

SAN DIEGO ASSOCIATION OF GEOLOGISTS

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SDAG MEETING ANNOUNCEMENT

WEDNESDAY, MARCH 16, 2016

A Tale of Two Water-Bearing Zones in a Fractured Hard-Rock Aquifer in East San Diego County

Presented by:
Chuck Houser

AND

500 Year Rupture History of the Imperial Fault at the International Border through Analysis of Faulted Lake Cahuilla Sediments, Carbon-14 Data and Climate Data

Presented by:
Kaitlin Wessel

Where: **Marina Village - Catalina Room**
1936 Quivira Way, San Diego, 92109 (See Map)

When: 5:30 pm - Social Hour
6:30 pm - Dinner
7:30 pm - Program

Directions: FROM INTERSTATE 5: Take the SEA WORLD DRIVE exit. From SEA WORLD DRIVE, take WEST MISSION BAY DRIVE on your right. When you see the large green sign that says QUIVIRA ROD, get in the farthest left of the two left turn lanes. Turn left, go one very short block and turn left again. Drive about one half mile and MARINA VILLAGE will be on your right.

FROM INTERSTATE 8: Take the WEST MISSION BAY DRIVE exit to the right. You will be on INGRAHAM STREET for a short distance from which you will take the next exit marked WEST MISSION BAY DRIVE on your right. When you see the large green sign that says QUIVIRA

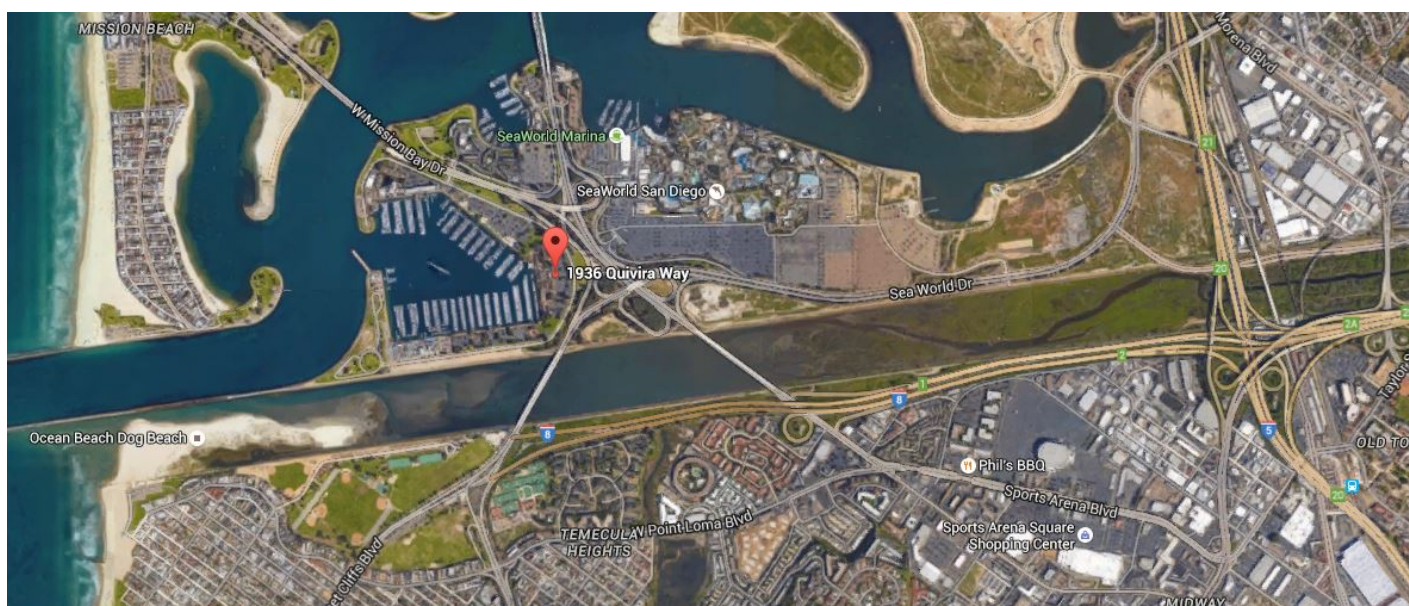
ROAD, get in the farthest left of the two left turn lanes. Turn left, go one very short block and turn left again. Drive about one half mile and MARINA VILLAGE will be on your right.

