

Pacific Section • American Association of Petroleum Geologists

January & February • 2011



Landing in Alaska

PSAAPG 2011

www.psaapg.org

With reservoirs becoming increasingly complex, you need the most accurate information you can get to better understand your reservoir.

Weatherford Labs helps you get more from your core by combining an unsurpassed global team of geoscientists, engineers, technicians and researchers with the industry's most comprehensive, integrated laboratory services worldwide. From core analysis, sorption, geochemistry and isotopic composition to detailed basin modeling and comprehensive data packages, we provide you with real reservoir rock and fluid information that hasn't been distilled by a simulator or iterated by software.

We call it "The Ground Truth"" – giving you the accurate answers you need for better reservoir understanding. You'll call it a better return on your reservoir investment. To learn more, contact TheGroundTruth@weatherfordlabs.com.



OFFICERS

President	Cynthia Huggins	
	661.665.5074	
	president@psaapg.org	
President-Elect	John Minch	
	805.898.9200	
	president-elect@psaapg.org	
Vice President	Jeff Gartland	
	661.869.8204	
	secretary@psaapg.org	
Secretary	Tony Reid	
	661.412.5467	
	vice-president@psaapg.org	
Treasurer 2009-2011	Cheryl Blume	
	661.864.4722	
	treasurer@psaapg.org	
Treasurer 2011-2012	Jana McIntyre	
	661.869.8231	
	treasurer@psaapg.org	
Past President	Scott Hector	
	707.974.6402	
	past-president@psaapg.org	
Editor-in-Chief	Ed Washburn	
	661.654.7182	
	editor@psaapg.org	
STAFF		
Web Master	Bob Countryman	
	661.589.8580	
	webmaster@psaapg.org	
Membership Chair	Emily Loera	
	661.859.9713	
	membership@psaapg.org	
Publications Chair	Larry Knauer	
	661.392.2471	
	publications@psaapg.org	
	LarryKnauer@chevron.com	
Advisory Council Repres	sentative Kurt Neher	
	661.412.5203	
	kurt neher@oxy.com	

Cover photo: View from the Black Rapids Glacier, AK, looking northwest with the Denali fault in the background. Courtesy Stephanie Perry and AGS. EVERY ISSUE

- 4 Message from the President C. Huggins
 - Editor's Corner E. Washburn
 - **PS-AAPG** News
- 13 Publications

6

7

6

8

15 Member Society News

This Issue

- PS-AAPG Constitution and By-laws UpdateT. Reid
- Surface Rupture Gap in the Landers Earthquake, San Bernardino, CA- pt. 2 • D. Crane





January 2011 PSAAPG President's Message

Well, we have nearly reached the half-way point of my term, and have said goodbye to 2010. For our industry it was a mixed year. There were big problems in the Gulf of Mexico, and several big discoveries internationally. The US industry still feels the effects of the BP blow-out. Some operators have resumed drilling wells that had been suspended, but no new drilling permits have been issued.

For us in the Pacific Section, Alaska has seen some of the fall out. Shell received Interior Department approval to drill in the Beaufort Sea in October, but had their previously issued EPA permits pulled in December.

In a recent article by Alan Bailey in the Petroleum News (January 9, 2011 Vol. 16, No. 2), Alaska Governor Sean Parnell commented on the EPA decision, "They have invested tens of millions of dollars in pollution control equipment, and met or exceeded every request made of them, yet they still can't get a permit to drill a single exploration well off the coast of Alaska. ... The federal permitting system is broken and we are paying the price. These appeals are not all about protecting the environment or the health of Alaskans. They are primarily about outside groups opposed to development and a federal administration in Washington, D.C., all too willing to accommodate them."

ConocoPhillips has decided to drop its Beaufort Sea leases. Both Shell and ConocoPhillips are focusing efforts toward the Chukchi Sea. Both companies have stated that they will continue to pursue their offshore exploration opportunities. Shell has invested \$3.5 billion on its exploration program in the Chukchi and Beaufort, while ConocoPhillips and its partner, Statoil, have invested over \$506 million in lease bonuses in the Chukchi.

The MMS estimates that 15 billion barrels and 77 TCF of technically recoverable oil and gas could reside in the Chukchi. Comparable volumes reside in the Beaufort. Those volumes would create jobs and opportunities, extend the life of the Trans Alaska Pipeline System, bring in revenue for the the country (as well as state and local communities), and improve the economics for all developments across the Alaska north slope.

Hopefully this gets resolved soon, and drilling can begin.

Just a quick update on the Imperial Barrel Award. This year we have two universities competing for Pacific Section's IBA; San Diego State University (the returning champion), and a new contender, Long Beach State University. Data sets have gone out, and our competition will be in March. Best of luck to both teams.

On the funding front, the revenue from the Anaheim Convention has been received and will be distributed to the affiliated societies in January. Kudos to Curtis Henderson and his hard working convention committee.

Speaking of hard working teams, David Hite and his convention committee are putting together the program for the Anchorage meeting (May 9-11, 2011). Please make sure you make every effort to participate.

There has been a change to the Executive Committee. Membership Chair Brian Church has accepted a transfer to Louisiana. He will be missed, and we appreciate all the hard work he did to modernize our record keeping and increase our membership. We are very pleased to announce that Emily Loera is our new Membership Chair. She recently moved to Bakersfield, and I thank her for taking on this key role.

