

# **Dark holes in Muir's "Range of Light": Insights from southern Sierra Nevada caves and karst**

**Dr. John C. Tinsley, Ph.D.**  
**US Geological Survey, Earthquake Hazards Team**

## **Abstract:**

The caves of the southern Sierra Nevada are spectacular natural laboratories that provide surprising geological insights into the region's natural history not obtainable in other ways. Diversely distributed geographically and elevationally, the caves have formed in carbonate-rich belts of marble that partly comprise the proverbial roof pendant terranes. The youngest caves are still developing in the bottoms of canyons; the oldest caves developed several million years ago and provide insights into the uplift history of the Sierra spanning the past 5 million years. Lilburn Cave, California's longest cave at nearly 22 miles has been managed by the National Park Service as an underground research laboratory during the past 30+ years and is easily California's most studied cave system, with research coordinated mainly by the Cave Research Foundation. Lilburn Cave provides insights into the operation of a rare ebb and flow spring. New caves continue to be found, and a few are spectacular both as biological ecosystems for cave-dwelling animals and as paleontological repositories. Please join the Northern California Geological Society for a speleological tour of selected southern Sierran cave systems and scientific insights derived from cave-based studies during the past three decades.

## **Biography:**

**Dr. John Tinsley** has been based for 35+ years at the U.S. Geological Survey, Menlo Park, California. A research geologist for the Earthquake Hazards Team, he specializes in Quaternary stratigraphy and the analysis of sedimentary basins, and maps the geologic underpinnings of the dual earthquake hazards of liquefaction and strong ground motion. His most recent endeavors include interpreting the sequence stratigraphy of the Dominguez Gap area, Los Angeles, and characterizing the regional geology of southern California for landslide and liquefaction susceptibility analyses as a part of the Multi-Hazards Demonstration Project's Magnitude 7.8 Scenario Earthquake on the southern San Andreas Fault.

However, John also has conducted a simultaneous and semi-secret life as a speleologist for nearly 35 years. He coordinates the southern California arm of the non-profit Cave Research Foundation and coordinates the Sequoia and Kings Canyon Cave Research Operations. He administered the Foundation's Karst Research Fellowship from 1982-1998 and has served on the Board of Directors and as Secretary of the Cave Research Foundation. He is a Fellow and Life Member of the National Speleological Society, and a past Chairman of the San Francisco Bay Chapter of the NSS, a local caving club of about 80 members. Tonight he will share with us interpretations of active karst processes from cave studies at Lilburn Cave and selected insights that his and others' research in other caves of the region reveal about the Southern Sierra Nevada's geologic history.