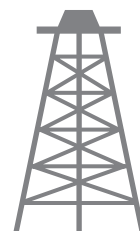




Pacific Petroleum Geology



NEWSLETTER

Pacific Section • American Association of Petroleum Geologists

March & April 2018

Embracing Geologic Fundamentals
April 22-25, Bakersfield, CA



PSAAPG Convention 2018
Fueling Your Passion

2018 PSAAPG-PSSEPM-PCSSEG Annual Meeting

Marriott Hotel, Bakersfield, CA

April 22-25, 2018

www.psaapg.org

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- CONTACT THE EDITOR at editor@PSAAPG.org
- Images (graphics, photos, and scans) must be at least 300 dpi resolution. Text should be at least 600 dpi.
- Scanned photos, illustrations (line art) or logos should preferably be submitted as a .tif, .gif, or .bmp; jpeg is OK.

Advertising Rates

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2018 Advertisements reduced price by 50%
due to drastic drop in oil prices

Societies Free Advertising:

Convention: Unlimited Space in PSAAPG Newsletter
Societies: 1/4 Page in AAPG Explorer

REGISTRATION INSTRUCTIONS & FORM

Save time – register online!

And please consider supporting a geology student by contributing to the "support a student" fund.

All registration, social-event, short-course and field-trip fees must be paid IN FULL at the time of the registration. All online registrations not including credit-card information or mail-in registrations received without credit-card information or a signed check from a U.S. bank will be returned. If completing a hard-copy form, use one form per professional or student registrant. If registering a guest, be certain to provide the individual's name for the badge. Professionals may not register as guests. All speakers and poster presenters must be registered.



Registration also available at
<http://www.psaapg2018.org>

If you are unable to register online, please complete the following registration form and mail it to Lisa Alpert, c/o Aera Energy LLC, 10000 Ming Ave., Bakersfield, CA 93311, with your check payable to **PACIFIC SECTION/AAPG**.

If you have questions concerning registration, please contact Lisa Alpert laalpert@aeraenergy.com or **661-665-5557**.

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Professional	Member AAPG/SEPM/SEG	Non-Member
Early Registration (through March 1, 2018)	___ \$205	___ \$305
Late/Onsite registration (after March 1)	___ \$255	___ \$355
Single Day Registration	___ \$180	
*Student	___ \$50	
*Emeritus Registration	___ \$150	
*Field Trip/Short Course Only	___ \$50	
*Guest Registration	___ \$30	

Name of Guest _____

Support a Student \$ _____

Please consider increasing your registration fee to offset student fees.

Please see <http://www.psaapg2018.org> for details.

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REGISTRATION INSTRUCTIONS & FORM

DON'T DELAY! PRE-REGISTRATION DISCOUNT ENDS March 1, 2018!

Field Trips

- | | |
|--|-------------|
| 1. The Monterey Formation of the Pismo Basin
(co-sponsored by PS-SEPM) | ___\$150.00 |
| 2. Stratigraphy and depositional environments of the Tulare Formation | ___\$125.00 |
| 3. Structure of the Northwestern Transverse Ranges and Southeastern Coast Ranges | ___\$150.00 |
| 4. Geology and Wine: Terroir of the Paso Robles Area | ___\$175.00 |

Short Courses

- | | |
|---|--|
| 1. Introduction to basin and petroleum systems modeling | ___ \$300 (professional) ___ \$100 (student) |
| 2. The fundamentals of deep-water petroleum reservoirs | ___ \$300 (professional) ___ \$100 (student) |

Luncheons

- | | |
|-------------------------|-------------|
| All-Convention Luncheon | ___ \$50.00 |
| DPA Luncheon | ___ \$50.00 |

Guest Activity

- | | |
|------------------|-------------|
| Time to "IMBIBE" | ___ \$45.00 |
|------------------|-------------|

Grand Total: \$ _____

I am willing to serve as a judge. () Yes

I am willing to serve as a volunteer. () Yes

For credit card payments, please call Lisa at 661-665-5557.

Dear Pacific Section AAPG Members,

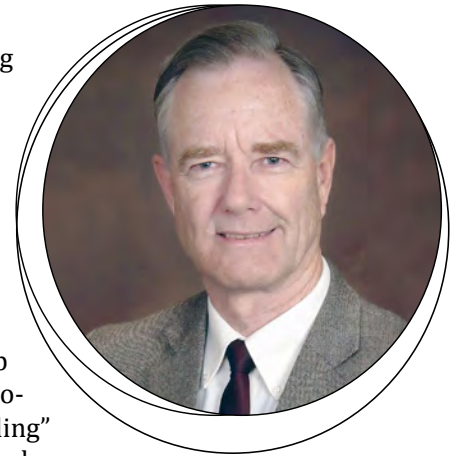
Welcome to the 2018 PSAAPG Annual Convention in Bakersfield this year! It has been a year of resurgent oil prices after 2-1/2 years of falling rig counts and oil industry. We are all relieved to finally see an upturn in oil and gas activity across the U.S. and in California. We produce a critical commodity that supplies much of the world's energy. We will rely on it for a very long time!

I thank the Convention Chair Becca Schempp, Technical Program Chair Plamen Ganey, and all of the chairs and co-chairs who have made this convention possible! It is a huge volunteer effort that began last year after the last convention finished in Anchorage. Even before that, planning started with a five-year convention schedule. This year, there are a total of twelve program chairs in addition to Becca and Plamen and I thank them for their commitment and service: Kay Pitts (Finance), Larry Knauer (Sponsorship), Afton Van Zandt (Exhibits), Anne Draucker (Exhibits), Lisa Alpert (Registration), Cynthia Huggins (Registration), Emily Fisher (Oral Sessions), Laura Bazely (Poster Sessions), Courtney Marshall (Short Courses), Greg Gordon (Field Trips), Brian Pitts (Photography), and Jlynn Bowen (Judges). These positions need a volunteer every year so start thinking about what you can do next year!

The 2018 Convention offers a great program of technical sessions and presentations, poster sessions, workshops, and field trips for geologists and geophysicists in industry and academia. Technical sessions include from "Pacific Exploration: Mature Basins and Prolific Reservoirs" to "Lacustrine to Deep Water Reservoirs" and "Microfractures to Plate Boundary Faults." There are several sessions on dealing with regulatory issues in California and the Western U.S. And still more focusing on petrophysics, geophysics, big data, and the Sacramento Basin. With this breadth of session topics, there is something here for you and your colleagues. I thank all of the oral and poster session presenters for your willingness to take the stage and showcase your good work!

A convention is not complete without field trips and short courses and this year is no exception. Four field trips are offered with excellent technical leadership. You can see the Monterey Formation on the coast in the Pismo Basin, depositional environments of the Tulare Formation in Elk Hills and Buena Vista Hills, structural features at the intersection of the Traverse and Coast Ranges, and the impact of geology on the wines of Paso Robles. I thank the field trip leaders for putting these trips together: Heather Stang, Rick Behl, Jon Schwalbach, Tony Reid, Jonathon Goodell, Eric Greenwood, Thom Davis, Tim Cleath, and Neil Currie.

PSAAPG is offering two short courses this year that will help build a foundation for your work in petroleum exploration and development. Professor Allegra Scheirer will conduct a workshop on "Basin and Petroleum System Modeling" which integrates basin dynamics, sedimentation, seismic, and outcrop photos.



With the wide variety of basin settings in California, the West Coast, and Alaska, this workshop offers a concentrated introduction to understanding basin analysis. Jon Rotzien will conduct a two-day workshop on the "Fundamentals of Deep-Water Petroleum Reservoirs." This is the dominant reservoir type in California and the better we understand this sedimentary system and its reservoir facies the more oil we can find and develop. Take advantage of these great learning opportunities!

Oil production began early in California's history. One of the first successful oil wells in the state was drilled by a young Civil War veteran, Thomas Bard, in the upper Ojai Valley in 1867. It was the Ojai #6. He found oil at 550 feet with a wood and cast-iron cable-tool drilling rig. Here we are 151 years later continuing the search for commercial quantities of oil and gas, with better tools and deeper knowledge, and with the same excitement!

Mike Nelson

PSAAPG President, 2017-2018

Eugene Claude Tripp

November 17, 1930 - February 8, 2018

Eugene Claude Tripp died on February 8, 2018, after spending six weeks in a Long Beach hospital valiantly trying to fight a number of different infections. He is preceded in death by his three wives, Margie Tripp, Dorothy Hester Tripp and Mavis Griffiths Tripp. He is survived by his three daughters, Jean Ancell, Jayne Tripp and Paula Tripp Victor; four grandsons, Lance and Clint Ancell and Josh and Joe Tripp; and five great-grandchildren, Daisy, Lilly, Triptin, Reiden and Piper; and sister, May Louise Nay.



