A data-driven evaluation of post-wildfire landslide triggers

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Areas burned by wildfires are more susceptible to landslides, due to reduced cohesion and increased runoff (Shakesby and Doerr, 2006). Little work has been done so far comparing post-wildfire with other rainfall-induced landslides on a global scale. This analysis addresses the following questions:

- Using the NASA Global Landslide Catalog (Kirschbuam, 2010), global precipitation (CHIRPS) and fire (MODIS Burned Area) products, can we observe differences between the precipitation triggers of ordinary rainfallinduced landslides and those of post-wildfire landslides?
- Are similar post-wildfire changes in landslide susceptibility observed in difference regions (as defined using hierarchical clustering by location) around the world?

The regions, determined by clustering on location, are shown below:



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Post-wildfire landslides have a different seasonality from other rainfall-triggered landslides.



Years before the landslid



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Landslide seasonality



Each region appears to have unique raising seasonality, landslide the possibility distinct triggering mechanisms depending on the climate.

In California and the Himalayas, the precipitation frequency curve is shifted to the right relative to unburned sites, indicating that landslides are occurring earlier in the season. This type of shift landslide suggests greater susceptibility at post-wildfire sites because earlier in the wet season the ground is not as saturated and landslideprone.

In the Intermoutain West of the US and Southeast Asia, landslides generally happen in an entirely different season than at burned sites. This suggests that burned sites are most susceptible when the ground is dry or immediately after a fire occurs.

Future work:

- change with the climate?

• Does wildfire have similar impacts on other types of landslides, such as earthquake-triggered landslides? • How might landslide susceptibility