



San Joaquin Geological Society

April 13, 2010

Cenozoic History of the Kern River

by

Wallace Kleck, Calif. State Univ. Bakersfield

ABSTRACT

The Kern River is somewhat unusual. It is the only south flowing major stream in the Sierra Nevada Mountains, is 265 km long, has a history of ~70 Ma, and has a mean annual discharge of ~700,000 acre-ft (currently; this discharge has probably fluctuated considerably over its history). Its history has been controlled by both climatic and tectonic events. This study is an attempt to provide a preliminary but detailed history. The timeline for the history is broken into five periods—70-40, 40-20, 20-12, 12-5, 5-0 Ma; dates are approximately $\pm 15\%$.

70-40 Ma. The course of the lower river turned east at Lake Isabella and flowed into the western Mojave region near Red Rock Canyon. It probably extended eastward (undetermined course) to join the proto-Colorado River.

40-20 Ma. It is suggested that a shallow arm of the Pacific Ocean extended across the eroded remnants of the Sierra Nevada Mountains at about 35.2° N. Lat. during this time. The river emptied into this arm of the sea near the south end of Kelso Valley.

20-12 Ma. At 20 million years numerous events affected and isolated the Southern Sierra Block (SSB)—shifting of the San Andreas Fault, deepening of the San Joaquin Basin (SJB), beginning of the Basin and Range extension, and separation of the SSB as an isolated block. The Kern River flowed into the developing SJB near Arvin and created a long, thin, dirty delta. The headwaters of the river shifted to the Little Kern River.

12-5 Ma. At 12 Ma faulting internal to the SSB rotated the Isabella micro-block which changed the course of the lower Kern River to its current lower course; it also created a natural dam of both the Kern and Walker Rivers forming two lake basins. The river flowed into the SJB near the mouth of the Kern River Gorge forming a short, thick, sandy delta with steep and unstable western edges.

5-0 Ma. During this time, the SSB was uplifted sporadically. At 5 Ma the two Sierra Blocks rejoined and the headwaters of the river shifted to near its current course. During the Pleistocene Ice Ages, the upper Kern River was glaciated.

BIOGRAPHY

- *Ph.D.—geology (1976) Washington State University; examination disciplines were petrology, mineralogy, geochemistry; dissertation was a study of the eastern Columbia River Basalts.*
- *M. S.—geology (1960) University of Oregon; areas of concentration were igneous petrology, mineralogy.*
- *A. B.—geology (1958) University of California, Berkeley; areas of concentration were economic-geology, petrology, and mineralogy. Employment Data:*
 - *1994-present - retired; part-time instructor CSUB*
 - *1979-1986 - administrative positions - Orange Coast College*
 - *1963-1979, 1986-1994 - Professor of Geology, Orange Coast College*
 - *1960-1963 - Instructor of Science and Mathematics, Palo Verde College*
 - *1953-1955 -- USAF*