

Uncertainty Associated with Hillslope Delineation in Watershed Erosion Modeling

X. Shawn Huang, Lyle W. Zevenbergen¹

River Engineering, Ayres Associates.

Abstract. Most watershed runoff and erosion modeling tools represent a complex watershed as a network of hillslopes, channels, ponds, and an outlet. In modeling practices, a hillslope is commonly treated as a planar surface of constant slope. However, hillslopes are actually irregular in geometry and non-uniform in slope. Soil type, vegetation cover, and land-use management might vary within a single hillslope. To solve this problem, some models like **Erosion And Sedimentation Impacts (EASI)** addressed complex hillslope geometries by cascading water and sediment from one hillslope to another. More recently, based on the development of spatial analysis tools in the GIS platform, a watershed can be delineated into as many hillslopes/channels as possible. Therefore, it is important to get a deeper understanding about uncertainty associated with hillslope delineation in watershed erosion modeling. In this study, a sensitivity analysis is conducted by partitioning typical concave or convex hillslopes into a series of planar surface with constant slope. Preliminary results show significant uncertainty and imply future improvements to watershed erosion models.

¹ River Engineering
Ayres Associates
3665 JFK Parkway
Building 2, Suite 200
Fort Collins, CO 80525
Tel: (970) 223-5556