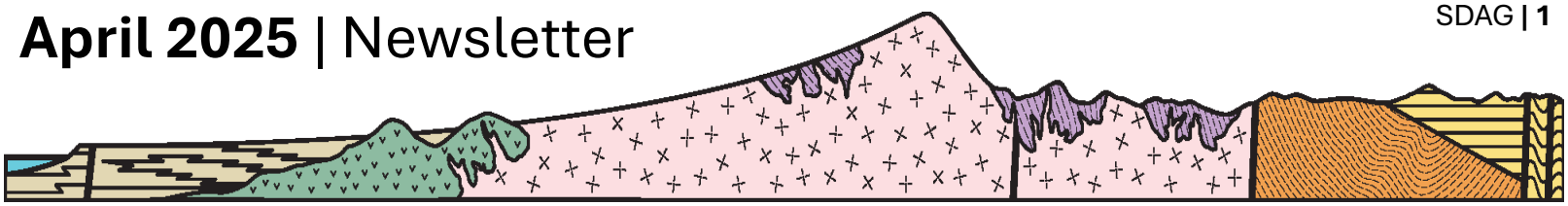
April 2025 | Newsletter



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SDAG Announcements

SDAG MEETING ANNOUNCEMENT

April 16, 2025

6:00 pm - Social Hour | 6:45 pm - Dinner | 8:00 pm – Program

LOCATION:

Phil's BBQ Event Center
3740 Sports Arena Blvd., Suite 10
San Diego, CA 92110
*Event room is located in the same shopping center as the Phil's BBQ restaurant.

STUDENT SPEAKERS:

Nicolas Oliver: *"Examination of Middle Cambrian hyolithidans from the Manuels River Formation of Avalonian southeastern Newfoundland"*

Emily Imperato: *"Constraining Natural and Anthropogenic Controls on Base of Freshwater and Underground Source of Drinking Water (USDW) In Central San Joaquin Valley"*

Jordan Jaeger: *"An investigation into the human health risks of lakebed sediments as a proxy for dust chemistry at the Salton Sea"*

DINNER: Pulled Pork and Tri-Tip Sandwich, BBQ Veggie Burger

COST: Member $50.00 - Non-Member $60.00 - Student $25.00

RESERVATIONS:
Make & Pay your reservation online through the SDAG website, before **6PM WEDNESDAY, APRIL 9th**

Click Here! For Directions

Click Here! For Reservations

Please note, all meeting reservations require online pre-payment due to venue costs, venue contracts, and loss of money due to no shows. Refunds cannot be processed after the registration deadline.

Meet Our | Speakers & Topics

NICOLAS OLIVER

Undergraduate Senior, B.S. Geology
San Diego State University

Nicolas Oliver has studied geology and paleontology since 2016, contributing to research both in field and lab settings pertaining to paleozoic invertebrates, mesozoic dinosaurs and pleistocene vertebrates. Nick is currently a senior in the undergraduate Geology program at San Diego State University with plans to pursue a Masters Degree at SDSU beginning this fall after graduating in the spring. While attending school Nick works professionally as a Paleontologist for a private company performing Natural Resource Mitigation to preserve and document fossil occurrences in the southwestern United States. Outside of work and academia Nick enjoys practicing and competing in Brazilian Jiu Jitsu, archery, fishing, hunting, and working on cars.

Examination of Middle Cambrian hyoliths from the Manuels River Formation of Avalonian southeastern Newfoundland

Nicolas Oliver, Dr. Jessica Whiteside
San Diego State University Earth and Environmental Sciences

Examination of Middle Cambrian hyoliths from the Manuels River Formation of Avalonian southeastern Newfoundland reveals the presence of Nevadotheca tenuistriata (Linnarsson, 1871), two forms identified as Angusticornid gen. and sp. 1 and Angusticornid? gen. and sp. 2, Hyptiotheca Bengtson in Bengtson et al., 1990, Tulenicornus gracilior (Matthew, 1895a), as well as four additional, incompletely preserved, hyoliths. Two possible hyoliths are kept in open nomenclature. These fossils provide further support for earlier recognized faunal connections of the Avalonian part of Newfoundland with eastern Avalonian Great Britain, Baltica, Laurentian North America, and Siberia. Nevadotheca tenuistriata is the most common hyolith in the Manuels River Formation. As most specimens of this species occur in the oxygen deficient dark gray to black mudstone lithofacies, this species was adapted to such environmental conditions. The species' name tenuistriata has been indiscriminately used for hyoliths of generally large size (60+ mm); we provide a sound morphologic basis for that concept of that species and for Nevadotheca excellens (Billings, 1872a) and N. princeps (Billings, 1871) which earlier have been mistakenly identified as N. tenuistriata.