Gene (or Chub as he is fondly remembered by family and childhood friends) was born on November 17, 1930 in Lincoln, Nebraska but moved to Burbank at age 6 where he grew up. He served in the Air Force during the Korean War and then attended and proudly graduated from the University of Southern California with a B.S. and M.S in Geology. His early years of marriage to Margie were spent in Bakersfield where he worked for Texaco exploring for oil in the Central Valley. Exploration of oil in Alaska led him to Anchorage for 2 1/2 years and then back to California. Gene and Margie retired in 1996 and moved to their dream home on a hill in Morro Bay where they enjoyed their beautiful ocean view.

Gene was among the best fast-pitch softball catchers and most family vacations in the early years were spent camping between stops along the softball tournament circuit. Politics and involvement in community affairs were passions of his, later to be superseded by his commitment to his faith and local church. He was also an avid sports fan (loving his Trojans and Dodgers), enjoyed and was quite good at almost any game of cards, and loved to just get in the car and drive and see the world. Most of all, he was passionate about his family and friends and cherished moments with them, whether just watching a game together, playing a game of cribbage, canasta or Mexican train dominoes, or just being with them.

A Celebration of Life service will be held on March 10, 2018 at 11 AM at the El Morro Church of the Nazarene, located at 1480 Santa Ysabel Avenue in Los Osos. In lieu of flowers, donations may be made to the Alzheimer's Association at <https://alz.org/> or the ALS Association at www.als.org.

Published in Bakersfield Californian on Feb. 15, 2018.

Robert L “Larry” Swarens

October 30, 1956 - December 3, 2017

Our dear friend Larry passed away on December 3, 2017. Larry is survived by his 3 daughters, son, grandson, loving family, and many wonderful friends.

He was a Geology and Earth Science graduate of CSU Chico. With his work in the oil and gas fields for over 35 years, he was well known and respected as mud logger and business owner of Strata-graphic Corp. Larry never missed an opportunity to be involved and always brought his smile to all our PSAAPG / SJGS meetings and events.

His loss will be greatly felt by many.



2018 PSAAPG NEWSLETTER has gone DIGITAL!

In a continual effort to reduce overhead and provide meaningful programs to our membership and the community, PSAAPG have decided to go DIGITAL. For those members still wanting hard copies of the newsletter, please email greg.thompsn@gmail.com or write to us at Pacific Section AAPG, P.O. Box 1072, Bakersfield, CA, 93302.

PSAAPG Membership Directory

The PSAAPG website will have a members-only password-protected membership directory available on March 1, 2018. Please email greg.thompsn@gmail.com if you do not want your name listed. There will also be a checkbox for this on the PSAAPG membership renewal form that goes out before the end of this year.

MUNGER MAP BOOKS

The CA Well Sample Repository is seeking donations of MUNGER MAP BOOKS. The collection is incomplete, so any donations would be kindly appreciated!!! Please contact Larry Knauer at laknauer@aol.com

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WITNESSED METEORITE FALLS OF THE PACIFIC SECTION

by Frank Cressy *

Part 2 – Alaska, Hawaii, Oregon, & Washington

ALASKA

Despite its huge land area, the state of Alaska has had no recovered witnessed meteorite falls that can be tied to a specific date, and only four meteorites total have been found in the state. This is easily attributed to its low population density and the difficult terrain to conduct meteorite searches. However, oral traditions of the native people, from who the Chilchoot iron meteorite was acquired in 1881, said the mass had fallen about 100 years earlier. As the exact date or even year of the meteorite is unknown, it has been recorded as a “find”.

HAWAII

As first thought, it might seem unlikely that an island in the middle of the Pacific Ocean would be a place a meteorite might fall, but space rocks fall randomly over the planet, and an island has the same odds as any other location. The island of Oahu has been the recipient to two meteorite falls, and incredibly they fell on about five miles apart in the city of Honolulu. The only other city that can claim this honor is the town of Wethersfield, Connecticut that had meteorites fall in 1971 and 1982. The two Hawaiian meteorites, Honolulu and Palolo Valley, which fell in 1825 and 1949 respectively, are also the two earliest meteorites witnessed to fall in the Pacific Section, both arriving during pre-statehood.

Honolulu – L5 Ordinary chondrite

Otto von Kotzebue was the commander of two of the earliest Russian maritime expeditions that explored the Pacific basin and circumnavigated the globe. On his return home from his second trip, he stopped in the Sandwich Islands [Hawaii]. While in port at the island of Oahu, he witnessed the Honolulu meteorite fall of Sunday morning, September 27, 1825, later writing about it in 1830:

“On the morning after our arrival, a remarkable phenomenon occurred, of which we were witnesses through-out its duration. While the heavens were quite clear, a thick black cloud formed itself over the island, resting its lower verge on the summits of the mountains, the densest portion of the cloud hanging over the little town of Hanaruro [Honolulu]. The wind was perfectly calm, till on a sudden a violent gust blew from the north-east, and at the same time a crashing noise proceeded from the cloud, as if many ships were firing their guns; the resemblance was so perfect, that we might have supposed we heard alternately the individual shots of the opposing broadsides. The concussion lasted some minutes; and when it ceased, two stones shot from the cloud into the street of Hanaruro, and from the violence of the fall broke into several pieces. The inhabitants collected the still warm fragments, and judging by these, the stones must have weighed full fifteen pounds each. They were grey inside, and were externally surrounded by a black burnt crust.”

(Continued on next page)

Three days after the fall, Kotzebue set sail for home with several fragments of the meteorite, and specimens from these stones have since been distributed throughout European museums. The Rev. Hiram Bingham also acquired a 617 gram specimen during his stay in Hawaii. He later donated it to Yale's collection in 1841.

Based on eyewitness accounts, the fireball traveled in a west northwest direction from Lahaina, Maui to Honolulu. The data suggest the fireball was very large and entered the atmosphere at a low angle. It dropped meteorites over an estimated 40-mile-long strewnfield, most which fell into the Pacific Ocean (Figure 1). Honolulu is an L5 ordinary chondrite that shows a brecciated texture and black shock veins acquired from an ancient violent cosmic collision (Figure 2).



Figure 1: Estimated 80-mile-long path and postulated 40-mile-long strewnfield of the Honolulu meteorite plotted on an antique 1837 map of Hawaii. Map courtesy of USGenWeb Archives.

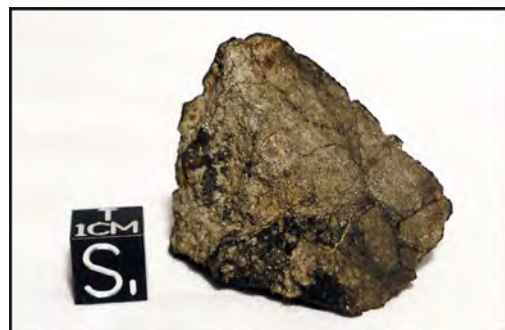


Figure 2: Interior view of a 32.5 gram fragment of the Honolulu meteorite showing black shock veins, melt pockets, and brecciated nature of the meteorite. From the Joachim Karl collection.

Palolo Valley – H5 Ordinary chondrite

One hundred twenty-four years after the Honolulu fall, the island of Oahu welcomed its second cosmic visitor at about 3:00 a.m. early in the morning on Sunday April 24, 1949. The stone struck a house at 1538-H Palolo Avenue in the Palolo Valley, a residential district of Honolulu. The location was only five miles east from the site of Hawaii's first meteorite fall which landed in the same city in 1825. According to one edition of the Honolulu Star-Bulletin of April 28, 1949, the meteorite tore through the eave of a house just outside of an occupied bedroom and penetrated six inches into the lawn (Figure 3). The crash awakened the occupant, Thelma Sakumoto. Seeing nothing amiss, she attributed the noise to the wind and returned to sleep. Later that next morning, a shattered 1" x 12" eave board was noticed and a lemon-sized stone was recovered.

A single, beautifully oriented stone weighing 682 grams was recovered and deposited with the geology department of the University of Hawaii. The stone, an H5 ordinary chondrite, was subsequently lost (Figure 4). The only remaining samples, totaling only 24 grams, are deposited in the Smithsonian.



Figure 3: Copy of the April 28, 1949 newspaper photo of the Honolulu Star-Bulletin that ran the story of the April 24th meteorite fall. Dark arrow (upper right) points to the damaged eave board. White arrow (lower right) points to the meteorite being held by 13-year-old Dudley Yasuda who also resided in the house.

Courtesy of the Smithsonian Institution.



Figure 4: Photo of the lost Palolo Valley meteorite. Note the smooth leading edge (upper side) of the oriented stone and the deep fluted lateral edges. U.S. quarter for scale.

Photo courtesy of the Smithsonian Institution.

