Channel erosion due to subsurface flow

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$\theta = 3.5$ degree $\quad \theta = 4.5$ degree $\quad \theta = 5.5$ degree $\quad \theta = 7.8$ degree

Evolution of channel shape as a function of bed slope. We study the physical processes that create eroded channels and drainage networks by doing laboratory experiments in a 1m x 1m box. Water is fed from a reservoir in the back and the pressure is maintained at a constant level. The water seeps through the porous medium (the "sand" consisting of monodisperse glass beads) and creates channels on the slope. We obtain the depth of channels as a function of time using the intersection of a laser generated light sheet with the pile surface. Contour maps of channels obtained using this laser-aided topography technique are shown above. The channel head develops a smooth amphitheater shape as the bed slope is increased.

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