Cheers,

Cynthia

Page 4

Teacher of the Year Award



Pacific Section Affiliated Societies,

Well, it's the new year and I still don't have any nominations in for Pacific Sections Teacher of the Year award. Nominations for this award need to be in to me by the end of February, 2011 for consideration. Please canvass your membership and try and come up with qualified nominees. This award is open to all K thru 12 teachers who teach at least 1 unit of Earth Science.

Each affiliated society can submit one or more nominees for consideration as the Pacific Section Teacher of the Year. The winner of the Pacific Section award will be eligible for consideration for the AAPG Excellence in Teaching award. This is a prestigious honor and the Pacific Section has had its share of National winners in the past.

Requirements and forms for Pacific Section's TOTY award are the same as those for the National AAPG award and can be found at the following website; http://foundation.aapg.org/toty/. Nominations should be submitted to me at the address below before March 2011..

Thank you for your effort.

Bob Ballog Coordinator, Teacher of the Year Award Eagle Exploration & Production Co. 1000 Business Center Circle, Suite 204 Newbury Park, CA 91320 Office: (818) 627-2735 Email: bob@eaglexpco.com. I hope the new year finds you re-energized and ready to meet new challenges. Cynthia's comments in the last issue regarding the Monterey Formation's latest resurgence were illustrated by the huge turnout (nearly standing room only) at the San Joaquin Geological Society January dinner meeting for a great talk on the subject by Dr. Richard Behl. Understanding the incredible complexity of this reservoir at very small scales, and how to most efficiently develop its huge resource potential at reservoir scales, will likely be among the most interesting technical challenges for many pacific petroleum geologists and engineers in the near future. Similar challenges await our colleagues who are working other unconventional shale reservoirs worldwide.

Another big challenge for our industry in 2011 is to begin to rebuild a damaged reputation with the public. While I disagree with the suggestion by the Deepwater Horizon commission that the entire industry shares a culture of complacency and indifference to safety and environmental issues, I agree with their conclusion that there are many improvements in technology and safety culture that can and must be made in order to prevent similar tragedies in the future (for those interested, the report can be found here- http://www.oilspillcommission.gov/final-report). These improvements should be made not due to public or government pressure in the aftermath of a major incident, or to guard against potential financial losses, but simply because operating safely and responsibly is the right thing to do in any business.



DHISERVICES

Formation Evaluation Specialists

www.dhiservices.com

Les Collins Regional Operations Manager

2202 Zeus Court Bakersfield, CA 93308 Tel: +1 (661) 588-8310 Fax: +1 (661) 588-8322 Cell: +1 (661) 742-2720 Email: lcollins@dhiservices.com

Recommended Changes to the Pacific Section AAPG Constitution and By-Laws: Call for Comments from the Membership

The Pacific Section's Constitution and By-laws governs how the Executive Committee conducts its business. As our organization matures, the rules we operate under periodically need revision. At the request of the 2009-2010 President Scott Hector, a committee was formed (consisting of Larry Knauer, Bob Countryman and myself) to review the Constitution and By-laws and to recommend changes that reflect our current activities and processes.

The committee submitted a draft of recommended changes to the Executive Committee in March 2010. President Hector appointed Dalton Lockman to select a small group (including Mark Wilson and Terry Thompson) to provide an independent assessment of the draft. Their recommendations were submitted to the Executive Committee at our September 17, 2010 meeting. After final revisions by the Executive Committee, a motion was approved to forward the proposed changes to the PS AAPG membership for comments.

Numerous changes are recommended, and the significant ones are discussed below:

1. Second Treasurer. We are out of compliance with the Constitution in several sections, including voting in the Executive Committee and in authorization for accounts. The fix (Treasurer-Elect) is rather simple to invoke although several specific changes are required.

2. Article IV, Officers, elected terms. The language here is complicated due to previous changes and it will only get worse with the new Treasurer-Elect spot. These passages are removed and placed in a new article in the By-laws.

3. Article IV, Officers, duties. New language for the Editor defined some duties, but the other officers are not defined. These passages are removed and placed in the By-laws in an article that defines the key duties of all the officers.

4. Article IV, Section 3. This new section requires that officers can not concurrently hold offices of local societies or the National AAPG (except for the House of Delegates).

5. Article V, Property. This new article defines what is the property of the Section and how it is managed.

6. Article VII, Meetings. This article combines comments from other areas of the Constitution into three sections that described our convention, public and Executive Committee meetings. The Executive Committee voted to raise the quorum for their business meetings to 8, which is half of the eligible voting members.

J.M. "BUZZ" DELANO, JR. Consultant Cell (661) 747-0337 Office (661) 832-5229 Fax (661) 832-5229 Email: BuzzBake@aol.com

Delano Petrophysical

Consulting Services

Dipmeter Analysis Tape Conversion Editing 816 Ferdinand Ct. Expert Petrophysical Analysis Bakersfield, California 93309 Wellsite Supervision

DAVID B. DEL MAR

Consulting Registered Geologist California Registered Geologist #634

Development - Thermal EOR - Property Reviews

2027 Park Drive Los Angeles, CA 90026 H (323) 664-3358 dbdelmar@earthlink.net 7. Article VIII, Section 2. A new passage corrects who is eligible to vote in the Advisory Council election.