(Continued on next page)

PACIFIC NORTHWEST

The paucity of recovered meteorite falls and finds in the Pacific Northwest can be attributed to the highly forested land west of the Cascade Mountains and to the low population density and extensive volcanic terrain in the eastern part of the states making recognition of meteorites and recovery difficult. One witnessed meteorite fall has been recovered in each state, and incredibly the two are located only about 55 miles from one another. The Washougal meteorite, a howardite, fell in southern Washington on July 2, 1939, and the Salem meteorite, an L6 ordinary chondrite, fell in northwest Oregon on May 13, 1981.

OREGON

Salem – L6 Ordinary chondrite

Police officers face enough dangers on their jobs without having to worry about being assaulted by falling rocks from space. But Marion County deputies John P. Price and Vincent Van faced such a situation early on the morning of Wednesday, May 13, 1981 in the Oregon capital of Salem. At 1:05 a.m., Deputy Sheriff Price was sitting on the curb in front of his house talking to Deputy Sheriff Van who was sitting in his patrol car. The men heard “a peculiar fast ‘fluttering’ noise, an impact of something hitting the house, and then the sound of small rocks falling near them.” Price began a search by flashlight and within ten minutes, found a 22.3 gram fragment of a meteorite (Figure 5). It was warm to the touch and had ended its journey at the front of his driveway within ten feet of the officers. The next morning, Price found four additional meteorite fragments and determined that the stone had impacted the garage roof just below the crown of the roof. A six-centimeter-diameter half-circle was broken out of the second row of asphalt shingles on the front of the garage. This indicated the meteorite had descended at a low angle from the southwest, or from the rear to the front of the house, barely clearing the peak of the roof, and striking the sloping roof at a very low angle. The impact shattered the stone, and five fragments were recovered; one in the rain gutter on the front of the garage, one on the rear of the garage roof, one in the driveway, and two in the street in front of the driveway including the fragment that Price had found earlier that night. Reassembling the fragments indicated that about a third of the stone was lost. The night sky had been overcast, and no fireball, sonic booms, or electrophonic noises were reported.

The Salem meteorite is classified as an L6 ordinary chondrite with a light gray interior exhibiting very little FeNi metal. Several very thin, black shock veins are present. Isotopic studies indicate unusually high levels of cosmic-ray-produced radionuclides suggesting the stone was derived from a singular small body in space that did not fragment in the atmosphere. That the meteorite was a single object is also supported by the fact that it was an oriented stone with an unusually thick fusion crust reaching nearly 3.0 mm thick on the trailing side.



Figure 5: The largest (22.3 gram) fragment of the Salem meteorite.

Note the difference in crust thickness on either side of the specimen. Thick crust on the left is interpreted as being deposited on the rear side of an oriented meteorite. The thinner crust on the right is interpreted to have formed on the leading or lateral sides of the stone.

Photo courtesy of Cascadia Meteorite Laboratory / Portland State University.

WASHINGTON

Washougal – Achondrite, Howardite

A few minutes before 8:00 a.m. on the morning of Sunday, July 2, 1939, a bright meteor traversed the sky over northwest Oregon and was observed by many people in both Oregon and Washington. Professor J. Hugh Pruett of the University of Oregon and the Pacific Region Director of the American Meteor Society investigated the sightings and determined the following information:

(Continued on next page)

"The fireball was sighted from Mt. Adams, Washington] (by a party of five) when it was likely still out over the [Pacific] ocean. Coming inland it passed across the coast line near Tillamook, then headed for Portland traveling a little north of east. It was seen by many by the time it had reached Forest Grove. Continuing eastward, it passed over the northern part of Portland and in that locality exploded several times. Trailing a heavy smoke cloud, it went on and finally 'blew all to pieces' at a height of not more than ten miles, a little west of Hood River, likely on the Washington side [of the Columbia River]."

The next day, Mr. Jerry E. Best of Washougal, located on the north side of the Columbia River a few miles east of the city of Vancouver, found a small, glassy-black stone, about the size of a tennis ball, lying on a small ridge near his home. During the previous morning at the time of the fall, he had been picking berries a few hundred yards north of his house. The meteorite was found between the house and the berry patch and must have passed over his location. Mr. Best did not hear any whistling or whizzing sounds commonly heard by falling meteorites or any sound of the rock hitting the ground. He said that the "detonations in the heavens kept him so busy he would have overlooked any minor disturbance."

Washougal is classified as a howardite, an achondrite meteorite formed on the surface of a differentiated asteroid thought to be 4 Vesta. Howardites have a broken, fragmental interior consisting of a diverse mixture of mineral and lithic clasts that have eucrite (basaltic asteroidal flows) and diogenite (shallow intrusive bodies) compositions. The ash-gray interior of the Washougal meteorite consists of nearly equal amounts of the two components (Figure 6).



Figure 6: Photograph of a glass plate slide of the Washougal meteorite. Note the fragmental nature of the interior, typical of a howardite. Photo near true scale with US dime for scale. Photo courtesy of Richard Pugh.

The main mass of the 220 gram stone is apparently lost. It was last seen in the collection at the University of Oregon in Eugene. The largest remaining mass of 17 grams is in the collection of the Museum of Natural History, London.

Chondrite Classification

Many of you may wonder what the letter/number designation of the ordinary chondrites represents. In a nutshell, the "H" is shorthand for "high" metal and the "L" for "low" metal, and is based on a petrographic/chemical classification of the olivine and pyroxene chondrules. The numerical designation 3 to 6 is indicative of the degree of thermal metamorphism observed in the chondrite. The higher the number is, the greater the degree of thermal metamorphism.

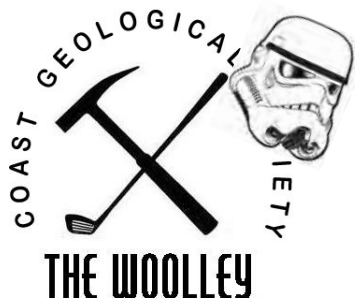
By Frank Cressy

**The author has been a consulting geologist in Bakersfield for the last 32 years and a member of the Pacific Section for 44 years. He has been interested in meteorites for 20 years and is the author of "From Weston to Creston – A Compendium of Witnessed US Meteorite Falls – 1807 to 2016." This article is derived from that work.*

Save the date!

SPRING 2018!

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WELCOME

Note from the President



"The annual PSAAPG Convention is your best opportunity to see the latest work in petroleum geology and geophysics, and sedimentary geology. Plus you can grow your network of contacts with exhibitors, sponsors, colleagues, and friends. It is a great refresher for your technical skills and will renew your enthusiasm for the practice of petroleum and sedimentary geology. The convention energizes participants with great session presentations, short courses, and field trips. The Convention Chair, Becca Schempp, and her team have done a great job putting together the convention program. Join all of us in April so that you too will be "Embracing Geologic Fundamentals and Fueling Your Passion." Think of it as refresher course in everything you need to know!"

- Mike Nelson, Pacific Section AAPG President

TECHNICAL
SESSION DAYS

+2

ATTENDEES

+350

#PSAAPG2018

WELCOME

Note from the Convention Chair

"I am excited to invite you to the 2018 Pacific Section AAPG convention in Bakersfield, California. Our host is the San Joaquin Geological Society, along with our Pacific Section SEPM and Pacific Coast Section SEG partners. Our theme is: "Embracing Geologic Fundamentals - Fueling your Passion." The convention committee has been working diligently to provide a great technical program, short course selection, and field trips that are sure to ignite your passion for geology! We'll see you in April!"



- Becca Schempp, 2018 Convention Chair

The Pacific Section AAPG is doing our part to help conserve the environment that we all enjoy everyday by **GOING GREEN** with this reduced announcement. All of the information found in here, and more, can also be found on the official convention website at www.PSAAPG2018.org

GUEST SPEAKERS

+60

FIELD TRIPS &
SHORT COURSES

+6

www.PSAAPG2018.org

CONVENTION DAILY SCHEDULE

----- SATURDAY, APRIL 21ST -----

FIELD TRIPS The Monterey Formation of the Pismo Basin
(co-sponsored by PS-SEPM)

Structure of the Northwestern Transverse Ranges
and Southeastern Coast Ranges, CA

SHORT COURSE The Fundamentals of Deep-Water Petroleum Reservoirs

----- SUNDAY, APRIL 22ND -----

FIELD TRIPS The Monterey Formation of the Pismo Basin
(co-sponsored by PS-SEPM) (cont.)

Stratigraphy and Depositional Environments of the Tulare
Formation, Elk Hills and Buena Vista Hills

SHORT COURSE The Fundamentals of Deep-Water Petroleum Reservoirs
(cont.)

EVENTS Registration, Opening & Awards Ceremony, Icebreaker,
and Exhibition

----- MONDAY, APRIL 23RD -----

EVENTS Registration, House of Delegates Breakfast (invite only),
Exhibition, Technical Sessions, PS-SEPM Reception,
Brew & Browse, and Student Q&A

*Additional
Reg. Req'd*

Guest Event at Imbibe, and
All Convention Luncheon with Charles Sternbach

----- TUESDAY, APRIL 24TH -----

EVENTS Registration, Exhibition, Technical Sessions, PSAAPG
Executive Meeting, Brew & Browse, and
Panel: CA Breakthroughs - past, present, & future

*Additional
Reg. Req'd*

DPA Luncheon (*Speaker TBD*)

----- WEDNESDAY, APRIL 25TH -----

FIELD TRIP Geology and Wine: Terroir of the Paso Robles Area

SHORT COURSE Introduction to Basin and Petroleum System Modeling

----- THURSDAY, APRIL 26TH -----

FIELD TRIP Geology and Wine: Terroir of the Paso Robles Area

WHERE TO STAY

Marriott at the Convention Center

801 Truxtun Avenue, Bakersfield, California 93301

Call (661) 323 -1900
and mention PSAAPG Convention for event rate

Limited number of rooms are available at a preferred
convention rate of \$125 USD/night (before tax).

Be sure to book your reservation by **March 21, 2018** to receive
the preferred convention rate. There is complimentary parking.

REGISTRATION



Early registration ends on March 1st

Secure your discounted rate NOW!

You can register for the convention, field trips, short
courses, and special events. Limited seats are available
for all field trips, short courses, and special events.

www.PSAAPG2018.org

GUESTS ARE WELCOME!

TIME TO "IMBIBE"

HOST: Imbibe Wine & Spirits at 4110 Truxtun Ave., Bakersfield, CA 93309

TIME AND DATE: 11:30am - 2:00pm, Monday, April 23rd

COST: \$45 per person (The more people that sign up, the better the wines!)

SUMMARY: Join us on Monday, April 23rd at Imbibe Wine and Spirits, one
of the nation's top wine and spirit retailers, for a Paso Robles experience
you don't want to miss. Tahlia Fischer, one of the leading experts on Paso
Robles wines through visiting, tasting and selling hundreds of Paso's
finest, will walk you through six different wines from this premiere region
of California. Enjoy a catered lunch while you sip, mingle and become an
expert on the wines of Paso. Event space is limited to 30 people.

VOLUNTEER OPPORTUNITIES

We need volunteer judges and general volunteers!

Please contact **Judges Chair:** Jlynn Bowen - jmbowen@aeraenergy.com
or **General Chair:** Becca Schempp - Becca.Schempp@crc.com

TECHNICAL SESSIONS (Oral and Poster).

PACIFIC EXPLORATION: MATURE BASINS AND PROLIFIC RESERVOIRS (PS-SEPM-SPONSORED)

California's complex structural history and variety of depositional environments have provided a playground for exploration over the past 100+ years. Despite the maturity of the area, "discovery thinking" has resulted in breakthroughs that have led to the discovery of new fields and exploitable step-outs that have extended the life of the basins. This session will present exploration efforts, discoveries and techniques used in successful "exploration thinking" in mature areas.

SEDIMENTOLOGY AND STRATIGRAPHY: FROM LACUSTRINE TO DEEP-WATER RESERVOIRS

California has beautiful exposures of clastic reservoirs with sediments and stratigraphy that are unique to our region. Presentations will include examples of the stratigraphic framework and the depositional interrelationships ranging from deepwater marine to shallow marine to non-marine alluvial, fluvial and lacustrine environments. Data gathered from outcrops, cores, and logging interpretation are used to explore the varied depositional history of the western margin.

STRUCTURE AND TECTONICS: MICRO-FRACTURES TO PLATE BOUNDARY FAULTS

The Pacific margin has an amazingly complex tectonic history of overprinted extension, compression and strike-slip systems that shape the oil fields. This session describes the structures of all scales – regional tectonics to borehole micro-fracture mechanics – that shape the producibility and trapping mechanisms of the reservoirs. Presentations will include the faults and folds that set up fields and the ways that we study them to regional cross-section interpretations and the syn-tectonic relationships that develop from deformation.

PETROPHYSICS AND GEOPHYSICS: FROM BOREHOLE TO BASIN

Session topics will range from borehole petrophysical calculations to basin-wide geophysical interpretations, including new logging tools and interpretation, rock fracture mechanics, and FMI interpretation to geophysical acquisition, processing or interpretation.

GEOLOGY AND DATA: LEVERAGING OLD DATA, NEW DATA, SMART DATA, AND BIG DATA

There is a wealth of data available in many mature basins and new concepts to explore using this data. In this session, share your insights in making the most of historic data, or introduce the new logging techniques, new types of modeling or uses of neural networking applied to your field. This session is for leveraging any type of data to solve a problem in California reservoirs.

SACRAMENTO BASIN EXPLORATION AND DEVELOPMENT

The Sacramento basin is a huge area for regional exploration and development, from deep gas to shallow heavy oil fields. This session includes new frontiers in exploration and continued work on developed fields.

GEOLOGIC APPLICATIONS IN A CHANGING REGULATORY ENVIRONMENT

The field-wide geologic evaluations associated with aquifer exemptions that have combined geology, engineering data and water quality data and have resulted in new geologic insights. This session will present those new geologic perspectives gained from the preparation of aquifer exemptions, UIC applications and sump closures and other regulatory requirements associated with oil and gas extraction and injection.

OIL AND THE ENVIRONMENT: ENVIRONMENTAL AND REGULATORY TOPICS ASSOCIATED WITH OIL AND GAS PRODUCTION (DEG-SPONSORED)

This session will provide updates on State and Federal regulations associated with underground sources of drinking water and protection of drinking water sources, including aquifer exemptions and the discharge of produced fluids to unlined surface impoundments. In addition to regulatory updates, the session will include groundwater investigations and case histories of aquifer exemptions, sump cleanups and refinement of the Underground Source of Drinking Water boundary.

(Continued on next page)

FIELD TRIPS

THE MONTEREY FORMATION OF THE PISMO BASIN

Leader: Heather Stang, Rick Behl, and Jon Schwalbach

Time and Date: 7:00am - 5:00pm, April 21 - 22, 2018

Cost: \$150

Summary: The Pismo Basin provides world-class coastal exposures of the Monterey Formation. This two-day, one-night trip will visit outcrops along the coast in the Shell Beach and Montana de Oro areas and will focus on stratigraphy, sedimentology and structural deformation of this important source rock and hydrocarbon reservoir.

- Basin setting, evolution and hydrocarbon system
- Sedimentologic observations and facies associations that reveal clues to depositional environment
- The expression of key stratigraphic surfaces that are critical for subsurface mapping
- Fracture distribution and the role of mechanical stratigraphy and structure

STRATIGRAPHY AND DEPOSITIONAL ENVIRONMENTS OF THE TULARE FORMATION, ELK HILLS AND BUENA VISTA HILLS

Leader: Tony Reid, Jonathan Goodell, and Eric Greenwood, California Resources Corporation

Time and Date: TBA

Cost: \$125

Summary: Pleistocene uplift of large anticline structures and subsequent erosion has exposed over 100 square miles of the Tulare in outcrops in Buena Vista Hills and Elk Hills. The Tulare section uncovered in the hills represents a depositional fairway located between alluvial fans derived from the growing Temblor Range, located to the southwest and west, and the Kern River delta to the east. Sediments in the fairway have characteristics of the neighboring depositional system, as well as unique facies including at least two major phases of basin floor lake sedimentation. This field trip will view outcrops of the Tulare as seen in road cuts and well pads across Buena Vista and Elk Hills and allow observation of a more distal Tulare facies, including fan delta, braided fluvial, and lacustrine deposits. Additionally, structural features, including normal faults and localized detachment anticlines, will be examined and discussed in reference to the tectonic development of the area.

STRUCTURE OF THE NORTHWESTERN TRANSVERSE RANGES AND SOUTHEASTERN COAST RANGES, CA

Leader: Thom Davis, Geologic Maps Foundation, Inc.

Time and Date: 7:00am - 6:00pm, April 21, 2018

Cost: 150

Summary: This trip will make an east to west traverse from the San Andreas fault near Frazier Park, through Lockwood Valley, the Cuyama Badlands and Valley, to the southernmost Coast Ranges near Stanley Mountain. Focus will be on the map-scale faults and folds, synorogenic deposits, tectonic history, and oil fields and petroleum system of the Cuyama basin. Stops will view and discuss the San Andreas and Big Pine faults, the San Guillermo and Ozena faults, the Morales thrust system, the South Cuyama fault, the South Cuyama and Russell Ranch oil fields, fold and thrust structure of the Caliente Range, Oligocene to early Miocene age half-grabens with Simmler Formation growth strata, and the Rinconada fault and its crystalline-basement boundary. Regional cross section interpretations of the major convergent structures will be shown and discussed. Exceptional outcrops of Oligocene to Quaternary synorogenic deposits will be visited and their significance to the tectonic history reviewed.

<p>Marty Hall Program Development Manager Multi-Client Services</p>	<p>7765 Windwood Way P.O. Box 549 Parker, CO 80134 USA</p> <p>P: 720 851.6152 C: 303 885.8860</p>
	
<p>geokinetics.com</p> <p>marty.hall@geokinetics.com</p>	

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GEOLOGY AND WINE: TERROIR OF THE PASO ROBLES AREA

Leader: Tim Cleath, PG CEG CHG, President of Cleath-Harris Geologists; Neil Currie, Project Geologist, Cleath-Harris Geologists

Time and Date: April 25, 2018

Cost: \$175

Summary: The Paso Robles area has become known as a world-class wine grape growing region of California. The Paso Robles American Viticulture Area has a distinctive terroir (the geology, soils, landform, climate, water resources that effect the growing of grapes and the quality of wine) that we will see and learn about during this field trip. At our first stops at Parkfield and Cholame, we will learn about how the tectonics at the Pacific/North American plate boundary formed the boundaries of this area. Our third stop at Franklin pond near Paso Robles will focus on the geothermal resources. Our fourth stop, at Niner Winery, will feature information on the soils and water resources of the Monterey Formation and the high quality wines of the Templeton/Adelaida region between the Rinconada and Nacimiento faults. Our fifth stop in Atascadero will be along the Salinas River where Santa Margarita Formation fossil beds can be sampled and geotechnical issues related to pipeline and bridge crossings will be discussed. The sixth stop will be at a well-loved wildflower and fossil locality on the Avenal Ranch at Shell Creek and Highway 58.

SHORT COURSES**INTRODUCTION TO BASIN AND PETROLEUM SYSTEM MODELING**

Leader: Allegra Hosford Scheirer, Consulting Faculty, Stanford University

Time and Date: 8:00am - 5:00pm, April 25 - 26, 2018

Cost: \$300 Professionals, \$100 Students

Summary: Course attendees will learn both the theory and practice of basin and petroleum system modeling. All lectures are accompanied with suggestions of both key readings and foundational texts. Outcrop photos and seismic expressions illustrate key concepts; case studies are essential to apply theory to practice; and effects of basin dynamics and sedimentation on petroleum systems weave through all modules. Class discussion is encouraged!

The course starts with a section on the petroleum system concept and the role that basin modeling plays in investigating it. It proceeds with discussions of boundary conditions, geohistory analysis, interpretation of organic geochemistry for basin modeling, petroleum migration, output analysis, and model calibration. Theoretical concepts will be illustrated with examples from real sedimentary basins.

THE FUNDAMENTALS OF DEEP-WATER PETROLEUM RESERVOIRS

Leader: Jon Rotzien, President, Basin Dynamics LLC

Time and Date: 8:00am - 5:00pm, April 21 - 22, 2018

Cost: \$300 Professionals, \$100 Students

Summary: This two-day seminar is designed to provide professionals with a modern awareness of the full spectrum of clastic deep-water petroleum reservoirs, their mechanisms of transport and deposition, their stratigraphic stacking patterns, their predictive characteristics, and their 3D heterogeneity. This collaborative course examines reservoirs from feeder systems that link the shelf to submarine canyon and transport sediment downslope to submarine fan and distal basin plain environments, using extensive outcrop, core, and seismic examples from various passive and active margins – including several examples from petroleum basins in western California.

This course is designed to give industry professionals an appreciation of deep-water sedimentary transport processes that control depositional products, as well as knowledgeable insight into the scale and architecture of the wide range of deep-water reservoirs. This course draws from materials presented in Basin Dynamics, LLC field trips to major deep-water sedimentary outcrops and petroleum basins worldwide, including California, France, New Zealand, Gulf of Mexico, and Ireland.

DEBRIS FLOW FACTS & SAFETY FOLLOWING THE THOMAS FIRE & MONTECITO DEBRIS FLOWS, SOUTHERN CALIFORNIA

Thomas L. Davis, PhD, California Professional Geologist #4171
 Geologic Maps Foundation, Inc., Ventura, CA
www.geologicmapsfoundation.org, www.thomasldavisgeologist.com
 email: geologicmapsfoundation@gmail.com, Distributed: January 30, 2018



There is a great need for public education on the dangers of debris flows (mud flows) following wildfires. This document is an attempt to address this need and can be freely distributed and used as an outline for public presentations.

Comments on the January 9, 2018 Montecito debris flows:

- 1) The Thomas Fire stripped the vegetation protection from the steep slopes above Montecito, and increased the soil's water repellent properties (hydrophobicity) which added to surface runoff ⁽¹⁾.
- 2) The abnormally high rain fall rate (~1/2" of rain in five minutes) resulted from an unstable warm air rising along the mountain front. Air mass instability should always be of concern during a rain event.
- 3) Montecito's elongate east-west shape and location along the base of a steep mountain front, cut by steep-walled canyons that drain extensive mountainous areas, adds to debris flow susceptibility, size and risk. Montecito is built over pre-historic debris flow deposits.
- 4) Preliminary maps show that the flows traveled several miles (runout) from their mountain sources, along stream beds and other low-lying areas, to the 101 Freeway that served as an unintended debris basin (Fig 1). The below surface construction of the 101 Freeway spared areas to the south of destruction and showed the effectiveness of large debris basins but created a costly and lengthy transportation and travel problem for many.
- 5) Most of the death and destruction from the flows occurred downslope and beyond the mountain front where stream channels were less confined by their natural walls.
- 6) Mapping by Santa Barbara County Public Works following the Thomas Fire and before the flows occurred was prescient and did show the debris flow hazard and possible impact in the populated areas downslope of the canyon mouths (Fig 2).
- 7) Preliminary debris flow hazard mapping by the United States Geologic Survey (USGS) following the Thomas Fire, and before the flows, only shows areas of potential slope instability (source areas of flows), and the USGS map does not show the hazard downslope of the canyon mouths that were most severely impacted by the Montecito flows and their deposition (Figs 3 & 4). It is important that the public understand the USGS map's limitations and not interpret the lack of color-fill as meaning an area is safe from debris flows.

Safety, take note of the following, if you live or work near an area impacted by wildfires:

- 8) Is your location downslope of a recently burned area, in a low-lying area, or near a gully, wash, canyon or drainage channel? Are there indications at your location, such as numerous boulders and cobbles, suggesting prior debris flow activity?
- 9) Stay weather informed via the National Weather Service. Pay attention to weather forecasts and predicted rainfall rates (greater than one-third an inch per hour should be of concern). Consider leaving or avoiding a debris flow prone area for a few days if weather forecast is for high rainfall rates or sustained rains that saturate the hillsides.
- 10) You may have little or no warning of flows and historically many of the deadliest flows occurred at night.
- 11) Develop an emergency plan for self and family.
- 12) Avoid driving during a debris flow event as streets can become flow routes and bridges and culverts can be damaged. Not driving should be an important consideration of your emergency plan.
- 13) Avoid canyons and stream channels during and following rain storms. If near a debris flow move quickly to high ground or up any high-standing and stable object (2d floor, roof, tree, etc.).
- 14) Follow City and County emergency service warnings and know their evacuation plans.



Fig 1. Preliminary map showing debris flow pathways and deposits (blue) from the Montecito flows of January 9, 2018. Note that flows followed existing drainages, traveled considerable distance from their mountain source, and stopped at the 101 Freeway that is below surface level through much of Montecito. Sources: mapping by Santa Barbara County Department of Public Works and published in the Santa Barbara Independent January 14, 2018.



Fig 2. Santa Barbara County Department of Public Works' map of the Montecito area showing potential debris flow pathways and deposits (blue). Map was made prior to January 9, 2018 debris flows and accurately includes the areas subsequently impacted by the debris flows and shows the safety benefit of this type of geologic mapping. Map was published in the Santa Barbara Independent January 14, 2018.