Dinner: Texas-Style BBQ - Beef Ribs and Chicken. Cash bar

Cost: \$30 per person, \$5 discount for members, STUDENTS: \$15. Add \$5 if you did not make a reservation.

Reservations: Make your reservation online at www.sandiegogeologists.org no later than noon, **Monday March 14th**. Reservations cannot be guaranteed after Monday at noon; but are always preferred over walk ins. Reservations well before the deadline are MUCH appreciated.

Maps:



ABSTRACTS

A Tale of Two Water-Bearing Zones in a Fractured Hard-Rock Aquifer in East San Diego County

Presented by: **Chuck Houser**

At Pine Valley Trailer Park in the town of Guatay, the Hilltop Mobil Station, as it was known most recently, provided gasoline, radiator water, and other services to travelers on Old Highway 80. After removal of underground gasoline storage tanks in 1992 and limited excavation of impacted soil, it was determined that groundwater, occurring at a depth of 25 to 30 feet, was impacted with petroleum hydrocarbons, including free product. The San Diego County Department of Environmental Health required assessment and remediation of the leaking UST case.

The site is underlain by fractured rock of the Peninsular Ranges batholith. According to Todd (2004), these rocks include Cuyamaca Gabbro and Chiquito Peak Monzogranite. Fracture trace analyses suggested fractures associated with plutonic emplacement, stress-release, and regional tectonic stresses are present at or in the vicinity of the site. Assessment included 16 shallow groundwater monitoring wells to assess the extent of groundwater impacts in a shallow water-bearing zone at a depth of 25 to 30 feet, and one deep well to assess a regional deep water-bearing zone at a depth of 150 to 160 feet. Coring the deep boring, along with analytical results, illustrated the shallow and deep water-bearing zones have minimal connectivity.

Remediation of free product and reduction of dissolved-phase hydrocarbons were accomplished using high-vacuum, dual phase extraction (HVDPE) in multiple remediation wells installed at the site. However, once remediation was largely completed, several impediments to closure still remained. A nearby supply well had low concentrations of aromatic hydrocarbons, suggesting possible connectivity between that well and the site. Aquifer testing confirmed the separation between the shallow and deeper water-bearing zones, and little to no connectivity between the Site and this well. Remaining high TPH concentrations, another impediment to closure, were addressed by additional HVDPE to evaluate whether additional mass was available for extraction. Upon determining that the hydrocarbons had been removed to the extent practicable, and with confirmation that sensitive receptors in the area were not affected, the case was closed.

SPEAKER BIO – Chuck Houser

Chuck Houser is a geologist and project manager with SCS Engineers in San Diego. He has a Bachelor of Science degree from San Diego State University from 1986, and a Master's degree from SDSU from 1997. His undergraduate thesis was on structural controls and mineralogical indicators for the formation of pockets in the Elizabeth R Mine in Pala, and his master's thesis was on the tectonic geomorphology and Quaternary history of the Old Woman Springs fault in the western Mojave Desert in San Bernardino County.

His practice has included an emphasis in assessment and remediation of leaking underground storage tank sites. He has worked on numerous leaking UST sites in San Diego County, and has achieved closure of at least 20 cases over the past decade.

500 Year Rupture History of the Imperial Fault at the International Border through Analysis of Faulted Lake Cahuilla Sediments, Carbon-14 Data and Climate Data

Presented by: **Kaitlin Wessel**

We excavated two trenches across a sag pond created by a 30 m-wide releasing step along the Imperial fault 1.4 km north of the U.S.-Mexico international border to test earthquake recurrence models. The stratigraphy at the site exhibits distinct pulses of lacustrine and deltaic deposition with localized zones and layers of well-sorted sand deposits interpreted as the result of liquefaction. Evidence for five events is observed in the upper 4 m of stratigraphy, which corresponds to deposition from three full lake episodes over the past 400-550 years. Age control is by ^{14}C dating of detrital charcoal from the trenches and correlation to the well-constrained regional chronologic model of Lake Cahuilla. Evidence for events is based on production of accommodation space and associated growth strata, upward fault terminations and fissures, massive liquefaction in the form of sand dike intrusions and sand blow deposits, and significant vertical offset in the step-over area. The two most recent events appear to be significantly larger than the earlier two events based on event-by-event palinspastic reconstruction and correlation to previous trenching studies. Six meters of strike slip passed through the sag in the 1940 Imperial Valley earthquake. The penultimate event produced nearly identical vertical displacement as in the 1940 earthquake, implying that it was also large and likely slipped about 6 m. In contrast, events 3 and 4 produced little vertical displacement from which we infer that displacement in these earthquakes was small at our site. We interpret these as moderate 1979-type earthquakes and that the southern end of these ruptures was likely close to our site. Event 5 is interpreted to be large based on its expression in nearby trenches; our trenches were not deep enough to capture the vertical separation for this event. Together, if each large event experienced a similar amount of displacement as in 1940, this implies something on the order of 18 m of displacement in the past 400-550 years, yielding a slip rate of 32-45 mm/yr. This rate is indistinguishable from all geodetically-inferred rates for the Imperial fault and implies that most of the plate motion is accommodated by the Imperial fault at the international border.

SPEAKER BIO – Kaitlin Wessel

Kaitlin Wessel recently graduated with her Masters in geology from San Diego State University where she worked closely with her thesis advisor, Dr. Thomas Rockwell, on southern California neotectonics and paleoseismology. During her graduate studies, she interned as an engineering geologist for Kleinfelder, Inc. and as an earth scientist for Chevron which ultimately led to a full time position in Houston. She also earned her Bachelors from SDSU in 2011 where her senior thesis involved a paleoseismic study at the Twentynine Palms Marine Corps Base. During that time she worked with the Naval Facilities Engineering Command as a geotechnical intern where she continued to work until graduate school.

Kaitlin enjoys being involved in both university and local organizations and has held multiple positions with the SDSU Associated Geology Students club and SDSU AAPG chapter; her most recent position was as AAPG student chapter president. In her spare time, Kaitlin likes to hike, travel, and take advantage of all of the outdoor activities San Diego has to offer.

UPCOMING MEETINGS

Meetings are usually held on the 3rd Wednesday of the month but may change to accommodate the speaker and meeting place schedules. Check the SDAG web site for updates.

April 20, 2016	Student Presentation: Michelle Zill - Evolution of Pelagic Fish Production Across the Oligocene/Eocene Boundary
May 18, 2016	Markus Johnson - Gulf of California Coastal Ecology: Insights from the Present and Patterns from the Past
June 8, 2016	Joint Meeting with South Coast Geological Society: Jeff Keaton - Oso Landslide: An Overview of the Geotechnical Extreme Events Reconnaissance (GEER) Response

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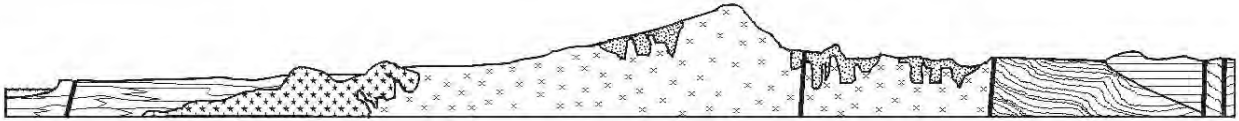
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Please include company, university or other affiliation

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Work E-mail Address: _____

NOTE: Your membership dues include delivery of the monthly SDAG newsletter and announcements to the email addresses given.

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Are you willing to serve as an **officer**? _____ Are you willing to volunteer as a **guest speaker**? _____

Field(s) of Interest: _____

Dues: _____ Student Member (email delivery only) \$ 5.00

(check choice)

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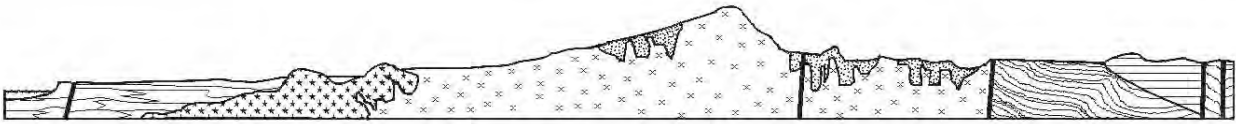
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Donation Level and Consideration:

☐ **EMERALD \$100.00** (In addition to monthly recognition for your contribution, you are entitled to a free Internet "link" from SDAG Website. We also list all Sponsors in any publications printed this year)

☐ **RUBY \$500.00** (In addition to the above, you are entitled to an image of your business card in the monthly newsletter and SDAG Website)

☐ **DIAMOND \$1,000.00** (In addition to the above, you will receive a commemorative plaque in recognition for your most generous support of the organization)

