
LABORATORY ALLUVIAL FAN BUILT BY A SINGLE CHANNEL

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When a river leaves a mountain range to enter a flat plain, the abrupt change in slope causes it to deposit its load into an alluvial fan. To understand this process, we develop a laboratory experiment where a single channel deposits corundum sand (0.3 mm) into a conical fan. We record the fan progradation with top-view images, and measure its shape using the deformation of a Moiré pattern. The fan remains virtually self-affine as it grows, with a nearly constant slope. Assuming that the river is close to the threshold for sediment transport, we can relate the fan morphology to the fluid and sediment discharges [1, 2]. At first order, the water discharge controls the longitudinal slope of the fan, in accordance with our laboratory observations. However, due to the downstream decrease of the sediment load, we expect this slope to get shallower towards the fan's toe. This suggests that the curvature of an alluvial fan could inform us about its growth velocity.

References

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