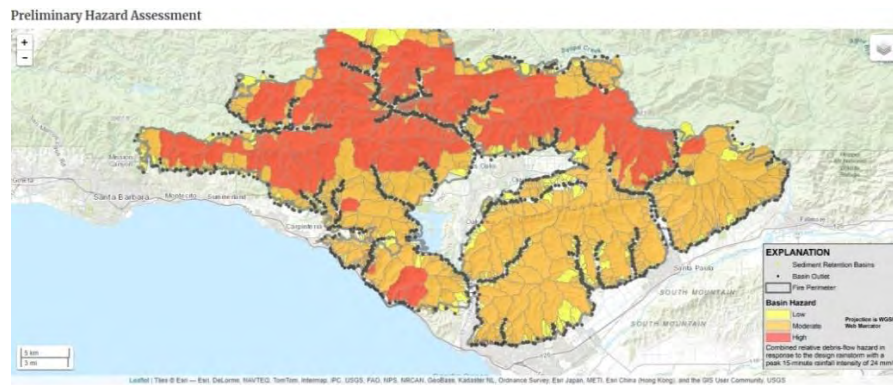


Fig 3. Debris flow hazard map made by USGS of Santa Barbara and Ventura Counties impacted by the Thomas Fire of December 2017. Map was made prior to the Montecito debris flows of January 9, 2018. The mapping estimates the likelihood of debris flows (in %), potential volume of debris flow (in m^3), and combined relative debris flow hazard in response to the design scenario with a peak 15-minute rainfall intensity of 24 mm/h. https://landslides.usgs.gov/hazards/postfire_debrisflow/detail.php?objectid=178

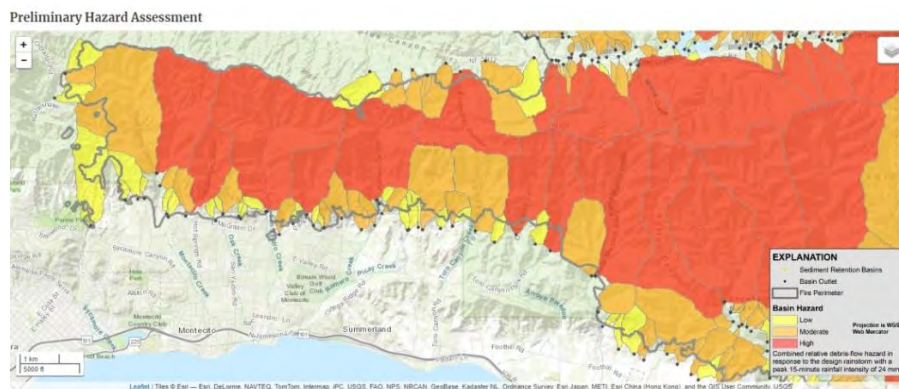


Fig 4. USGS debris hazard map enlarged over the Montecito area. Map only shows areas of potential slope instability (source areas for debris flow) and does not include the populated areas downslope of the canyon mouths and most severely impacted by the debris flows and their deposits (compare with Figs 1 & 2). Most of the death and destruction at Montecito occurred in the uncolored areas of the map. It is important that the public understand the limitations of this type of mapping that does not show all areas of potential impact downslope.

DEBRIS FLOW FACTS & SAFETY IN VENTURA

Prepared by Thomas L. Davis, PhD,

California Professional Geologist #4171

Geologic Maps Foundation, Inc., Ventura, CA

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email: geologicmapsfoundation@gmail.com

Thomas L Davis is a local geologist with experience in mapping geologic hazards.

Distributed: 12/31/2017



What are debris flows? Debris flows (mudslides) are rapidly flowing masses of rock and mud that initiate in steep-walled canyons (more or less those difficult to hike up the walls) and commonly flow through the canyon openings and onto the gentler, open slopes below. Flows have the consistency of wet cement, yet typically move downslope at about 10 mph and can exceed 35 mph ⁽²⁾, are a common geologic process, and can be very dangerous and destructive. In the United States, landslides and debris flows result in 25 to 50 deaths each year ⁽³⁾. The risk of debris flows increase significantly following brush and forest fires ⁽⁴⁾. This elevated risk usually lasts for 2-3 years following a fire ⁽⁵⁾.

Will debris flows occur in Ventura? No one knows, but the likelihood is greater due to the Thomas Fire stripping vegetation from the slopes above the city, and increasing the soil's water repellent properties (hydrophobicity) which adds to surface runoff ⁽¹⁾. The city's location and elongate shape along the base of a moderate to steep slope, cut by steep-walled canyons (barrancas) that drain extensive areas uphill of the city, and the unconsolidated and easily erodible "bedrock" underlying the slopes adds to debris flow susceptibility.

When? Flows are triggered by periods of intense rainfall and their occurrence increases when: 1) the ground is already water saturated from previous rainfall(s), 2) vegetation and ground have been burnt during the last several years, 3) the first set of significant rain storms arrive following a fire. Debris flows can occur with little or no warning and commonly happen at night; many fatalities have occurred when people are sleeping ⁽¹⁾.

Where? Debris flows frequent canyon bottoms, stream channels, at canyon mouths (openings), along man-modified slopes such as road cuts, and at and near drainage culverts. Is your residence in such a location, as flows will follow the same pathways? It is important to understand the drainage pattern at and above your residence: are you in a low spot, do drainages converge upslope from you, is there evidence of prior earth movements such as tilted walls and trees?



GOOGLE EARTH IMAGE OF HILLS ABOVE THE CITY OF VENTURA SHOWING THE SERIES OF STEEP-WALLED CANYONS (BARRANCAS) WHICH DRAIN TOWARDS THE CITY.

Safety tips:

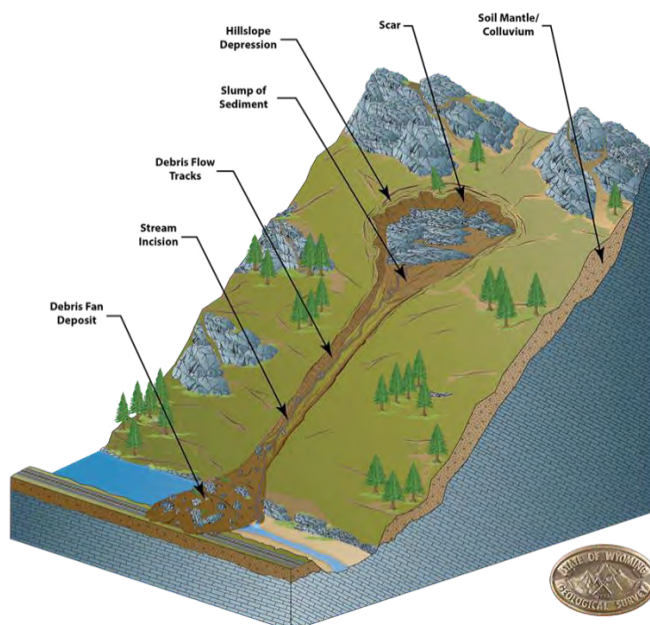
- ✓ Know the City and County emergency services and evacuation plans. Build a personal evacuation plan.
- ✓ Stay informed via the National Weather Service about approaching storms and expected rain fall rates and amounts⁽⁵⁾. In California, post-fire debris flows started from as little as 0.5 inch of rain in 40 minutes⁽⁵⁾.
- ✓ Avoid canyons and stream channels during and following rain storms. Stay on high ground.
- ✓ Remain awake during heavy rain if you are in an area of debris flow potential. Watch for sudden increases and decreases in surface runoff and changes in the muddiness of the water. Listen for unusual sounds from breaking tree limbs and boulders tumbling. Be ready to go quickly to higher ground. Don't wait!
- ✓ Avoid driving during periods of intense rainfall. If you reside in an area of high debris flow potential then consider leaving prior to the arrival of storm events and return home after the storm.

Insurance: There are many types of insurance that a property owner can obtain to address property loss due to fire, flood, and earthquake. Please consult with an insurance provider as to the different types of insurance and what they cover and exclude and the timeframe on when the policy becomes effective from the purchase date⁽⁷⁾⁽⁸⁾. Read all policies closely and ask questions⁽⁹⁾!

Additional resources on debris flows and references:

1. United States Geological Survey (USGS); California Water Science Center, Wildfires, Water, and CWSC Science; <https://ca.water.usgs.gov/highlights/2017/10/wildfires-water-quality>
2. United States Geological Survey (USGS), Fact Sheet 176-97, <https://pubs.usgs.gov/fs/fs-176-97/fs-176-97.pdf>
3. Center for Disease Control and Prevention (CDC), Natural Disasters and Severe Weather>Landslides and Mudslides, <https://www.cdc.gov/disasters/landslides.html>
4. United States Geological Survey (USGS), Southern California Wildfires and Debris Flows, <https://pubs.usgs.gov/fs/2005/3106/pdf/FS-3106.pdf>
5. S.H. Cannon, et al., 2010 <https://pubs.usgs.gov/of/2010/1039/pdf/OF10-1039.pdf>
6. National Weather Service Forecast Office, Los Angeles/Oxnard: http://www.wrh.noaa.gov/total_forecast/getprod.php?wfo=lox&afos=AFDFGZ
7. FEMA, National Flood Insurance Program Summary of Coverage FEMA F-679 / November 2012 https://www.fema.gov/media-library-data/20130726-1620-20490-4648/f_679_summaryofcoverage_11_2012.pdf
8. FEMA, National Flood Insurance Program Dwelling Form Standard Flood Insurance Policy F-122 / October 2015, https://www.fema.gov/media-library-data/1449522308118-6752c210f65aed326a9ddf4a0ddaca1f/F-122_Dwelling_SFIP_102015.pdf
9. Homeowners Insurance Does Not Cover Many Types of Damage, <http://geology.com/articles/homeowners-insurance.shtml>

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SKETCH SHOWING THE BASIC FEATURES OF A DEBRIS FLOW (MUD FLOW).
COURTESY OF THE WYOMING GEOLOGIC SURVEY.

