COLLEGE OF SCIENCE
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Research Horizons Day

Assessing the Accuracy of Landslide Runout Simulations within Myanmar, Southeast Asia

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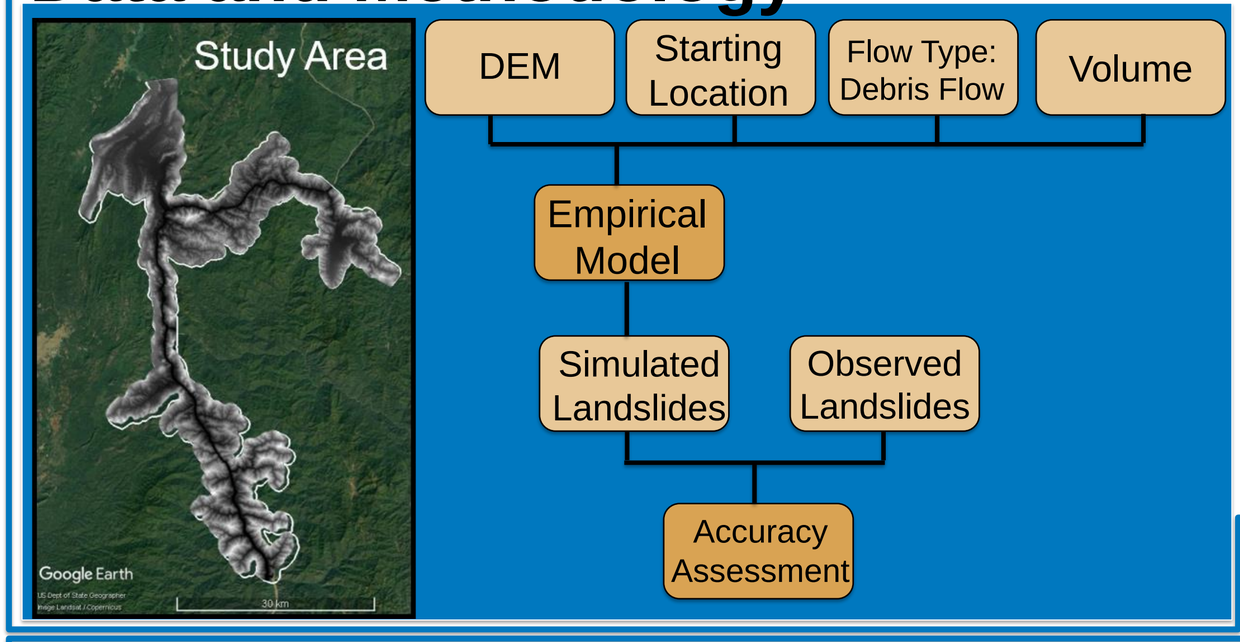
Introduction

Due to its geographic location, natural hazards such as heavy rainfall, earthquakes, and flooding occur frequently within Myanmar. Common triggers for landslides, these natural hazards over time contribute to the debris flows that ultimately results in the displacement of people as well as the destruction of roads, homes, and farms. The lack of documentation for these events makes it difficult to prepare for and prevent similar disasters from occurring in the future. Being able to accurately simulate landslides can help support future land use planning and zoning efforts within Myanmar.


(2) Observed Landslides

Data and Methodology



Obtained Two DEMS
- 50cm DEM resampled to 2m and a 30m DEM

Used Satellite Imagery to identify and digitize landslides in study area
- Recorded starting locations and runout areas of 9 landslides
- Determined volumes using existing Area-Volume Relationships

Simulated landslide runout paths with an Empirical Model
- The model used for simulations was Laharz

Stratified Random Sampling Method to assess accuracy
- The number of accuracy assessment points were determined by the landslide size and the cell resolution of the DEM

