

**2019 SCEC Progress Report
SCEC Award #19170**

Multidisciplinary investigation of determining channel incision ages in the Carrizo Plain, California.

*Researchers
Sinan Akciz and Matthew Kirby, CSUF*

Amount awarded: \$38,241

Work Plan

(a) Direct dating of offset channels: Two channels, Sieh33 and Sieh 34, will be trenched with an excavator to expose the channel fill deposits. Our previous experience from the excavation of channels in the Carrizo Plain suggests that the now-filled channel thalwegs are ~ 6ft below the current thalweg location. Trenches will be shored using SCEC shores and cleaned and photologged at 1:20 scale or better as needed. Sandy units within the channel fills will be sampled for pIR/IRSL dating. We propose to collect and date 2 samples from the channel fill and another sample from the host-sediments that the channel has incised in to have an additional control point data. We anticipate this work to be complete in 5 days. We will be camping in the area to reduce costs.

Status: No fieldwork was completed before mid-August due to the late arrival of funds to CSUF. No cost extension was requested to complete the field work in summer 2020. As the nature of the investigation is a team effort, no special approvals have yet been issued for the project to begin in the summer of 2020.

(b) Paleoclimate data collection: A sag pond at the southern end of the Carrizo National monument will be the test site for this proposal. This site will first be surveyed using a soil probe and a grid system to characterize the subsurface. These results will be used to develop a 3-D image of the basin's subsurface, with the intention of locating the best 2-3 locations for scientific coring. Once located, 2 overlapping cores will be extracted from the 2-3 targeted sites. These scientific cores will be transported to the CSUF Paleoclimatology Lab where they will be analyzed using a variety of physical, chemical, and biological analyses that are well established climatic indicators in California's arid environment lakes.

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Project Management and Research tasks

Dr. Akciz has extensive experience with paleoseismic investigations in the Carrizo Plain and a seasoned awareness of access, working conditions, and contacts with excavation equipment rental companies. He has led many projects in the Carrizo Plain along with Dr. Grant Ludwig and Dr. Arrowsmith for over a decade. For this project, Dr. Akciz will lead the direct dating of the two most recent channel incision events through excavation of two channels in the Carrizo Plain. For this portion of the work, he will work with three other undergraduate students who will produce a senior thesis from this research experience.

Channel logs and age dating results including raw data will be shared with the SCEC community through the final technical report. We anticipate this to be a part of a future community paleoseismic database.

Dr. Kirby has spent the past 16 years extracting sediment cores from CA lakes, including from Lake Elsinore, Dry Lake and Baldwin Lake (in the San Bernardino Mtns), Crystal Lake (in the San Gabriel Mtns), Zaca Lake (northeast of Santa Barbara), Abbott Lake (in the Santa Lucia Range), as well as several others north of San Francisco in the North Coastal Range. Dr. Kirby will lead the paleoclimate data collection and analysis. For this initial work, we prefer to work with the experienced student lab assistant rather than training new undergraduate student on all aspects of the analysis. This will secure a timely completion of the proposed investigation. 2 additional undergraduate students will help with the field work.

Timeline

Feb 1 – May 15, 2019: Field work preparation including the instruction of undergraduate students on paleoseismic methods. Permitting.

June 20 – 22. Coring the Southern Carrizo Sag Pond

June 24 – 28. Trenching two channels, photologging and pIR/IRSL sample collecting.

June – July – August. Data analysis and compilation. pIR/IRSL sample preparation at UCLA.

Sep. Presentation of preliminary results at SCEC annual meeting

Sep – Dec. Continued data collection and analysis.

Jan, 2010. Submit final SCEC report. Start drafting NSF proposal to “Geomorphology” section.

Status: Anticipated timeline for the project is as follows.

Feb 2021. Coring the Southern Carrizo Sag Pond

May 2021. Trenching two channels, photologging and pIR/IRSL sample collecting.

June – July – August, 2021. Data analysis and compilation. pIR/IRSL sample preparation at UCLA.

Sep. Presentation of preliminary results at SCEC annual meeting

Sep – Dec. , 2021 Continued data collection and analysis.

Jan, 2022. Submit final SCEC report. Start drafting NSF proposal to “Geomorphology” section.