Big Slow Movers: A Look at Weathered-Rock Slides in Western North Carolina

So what is a “Big Slow Mover”???

Big, slow to very slow moving, weathered-rock slide

• **BIG**: Relative description of size; refers to slides at least 0.5 acre in size.

• **SLOW MOVER**: Velocity Class 2-3 (Cruden and Varnes, 1996) or 0.5-36 ft/yr.

• **WEATHERED ROCK**: Partially to completely decomposed according to URCS (Williamson, 1984)
Toxaway River Slide

[Image of a map showing the Toxaway River Slide]
“Approximately 5,376,548,571 gallons of water changed hands.”
S.W. McCallie

August 1916

~ 298,938 cfs
~ 50 mph

2.1 mi. - Wintergreen Falls
5.7 mi - Lake Jocassee
6.9 mi - N.C. / S.C. Line
Geologic and Geomorphic Setting
Cross Section A-A'

Explanation

- Hand auger location
- Slide movement direction
- Arrows depict inferred movement direction on pre-synmetamorphic fault
- Survey station
- Inferred slide failure surface at depth
- Foliation orientation

Note: Fracture and foliation orientations shown on cross sections are based on field measurements; actual locations and folding shown on cross sections are diagrammatic.
Tree Increment Borings

Control Tree

Landslide Tree

Increment core from control tree: *Tsuga canadensis* (eastern hemlock) - sample LSC-D1-C1

Increment core from landslide tree: *Tsuga canadensis* (eastern hemlock) - sample LS-D1-C1
Lake Logan Center
Cross Section A-A'
North Carolina Geological Survey
August 4, 2005

Bearing = 250°

- A10: Data point along the section line
- N: Scarp/Tension Crack
- : Bedrock Foliation Planes - locations shown are schematic
- v: Inferred, possible contact
- : Exposed old, slip surface
- : Grass and/or erosion mat
- : Colluvium
- : Fill
- : Residuum
- : Large boulders

Survey mapped by NCGS staff members RSL and RMW on August 4, 2005 using a cloth tape, clinometer, and Brunton Compass.
Hunters Crossing Vector Movement at Survey Locations
January 16, 2006

Numbers indicate cumulative change in elevation in feet.

Vector Scale 1 inch

Map Scale
0 20 40 80 120 160 Feet
Similarities

Geomorphology

- Toe of slope in subtle concavity
- Stream/creek that encroaches on toe of failure
- West- to southwest-facing slopes
Similarities (Cont)

Geology

- Steeply dipping discontinuities
- Residual soil = SM with high mica content
- Basal sliding surface at or above contact with hard bedrock
Future Work

• Identifying topographic signatures using LiDAR
• Analysis of Clay Mineralogy
• Subsurface Exploration??
Questions ??

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