8. By-laws Article I. New article defines the terms for the officers.

9. By-laws Article II. New article defines the duties of the officers.

10. By-laws Article III, Membership. Deletes Associated Members.

11. By-laws Article IV, Committees. Removes the Planning and Legislation Committees. This committee has been inactive for several years.

12. Numerous edits to correct inconsistencies in grammar including use of capitalization.

Members are encouraged to review the proposed changes on drafts posted on our website at www.psaapg.org (green links near bottom of home page near convention registration info). Your comments are welcome and should be addressed to secretary@psaapg.org.

Tony Reid Secretary, PS AAPG

Stanford University Geologic Studies of the San Joaquin Basin, 1980-2010

Stephan A. Graham, W.J. and M.L. Crook Professor School of Earth Sciences, Stanford University, Stanford, California

The dissertations reproduced on this DVD largely predate the digital era, so many have been scanned from original hard copies of variable states of preservation; as a result, the quality varies in this product. The original dissertations are on file and accessible to the public at Branner Earth Sciences Library, School of Earth Sciences, Stanford University. Scans for this DVD derive from two sources. Some were produced as part of a program at Stanford to digitize all older dissertations, with thanks to Julie Sweetkind-Singer, (Acting Head Librarian) and her staff at Branner Library, for facilitating access to previously scanned dissertations. However, the majority of the dissertations in this collection were scanned pro bono by PayZone, Inc. of Bakersfield, thanks to the considerable efforts of Deborah Olson and her colleagues. Larry Knauer, Pacific Section AAPG, encouraged and facilitated production of the DVD. Ultimately, principal credit for this compilation goes to Deborah Olson, who first suggested the idea of this DVD in order to facilitate greater public access to these dissertations, because most were previously unpublished or published in regional publications of limited circulation. This body of research would not have been possible without the support of the San Joaquin Project consortium member companies, which over time included: Amerada-Hess, Amoco, Arco, BP Alaska, Champlin, Chevron, Cities, Conoco, Exxon, Getty, Gulf, Husky, Marathon, Mobil, Natural Gas Corp, Occidental, Phillips, Santa Fe Energy, Shell, Sohio, Superior, Tenneco, Texaco, and Unocal.

A 2-DVD set containing the information described above may be purchased from the Pacific Section American Association of Petroleum Geologists (PSAAPG) Publications Committee for \$39.00 by contacting (and including a check or credit card information and a shipping address)

PSAAPG Publications		Larry Knauer (Publications Chair)
P.O. Box 1072	or	larryknauer@chevron.com
Bakersfield, CA 93302		661-392-2471

An Examination of the Surface Rupture Gap in the Landers Earthquake between Johnson Valley and Eureka Peak Faults, San Bernardino County, California

David J Crane Chevron North America Exploration and Production Company, Bakersfield, CA

Continued from Nov-Dec. 2010 Newsletter. See website version for color figures.

Seismic Data

Figure 3 illustrates the regional seismic aftershock epicenter data for the period from April 1, 1992 to June 1, 2007. These data, obtained from the Southern California Earthquake Data Center, document a continuous narrow chain of epicenters that extend from the Salton Sea region in the south, pass through the Landers earthquake fault complex, and terminate 41 km southeast of Barstow, California. During this time period the April 1992, M 6.3 Joshua Tree, the June 1992, M 7.3 Landers, and the October 1999, M 7.1 Hector Mine earthquakes are the latest major expressions of these events (Felzer, et al., 2002) and suggest these fault systems reflect the current transfer of stress from the San Andreas fault into the Mojave Desert region (Vincent, 2000).





Studies suggest that the Coulomb stress field associated with the Landers ground rupture changed dramatically from its initial condition prior to the 1992 earthquakes (Ichinose, 1999, King, et al., 1994). This resulted in an energy transfer, triggering the M 6.6 Big Bear aftershocks (Toppozada, 1992) and the M 7.1 Hector Mine earthquake (Felzer, et al., 2002). Consequently, this area remains seismically active and high regional stress levels persist which account for the continuation of local aftershocks (King, et al., 1994).

Within the ground rupture gap region (Figure 4), a dense "cloud" of aftershock epicenters (44 epicenters per square kilometer) border the northern edge of Section 25. From there, epicenter density decreases abruptly (11 epicenters per square kilometer). Directly south of the Pinto Mountain fault, the epicenter cloud again increases, though considerably less dense compared with the northern region (approximately 18 epicenters per square kilometer).



Sawtooth (S), Pinto Mountain (PM), Long Canyon (LC), Burnt Mountain (BM), and Eureka Peak (EP) faults. Boxed area outlines site of cross

section represented in Figure 5.

Work by Liu (et al., 2003) proposes the highly dense epicenter cloud represents increasing structural complexity in the principal fault plane and may infer faulting activity extends south to Section 25, consistent with strain adjustments in a largely splaying fault zone beneath the alluvial cover. Conversely, areas of reduced epicenter density represent only minor adjustments in the regional stress field.

Deep seated displacements in the gap area are also documented in the subsurface through the use of global positioning and geodynamics services (Blewitt, et al., 1993) coupled with coseismic surface analysis (Peltzer, et al., 1994). These data support the idea of basement rupture further south of the Johnson Valley fault than have been mapped based on surface ground off-sets. Peltzer (et al., 1994) believes it is consistence with 1.5 to 3.5 meters of right lateral slip and a locking depth of 1.5 km.