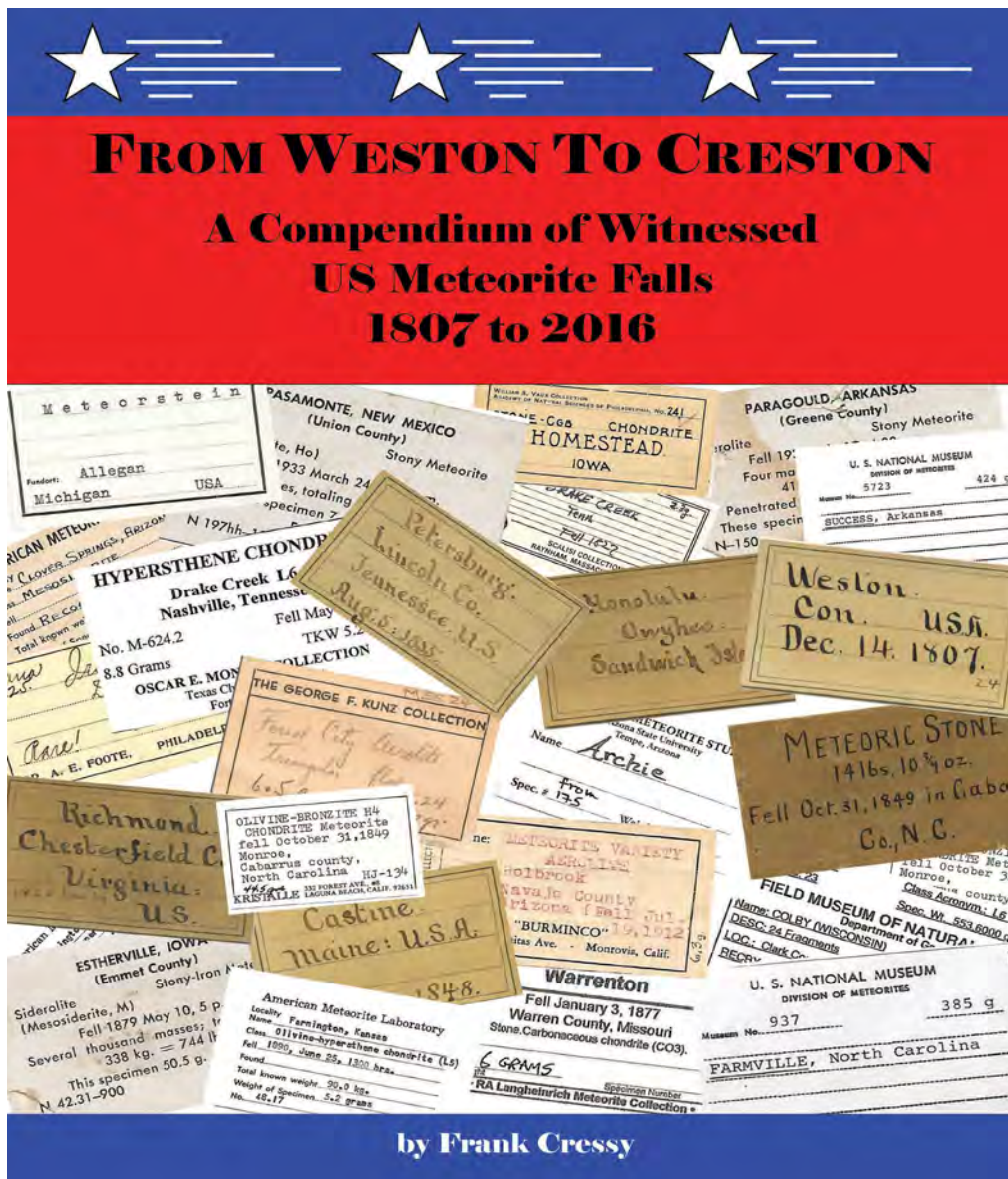
New Publication

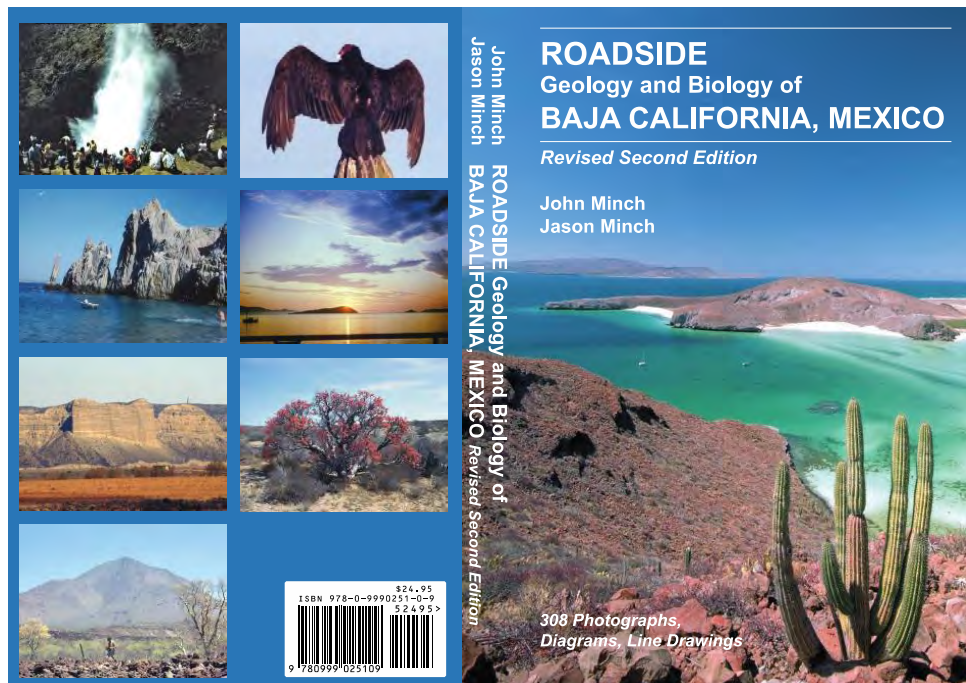
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by Frank Cressy

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John Minch and Jason Minch

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Step 1



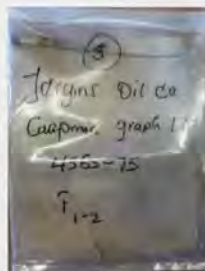
Wooden Crates with Samples

Step 2



Samples in Paper Bags from 1920's

Step 3



Samples Transferred into Plastic Bags

Step 4



Plastic Bags Placed into Boxes

Step 5



Boxes Placed on Shelf



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Alaska Geological Society

March 20th, 2018.

Speaker: Trystan Herriot, State of Alaska.

Talk: "Sequence-stratigraphic framework of the Middle Jurassic Chinitna Formation, Cook Inlet forearc basin, south-central Alaska".

April 20th, 2018.

AGS Technical Conference.

Location: University of Alaska, Anchorage.

Coast Geological Society

March 20th, 2018.

Speaker: Brenna Quigley.

Talk: "Discussing the Geology of Wine".

April 17th , 2018.

Speaker: Dr. Regan Maas & Danielle De Mello.

Talk: "Discussing a Vintage Geologic and Geophysical map geo-database".

L.A. Basin Geological Society

March 22nd, 2018.

Speaker: Ben Hagedorn, CSULB.

Talk: To be decided.

April 26th, 2018.

Speaker: unassigned.

Talk: unassigned.

May 24th, 2018.

Speaker: Sherilyn Williams-Stroud, President/CEO of Confractus, Inc.

Talk: "Is it Possible to Estimate Induced Seismicity Hazard from Fault Size-Frequency Relationships?"

Northern California Geological Society

March 28th, 2018.

Speaker: Dr. Tom MacKinnon.

Talk: "Early Accretionary History of the Franciscan Complex as inferred from the Yolla Bolly/Black Butte area of the Eastern Belt".

April 25th, 2018.

Speaker: Dr. Andrew Gunther.

Talk: ""Climate Change topics".

May 30th, 2018.

Speaker: Dr. Isabel Montanez, UC Davis and President of The Geological Society of America.

Talk: "Reconstructing precipitation patterns in California during past warmings and coolings of the last 20,000 years".

Northwest Energy Association

Announcements comming soon.

Sacramento Petroleum Association

March 14th, 2018 (not regular meeting date).

Speaker: Dr. Brian Hausback, California State University at Sacramento.

Talk: "The Geology of the Sutter Buttes".

April 18th, 2018.

Speaker: Greg Croft, St. Mary's College.

Talk: "Update on the Shale Resource Plays of California".

May 16th, 2018.

Speaker: Dr. Victoria Langenheim, U.S.G.S.

