

Joshua West, TO seminar April 1st 2014: The geomorphic aftermath of the 2008 Wenchuan earthquake and implications for tectonics and secondary hazards

Abstract: The very large number of landslides triggered by the 2008 Wenchuan earthquake provide a rare opportunity to study the erosional processes associated with large seismic events, and to explore their implications. This talk will cover three pieces of work that we have completed related to the aftermath of the Wenchuan earthquake. The first is a reconsideration of the volume of coseismic landslide material. Our reanalysis shows that previous estimates of landslide volumes were probably too large, but that landslide erosion did nonetheless significantly offset coseismic uplift. We place this result in the context of a new global model for coseismic “volume balance.” The second part of this talk will discuss the post-earthquake increases in sediment fluxes measured from major rivers draining the area affected by the earthquake, and will consider what these fluxes mean for timescales of sediment evacuation. The measured fluxes suggest that there is a “persistent fluvial memory” that may last over timescales of decades to even centuries, posing prolonged secondary hazard, but that sediment is likely to be evacuated within the return time of events of the Wenchuan magnitude. Finally, the talk will include discussion of cosmogenic ^{10}Be data from before and after the earthquake, which reveal large changes due to input of landslide debris. Such changes complicate the interpretation of denudation rates using ^{10}Be in tectonically active locations but also provide an opportunity to trace landslide contributions to river sediment, offering useful information that complements the measurements of fluxes from river gauging. I will conclude the talk by briefly summarizing some of the research we are currently pursuing that develops from this work.