A cross sectional view of the western half of Sections 24, 25, and 36 (Figure 5, next page) shows approximately 91% of the hypocenters within the ground rupture gap region lie at a depth within 6 km of the ground surface, with a maximum depth of 12 km. Notably, however, 85% of the hypocenters lie north of a plunging line, dipping 77° north. This line intersects with the surface trace of the Pinto Mountain fault and may represent this fault's subsurface profile. This leads to the conclusion that this fault has compartmentalized the subsurface and thus restricted southward propagation of subsurface slippage associated with the Johnson Valley fault.

A secondary, but significant shallow seismic gap is also defined by a triangular region above the 3 km depth in juxtaposition and north of the projected trace of the Pinto Mountain fault. This region underlies the curvilinear fault traces in Section 25. The correlation of low hypocenter density of shallow seismic activity within Section 25, in conjunction with the curvilinear fault traces suggests this portion of the Landers earthquake stress field remains locked and relatively unaffected at depths less than 3 km despite Coulomb stress analysis indicating this area remains under positive stress (Ichinose, 1999). King, et al. (1994) in their analysis of the Landers earthquake assume only those fault planes optimally orientated to the Coulomb stresses were most likely to slip and release strain. Optimum orientation in this case is approximately north to south, parallel with the regional stress field as defined by the chain of epicenter activity.



Figure 5. Cross sectional plot of post-April 1992 earthquake focuses ranging from M 2 to 6. Line of section traverses the west half of Sections 24, 25, and 36. High density of foci in upper right quadrant represent strain associated with the Johnson Valley fault terminating along a line plunging at 77 degrees north. This line potentially represents the plane of the Pinto Mountain fault. The seismic gap is a region of near surface, non-seismic activity beneath Section 25.

Based on this assessment, the oblique alignment of the curvilinear faults and their opposing slip would prevent their activation and thus serve as the principal reason for the shallow seismic gap and likewise, the absence of ground rupture.

The hypocenter data also infer that the faults south of the Pinto Mountain fault, although part of the same stress field, are less seismically active, and isolated from the main ruptures to the north. South of the Pinto Mountain fault, ground rupture along the Burnt Mountain, Long Canyon, and Eureka Peak faults occurred one to three minutes following the main shock. It is reasonable to assume this resulted from secondary activation of these buried faults and may account for their low epicenter density.

Discussion

High angle reverse slip along the Sawtooth fault, located just east of the intersection of the Pinto Mountain and Morongo Valley faults, is consistent with a compressive regime, potentially resulting from forces exerted against and under-thrusting the Sawtooth Range, consistent with the rotation of the East Transverse Ranges and the opening of the Morongo Valley graben to the west.

Rotation of the fault planes in Section 25 appeared initially to result from plastic deformation associated with left-lateral slip along the Pinto Mountain fault. However, ductile deformation and brittle fracturing within crystalline rock rarely coexist. Therefore, simple large-scale strain or post-rupture bending of these fault planes is improbable. An alternative explanation attributes the progressive rotation of the fault traces to warping of the principal horizontal stress axes as a function of distance from the principal regional faults (Johnson Valley, and the Pinto Mountain faults). Section 25 lies at the junction of two major stress regions, namely the Landers earthquake stress field, supported by compressive forces from the San Andreas fault, and the Pinto Mountain fault as a result of East Transverse Range rotation (Richard, 1993). These stress regimes intersect at right-angles in Section 25. Consequently, the local stresses in Section 25 warp in conformance with the intersecting regional stresses.

It is logical to conclude the shear-stress vectors within the crystalline basement progressively rotate counterclockwise in relation to a point of reference with the Johnson Valley and/or the Pinto Mountain faults. Work by Cruz-Atienza (et al., 2006) emphasizes propagation of non-planar fault rupture is governed by the shear stress field in advance of the rupture front. Consequently, fault rupture in Section 25 followed this line of stress rotation.

Field data suggest fault rupture in Section 25 initially occurred in the northwestern portion of the Section based on width of the fault zone (3 meters) and high abundance of fault gouge. Likewise, alignment of the dihedral angles of the shear fractures within proximity of the fault plane also strongly indicates a vertical compressive force. Evidently, faulting propagated in a scissor-like fashion, becoming progressively narrower and less distinctive at its termination and hinge point in the southeast. The curvilinear faults also mark the transition from strike-slip to dip-slip, potentially resulting from the under-thrusting and uplift of the Sawtooth Range by the Pinto Mountain fault.

Conclusions

Seismic data suggest the Pinto Mountain fault dips about 77 degrees north, under-thrusting the Mojave Block to give rise to the Sawtooth Range. Low aftershock hypocenter density south of this plunging fault plane also suggests the Pinto Mountain fault restricted propagation of the Landers Earthquake energy to the north of its main shock epicenter.

Faults within the Sawtooth Range consist of an east-west trending, high-angle reverse fault reflective of a compressive or under-thrusting regime, also consistent with the block rotation model of the Eastern Transverse Range (Little San Bernardino Mountains) and the western opening of the Morongo Valley graben.