Meet Our | Speakers & Topics

EMILY IMPERATO

MS in Geological Sciences - San Diego State University

I'm Emily Imperato, and I hold a Bachelor of Science in Geology from the University of California, Santa Barbara, and a Master's in Geology from San Diego State University, which I completed in December 2024. During my master's program, I interned at the Electric Power Research Institute (EPRI) on their carbon sequestration team and at Chevron's Bakersfield office, where I contributed to a carbon sequestration prospect assessment.

For my master's thesis, I focused on groundwater salinity mapping in California's San Joaquin Valley using geophysical logs. I continued this work at the U.S. Geological Survey (USGS), extending salinity mapping efforts across other regions of California.

I am very grateful to the San Diego Association of Geologists (SDAG) for the student scholarship, and I look forward to presenting my master's thesis work and the work I am doing at USGS.

Constraining Natural and Anthropogenic Controls on Base of Freshwater and Underground Source of Drinking Water (USDW) In Central San Joaquin Valley

Emily Imperato, Matthew Weingarten, Rafael Almeida

San Diego State University Earth and Environmental Sciences

Groundwater salinity trends within California's Central Valley are not well constrained. This study identifies the shallowest elevation of base freshwater (BFW), <3,000 parts per million (ppm) total dissolved solids (TDS), and the shallowest elevation of base of underground source of drinking water (BUSDW), <10,000 ppm TDS in Fresno, Madera, Kings and Tulare counties. Resistivity and lithologic logs from over 600 oil and gas wells inside and outside of oil fields were analyzed. Resistivity values were identified to represent these groundwater surfaces: 10 ohms for BFW and 3 ohms for BUSDW. These representative resistivity values were derived using a temperature and porosity correction for thick (>10 ft) clean sands, specific to the study area. These chosen values are consistent with previous studies conducted south of the study area in Kern County (Gillespie, 2017). The results reveal distinct salinity trends north and south of the Kings River drainage divide. South of the divide, BFW and BUSDW are relatively deep, reaching up to 6,000 feet (ft) below ground surface (bgs) on the eastern margin, rising sharply to near surface elevation in the Tulare Lakebed basin. North of the divide, BFW and BUSDW are shallower, particularly along a central ridge where these surfaces are about 1,500 ft higher than at the margins. Along the western edge of the basin, BFW and BUSDW elevations vary greatly. In general, the observed salinity patterns across the study area are interpreted to result from spatially variable freshwater recharge from the Sierra Nevada and Coast Ranges. BFW and BUSDW depths follow the basement along the eastern margin of the study area. We interpret the shallow depth of saline water in the Tulare Lakebed basin to result from a combination of the low permeability Tulare Lake sediments limiting freshwater recharge and the natural filling and evaporation cycle of the closed lake basin. In general, BUSDW remains between 500–1,500 ft below BFW, except in the westside subbasin, where historical (pre-1960s) groundwater pumping was substantial. We propose that historical groundwater pumping of fresh groundwater in the westside subbasin has caused the BFW to become shallower, but not BUSDW, as evidenced by an increased gap (approximately 2,500 ft) between the two surfaces. Shallow groundwater pumping is more likely to result in upward movement of the BFW than BUSDW because these groundwater wells target only shallower freshwater zones and low vertical permeability inhibits upward flow of the deeper, more saline water. Study results suggest that overall, the dates of geophysical logs are not especially critical when mapping BUSDW, which may change little over time.

Meet Our | Speakers & Topics

JORDAN JAEGER

MS in Environmental and Ocean Sciences – University of San Diego

Jordan Jaeger is a current Master's student in Environmental and Ocean Sciences at the University of San Diego. Under the guidance of Dr. Beth O'Shea (MPH), Jordan's research aims to enhance understanding of the health risks faced by local community members due to the shrinking Salton Sea. Jordan's broader research interests focus on the intersection between environmental science, geochemistry, and human health, focusing on how environmental factors impact human health outcomes. Jordan is also passionate about collaborating with community members to inform research and provide them with data to support advocacy for accurate and comprehensive public health policies. Jordan recently accepted a Ph.D. position at Auburn University, working under Dr. Ann Ojeda. At Auburn, Jordan will continue to pursue research into the links between geochemistry and human health, focusing on the impacts of environmental contamination and the health impacts on communities in Alabama.

