How and When Was Grand Canyon's Inner Gorge Cut?

GES Spring 2025 Colloquium

Friday, March 14, 1-2 pm

Columbine Hall, rm. 329

Presenter: Lon Abbott, PhD
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The Grand Cayon: What do river terraces tell us about its formation?

Abstract: Ever since geologist John Wesley Powell led the first daring descent through the Grand Canyon in 1869, scientists have studied how this incomparable gorge was carved. Despite more than 150 years of research, many debates rage over how and when the Canyon formed. One such debate is whether the Canyon was incised at a constant rate over millions of years or if instead it was carved by the upstream migration of a transient knickzone, which would trigger brief episodes of extremely rapid incision that separate periods of slower, steadier incision.

Another, interrelated debate is whether the Colorado Plateau rose to its current 2000-meter surface elevation during the Laramide Orogeny or more recently. Proponents of the steady-state incision hypothesis argue that such steady-state requires recent and ongoing, mantle-derived surface uplift. By contrast, the knickpoint hypothesis does not require (though it certainly doesn't preclude) recent surface uplift.

Determining the style and tempo of river incision requires measuring the depositional ages of river terraces at different elevations. In this talk I survey past efforts to date Grand Canyon River terraces, present new luminescence dates for terraces at Lees Ferry and at the Colorado River's confluence with Hermit Creek and examine the implications of these results for the competing incision rate hypotheses.

FREE EVENT! FREE FOOD! ALL ARE WELCOME!