Curvilinear faulting is contained wholly within Section 25. These faults originate as vertical-slip scissor faults resulting from the under-thrusting of the Pinto Mountain fault and the uplift of the Sawtooth Range. The curved nature of these fault traces result from their proximity to normally intersecting regional stress fields; represented by the Pinto Mountain fault and the Landers complex. These fault traces reflect the progressive realignment or warping of the regional stress field at this junction. Oblique alignment of the curvilinear faults to the major strike-slip faults of the Landers earthquake complex possibly prevented propagation of the strike-slip motion south along the Johnson Valley fault during the Landers event, thus resulting in the ground rupture gap. Although different in slip, the curvilinear faults of Section 25 may be the southern extension of the Johnson Valley fault based on remote sensing subsurface evidence, aftershock patterns, and surface trace alignment.

Inactivity of faulting in Section 25 strongly suggests this region is tectonically locked, despite its location within a tectonically active zone dominated by large right-lateral slip. This dichotomy in relative separation can only result with extension occurring in the ground rupture gap region south of the Johnson Valley surface trace and north of the Sawtooth Range. Northeast-southwest alignment of the southern-most surface traces of the Johnson Valley fault support this contention. The high aftershock epicenter density within this region also suggests a highly complex subsurface faulted network.

REAY ENTERPRISES

William G. Reay

112 Arabella Dr Fort Davis, TX, 79734 432.426.2433

wgreay@mztv.net

Age dating and environmental determinations of the LA Basin, the Ventura Basin, the San Joaquin and Sacramento sections, as well as the Alaskan Cook Inlet and Post Paleozoic North Slops section

Joseph F. Elliott

Geophysical Consultant

Exploration Management = international / domestic interpretations synthetics modeling

Office: (949) 240-1505

26801 Lariat Circle San Juan Capistrano, CA 92675

Acknowledgements Much thanks and deep appreciation to Bonnie Bloeser and Tony Murer of Aera Energy LLC for their critical review and helpful critique of this work.

References Cited;

Blewitt, G., M. B. Heflin, R.J. Hurst, D. C. Jefferson, F.W. Webb, J. F. Zumberge, 1993, Absolute far-field displacements from the 28 June 1992 Landers Earthquake Sequence: Nature, Vol. 361, pp. 340-341.

Cadena, A. M., C. M. Rubin, T. K. Rockwell, C. Walls, S. Lindavall, C. Madden, F. Khatib, and L. Owen, 2004, Late Quaternary activity of the Pinto Mountain fault at the Oasis of Mara: Implications for the eastern California shear zone; Geological Society of America Abstracts with Programs, Vol. 36, No. 5, p. 137.

Cruz-Atienza, V. M., J. Virieux, and H. Aochi, 2006, 3D nonplanar dynamic rupture in a heterogeneous medium: the prestress effect; Geophysical research Abstracts, Vol. 8.

Dibblee, T. W. Jr., 1991, Geology and inferred tectonics of the Pinto Mountain fault in "Proceedings of the Workshop on the Eastern California Shear Zone", September 1991, Institute for Crustal Studies, University of California, Santa Barbara, California.

_____, 1967, Geologic map of the Joshua Tree quadrangle, San Bernardino Count, California: U.S. Geological survey Miscellaneous Geologic Investigations Map I-516, scale 1:625000.

Felzer, K. R., T.W. Becker, R. E. Abercuombie, G. Ekstrom, and J. R. Rice, 2002, Triggering of the 1999 M 7.1 Hector Mine earthquake by aftershocks of the 1992 M 7.3 Landers earthquake: Journal of Geophysical Research, Vol. 107, No. B9.

Hart, E.W., W. A. Bryant, and J. A. Treiman, 1993, Surface faulting associated with the June 1992 Landers Earthquake, California; California Geology, Vol. 46, No. 1, pp. 10-16.

Hopson, R. F., 1996, Basement rock geology and tectonics of the Pinto mountain fault, San Bernardino County, Southern California: [M.S. thesis]: California State University, Los Angeles, p113.

, 2001, The origin of Morongo Valley, a pull-apart basin in the Transverse Ranges, southern California, Cordilleran Section; 97th Annual meeting and Pacific Section, American Association of Petroleum Geologists (April 9-11, 2001).

Ichinose, G. A., 1999, Introduction-Preliminary analysis of the 1999 Hector Mine, California earthquake, University of Nevada Reno seismological Laboratory and University of Nevada Reno department of Geological Sciences, Updated October 22, 1999; http://www.seismo.unr.edu/htdocs/WGB/Recent.old/HectorMine/

King, G.C.P., R.S. Stein, and J. Lin, 1994, Static stress changes and the triggering of earthquakes: Bulletin of the Seismological Society of America, Vol. 84, pp. 935-953.

Liu, J., K. Sieh, and E. Hauksson, 2003, A structural interpretation of the aftershock "Cloud" of the 1992 M 7.3 Landers earthquake: Bulletin of the Seismological Society of America, Vol. 93, No. 3, pp. 1333-1344.

Pletzer, G., K. W. Hudnut, and K. L. Feigl, Analysis of coseismic surface displacement gradients using radar interferogmery: New insights into the Landers earthquake; Journal of Geophysical Research, Vol. 99, No. B11, pp. 21,971-21981.