An investigation into the human health risks of lakebed sediments as a proxy for dust chemistry at the Salton Sea

Jordan Jaeger, Ryan G. Sinclair, Suzanne Walther, Claudia Avila, Jacob Jaeger, Beth O'Shea

The desiccation of the Salton Sea and subsequent increase in dust-generating lakebed sediment exposure has raised concerns for the current and future health of local communities. Increased airborne particulate matter concentrations create increased risk of sediment inhalation, which has the potential to cause adverse health effects. The Salton Sea Region has already shown evidence of these adverse health effects, the most current data from the California Department of Health indicated Imperial County asthma rates, emergency department visits related to asthma, and rates of hospitalization for asthma above the California state averages from 2019-2020. Due to the changing environmental conditions presented by the shrinking Salton Sea, this study used a multidisciplinary approach to investigate the impact of these environmental conditions on community health by attempting to link geochemistry, air quality, and human health. Exposed lakebed sediments from the Salton Sea were used as a proxy to better understand dust generation and dust chemistry by physically separating samples into >63 um and <63 um fractions, with <63 um fractions representing those most likely to become dust. The <63 um sediments were exposed to four synthetic bodily fluids; lung, gastric, saliva, and tears, in experimental conditions that simulated inhalation, ingestion by mouth into the stomach, and particles entering and interacting with the eyes. These synthetic bodily fluids were then analyzed for trace elements to determine their bioaccessibility and subsequent health risks using the Agency for Toxic Disease and Substances Registry Public Health Assessment Site Tool to perform human health risk calculations.

This project explores the health risks for a child resident, adult resident, and high soil contact outdoor worker to represent an agricultural worker, with a particular emphasis on As, Cr, Mn, exposure. Human health risk calculations have been performed using the average and maximum bioaccessible element concentrations from the fine fraction of Salton Sea sediment samples,
and results showed excess cancer and non-cancer risk values for a child resident, adult resident, and high soil intensity outdoor worker from As, Cr, and Mn. The results of this study provide valuable information to inform future community science projects as well as advocate for policy related to air quality and dust mitigation at the Salton Sea.

Because this study seeks to quantify health risks to local communities associated with Salton Sea sediments, working with community members is vital to the integrity of this research. The O'Shea lab has worked with Alianza, a community non-profit, to assist in their environmental justice and community science projects at the Salton Sea. These projects have ranged from assisting in Salton Sea water and sediment sampling efforts, providing scientific equipment and expertise, and planning Salton Sea salinity workshops for high school students near the Salton Sea.

PRESIDENT'S CORNER

Hello SDAG Members,

I heard our March meeting featured an excellent talk by Don Barrie! I had no doubt it would be. 😊 Unfortunately, I came down with something viral and wasn't able to host the meeting, but Xiomara and Jasmine did a great job in my absence, with some help from Diane Murbach! THANK YOU ALL SO MUCH!

For anyone who wasn't able to attend, Don's talk was recorded and will be made available on our website soon. On a related note, the recording of Dr. Karl Mueller's talk on active faulting in San Diego (from our February meeting) is now available!

Up next is our **April 16th** meeting at **Phil's BBQ Event Center in Sports Arena**, where three deserving students—**Nicolas Oliver, Emily Imperato, and Jordan Jaeger**—who were awarded **SDAG student scholarships** will present their research. Join us to learn about their work on:

- Examining Middle Cambrian hyoliths from the Manuels River Formation in Newfoundland
- Constraining controls on the base of freshwater and underground sources of drinking water in the Central San Joaquin Valley
- Studying human health risks of lakebed sediments

Just a friendly reminder: **Wednesday, April 9th** is the last day to sign up!

