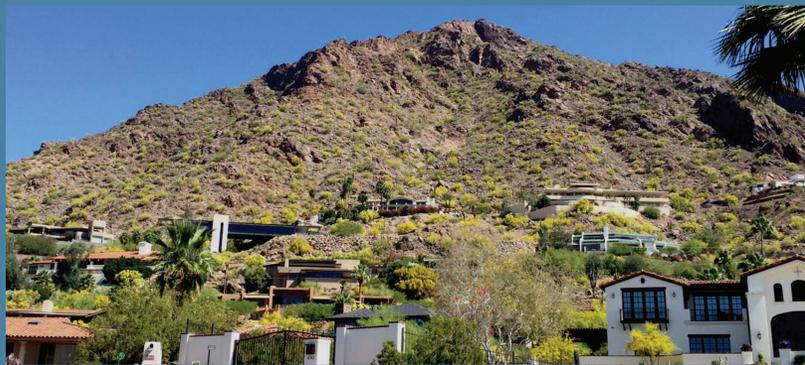


Landslide Hazards in Metropolitan Phoenix

Ryan Cleary, Decision Center for a Desert City, Arizona State University

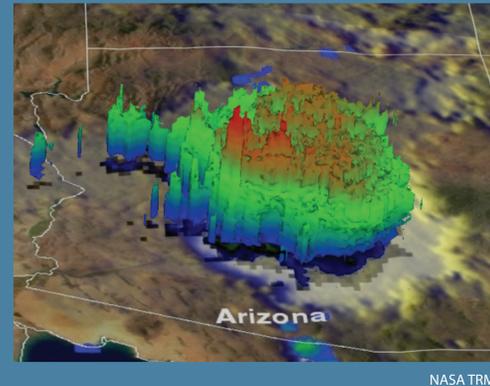
Where in the Phoenix Metropolitan Area are landslide hazards present and how can damage to residential areas be mitigated?

Development on or near steep mountain slopes in metropolitan Phoenix has left some homes at risk for damage from potential landslides. The goal of this study is to locate potential landslide hazards and identify homes or roads in proximity. With this inventory, city planners and homeowners will be more aware of hazard risk.



South Mountain Case Study

Heavy monsoon precipitation in August and September of 2014 activated debris flow chutes on ranges in South Mountain. The images below show debris flow chutes before and after these events.



Before

After



Damage and Injury Mitigation

- Avoid building homes or structures on steep slopes or near drainage ways. Risk of damage increases with greater slopes.
- In hazardous areas, consider installing retaining/deflection walls or altering the course of drainage channels
- Before and during rain, monitor slopes for signs of material movement. Downslope movement is a warning sign to evacuate the area.
- During heavy rainfall, evacuate yards that face a steep slope. Also, avoid sleeping in bedrooms on a side of the house that faces a steep slope.

Conclusion

The evidence from South Mountain shows that heavy precipitation can cause significant movement on debris flow chutes. If similar debris flows had been activated on slopes that are near residences, significant damage may be possible.

Future Work

When the aerial imagery from October 2014 becomes available, the next step is to compare this imagery with imagery taken before the event. This will more clearly show the extent of movement of the debris flow chutes.

Further study would also involve monitoring future rainfall events and observing their effects on other areas throughout Metropolitan Phoenix.

Methods

Methods for collecting data in Google Earth:

1. Identify a debris flow chute
2. Take screenshot of chute to compare with new aerial imagery
3. Add path following the debris flow chute
4. Display elevation profile
5. Record elevations (min, avg, and max), distance, and slope (max and avg)
6. Identify residences or roads that are at risk for damage
7. Save location as kmz file for mapping

Acknowledgements

Brian Gootee, Mentor,
Arizona Geological Survey
Ron Dorn, Faculty Mentor,
Arizona State University

This material is based upon work supported by the National Science Foundation under Grant No. SES-0951366 Decision Center for a Desert City II: Urban Climate Adaptation (DCDC). Any opinions, findings and conclusions or recommendation expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF).