South Coast Geological Society Newsletter View this email in your browser

THE RECORD

OFFICIAL NEWSLETTER OF THE

South Coast Geological Society

In this edition:

MEETING INFORMATION

Location:

Dave & Buster's

20 City Blvd W

Orange, CA 92868

Cost:

Meeting Date: Monday, November 5th

24th Annual Poster Session

Join us for an evening of original research, thrilling discussions, and student poster awards! Be a part of the discussion and share your recent work. Industry professionals, academics, and students are invited to submit abstracts. Completed, active, or proposed theses and projects are encouraged! This is a casual forum for students, academics, and professional geologists to share knowledge, experience, and ideas. Preview the poster topic below!

REGISTER TODAY

Outstanding Poster Awards

We strive to encourage excellence in research by students in the geological sciences. We are awarding a total of $1,000 to outstanding student presenters. us for an evening of original research, thrilling discussions, and student poster awards!

Meeting Agenda

7:00 PM – Meeting Begins; Presenters set up

7:10 PM – Dinner Buffet open

7:20 PM – Welcome by Jeff Miller

7:45 PM – Judging (Group 1)

8:15 PM – Judging (Group 2)

Member $30

Non-Member $35

Student/Prof. $15

9:00 PM – Judges Convene / Opportunity Raffle

9:20 PM – Student Awards Announced by Jeff Miller

9:35 PM – Concluding remarks/Thank you by Ben Lewis

2017 Outstanding Poster Award Recipients

Presidents Corner

Hello South Coast Members,

One of the purposes of South Coast is to support students and provide education opportunities for professionals and non-professionals. You can help by attending Monday's Poster Session meeting and provide encouragement and feedback to students and their research. Equally, you will get a chance to learn about interesting new research in many different fields and be able to pick up some knowledge nuggets too.

Thanks again to Dr. Trevis Matheus for his dendroclimatology talk at last month's meeting. South Coast appreciates field- and lab-driven research that is relevant and cutting edge. I think we were also jealous of the beautiful field sites Trevis utilizes and appreciate a geographer presenting to our organization.

At the October meeting the new by-laws were discussed again and there were five nominations for the first Board of Directors: Eldon Gath, Bert Vogler, Roy Shlemon, Chris Baker, Steve Zigan. A ballot for regarding the proposed bylaws and nominated board of directors (including a write-in option) will be sent out separately.

There are a few ways to assist South Coast right now. If you are interested in providing your time either as an officer, manager, or helper, please contact either me or Allison. Earth Consultants International generously allows SCGS to store our publications and materials in a storage unit at their office but we are in need of bookshelves and storage bins; if you have a donation please contact Taylor. Finally, to provide monetary support for SCGS you can link your Amazon account to Amazon Smile, donate a car through Harold's Car Donation Service, or provide a personal or corporate sponsorship.

Also, a reminder to attend our December 10th meeting at Dave and Busters for our holiday party and officers elections. Donations are welcome for the silent auction/opportunity drawings. It's always nice to celebrate another busy year for SCGS and go into the new year with a bang.

Cheers,

Ben Lewis
2018 President

2018 Draft of Updated SCGS Bylaws

Bylaws Draft Presentation

Ben Lewis, SCGS President

ABSTRACTS

FOSSIL WALRUS SKULLS FROM THE EMPIRE FORMATION OF OREGON REPRESENT A NEW LINEAGE FROM THE LATE MIOCENE AND SUPPORT A SIGNIFICANT LATE MIOCENE RADIATION OF ODOBENIDS

Shooka Shahbazi, Undergraduate Student
California State University, Fullerton

Walruses are represented by a single extant species (Odobenus rosmarus) that is restricted to the Arctic, but from the Miocene to the Pliocene a diversity of fossil odobenids (20 species, 16 genera) are known throughout the North Pacific. Most fossil odobenids lack the highly specialized and characteristic cranial morphology found in O. rosmarus, which is easily recognized by its elongated canines (tusks) and squat rostrum. Instead, fossil walruses show a wide range of cranial