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San Diego Geological Society, Inc.
3130 North Evergreen St.
San Diego, California 92110 **Thank you!**

*Donations may also be made
at monthly meetings.*

Revised 11/18/2015

ANNOUNCEMENTS

CALL FOR PAPERS

GEOHAZARDS OF NORTHERN BAJA CALIFORNIA

Evaluating the Effects of Geologic Hazards on the Local Landscape

SDAG 2016 Field Trip – October 21th through 23th

On this field trip, we will travel south of the US-Mexico border to examine the geomorphic features related to faulting, landsliding and other erosional and mass wasting processes. If possible, we will also examine fault related features on a smaller scale in trench exposures. In addition, depending on the outcome of this year's highly anticipated El Niño, we may be able to examine the effects of the heavy rains on the local landscape. Where possible, we will look at how geotechnical engineering solutions have been employed to stabilize the local landscape.



SDAG seeks new manuscripts based on original work relating to earthquakes, faulting, landsliding, and/or any other geologic hazards that may affect Northern Baja. We also invite authors to submit articles on a broader range of topics including regional geology, structural geology, hydrogeology and groundwater resources.

Deadline for Abstracts: Friday, May 20th, 2016

Please submit the following information along with abstracts:

- Title
- Author(s) and affiliation
- Address, email, and telephone numbers for the author(s)

Please submit abstracts by email to Rupert Adams at adams@geoconinc.com



"ROCK DONATIONS NEEDED:

Amy Romano, one of our former student members, is looking for rock donations. Amy is currently attending Humboldt State University and majoring in Geology. She is very involved with Humboldt's Geology Club, and every year the club holds a rock auction to support their activities. If you have any rocks to donate, please contact Amy at ajr612@humboldt.edu.

CALL FOR ARTICLES

SDAG invites members to submit articles on their current research or an interesting project they are working on for publication in the monthly newsletter. The article should be no more than 1 page in length. Photos are welcomed; too. Please submit articles to the SDAG secretary via email.

SDAG RESEARCH TOOL

SDAG RESEARCH TOOL - A comprehensive listing of all papers published by SDAG, whether as annual field trip guidebooks or special publications, is now available on our website. Entries are sorted by primary author, or chronologically by date of publication, from our first guidebook in 1972, up the San Luis Rey River in 2013, and from Coast to Cactus in 2014. These can be accessed or downloaded as .pdf files. They are fully searchable in Adobe Reader or Acrobat, so if you are researching a topic, "tsunami" for example, you can search for that keyword. This listing will be updated as new books are published. Thanks to Greg Peterson and Hargis + Associates, Inc., for making this possible. See the links below:

http://www.sandiegogeologists.org/SDAG_Pubs_authors.pdf

http://www.sandiegogeologists.org/SDAG_Pubs_chronological.pdf



The 2015 GSA Annual Meeting will be September 25 - 28, 2016
in Denver, Colorado

SDAG MONTHLY PHOTO COMPETITION

This month's photo submittal comes courtesy of Rob Hawk and the One Stop Wonder he organized. This was a great event which occurred at a very low tide at an optimal Saturday allowing everyone to walk along La Jolla Shores and gaze at the sea cliff geology. Great presentations were provided by Rob Hawk, Pat Abbott, Jillian Maloney, and Monty & Diane Murbach. Submit your photo via email to the SDAG secretary for entry.



GEOLOGY JOB OPPORTUNITIES

Crux Subsurface, Inc.

From our past president Brian J. Olson, Crux Subsurface, Inc. has several new positions available. For open positions and an on-line application visit the following url:

https://www.appone.com/MainInfoReq.asp?R_ID=1226572&B_ID=83&fid=1&Adid=0&ssbgcolor=5B5B5B&SearchScreenID=1349&CountryID=3&LanguageID=2

Geocon

Certified Engineering Geologist, Orange County, California

Geocon has an immediate opportunity for a highly motivated geologist to work on a wide variety of engineering geology projects based out of our office in Irvine, Orange County. The ideal candidate will have experience performing a wide variety of geotechnical investigations for public and private sector clients, supervising rough grading operations for large-scale land development projects, and be proficient in utilizing field data to characterize and solve complex engineering geologic problems. Flexibility to travel, ability to work simultaneously on multiple projects, willingness to learn new skills, and a commitment to workplace health and safety while maintaining a positive attitude is desired.

