Steep Hillslope Catenas in the Rio Chagres Watershed, Panama. (S06-hendrickx183353-Oral)

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Abstract:

Hillslopes in the Chagres National Park are short, 100-300 meters long, range from 28 to 35 degrees and covered in dense tropical forest. Soils developed on the hillslopes are deeply weathered, up to 3m depth overlying saprolite. Several processes interact to produce variability of soils in this area. The sideslopes undergo periodic deep seated mass movements such as slumping and landsliding. The base of these erosion events is the contact between the soil and the saprolite, unweathered bedrock is rarely seen. Small scale mass movement is seen in the frequent treefalls that occur on all landscape elements. In these instances, the tree roots remove the top 0.5-1m of the soil surface and deposit it in a downslope direction. Another major driver in producing soil variability is the catenary relationships that were found in the three first order drainages studied in this project. Soils found at the toeslope position invariability showed evidence of gleying, indicating saturated moisture conditions existing for sufficient periods of time to allowing reducing conditions to form in the soil. The deep weathering produces soils with high clay contents, and in each soil profile studied, there was evidence of significant water movement through the soil. All soils contained at least one pipe 1-15 cm in diameter, often a former root channel. Clay and organic matter films were observed on the walls of these pores, indicating water movement from the surface into the soil. The soils contained a high proportion of swelling clays leading to the development of strong structure and distinct peds all of which were lined with clay and organic matter films. The swelling clays also lead to the development of large orthogonal cracks at t he soil surface immediately underlying the thin organic or litter layer.

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