morphologies that represent distinctive feeding strategies. Adding ghost lineages to counts of described lineages suggest that there were two radiations of walruses in the Miocene: a middle Miocene radiation that includes a paraphyletic grade of “imagotariines,” and a late Miocene radiation that includes odobenines, dusignathines, and a long-skulled walrus from the late Miocene Empire Formation of Oregon, Pontolis magnus. Here we report on additional fossil walrus skulls from the Empire Formation (Emlong collection at USNM) that belong to an “imagotariine”-grade taxon. The new Empire “imagotariine” shows superficial similarities to an undescribed new genus and species of “imagotariine” from the late Miocene Capistrano Formation of southern California. Phylogenetic analyses place both the new late Miocene “imagotariines” (Empire and Capistrano) as close to P. magnus but overall recover low support for relationships among the middle Miocene “imagotariines” and the monophyly of dusignathines. Despite this phylogenetic uncertainty, the new late Miocene “imagotariines” and P. magnus are found to be more closely related to odobenines and dusignathines than to any middle Miocene walrus. This result emphasizes the proposed pattern of a late Miocene radiation of walruses.

SHAHBAZI, Shooka, California State University, Fullerton, CA, United States of America; MAGALLANES, Isaac, California State University, Fullerton, CA, United States of America; PARHAM, James F., John D. Cooper Archaeological and Paleontological Center, California State University, Fullerton, CA, United States of America; BOESSENECKER, Robert W., College of Charleston, Charleston, SC, United States of America

U-Pb AGE OF CONTINENTAL RED BEDS NORTH OF ALAMO LAKE, ARIZONA

William J. Elliott retired engineering geologist volunteer editor for South Coast Geological Society, William J Elliott* and Joseph L. Corones

Scattered, isolated outcrops of siliciclastic red beds occur throughout southeastern California and southwestern Arizona. Camel, dog, cat, and bird trackways in fine-grained sediments, found near Lincoln Ranch, AZ, suggest a continental origin. Red and orange staining derives from post-depositional weathering of iron bearing minerals, such as hornblende and biotite, in hot arid or semi-arid climates. North of Alamo Lake, AZ, an approximately 2’ thick, cream to light green volcanic ash occurs within the red-orange Chapin Wash Formation. Basal ash was deposited on a dry, mud-cracked lake bed. U-Pb Zircon age of this ash is: 12.53 ± 0.16 Ma (middle Miocene).

ALAMO SCHIST NORTH OF ALAMO LAKE, ARIZONA

Geophysical Characterization of Groundwater-Fault Dynamics at San Andreas Oasis

Drew Faherty, Graduate Student

California State Polytechnic University, Pomona

The San Andreas Oasis has historically provided a reliable source of fresh water near the northeast margin of the Salton Sea, although since the recent completion of the Coachella Canal Lining Project and persistent drought in California, surface water at the site has begun to disappear. This may be an effect of the lining of the canal, however, the controls on groundwater are complicated by the presence of the Hidden Springs Fault (HSF), a dextral fault that trends near the San Andreas Oasis. Its surface expression is apparent as a lineation against which all plant growth terminates, suggesting that it may form a partial barrier to subsurface groundwater flow. Numerous environmental studies have detailed the chemical evolution of waters resources at San Andreas Spring, although there remains a knowledge gap on the HSF and its relation to groundwater at the site. To better constrain flow paths and characterize groundwater-fault interactions, we have employed resistivity surveys near the surface trace of the HSF to generate profiles of lateral and depth-dependent variations in resistivity. In addition, we have gathered constraints on the geometry of the HSF using ground-based magnetic surveys. Resistivity results depict a shallow conductor localized at the oasis and discontinuous across the HSF. Magnetic data reveal a large contrast in subsurface magnetic susceptibility that appears coincident with the surface trace and trend of the

HSF. These data also hint at a second, previously undocumented fault bounding the opposite margin of the oasis and trending sub-parallel to the HSF. We thus speculate that the Hidden Springs Fault and this possible secondary fault act as partial barriers to lateral subsurface flow and form a structural wedge, localizing groundwater beneath the oasis.

Quantitative Compositional Characterization of the Biosiliceous Miocene Lark Formation, Danish North Sea and Norwegian Margin

Megan Mortimer-Lamb, Graduate Student
California State University, Long Beach

Biogenic silica, composed of the tests of diatoms and other siliceous algae, is a major constituent of many marginal and equatorial oceanic sediments. Highly siliceous mudstones, like the Monterey Formation in California, are important source and reservoir rocks for oil and gas exploration. The proportion of biogenic silica to detritus has large controls on reservoir quality including porosity, permeability, and diagenetic phase. However, attempts to quantify biosilica must be multifaceted as two of the diagenetic phases, opal-A and opal-CT, are non-crystalline and poorly crystalline, respectively. These materials are amorphous to x-rays; therefore, traditional methods of quantification of minerals, like x-ray diffraction (XRD), must be calibrated by and combined with other techniques, such as ICP-MS geochemical analysis, FT-IR spectra analysis, and wet-alkaline digestions of the biosilica. The purpose of this study is to generate a comprehensive biosilica quantification technique using 45 biosiliceous mudstone core samples from three different wells in the North Sea. The information provided by this work will test the robustness of each quantification technique, and will be used to generate an excess silica equation that can be applied to the Norwegian Margin and Danish North Sea. Based upon an empirically derived biosilica to detritus ratio, the excess silica equation will be used to estimate how much silica was biogenic in nature, even in highly diagenetically altered rocks.

