



# San Joaquin Geological Society

**Date:** Tuesday, March 13, 2018

**Time:** 6:00 PM Social Hour  
7:00 PM Dinner  
8:00 PM Lecture

**Place:** Eagles Lodge  
1718 17<sup>th</sup> Street, Bakersfield, CA 93302

**PSAAPG Members**  
\$25 with reservation  
\$30 without reservation

**Non PSAAPG Members**  
\$30 with reservation

**Full-time Students with ID:**  
\$10 - Courtesy of  
California Resources Corporation

**\* RSVP \***

**By: noon Monday,  
March 12, 2018**

Register online:  
<http://www.SanJoaquinGeologicalSociety.org/>

Pay online or at the door

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<http://www.SanJoaquinGeologicalSociety.org/>

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## Geomorphic constraints on the evolution of the Kern Gorge, southern Sierra Nevada, California

Presented by: Blake Foreshee, DOGGR

**Abstract:** The southern Sierra Nevada Region, California is currently responding to a change in tectonic boundary conditions, likely due to a delaminating lithospheric root remnant. Stream profile analysis of the Kern River and feeding tributaries was used to investigate the nature and timing of the dynamic topographic response of the region. Stream profile analysis utilized a metric of the stream power model known as the normalized steepness index (ksn), which uses channel steepness and contributing drainage area to quantify the competition between uplift and erosion rates. Two relict topographic domains were identified and suggest that 1) The Kern Plateau once extended into the southernmost Sierra Nevada and 2) that recent incision within the lower Kern River drainage basin is signature of increased uplift rates within the area of recent slab delamination. Erosion rates of the relict Kern Plateau surface were estimated using two methods: ksn values and incision measurements with previously established time constraints, which yield 0.04 – 0.08 mm/yr. Moreover, increasing ksn values within the Kern drainage basin toward the Kern Arch suggest that the two are linked to mantle delamination beneath the region. Estimated erosion rates using ksn values and incision measurements suggest ~0.31 – 1.31 mm/yr. These erosion rates are less than previously constrained uplift rates. This difference between uplift and erosion rates along the mountain front may be attributed to either uplift and incision initiation beginning much later than the previously constrained 1 Ma; a missing sediment record that has been stripped off the Sierran mountain front; or that uplift rates are simply greater than erosion rates, resulting in surface uplift. In any case, it is evident that the lower Kern River drainage basin and southern Sierra Nevada is responding to Late Cenozoic tectonic activity.

**Biography:** Blake Foreshee is a geologist with the California State Department of Conservation, Division of Oil, Gas and Geothermal Resources. Blake received a BS and MS in Geology from CSU Bakersfield, where he was recognized as an outstanding graduate student. His Masters research was funded by the NSF Center for Research Excellence in Science and Technology (CREST) program. His primary research interest is understanding the imprint of tectonics and geomorphology on mountain-valley systems. Blake is co-author on a recently accepted Geosphere article on the research he will be presenting this evening. Since working with DOGGR, he has been a part of the Underground Gas Storage team. He also worked with Cal Fire and California Geological Survey in assessing post-fire debris flow and mud flow potential in southern California Oil and Gas fields impacted by the Rye and Thomas fires. He currently lives in Ventura, California.

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