Using 10-Be to Determine Sediment Production and Transport Rates on Steep Hillslopes in Varied Tectonic and Climatic Settings
Objectives of this Project

• Establish a new use of cosmogenic nuclides
• Determine nuclide activity in sediment as a function of depth and distance downslope
• Build simple box models of sediment production from rock and subsequent transport downslope
• Determine whether sediment is generated primarily at ridges or whether the rate of sediment production changes downslope
• Determine whether different grain sizes act differently within a hillslope’s soil profile
Hillslopes are often cited as fundamental components of geomorphic systems, but their complexity has discouraged field-based studies.
How?
Quantifying Sediment Transport Rates with $^{10}$Be

- Previous work done by Nichols et al. (2002) on desert piedmonts
- Common sense tells us that sediment should be generated at rangefronts, and subsequently march down piedmont from points of generation
- Concentrations of cosmogenic nuclides in piedmont sediment support this hypothesis showing a direct relationship between distance from rangefront and nuclide concentrations
- Will sediment on steep hillslopes show this same relationship? Stay tuned...
Sample Collection
Where?
(but those all seem so different...)
Preliminary Results

$[Be] \times 10^6$ v. Distance Downslope
Preliminary Results
Preliminary Results

$[\text{Be}] \times 10^6$ v. Depth
What’s Next?

- sediment production and transport models
- ALSM (LIDAR) and topographic modeling
- comparison of in situ and meteoric Be
Thanks!