Richard, S. M., 1993, Palinspastic reconstruction of southeastern California and southwestern Arizona: Tectonics, Vol. 12, pp. 830-854.

Sieh, K., L. Jones, E. Hauksson, K. Hudnut, D. Eberhart-Phillips, T. Heaton, S. Hough, K. Hutton, H. Kanamori, A. Lilje, S. Lindvall, S. McGill, J. Mori, C. Rubin, J. A. Spotila, J. Stock, H. K. Thio, J. Treiman, B. Wernicke, and J. Zachariasen, 1993, Near-field investigations of the Landers earthquake sequence, April to July 1992: Science, Vol. 260, pp. 1710176.

Toppozada, T. R., 1992, The Landers-Big Bear earthquake sequence and its felt effects., California Geology, Vol. 46, No. 1, pp 3-9.

U.S. Geological Survey, Western Earth Surface Processes team (Geologic Division) September 30, 2002, http://geopubs. wr.usgs.gov/open-file/of02-353/depth.html, Basin Depth Maps and Analysis.

, 2002 United States National Seismic Hazards Maps, http://earthquake.usgs.gov./research/hazmaps/ products_data/2002/

Vincent, P., 2000, Aseismic slip events along the southern San Andreas fault system captured by radar interferometry; Proceedings of the 3rd Conference on Tectonic Problems of the San Andreas Fault System, G. Bokelmann and R. Kovach editors, Stanford University Press, Dec. 2000.

Wald, D. J., T. H. Heaton, 1994, spatial and temporal distribution of slip for the 1992 Landers, California Earthquake: Bulletin of the Seismological Society of America, Vol. 84, No. 3, pp. 668-691.



GREGORY GEOLOGICAL SERVICES

Glenn J. Gregory

California Professional Geologist #3676

4800 Easton Drive, Suite 101 Bakersfield, CA 93309

(661) 633-5555 glenng@bak.rr.com

DIBBLEE CENTER HAS COMPLETED THE DIGITIZING OF 96% OF TOM DIBBLEE'S MAPS 404 of the 419 maps have been digitized. Only 15 of the maps remain to be digitized We need help to finish the project

The AAPG is featuring Tom's maps in digital format in the Datapages section on their website for downloading as georeferenced, layered PDF files by end user. The Dibblee Geologic Map Collection is available to end users on a global level. Paper maps are still available.

Jason and I have been vigorously soliciting funds to digitize the original 76 maps of the Dibblee Collection that were prepared by hand. We need less than \$75,000 of additional funding to accomplish our goal. I am asking you to consider helping us to obtain funding for all or part of our mission. Help us to finish this project.

To aid our funding quest, blocks of the Adobe Illustrator Dataset as CS4 .ai files can still be purchased. Data in this set is in an unrestricted, layered format to allow the user to examine and manipulate the data, and to help incorporate it into their data set.

The AAPG Foundation has the E.F. Reid Dibblee Fund, created by Bud Reid, to support the work of the Thomas W. Dibblee Jr. Center for Geology of the Santa Barbara Museum of Natural History. Contributions can be made through this fund, or directly to the Dibblee Map Digitizing Fund, Dibblee Geological Center, Santa Barbara Museum of Natural History.

John Minch, Editor, Thomas Dibblee Jr. Geological Center Santa Barbara Museum of Natural History, 2559 Puesta del Sol, Santa Barbara, CA 93105 805-569-1800 <jmainc@earthlink.net>



PUBLICATIONS OF THE AAPG PACIFIC SECTION ON DVD

AAPG Datapages and the AAPG Pacific Section announce our recent release of the digital archive, "Publications of the AAPG Pacific Section on DVD" released by the AAPG Bookstore.

This fully-searchable volume contains 132 publications of the Pacific Section published from 1947-2001. Included are special publications, field trip guidebooks, and 32 special Cross Section publications. All documents are included as Adobe Acrobat (PDF) format.

Price is \$145.00

To order send a check or CC info to:

PSAAPG Publications P.O. Box 1072 Bakersfield, CA 93302

Or email the PSAAPG Publication Chair at larryknauer@chevron.com

This DVD may also be order through AAPG Datapages.



The Coast Geological Society presents a workshop on:

Monterey Reservoirs

Friday, March 4th , 9 am – 3 pm Shell / Aera Ventura Clubhouse, Ventura, California

Topics: Deposition and Diagenesis Reservoir Characterization (Rocks and Fractures) Subsurface Analysis Completions and Production

The workshop is designed to present geological aspects of the Monterey Formation and relate specific reservoir characteristics to completion and production strategies. We will discuss evaluation techniques and the integration of data to develop conceptual geologic/reservoir models. Data from the Monterey and similar formations reveals how reservoir parameters influence hydrocarbon distribution and potential fluid flow. These are key factors in selecting the appropriate completion strategy for the wide variety of potential Monterey reservoirs.

Presenters:

Rick Behl (CSULB), Steve Grayson (Schlumberger), and Jon Schwalbach (Aera Energy LLC)

Contribution: \$75 if paid by February 15, \$100 thereafter (includes coffee and Bar B Q lunch) Limited student registrations available \$25.

Registration limited to 50 participants, space reserved when payment is received. All proceeds go towards CGS scholarships awarded in the Spring to local undergraduate and graduate geology students.