Results/Discussion

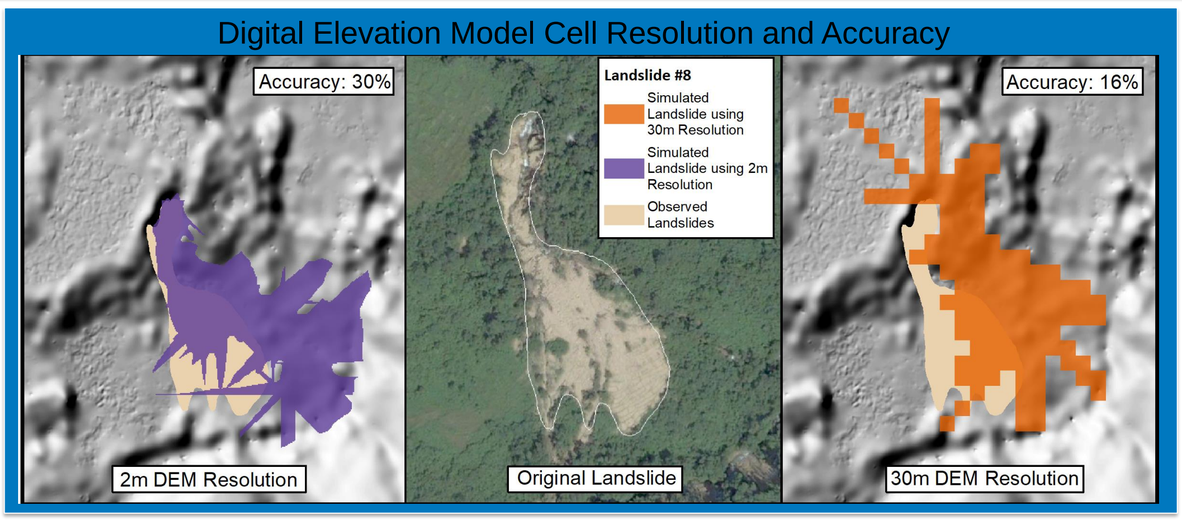
- Overall accuracy for the 2m DEM was 33% - 38% and 19% - 22% for the 30m.
  - The 30m DEM yielded a smaller range of accuracies (9% - 30%) than that of the 2m DEM (14% - 66%).
- The Area-Volume Relationships yielded higher accuracies with the 2m DEM than the 30m DEM.
  - Relationships by Marten as well as Guthrie and Evans were the exception to this. The cause of this is unknown.
- When simulating debris flow, the model performed better with landslide that were narrower and straighter. Landslide shape affected accuracy.
  - This could be due to the size of the landslides simulated.

Area-Volume Relationships by Author

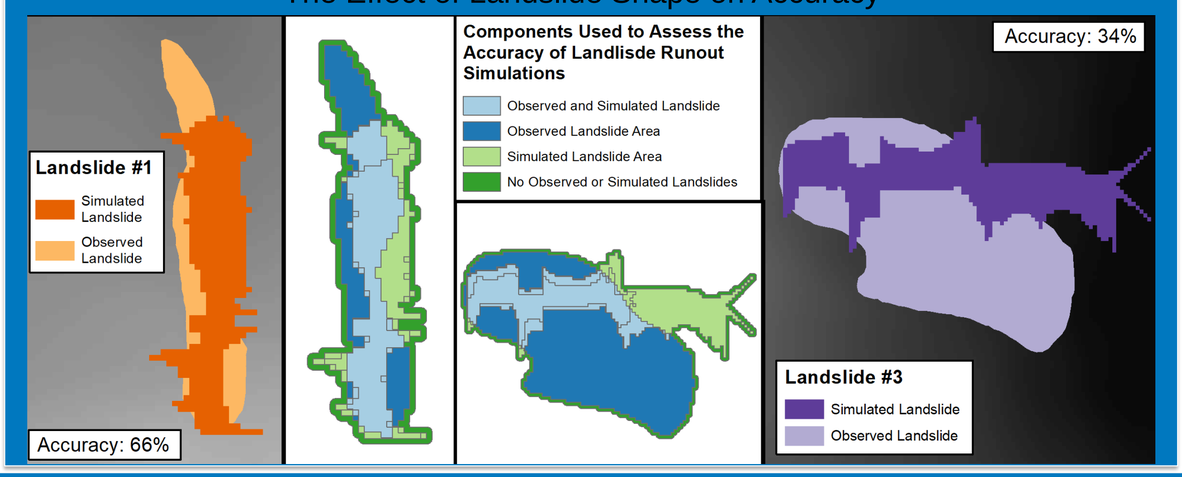
	Simonett	Omidvar and Kavian	Marten et al.	Guthrie and Evans	Guzzetti et al. 2009	Guzzetti et al. 2008	Larsen and Torres Sanchez	Imaizumi et al. 2008	Imaizumi and Sidle 2007
2m	30% - 34%	30% - 36%	28% - 34%	28% - 36%	31% - 35%	31% - 34%	32% - 43%	53%	37%
30m	10% - 19%	20%	26%	24%	16% - 23%	15% - 20%			

No Accuracy Available

Digital Elevation Model Cell Resolution and Accuracy



The Effect of Landslide Shape on Accuracy



Conclusions

Landslides occur frequently in Myanmar and runout path prediction can help improve disaster preparedness. These area-volume relationships were used due to a lack of landslide data within this region. Described as being independent of their local physiographic setting, these relationships yielded volumes that made it possible to simulate runout paths (Guzzetti, 2009). When it comes to simulating debris flows, improvements can be made in order to generate greater accuracy for the future. While simulations didn't perform well enough to be useful for land use planning and zoning they are helpful considering that data for these events didn't exist previously. Hopefully for future events more information can be collected about landslide events.

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