3D Compositional Characterization of the Eocene Kreyenhagen Formation: San Joaquin Basin, California

Leo Giannetta, Graduate Student
California State University, Long Beach

The Eocene Kreyenhagen Formation is an understudied, but potentially important siliceous, organic-rich mudstone of the San Joaquin Basin (SJB). Known as a source rock for the northern SJB, the Kreyenhagen has emerged as a potential unconventional resource. However, in comparison to other U.S. shales, data from the Kreyenhagen is limited. This study will complete a 3D stratigraphic characterization of the Kreyenhagen and its lithostratigraphic zones to understand its compositional variability and depositional history. The Kreyenhagen was subdivided into 8 zones and correlated across 128 wells to define its stratigraphic framework. Cross-sections, structure, and isopach maps were generated. Compositional data including TOC, mineralogy, and elemental geochemistry were compiled by zone. The lower and upper Kreyenhagen contain a higher proportion of detritus relative to the middle Kreyenhagen, which is enriched in TOC, biogenic quartz, and redox-sensitive trace elements. This succession is interpreted to record one first-order transgressive-regressive cycle, with the middle Kreyenhagen representing the period of highest sea-level. Regional mapping of compositional data shows high TOC and trace element enrichment along the present-day basin axis and an increase in detrital content towards the east. Such trends likely indicate a dominantly bathyal depositional setting and a terrigenous sediment source east of the study area. Findings reveal spatial and temporal changes in depositional environments of the SJB during the Eocene and potential unconventional reservoir zones within the middle Kreyenhagen. We hope that this study illuminates the depositional controls on compositional variations in deep-water siliceous, organic-rich mudstones and demonstrates how these controls influence unconventional resources.

GEOLOGY AND HISTORY OF THE KENSINGTON CAVES, 4691 E. TALMADGE DRIVE, SAN DIEGO, CALIFORNIA

Stephen Jacobs, Consultant

A home on 4691 E. Talmadge Drive in the Kensington district of San Diego has a fascinating maze of caves and tunnels that once served as an elaborate playground for the family that previously owned the property. The house sits above an approximately 100-foot high slope that descends easterly below the house pad. The caves and tunnels were reportedly dug starting from 1949 and occupied through the 1980s. A recent inspection of these caves and tunnels that run under the existing lot reveals an interesting geologic profile.

Entrance to the caves and tunnels is from a crawl space near the northeastern corner of the house. A circular stairway excavation descends vertically about 70 feet to one of several cave rooms.

Descending below the entrance, the stairway excavation exposes brown sandstone and conglomerate of the middle to early Pleistocene Lindavista Formation (very old paralic deposits according to the most recent geologic literature) to a depth of about 30 feet. A sharp striking contact is seen at this depth as the stairway excavation descends further down into tan and orange-banded sandstone of the early Pleistocene to late Pliocene San Diego Formation through which the caves and tunnels below are dug. After traversing through several cave rooms the last tunnel exits to a locked iron gate at the slope face near the eastern property line.

Rate and Character of Late Quaternary Uplift and Folding in the Santa Maria Basin, CA: Implications for Active Faulting

Ian McGregor, Graduate Student

California State University, Long Beach

The Santa Maria area in southern California is an inverted basin with several kilometers of estimated shortening that has folded, faulted, and uplifted Miocene deep-water basin rocks [Woodring and Bramlette, 1950; Namson and Davis, 1990]. Abundant outcrop and subsurface data from active oil fields have allowed previous studies to document the total amount of shortening and the near-surface structure in detail. While those reports describe the basin stratigraphy and general kinematics through time, there is little focus on the Late Quaternary history such as whether these structures are still active, or what the Quaternary deformation rates are. The current lack of constraints on the amount and rate of shortening that has occurred in the Quaternary prevents accurate estimates of regional seismic hazards for the local population and the Diablo Canyon Nuclear Power Plant, which is 40 km to the northwest. In addition, conflicting structural models have been proposed for the uplift and folding present [PG&E, 1988; Namson and Davis, 1990; Seeber and Sorlien, 2000] and a detailed quantitative description of fold growth is needed to determine which structural models best describe the Quaternary deformation. The Orcutt Formation is a regionally-mapped fluvial deposit estimated to be between 24 Ka to a few hundred thousand years old, and is tilted as much as 15˚ on the flanks of major folds [Orme, 1992]. The depositional surface of this unit is utilized as a marker of Quaternary deformation for quantitative structural analysis.

