



Temporal Dynamics of Gully Evolution in a Small, Ephemeral Channel in a Semiarid Watershed

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Incised channels that terminate at a vertical-wall gully heads are common features in semiarid watersheds. The geomorphic evolution of such channels is often dominated by migration of the headwall. The evolution of a headwall in a low order channel on the USDA-ARS Walnut Gulch Experimental Watershed (WGEW) in southeastern Arizona has been monitored since 2004, and since 2012, time-lapse photography has been employed to observe the temporal dynamics at high resolution. A Canon A1300 off the shelf point and shoot digital camera mounted inside a weatherproof Pelican case has been taking 15 mp photographs since 2012. The camera power supply was modified to run from a 12V car battery that was charged with a 25 Watt solar panel through a solar controller. During the runoff season from July through September, images were collected every 30 seconds and the time step was increase to 30 minutes during winter months. The field of view covers the headcut and the immediate surroundings. Runoff events were distinct flash floods in response to high intensity rain. The temporal sequencing of the dominant processes of erosion including mass wasting, plunge pool erosion, and piping are described. In addition, we present a description of the time-lapse camera system with suggestions for future improvements.