LANDSLIDE DATA FIX BEFORE NON-GEOLOGISTS "FIX" THE LANDSLIDE

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Landslides are an unpredictable but common Earth process. Since landslides do not occur on a knowable schedule, it is difficult to plan for extensive landslide studies. Thus, when a landslide does occur, local geologists usually rush to observe and measure the fresh geological exposure. Since many landslides occur in unconsolidated sediments, occur near rivers that carry the debris away, or occur on private property that is "restored" to the pre-landslide condition, the landslide-intrigued geologist must make time to quickly collect the data before it is naturally or mechanically removed.

One such opportunity occurred in Jeffersonville, VT in April, 1999, when a 46 m high bank of the Brewster River failed on a coherent bench of glacial silt, ~5 m above the river, and traveled ~290 m across the adjacent floodplain. The top of the bench had higher cohesions (direct shear test) (17 kPa) than below (5.6 kPa) and above the bench (8.2 kPa). The intact bench suggests bank undercutting was not the immediate initiation mechanism. The landslide initiated after 6 months of below normal precipitation (76% of annual average), unusual in Vermont, where many hillslopes (especially those underlain by clay and silt deposited in glacial lakes) require extended wet periods to fail. The previous summer, however, was the wettest summer on record. The landslide debris was completely removed by the following year.

Excavation of the debris revealed a basal 20-cm thick saturated shear zone with infrequent 1–3 cm cohesive clay clasts in a homogenized gray silt matrix. The basal zone allowed for debris mobilization, and was in sharp contact with the underlying, uneroded grass. An R_f/ϕ test suggests that landslide movement aligned and rotated the clay clasts. The saturated shear zone dewatered through fields of mud volcanoes (0.5 to 2 m wide) on the surface of the debris. At the landslide margin, steep snouts of fine-grained material suggested debris-flow like behavior.

The window of opportunity to collect data on the Jeffersonville slide was short but the data rich study allows for unique insight to landslides. In particular, we now have a better understanding of landslide hazards, timing and runout distance, and of the landslide mechanics of failed glacial sediments.