To register, return this form with check payable to Coast Geological Society or credit card information to Jerry Nichols, Coast Geological Society Secretary (805-644-8555 x210)

via email: (secretary@coastgeologicalsociety.org) or c/o: Orchard Petroleum, Inc., 3585 Maple Street , Suite 284, Ventura, CA 93003

Name: _____(match cc if using that option)

Credit Card number: _____ Exp _____

Email (required for distribution of logistical information)

Company Affiliation/Mailing Address:

Alaska Geological Society

www.alaskageology.org

P. O. Box 101288 Anchorage, AK 99510 Contact: Tom Morahan 907.230.1672



Luncheon meetings 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 a.m. to 1:00 p.m. The hot lunch cost is ^{\$}20 for members with reservations; ^{\$}22 for non-members with reservations; and ^{\$}25 without reservations. The box lunch cost is ^{\$}13 for members with reservations, ^{\$}15 for non-members with reservations, and ^{\$}18 without reservations. For reservations, call the AGS reservation voice mail at 907-258-9059 or contact David Hite at hiteconsult@acsalaska.net by noon on Monday before the meeting.

President: President-Elect:	Tom Morahan Bill Morris	907.230.1672 907.265.3701	tmorahan@petroak.com William.R.Morris@conocophillips.com
Vice-President:	Ken Helmold	907.269.8673	ken.helmold@alaska.gov
Secretary:	Chad Hults	907.786.7417	chults@usgs.gov
Treasurer:	Alan Hunter	907.263.7947	alhunter@chevron.com
Past-President:	Tom Homza	907.770.3701	Thomas.Homza@shell.com

Coast Geological Society	P. O. Box 3055	Contact: Mike Nelson
www.coastgeologicalsociety.org	Ventura, CA 93006	805.535.2058



Dinner meetings are held monthly September through May, usually on the third Tuesday of the month, at the 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); the talk is free. For reservations, please email Jerry Nichols (secretary@coastgeologicalsociety.org). Reservations should be made by 4:00 p.m. on the Friday before the meeting.

President:	Jon Schwalbach	805.648.8518
Past President:	Mike Nelson	805.535.2058
Vice President:	John Harris	805.407.7644
Secretary:	Jerry Nichols	310.245.8897
Treasurer:	Ed Magdaleno	805.535.2086

president@coastgeologicalsociety.org pastpresident@coastgeologicalsociety.org vicepresident@coastgeologicalsociety.org secretary@coastgeologicalsociety.org treasurer@coastgeologicalsociety.org

Los Angeles Basin Geological Society www.labgs.org

515 So. Flower Street, Ste 4800 Los Angeles, CA 90071

Contact: Bill Long 213.225.5900 x 205



Luncheon meetings are held monthly September and October; and January through June, usually on the fourth Thursday of the month, in the Monarch Room 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 ^{\$}20 (with reservations), ^{\$}25 (without reservations), or ^{\$}0 (students are covered by Halliburton and Schlumberger). Reservations can be made online at www. labgs.org or by contacting Marieke Gaudet at 562.624.3364 or marieke_gaudet@oxy.com. Reservations must be made prior to Tuesday before the meeting.

Bill Long	213.225.5900 x205	william.long@breitburn.com
Greg Hummel	213.225.5900 x251	ghummel@energy-reserves.com
Bert Vogler	562.432.1696	hvogler@kleinfelder.com
Rebecca Lanne	rs 562.624.3364	Becca_Lanners@oxy.com
Jean Kulla	949.500.3095	k2mobile@msn.com
	Bill Long Greg Hummel Bert Vogler Rebecca Lanne Jean Kulla	Bill Long213.225.5900 x205Greg Hummel213.225.5900 x251Bert Vogler562.432.1696Rebecca Lanners 562.624.3364949.500.3095

Northern California Geological Society	9 Bramblewood Court	Contact: Barb Matz
www.ncgeolsoc.org	Danville, CA 94506-1130	Barbara.Matz@shawgrp.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.

Northwest Energy Association

www.nwenergyassociation.org

P. O. Box 6679 Portland, OR 97228-6679 Contact: Tim Blackwood 503.656.0156



Breakfast meetings are held monthly September through May, usually on the second Friday of the month, at the Multnomah Athletic Club (1849 SW. Salmon Street) in Portland. Meeting time is at 7:30 - 9:00 am. The cost is ^{\$}18. For information or reservations, contact Steve Walti at 503-226-4211.

President Treasurer Tim Blackwood Steve Walti tblackwood@pacificgeotechnicalllc.com steven.walti@nwnatural.com

Sacramento Petroleum Association

P. O. Box 571 Sacramento, CA 95812-0571

Contact: David Hartley 530.304.4277



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	916.486.2643	JWR5532@aol.com
Vice-President:	David Hartley	530.304.4277	drilmax1@aol.com
Secretary	TBD		
Editor/Treasurer	Pam Ceccarelli		

San Joaquin Geological Society www.sjgs.com

P. O. Box 1056 Bakersfield, CA 93302 Contact: Kurt Johnson kurt_johnson@oxy.com



We have dinner meetings on the second Tuesday of the month at the American Legion Hall at 2020 "H Street" in Bakersfield. There is an icebreaker at 6:00 pm, dinner at 7:00 pm, and a talk at 8:00 pm. Dinner is \$20.00 for members with reservations and \$25.00 for nonmembers, \$25.00 for members without reservations and \$30.00 for nonmembers without, and the talks are free.