Responsibilities:

- Prepare project proposals and budgets and coordinate staff scheduling
- Plan, coordinate, and conduct geotechnical investigations
- Collate, analyze, and present project geologic data, including the preparation of trench and boring logs, geologic maps and cross-sections, fault trench logs, and interpretation of historical stereographic aerial photographs
- Perform construction documentation during grading projects, including field mapping of cut slopes and other excavations
- Identify/evaluate geologic conditions impacting project design, construction and/or long-term performance of engineered structures
- Coordinate the collection of field samples and assignment of laboratory testing
- Prepare project geotechnical reports
- Review project plans, specifications, and related documents
- Attend meetings with clients, contractors, and project staff as-needed

Requirements:

- Bachelor's or Master's Degree in Geology or Engineering Geology (graduate level education preferred)
- Professional California Registration as a Certified Engineering Geologist required

- A minimum of 5-plus years of relevant work experience
- Knowledge of complex structural geology, ability to recognize geologic hazards, and experience in evaluating the impacts of slope instability and landsliding on land development.
- Experience in a variety of subsurface investigation techniques, including downhole logging of large diameter borings
- Excellent verbal and written communication skills
- Ability to work both independently and as the member of a professional team to accomplish project goals
- Valid California driver's license

Geocon is an Equal Opportunity Employer committed to retaining talented staff; therefore, we offer competitive market wages and extensive benefits to our full-time employees. We have established a variety of employee benefit programs designed to assist our employees and their dependents in meeting financial requirements that can result from illness and disability as well as assist in planning for their retirement. Our benefits package includes medical insurance, vacation and sick leave, bereavement leave, family leave, medical and pregnancy leave, life insurance, short-term and long-term disability insurance, and a profit sharing program. We practice same-week reimbursements for mileage and expenses as well as flexible work hours to accommodate employees' needs. Most of our employees have been with the company for over five years, and the majority for over ten to twenty years. Come work for a company that truly values its employees and offers an energetic work environment, great benefits, pleasant office dynamics, no corporate red tape, flexible work hours, and the opportunity to advance in your career!

Benefits and salary based on experience

For consideration, please e-mail resume to Rupert Adams at adams@geoconinc.com

Geology Institutions

We have heard from many upcoming geologists at our recent meetings, all of whom are seeking work opportunities here in San Diego. Included herein, in no particular order, are bio's and contact information of our members looking to gain a foothold in the local professional community:

Maxwell Clayton Utter

| mu47@nau.edu | cell: 858-663-9580|

Education

Education Level: Undergraduate Student 80 Credit Hours

Education Institution: Northern Arizona University

Majors: Environmental Sciences and Geology

College GPA: 3.46

SAT Score: 1850 690 Math, 630 Critical Reading, 520 Writing

Academic and Related Awards

Northern Arizona University

- Northern Arizona University Dean's List 2013, 2014, 2015
- Delta Epsilon Iota Honor Society Member Nov 2014
- National Society of Leadership and Success Member Oct 2014
- National Society of Collegiate Scholars Member
"For exemplary academic performance" May 2014
- Cardinal Key Honor Society Nominee Aug 2014
- Blue Key Honor Society Nominee Nov 2014

Del Norte High School

- Nighthawk Scholar
"For achieving a GPA of 4.0 or greater" 2012, 2013
- Principals Honor List
"For achieving a GPA of 3.75 or greater" 2012
- Del Norte High School Certificate of Merit
"For exceptional merit in academics" Mar 2011
- Mensa Member Oct 2010

Oak Valley Middle School

- Science Olympiad 1st Place in Meteorology San Diego County Feb 2009
- Science Olympiad 3rd place in Meteorology State of California Apr 2009

Leadership

- Northern Arizona University Geology Club President 2014-present
- Delta Epsilon Iota Honor Society Treasurer Jan 2015-Aug 2015

Work Experience

- Northern Arizona University REDD+ Research Assistant Dec 2014- Mar 2015
- Teaching Assistant Northern Arizona University Chemistry 151 Aug 2014- Dec 2014
- Teaching Assistant Black Mountain Academy Aug 2014
- Habitat Restoration: San Diego Botanical Gardens Jun 2014- Aug 2014
- Landscaper Jun 2008 to Aug 2013

