

# From Bombay Beach to the Carrizo Plain: The CERI 2022 Southern San Andreas Field Trip, July 24-29

Poster 276

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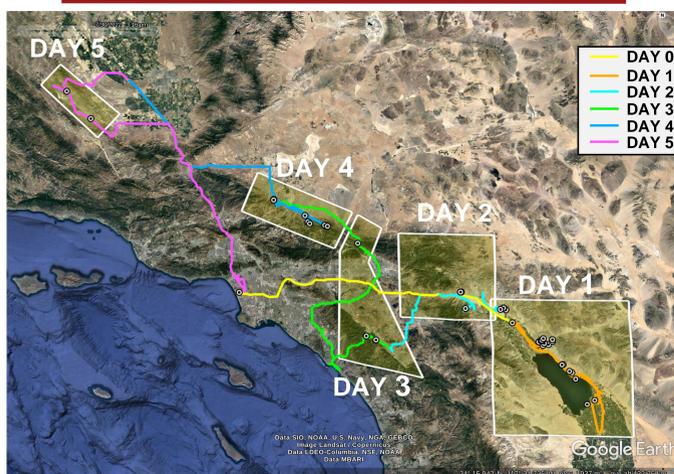
## ABSTRACT

Geologic field trips provide an opportunity for faculty and students to explore geologic sites otherwise available only through geologic guides. We are presenting a photographic diary of a five-day long (July 25-29, 2022) field trip along the Southern San Andreas Fault (SSAF) organized by the Center for Earthquake Research and Information (CERI) at the University of Memphis. We visited several locations along the SSAF, starting from Bombay Beach and concluding our trip at the Carrizo plain.



**Figure 1:** Group photo at Bombay Beach, California. Center and starting from left graduate students Roshan Bhattarai, Kiran Pandey, Ivan Luis Bazan Flores and Roshan Koirala. Faculty, Dr. T. Goebel (left) and Dr. C. Kyriakopoulos (right).

## DAILY SHORT SUMMARY



**Figure 2:** Map of southern California with timeline and visited areas (divided by day) visited along the Southern San Andreas and Elsinore Faults. The visited areas are highlighted by white boxes and yellow shading. Colored lines (see legend) show the daily travel paths ("Day 0" is the arrival day, Sunday July 24th). White and black circles show visited locations.

**DAY 1.** The first day, after an initial stop at Bombay Beach, the group had the opportunity to explore and make observations inside a geologic trench (Salt Creek) intersecting the SSAF. After the exploration of the eastern shore, we moved to the geothermal area (southeast end of Salton Sea), visiting the Red Hill rhyolitic dome and observed an array of mud volcanoes at the intersection of Davis and Schrimpf roads. The final part of the day was dedicated to the exploration of the spectacular stratigraphy of the Mecca hills inside Box Canyon.

**DAY 2.** We shifted our attention to the northern portion of the Coachella Valley and the complexities of the San Gorgonio Pass (SGP). At the end of the day the group "climbed" to the top of Mt San Jacinto using the Palm Springs aerial tramway. From here, the panoramic view of the Coachella Valley and SGP offered a new prospective on the topics discussed during the first part of the day.

**DAY 3.** In the first part of the third day the group visited the Elsinore fault zone and its local geomorphic expressions. More specifically the students had the opportunity to make observations on both compressional and extensional features generated by the combination of strike slip motion and step-over regions. During the second part of the day the group returned to the SAF and followed the geomorphic expression of the fault across the Cajon Pass.

**DAY 4.** The fourth day the group moved to the SSAF Mojave segment. We started along the Big Pine Hwy to locate and experience firsthand how plutonic and metamorphic rocks have been mechanically pulverized by highly energetic SSAF events. Subsequently, we hiked around the area of the Punchbowl fault geologic site. We closed our day with the exploration of the Pallet Creek paleo-seismological site.

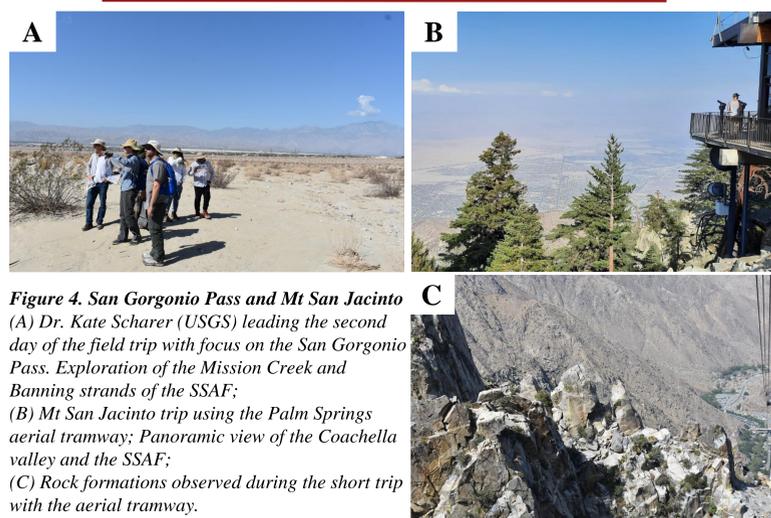
**DAY 5.** The last day of the field trip the group explored the SSAF along the Carrizo plain. We started our day at Wallace Creek, observing the impressive shift between the upstream and downstream part of a 3800-year-old channel. During the second part of the day, we moved southeast and climbed the ridges of the probably most iconic SAF geomorphic expression along the Elkhorn scarp pressure ridge.

