Channel Initiation in the Semiarid Colorado Front Range

Jameson Henkle
Department of Geosciences, Colorado State University

Abstract: The channel head represents the transition from hillslope processes to fluvial processes. The ability to delineate the location along a slope at which channels initiate is important for understanding hydrologic and geomorphic processes governing headwater streams. Understanding how headwater streams function will aid in better understanding fluvial processes and landscape evolution. Channel heads were mapped in the headwaters of the Cache la Poudre River and the North St. Vrain River in the semiarid Colorado Front Range. Multiple field sites were chosen along both rivers to account for variability due to elevation and aspect. Surface topographic parameters were measured in the field and analyzed to determine whether surface processes control channel initiation in this region. Preliminary results display a poor inverse relationship between source area and local slope illustrating that surface processes exert an influence on channel initiation but may not be the dominant control. A threshold of erosion that is just shorter than the hillslope length necessary to initiate a channel was observed for both contributing area and basin length. Lack of highly correlated results indicates the importance of subsurface controls on channel initiation.