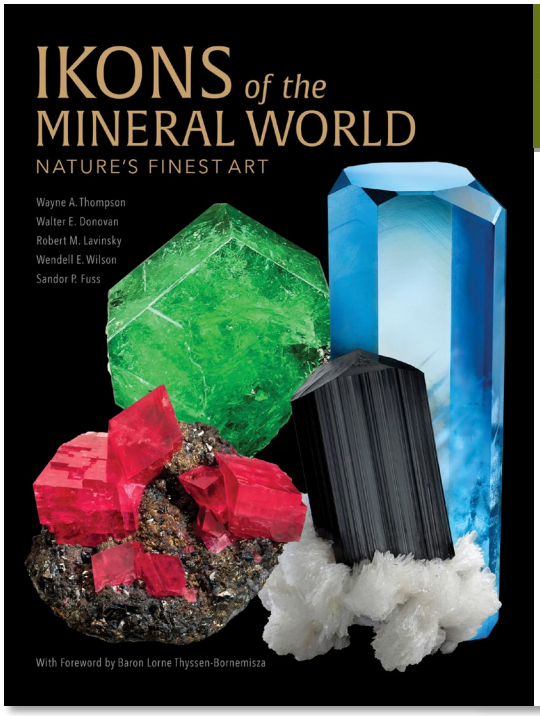
If you haven't heard through the grapevine, **Dr. Monte Marshall** will be giving a talk on *"The Evolution of Our Understanding of the San Andreas Fault System"* at the **AEG-Inland Empire Chapter** meeting on **Wednesday, April 9th**, at **Geocon's Murrieta Office**. His talk is based on a paper he wrote for our upcoming annual field trip this year, which will be included in the **2025 SDAG Field Trip Guidebook!**

Thanks, and see you all at the **April 16th meeting!**

-Heather Reynolds
2025 SDAG President

2025 Upcoming Meetings

DATE	SPEAKER & TOPICS
April 16	Student research presentations by student scholarship recipients
May 14 (2nd Wednesday)	SDAG/Geo-Institute Joint Meeting: Sebastian Lobo-Guerrero on Landslide Stabilization at Sufi Mediterranean
June 18	SDAG/SCGS Joint Meeting: Dr. Miles Kenney on the controversial Beverly Hills fault at El Adobe in San Juan Capistrano
July 16	Rachel Maxwell on a survey of the Mojave-Sonoran Desert Springs and their sources. *"Is this spring connected to that Aquifer?"*
August 20	Dr. Mario Caputo on "Newly Discovered Tetrapod Bones, Insect Trace Fossils, & Eolian Adhesion Structures- Upper Pennsylvanian Wescogame Formation, Supai Group, Grand Canyon, Arizona
September 26-28	SDAG Annual Field Trip, San Andreas Fault in the Wrightwood area, Transverse Ranges (no meeting this month)
October 15	Todd Wirth on "First report of marine invertebrate megafossils from the Eocene Mount Soledad Fm at Tourmaline Surfing Park"
November 19	Joint Meeting with AEG Inland Empire Section
December 17	Traditional Holiday Celebration at the San Diego Natural History Museum with Tom Demeré



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ONE STOP WONDER | MARCH 6TH
LAKE CAHUILLA AND THE SALTON SEA

Another One Stop Wonder went off without a hitch! Thank you to John Peterson for all your hard work and for leading an adventurous geologic tour around the Salton Sea—plus a much-needed escape to warmer weather, even if just for the day. Stay tuned for future OSW trips!

SDAG | March Meeting Recap

THANK YOU!

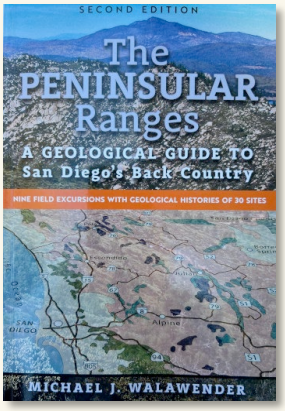
A huge thank you to our speaker, Don Barrie, for his exciting tour of New Zealand's geologic setting and wonders! We also want to give another big thank you to Don for introducing so many young and aspiring faces to our March meeting. Special appreciation goes to our President, Heather, who, despite not being able to attend, ensured a seamless and successful event through her hard work and dedication.

We were thrilled to have 53 guests in attendance—nearly reaching our venue's capacity! We can't wait to see you all at our April meeting!

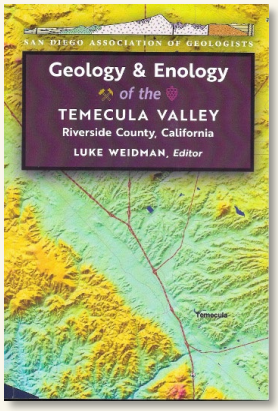
SDAG | Publications

The SDAG publication page includes links to in stock books we sell thru Sunbelt Publications, out of stock books we sell thru Google Play Books, and out of stock books that we provide free as scanned copies to download.