Volunteer Service

- Water Sampling Studies For Reintroduction of Native Species Jan 2010- Jun 2015
- Stone Ranch Elementary Science Fair Judge Feb 2011, Feb 2012
- Boy Scout Beach Cleanup Aug 2012
- 4S Ranch Autism Walk Founder Jan 2008- May 2013
Raised over \$10,000 for children with Autism
- Best Buddies- Event organizer Aug 2009- May 2013
- Facilitator- Special Education Basketball League Jan 2013- Jan 2015
- Bread of Life Homeless Facility Oceanside CA Aug 2011
- Home of Guiding Hands Building Renovation Jan 2011
- UCSD Brain Function Study Jan 2009

Extra-curricular Awards

- Autism Society of America Autism Angel Award Jan 2013
"For extraordinary service to the special needs community"

This is Farida Baxamusa, MS- Earth Science from Scripps Institution Of Oceanography (SIO), University of California, San Diego (UCSD). I am originally from India, and have another Master's in Earth Sciences from St. Xavier's College, University of Mumbai, India. I have also been granted the Dr. Ratan Nadirshaw Sukeshwala and Dr. Dayanand Dattatraya Yellur scholarship for securing highest rank in Earth Science at MS Part I and Part II. After completing my MS in India, I secured an internship at Oil and Natural Gas Corporation (ONGC), Mumbai, India. Later I worked as an Earth Science lecturer at St. Xavier's College, University of Mumbai, India where I held classes, directed discussions among large groups ranging from 35 to 80 students on mineralogy, petrology, geochemistry, crystallography, economic geology, oceanography, and plate tectonics and led lab courses involving mapping, stratigraphy, and paleontology. In September of 2013, I was accepted at SIO, UCSD for a master's program. Dr. Lisa Tauxe was my advisor and I worked as a research assistant under her in the field of paleomagnetism. I worked in the paleomagnetism laboratory where I skillfully selected quenched rock materials from lava flow samples to obtain accurate estimates of

the Earth's magnetic field intensities. I developed python scripts to analyze individual samples to obtain their paleointensity values. I also worked as a teaching assistant for a year where I assisted teaching undergraduates introductory geology and Earth processes, collaborated with other teaching assistants and professors to aid in conducting an introductory course about hydrologic processes on Earth and held office hours, tutored students, proctored and graded exams. Around the time of completion of my degree I presented my year's research to the faculty members of the Geoscience Research Division (GRD) and qualified for my MS in Earth Science and graduated in September of 2014. I am currently doing 3 part time jobs, one as a Staff Research Associate at SIO, the other as a Staff scientist at the Bodhi Group where I perform phase I site assessments, and the third as a geology education website volunteer at California Coastal Commission Public Education Department, CA. I am now actively looking for a job in environmental consultancy firms or educational institutions. I believe that I have a varied background and education and the perseverance and grit in achieving excellence in everything I do. If you have any advice, jobs, internships please feel free to contact me at fbaxamus@ucsd.edu or call me on 858-397-8456. Your help and guidance will be highly appreciated.

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On behalf of the San Diego Geological Society, Inc. (SDGS), a public benefit 501(c)3 nonprofit educational corporation, we would like to request tax deductible Donations for our San Diego Association of Geologists (SDAG) group. The list of paid Sponsors and the forms to become a Sponsor are located on the SDAG web site at: <http://www.sandiegogeologists.org/Sponsors.html>.

Your donation will further the SDGS mission to promote geology and related fields in the greater San Diego region, operating through the San Diego Association of Geologists (SDAG), a committee of SDGS. To achieve our primary educational objective, we organize frequent field trips and maintain a program of monthly meetings featuring speakers on current geological topics. We also publish field trip guidebooks and other publications related to geology and natural history. We encourage scholarship and research by awarding scholarships from the elementary through graduate levels. With your \$100 "EMERALD" donation, your name/business will be listed as a sponsor on the SDAG web site (<http://www.sandiegogeologists.org/>) and in the monthly SDAG meeting newsletters. With your \$500 "RUBY" or \$1,000 or more "DIAMOND" level donation, your business card will also be included on the SDAG web site and in the monthly SDAG meeting newsletters. In addition, as a "\$1,000 or more DIAMOND" level donation you will be presented with a thank you plaque.

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Contact: Dr. David R. Hargis



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Contact: Louise Adams or Suzie Nawikas



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Contact: Dave Bloom



Contact: Rupert Adams, CEG

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Contact: Brian Olson

<http://www.cruxsub.com/>

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