Introduction

Landslides triggered by large earthquakes (EQ): cause severe social damage (e.g., building destruction, road blocking, river channel aggradation and flooding). Managing these seismically-induced geohazards require understanding of characteristics of locations and grain size of those earthquake-triggered landslide deposits.

The 2008 M7.9 Wenchuan EQ triggered over 60,000 landslides in the populated Longmen Shan mountain range and cause significant life and economic loss (Parker et al., 2011). This seismic event provides a good opportunity to study the geomorphic locations and grain size distribution (GSD) of hazardous landslides associated with large EQs.

Research Questions/Objectives

1. Understanding differences between landslides before and after EQ.
2. Obtaining GSD of landslides after EQ.

Methodology

1. Pre-EQ landslide mapping and analysis (ArcGIS)
   3m SPOT 5 image + ArcGIS. Post-EQ landslides from Li et al., 2014.

2. Co-EQ/Post-EQ landslide grain size distribution (GSD)
   A. Photo scaling (Adobe Illustrator)
   B. Photo sieving (Digital Gravelometer)

Results and Discussion

1. Characteristics of landslides before and after the EQ

2. GSD of the Wenchuan EQ triggered landslides
   Ongoing work: already processed over 200 images (two sites).
   Geologic unit: S metamorphic rocks: slate interlayered with marble.

   A: Larger landslide area after the EQ, (stronger seismic shaking vs. rainfall-induced hill slope destabilization);
   B: Slightly steeper slope (5°) (steeper slope is easier to be destabilized);
   C: Located at lower elevation (slope-elevation variation);
   D: Aspect: S (pre-EQ) → S+NE (post-EQ) (irradiation + topographic site effect) (Meunier et al., 2008)

Conclusion and Implications

1. Critical regions susceptible to EQ-triggered landslides: evaluated preferred slopes, elevations and aspects for EQ-triggered landslides.
2. Landslide grain size distribution and transportability: mostly from mm to cm scale; provide basis for modeling bed sediment transport.
3. Next: more landslide deposits photos need to be processed and classified into different geologic units.

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References

[1] Li et al., 2014, Geochemistry, Geophysics, Geosystems, 15(4), 833-844.