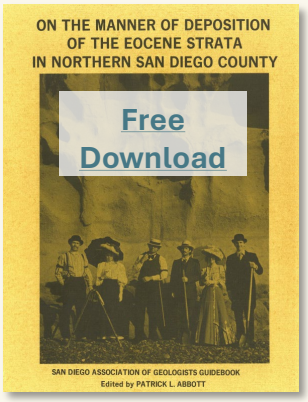
FIELD TRIP GUIDES & RESEARCH REPORTS



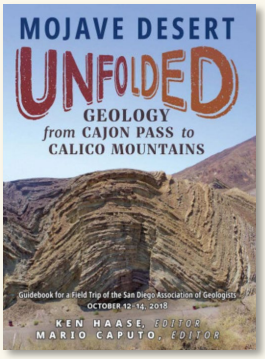
The Peninsular Ranges: A Geological Guide to San Diego's Back Country 2nd Edition



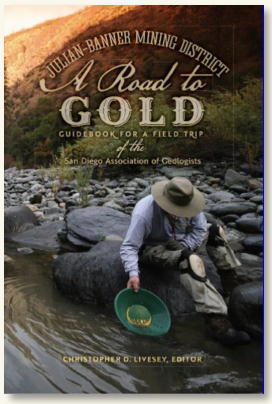
Geology & Enology of the Temecula Valley Riverside County, California 2nd Edition



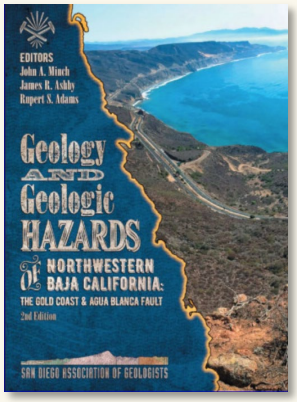
On the Manner of Deposition of the Eocene Strata in Northern San Diego



Mojave Desert Unfolded Geology From Cajon Pass to Calico Mountains



Julian-Banner Mining District: A Road to Gold



Geology and Geologic Hazards of Northwestern Baja California Gold Coast & the Agua Blanca Fault, 2ed

FREE GUIDES AVAILABLE FOR DOWNLOAD

- 1972 Otay Mesa
- 1977 SW San Diego
- 1978 Coronado Islands, BC
- 1979 San Diego Region
- 1987 Julian Gold
- 1981 Geologic Investigations of the San Diego Coastal Plain
- 1982 Geologic Studies in San Diego
- 1985 Eocene in San Diego
- 1989 Fault Features: La Jolla - Ensenada

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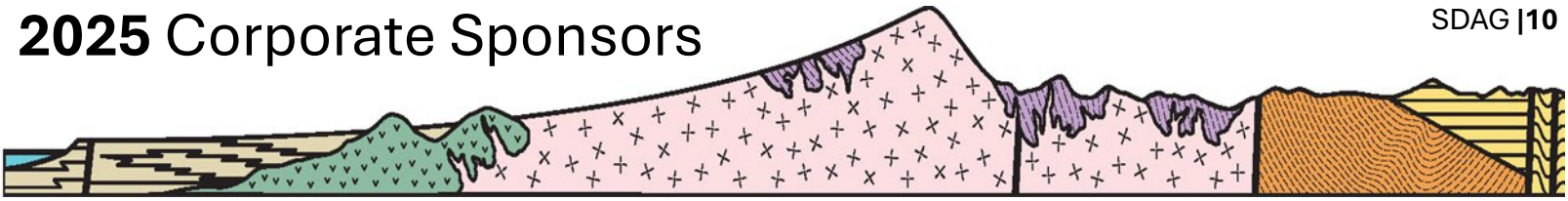

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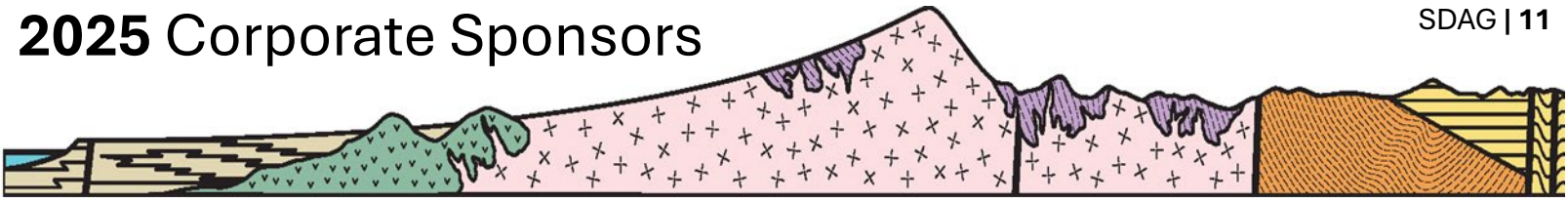

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