



## **Identifying post-seismic debris flow hazards in the Wenchuan province of China.**

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In 2008 the Wenchuan earthquake devastated the Sichuan province of China, initiating tens of thousands of landslides across the landscape that mobilised > 2.5 km<sup>2</sup> worth of sediment, the majority of which remained on the upper slopes of steep mountain catchments. A series of intense rainfall events in 2010 initiated a number of these post-seismic deposits to form large debris flows that evacuated huge volumes of sediment out of the valley limits destroying many settlements in their wake.

We estimate that there is still in excess of 1 km<sup>2</sup> of sediment residing on steep slopes within the Longmen Mountain valley catchments with the potential to initiate many more hazardous debris flows.

Comparing pre and post event satellite imagery, as well as in situ measurements of the final volume and extent of sediment deposits, we have constrained a mass and momentum balance model based on the shallow water equations with a description of basal entrainment, to replicate the initiation and development of these historic large debris flow events.

We have then determined the conditions necessary to maintain and build a debris flow large enough to extend beyond the valley limits, and so developed a physically based hazard assessment model that can be used to examine the range of likely debris flows generated from catchments that still harbour large post-seismic deposits, and identify those settlements most at risk.