Analysis of faulting along the eastern Sierra Nevada Mountains near Horseshoe Meadows

Distribution of Surficial Slip Along the Santa Cruz Island Fault based on Field and Lidar Measurements

Radwan Muthala, Undergraduate Student

California State University, Fullerton

San Andreas Fault is the fastest moving (36 mm/yr) active fault in southern California that is capable of producing a moment magnitude (Mw) 8 earthquake. However, a much slower (1 mm/yr) and quieter (recurrence intervals 2000-5000 yrs) fault system that forms the boundary of the Western Transverse Ranges and extends for over 200 km from the Channel Islands to Pasadena poses an even greater risk to Los Angeles. This left-laterally slipping fault system consisting of seven short (15-90 km) but closely spaced (separated by less than 2 km) faults is capable of causing a major earthquake of Mw 7.5 that ruptures right through downtown LA. Despite this potentially catastrophic hazard, there is not enough paleoseismic information from any of the individual fault sections to determine if such a large magnitude earthquake has ever occurred along this fault system. Based on very limited chronological data from different sections of the fault

system, we hypothesize that the fault system generally ruptures as a whole during large, but infrequent earthquakes that produce offsets that average 3-5 m. Santa Cruz Island Fault (SCIF) is at an ideal location to investigate the rupture history of the fault system as most of the other sections are either underwater or in heavily urbanized areas (e.g. Anacapa-Dume, Manta Monica, Hollywood, and Raymond faults). Numerous offset drainages, scarps, and shutter ridges that demonstrate left-lateral offset form a sharp lineament visible in topographic maps and satellite imagery. The goal of this project is to measure offsets on tectonically displaced stream channels along 10 km section of the SCIF to estimate slip-per-event for the past several surface ruptures. Thalwegs of channels and channel margins will be measured to estimate displacement for each feature. For the entire field area, we will also utilize light detection and ranging (lidar) data to create high-resolution bare earth digital elevation models (DEMs) with which to analyze the tectonic geomorphology of the SCIF down to the sub-meter scale. Since the distribution of displacement resulting from surface rupture during a large earthquake closely correlates to the magnitude of the earthquake, documentation of large slip-per-earthquake displacement measurements made along the SCIF will be interpreted to imply long ruptures that may have affected the entire fault system. This study will help us better understand the potential hazards associated with earthquakes along these fault sections and improve our ability to anticipate and communicate its potential impacts in advance of a disaster.

MEMBERSHIP

Your membership in 2017 allowed SCGS to host stellar field trips, provide over $2,000 in student scholarships, and improve the society in many ways. South Coast Geological Society raises our annual budget through private contributions, so your membership is essential for us to continue the society, make improvements, provide phenomenal meetings, host field trips, and award student scholarships. To support the goals of SCGS we are asking for your membership renewal for 2018.

A membership to South Coast Geological Society has many benefits including discounted meeting and field trip costs, exclusive field trips and events, and more!

We welcome you to join SCGS, one of the largest, most active Geological Societies in Southern California.

Membership Costs:

Professionals: $35 / year

Students: Free

Click Here for the Membership Form!

South Coast Geological Society Corporate Sponsorship

SCGS greatly appreciates our Corporate Sponsors! Corporate sponsorship allows SCGS to host stellar field trips, provide annual scholarships, and publish guidebooks. There are four Corporate Sponsorship Levels: DIAMOND ($1,000+), GOLD ($500+), SILVER ($250+), and BRONZE ($100+).

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MEETING HIGHLIGHTS

Thank you to members and friends who attended our October meeting. A special thanks to Dr. Trevis Matheus of CSU Fullerton for their spectacular presentation on Western US Dendroclimatology!

UPCOMING EVENTS

Join SCGS for our Annual Holiday Party on December 10th at Dave & Buster's in Orange, CA (7-10pm)!

