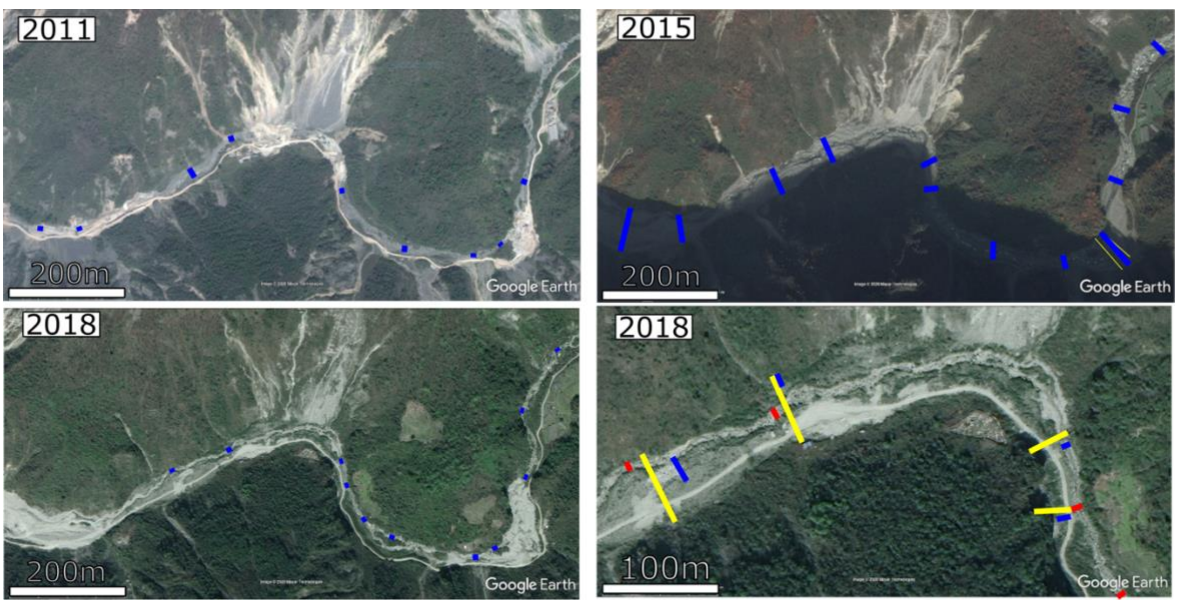

Figure S2: Examples of the mapping of tributary channel deposit cross sections. The first 3 images are of the same area through time. For each image the channel deposit is mapped to the edge of the visible sediment at regular intervals, shown in blue. The final image shows a subsection of a catchment with the mapped cross sections in different colours. The cross section from 2011 is mapped in blue, 2011 in yellow and 2018 in red. Due to rectification errors within Google Earth the cross sections are not in the exact same position, however care was taken to ensure repeat surveys were taken as close as possible.

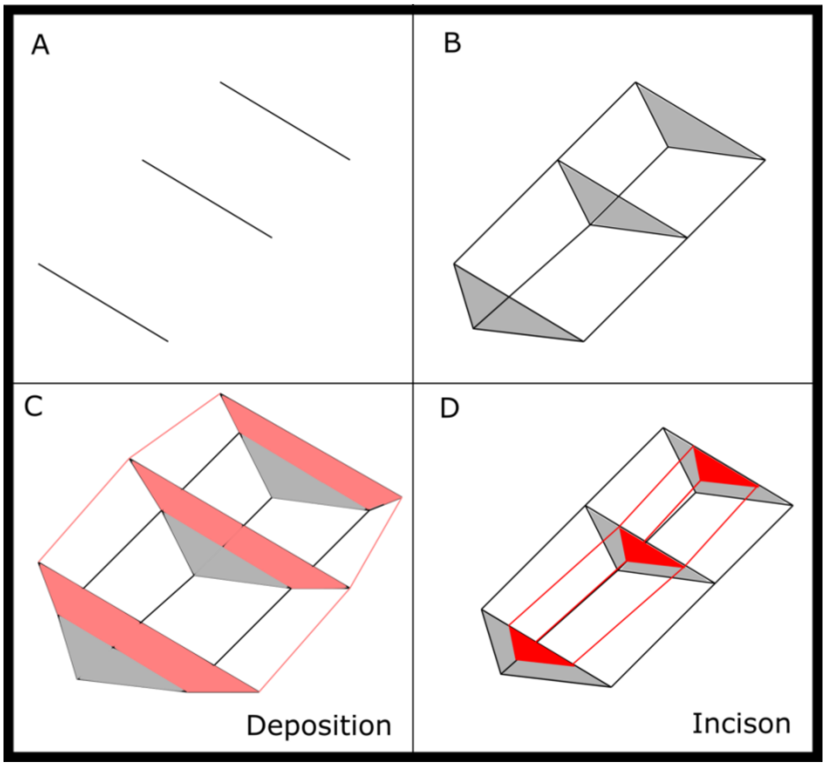

Figure S3: A cartoon illustrating the estimation of channel deposit volumes from the mapped cross sections. A) the cross sections are drawn. B) the along channel distance between the cross section is calculated and a triangular cross section is assumed. Multiplying the distance by the area provides an estimate for the volume contained in the tributary channel deposits. C) The cross sections are remapped and the widths have increased. To determine the volume of sediment deposited the triangular cross section and volume is recalculated with the new width and the previous volume is removed. D) if the width has stabilised, we assume no deposition has occurred. Therefore, we map the width of the actively incising channel and estimate the volume of sediment removed by the channel by again assuming a triangular cross section.

Date of image	Source of Image	Resolution	Coverage
May – July 2008	Aerial photography	1 – 2.5m	97%
April 2011	Aerial photography and Worldview satellite	0.5 – 1m	99%
April 2013	Aerial photography and Pleiades satellite	0.5 - 2m	95%
April 2015	Spot 6 satellite	1.5m	99%
April 2017	Spot 6 satellite	3m	93%
April 2018	Spot 6 satellite	3m	93%

Table S1. The date, source and resolution of the images used in the development of the inventory. Coverage describes the percentage of the study area covered by the imagery at each time step.

Parameter set	Median volume (km^3)	Minimum volume (km^3)	Maximum volume (km^3)
Table 1	0.27	0.14	0.38
Average depths of 1, 2 or 3 meters	7.3	1.5	157
Average depth between 0.05 and 0.95 meters and shallow soil landslides (Larsen)	4×10^{-2}	1.8×10^{-2}	0.15
Estimated increase in tributary channel deposits	-	2.12×10^{-2}	4.9×10^{-2}

Table S2. The estimated volume entering the tributary channel deposits using different combinations of area-volume scaling relationships. The final row contains the estimated volume of the channel deposits from the analysis of the cross sections. Any scaling relationships which produce an estimate of volumes substantially different from the independent estimate of tributary channel deposits is discounted.