

## Advances in Stratigraphy and Geochronology

### *Virtual Seminar Series of the Stratigraphy and Chronology Commission (SACCOM) of INQUA*

Thursdays at 9 am USA EST, 2 pm London, 3 pm Paris, and 10 pm Beijing time.

The fifth talk of the weekly series is on May 20,  
given by:

**Dr. Matthew Kirby (California State University, Fullerton)**

*"Re-visiting Lake Mojave Using a Basin Analysis Approach: Trying to Resolve a Complex History of Lake Level Change"*



Dr. Matthew Kirby is a professor at California State University, Fullerton in the Department of Geological Sciences. He was raised along the Susquehanna River in Binghamton, NY – a distant memory compared to the dry rivers of southern CA. He received his AB from Hamilton College, a MSc from the University of Colorado, Boulder (Institute of Arctic and Alpine Research), a PhD from Syracuse University, and served as a post-doc at the University of Southern California. In 1992, he spent 34 days on the RV Polar Duke along the Antarctic Peninsula collecting geological data for his undergraduate thesis with Dr. Eugene Domack. From that point on, Kirby knew he wanted to study Earth's climate history. Today, he researches California's geological (past 10,000 to 100,000 years) history of floods, fires, vegetation, and droughts using lake and wetland sediments. His presentation will examine new and old data from Glacial Lake Mojave. For more information, check out Prof. Kirby's Google Scholar research profile: <https://scholar.google.com/citations?user=pgMWI14AAAAJ&hl=en>

**Abstract:** Glacial Lake Mojave has long been studied (e.g., Wells et al., 2003). A well-dated comparison, however, between lake sediment cores and beach, or near-shoreline, indicators is missing. As a result, minimum lake depth estimates are unknown. Yet, understanding lake depth is key to estimating the volume of water required to fill Lake Mojave over time. And, knowing the volume of water in Lake Mojave over time will provide key information for calculating the required P:E (precipitation:evaporation) conditions (i.e., paleo hydroclimates) requisite for filling the lake. Using sediment cores collected in the 1980s, Wells et al. (2003) produced a qualitative record of lake level change from 22.6ka <sup>14</sup>C to 8.6ka <sup>14</sup>C years. Although an excellent initial study, the lake sediment cores are constrained by only six <sup>14</sup>C dates on bulk organic matter. Using the Wells et al. (2003) study as a starting point, we collected over 62 m of new sediment cores in 2018, adjacent to the primary Wells et al. (2003) sediment core locations. Although still in progress, we now have acquired 23 x <sup>14</sup>C dates from either bulk organic matter or ostracods spanning 23.8ka cal BP to 3.8ka cal BP. Using a Bayesian determined age model (Bacon v.2.2, IntCal13) on our 23 x <sup>14</sup>C dates, we compare the ages of beach, or near-shoreline, indicators to the lake core-based chronostratigraphic horizons. Using this basin analysis approach, we provide the first-ever, quantitative calculation of Lake Mojave minimum lake depth through time. We also explore future research directions for Lake Mojave using this basin analysis approach.

For more details of the full seminar series please go to the SACCOM webpage at: <https://www.inqua.org/commissions/saccomm/fig>. Please see the Zoom link below.

**ZOOM LINK:**

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Overseen by Lewis Owen on behalf of SACCOM