'tis the season to rock ho-ho-horrible holiday sweaters!

Join the South Coast Geological Society for a night of fun, cheer, and great company as we host our Annual Holiday Party and Benefit night this year on December 10th at Dave & Buster's in Orange, CA (7-10pm)! The night will feature several activities for you to partake in including a raffle, silent auction, and an ugly sweater contest! Proceeds from this night will go to support us and our future events. So help us make our New Year great by celebrating with SCGS! This event includes a buffet dinner, desserts, and beverages (soda/tea).

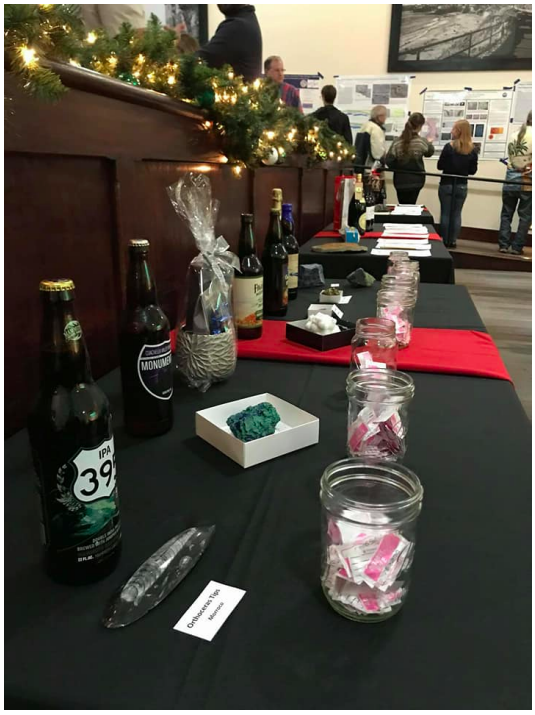
Raffle and Silent Auction: We have a great assortment of fossils, rocks, brews, and wine for our raffle and silent auction!

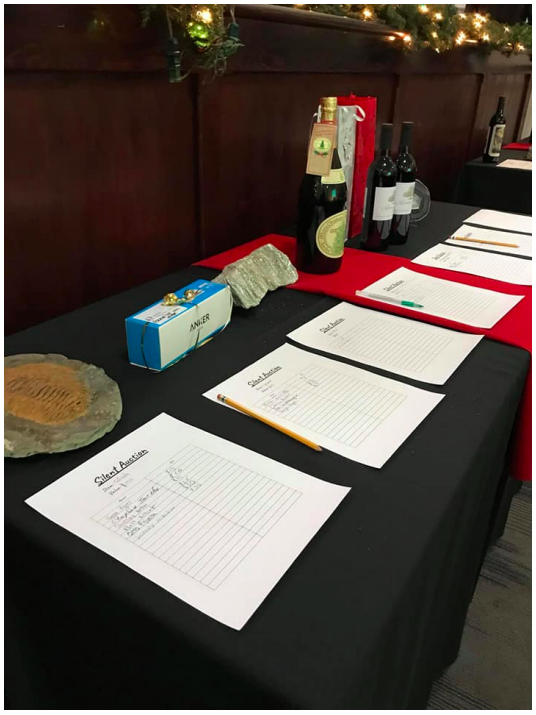
Merchandise and Publications SALE: Selected merchandise and publications will be 30-50% off! Shop for the holidays and grab some stocking stuffers or a new guidebook!

Call for Donations: We welcome donations of all sorts for our raffle & silent auction. If you

have any items such as minerals, rocks, fossils, maps, crafts, bottled brews or wines you wish to donate we will gladly accept them. We greatly appreciate your donations! (If you require execution of any other documentation in support of your tax deductible donation, please let us know at the time of your remittance.)

RSVP Today!





Volunteer with SCGS

South Coast Geological Society is seeking a motivated individual for the volunteer position of Secretary. Duties include checking-in members at meetings and events, sending monthly Newsletters and meeting announcements, managing membership, and maintaining meeting records.

Contact SCGS if you are interested.

ADDITIONAL LINKS

Association of Environmental & Engineering Geologists - So. California

Association for Women Geoscientists - LA/OC Chapter

American Society of Civil Engineers

Coast Geological Society

Groundwater Resources Association of California - So. California

Inland Geological Society

Los Angeles Basin Geological Society

San Diego Association of Geologists

San Joaquin Geological Society

Southern California Paleontological Society

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