## DAY 1



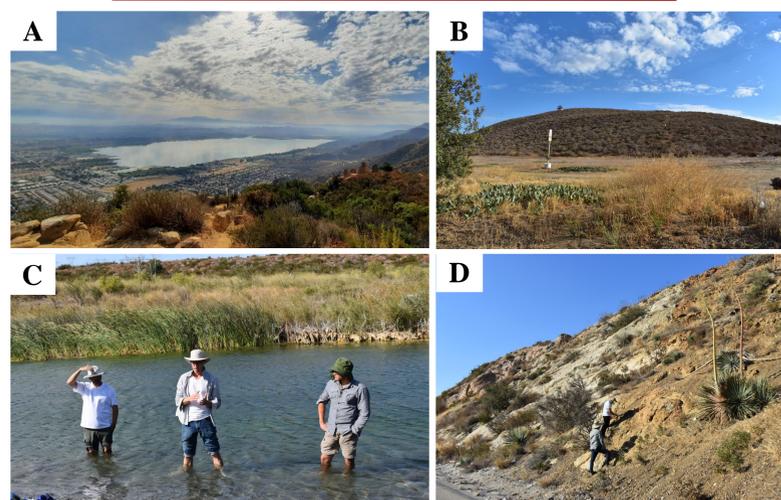
**Figure 3. Coachella Valley and Brawley Seismic Zone** (A) Exploration of the Salt Creek Geologic Trench, near the eastern shore of the Salton Sea; (B) Obsidian viscous extrusion at the Red Hill rhyolite dome; (C) Array of Geothermal Mud Volcanoes near Davis and Schrimpf Rd (person for scale); (D) Mecca Hills stratigraphy and angular unconformity observed along Box Canyon; (E) Hidden Springs fault. Group photo with exposed fault surface and relative displacement recorded by slickenlines in Box Canyon.

## DAY 2



**Figure 4. San Gorgonio Pass and Mt San Jacinto** (A) Dr. Kate Scharer (USGS) leading the second day of the field trip with focus on the San Gorgonio Pass. Exploration of the Mission Creek and Banning strands of the SSAF; (B) Mt San Jacinto trip using the Palm Springs aerial tramway; Panoramic view of the Coachella valley and the SSAF; (C) Rock formations observed during the short trip with the aerial tramway.

## DAY 3



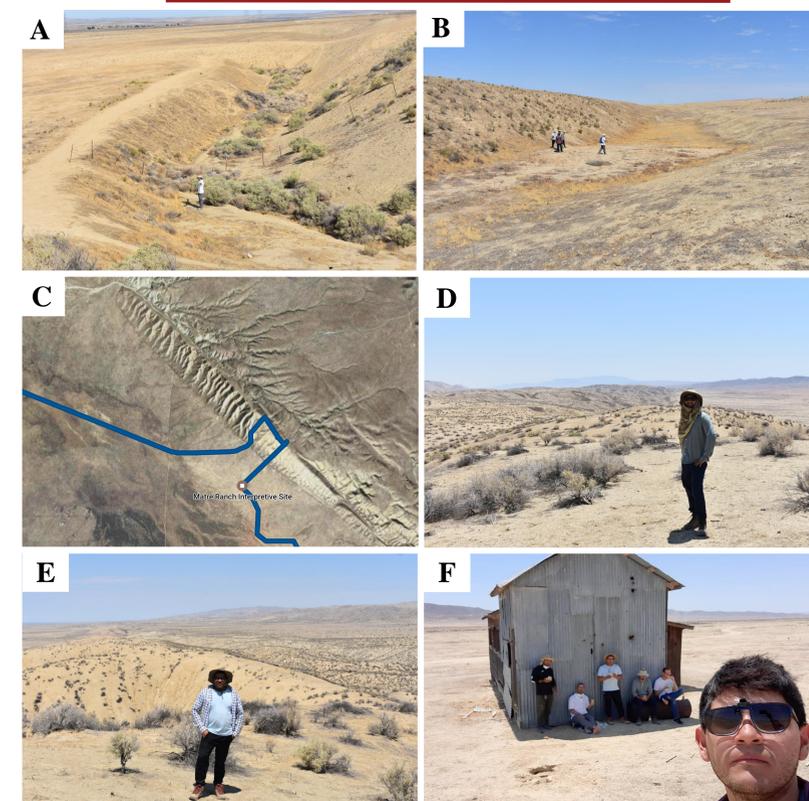
**Figure 5. Elsinore Fault and Cajon Pass.** (A) Panoramic view of the Elsinore Fault – extensional structure; (B) Pressure ridge along the Elsinore fault zone; (C) Lost lake Sag Pond in the Cajon Pass; (D) SSAF deformation zone in the Cajon Pass.

## DAY 4



**Figure 6. SSAF Mojave Segment** (A) Pulverized rocks along the Mojave SSAF segment; (B) Pulverized rock turns to "powder" in our hands; (C) Pallet Creek Paleoseismological SSAF site; (D) Deformed rocks within the SSAF fault zone; (E) and (F) Exploration of the Punchbowl fault.

## DAY 5



**Figure 7. Spectacular offsets SAF in the Carrizo Plain** (A) The world-famous Wallace Creek (420 feet) offset along the SSAF in the Carrizo plain (Person for scale); (B) Sag Pond along the SSAF in the Carrizo plain (Students for scale); (C) Timeline showing the hike at the top of the linear ridge system and while crossing the SSAF; (D) and (E) students at the top the linear ridge system, for a southward and northward camera view respectively; (F) Searching for a little shade to eat our sandwiches and hydrate. Final stop at the Matre Ranch site before returning to LA.