Talk: "Imaging the Northern Sacramento Basin Using Gravity Data".

San Joaquin Geological Society

March 13th, 2018.

Speaker: Blake Foreshee, DOGGR.

Talk: "Geomorphic constraints on the evolution of the Kern Gorge, southern Sierra Nevada, California".

April, 4th, 2018.

Speaker: Todd Greene, Chico State.

Talk: "Facies architecture and provenance of a boulder-conglomerate submarine channel system, Panoche Formation, Great Valley Group".

May 8th, 2018.

Speaker: Katherine Stack Morgan, NASA JPL.

Talk: "Exploring the evolution of an ancient lake basin on Mars with the Curiosity rover".

Alaska Geological Society
www.alaskageology.org

P. O. Box 101288
Anchorage, AK 99510

Contact: Dave Buthman
dbuthman@hilcorp.com



Geology meetings/talks are held monthly September through May, usually on the third Thursday of the month, at the BP Energy Center (1014 Energy Court) from 11:30 am to 1:00 pm. Open To The Public. No Charge to Attend.

President:	Larry Smith	ljsmith@gci.net
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Past-President:	Chad Hults	chadcph@gmail.com

Coast Geological Society
www.coastgeologicalsociety.org

P. O. Box 3055
Ventura, CA 93006

Contact: Theresa Heirshberg
805-443-7641



Dinner meetings are held monthly September through May, on the third Tuesday of the month, at Poinsettia Pavilion, 3451 Foothill Road in Ventura. Social hour starts at 6:00 p.m., dinner is served at 7:00 p.m., and the talk starts at 8:00 p.m. The cost of dinner with reservations is \$20 (members), \$25 (non-members), or \$10 (students and K-12 teachers). For reservations, please email Shelby Fredrickson (secretary@coastgeologicalsociety.org), and should be made by 4:00 p.m. on the Friday before the meeting.

President:	Theresa Heirshberg	president@coastgeologicalsociety.org
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Membership chair:	Bonnie Walters	membership@coastgeologicalsociety.org
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Los Angeles Basin Geological Society
www.labgs.org

Contact: Bert Vogler
949-585-3103



Luncheon meetings are held monthly September and October; and January through June, usually on the fourth Thursday of the month, at The Grand at Willow Street Conference Centre (4101 E. Willow Street) in Long Beach. Lunch is served at 11:30 a.m., and the talk starts at 12:15 p.m. The cost is \$25 (with reservations), \$30 (without reservations), \$20 for retired members, and \$5 for students. Reservations can be made online at www.labgs.org or by contacting Ryan Weller at 562-637-6019 or ryweller@gmail.com Reservations must be made prior to Tuesday before the meeting.

President:	Bert Vogler	hvogler@kleinfelder.com
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Scholarships:	Karla Tucker	ktkr2@aol.com
Webmaster	Ivan Aburto	Ivan.aburto@crc.com

Northern California Geological Society
www.ncgeolsoc.org

803 Orion #2
Hercules, CA 94547-1938

Contact: Barbara Matz
barbara.matz@cbifederalservices.com



Evening meetings are held monthly September through May, usually on the last Wednesday of the month, at the Masonic Center (9 Altarinda Road) in Orinda. Social hour starts at 6:30 p.m., and the talk starts at 7:00 p.m. (no dinner). For reservations, contact Dan Day at danday94@pacbell.net before the meeting. Cost is \$5 per regular member; \$1 per student member; and \$1 per K-12 teachers.

(Continued on next page)

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Northwest Energy Association

www.nwenergy.us

P. O. Box 6679

Portland, OR 97228-6679

Contact:

Jim Jackson or John Armentrout



Luncheon meetings are held monthly September through May, on the third Thursday of the month, at the Multnomah Athletic Club (1849 SW. Salmon Street) in Portland, Oregon. Meeting time is at 11:45 AM to 1:00 PM (speaker about 12:15 PM). The cost is \$25 for members and \$30 for non-members. For information or reservations email NWEnergyAssociation@gmail.com, or our Postal Box: Northwest Energy Association, P.O. Box 6679, Portland, Oregon 97228-6679.

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Sacramento Petroleum Association

P. O. Box 1844

Folsom, CA 95630

Contact: Pam Ceccarelli

916-439-0400



Luncheon meetings held monthly January through November, on the third Wednesday of the month. Location: Club Pheasant Restaurant in West Sacramento. The meetings starts at noon. The cost is \$16 - \$20. For information or reservations, contact Pam Ceccarelli.

President:	Jerry Reedy	JWR5532@aol.com
Vice-President:	Scott Hector	Scott.Hector@gmail.com
Secretary	Derek Jones	djones@gasbiz.com
Editor/Treasurer	Pam Ceccarelli	pc626@comcast.net

San Joaquin Geological Society

www.sanjoaquingeologicalsociety.org

P. O. Box 1056

Bakersfield, CA 93302

Contact: Lindsey Thompson

lthompson@envirotechteam.com



We have dinner meetings on the second Tuesday of the month, October through June, at the Eagle's Lodge at 1718 17th Street, Bakersfield, CA 93302. There is an icebreaker at 6:00 p.m., dinner at 7:00 p.m., and a talk at 8:00 p.m. Dinner is \$25 for members with reservations and \$30.00 for nonmembers and members without reservations. Students may attend for free.

President:	Cameron Campbell	cameron.campbell@conservation.ca.gov
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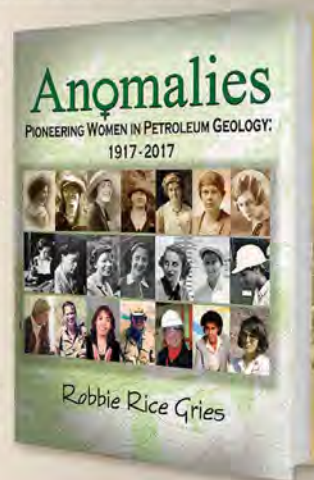
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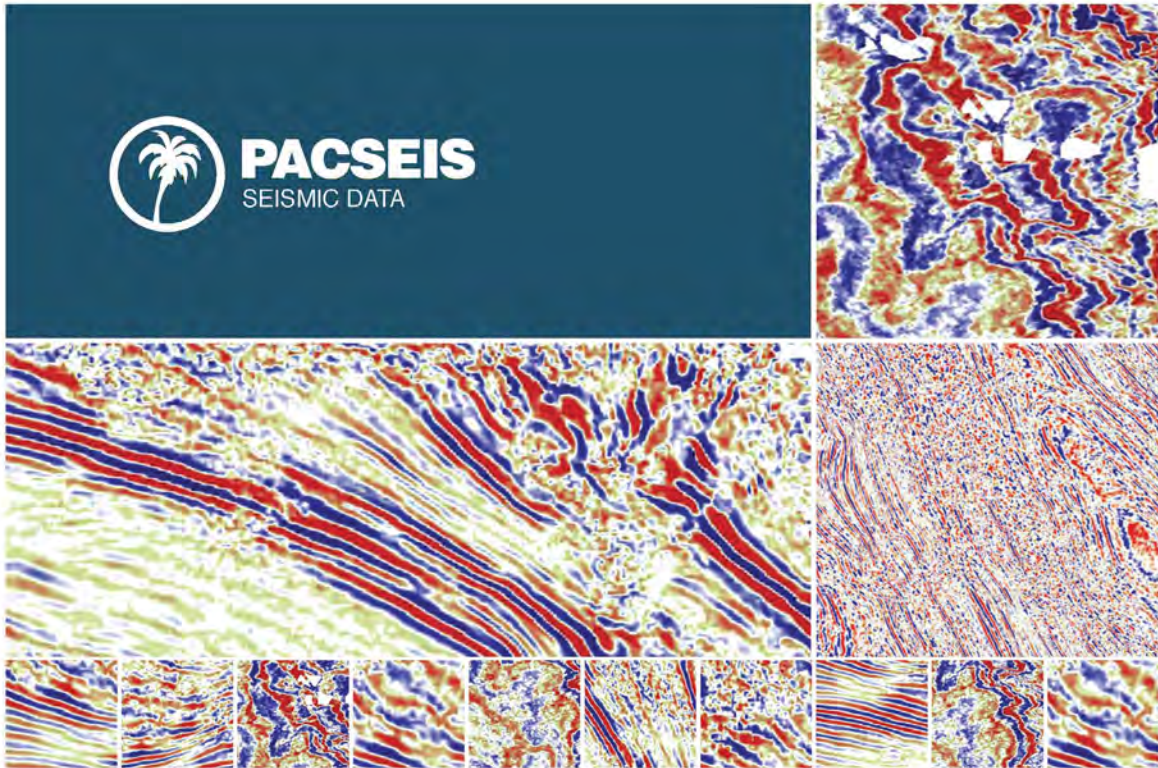
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