Jack Grippi	JGrippi@aeraenergy.com
Kurt Johnson	kurt_johnson@oxy.com
Tim Elam	paselam@peoplepc.com
Stephano Mazzoni	Stephano_Mazzoni@oxy.com
Mike Minner	MMinner@chevron.com
Linji An	LAn@aeraenergy.com
	Jack Grippi Kurt Johnson Tim Elam Stephano Mazzoni Mike Minner Linji An

- Images (graphics, photos, and scans) must be at least 300 dpi resolution. Text should be scanned at least 600 dpi.
- Scanned photos, illustrations (line art) or logos must be scanned at 300 dpi minimum and saved as a tiff or eps.
- Avoid clip-art and images from the internet. These images are low-resolution (72 dpi).

Advertising Rates

Members
Full Page
Half Page
Quarter Page
Business Card

Single Issue \$400.00 \$250.00 \$150.00

Societies Free Advertising

Unlimited Space

1/4 Page

Year (6 issues) \$1600.00 \$1050.00 \$650.00 \$250.00

Newsletter Deadline

March & April Issue

March 1st

Convention Societies PSAAPG Newsletter

AAPG Explorer

EN ERRIFIC OPICAL RANSVERSE RANGE RAVERSES

The Fritsche's GeoTrek IV

Preliminary Announcement

GeoTrek IV in support of Coast Geological Society Geology Student Scholarships will get underway in February, 2011. Rather than a long continuous hike over a series of days as in past years, this GeoTrek will consist of ten separate hikes, each of about 10 miles in length and each designed to teach the participants some aspect of the geology of the area surrounding the San Fernando Valley. Six of the hikes will be on Saturdays in order to encourage participation by CGS members and other friends of geology. The other four will be held on Wednesdays. The total distance hiked by Gene over the ten days will be about 100 miles. As in the past, your support of Geology Student Scholarships will be in the form of pledges made to the Coast Geological Society before or during the hike and collected when Gene finishes hiking the 100 miles. Dates and topics for the hikes are listed below. Put the dates on your calendar and plan on joining Gene as often as you can to learn about the geology of the region around the San Fernando Valley. One of the hikes is already scheduled for the Ventura area and there is an opportunity for you to suggest a second one on either May 4 or May 25 for near Ventura so that CGS members will have an opportunity to join a hike near their home. Send your ideas to Gene or ask questions about the GeoTreks at geneandsuef@dslextreme.com.

GeoTrek IV-A - Saturday, February 12, 2011

Mesozoic and Paleogene sedimentary and structural history of the Santa Monica Mountains. Traverse from the south end of Reseda Blvd. to Malibu. GeoTrek IV-B – Wednesday, February 16, 2011

Mesozoic plutonic and Neogene sedimentary, volcanic, and structural history of the eastern Santa Monica Mountains. A circular traverse in Griffith Park.

GeoTrek IV-C – Saturday, February 26, 2011 Neogene sedimentary, volcanic, and structural history of the western Santa Monica Mountains. Traverse from Lost Hills Rd. to Puerco Canyon trailhead.

GeoTrek IV-D - Wednesday, March 2, 2011

Discovering a Neogene volcano in the western Santa Monica Mountains. Traverse from Potrero Valley to the ocean at Sycamore Canyon. GeoTrek IV-E – Saturday, March 12, 2011

Mesozoic and Cenozoic sedimentary and structural history of the Simi Hills. Traverse from a Palo Comado Canyon trailhead to Wood Ranch. GeoTrek IV-F – Saturday, April 30, 2011

Neogene sedimentary and structural history of the Santa Susana Mountains. Traverse from Towsley Canyon to O'Melveny Park in Granada Hills. GeoTrek IV-G – Wednesday, May 4, 2011

Traverse and topic still to be determined. Perhaps you have a suggestion for a trail in an area where you would like to learn something about the geology.

GeoTrek IV-H - Saturday, May 14, 2011

Paleogene sedimentary and structural history of the Topatopa Mountains and a Quaternary lake. Traverse from Sespe Creek at Lion Canyon to Ojai. GeoTrek IV-J – Wednesday, May 25, 2011

Traverse and topic still to be determined. Perhaps you have a suggestion for a trail in an area where you would like to learn something about the geology.

GeoTrek IV-K - Saturday, May 28, 2011

Neogene sedimentary history of the Soledad Basin and age of the San Gabriel Mountains. Traverse from Soledad Canyon to Vasquez Rocks County Park.



Joseph F. Elliott **Geophysical Consultant** Exploration Management = Office: (949) 240-1505 international / domestic interpretations 26801 Lariat Circle synthetics San Juan Capistrano, CA 92675 modeling





Arctic to the Cordillera: Unlocking the Potential

The 2011 Pacific Section of the American Association of Petroleum Geologists (PS-AAPG) meeting will be held in Anchorage, Alaska – the gateway to the 'Last Frontier'. The Pacific Section of SEPM and the Pacific Coast Section of SEG will also be participating in the conference and will sponsor several of the technical sessions. The Western Region of the Society of Petroleum Engineers will be co-hosting the conference and helping to provide a cross-discipline forum that offers attendees a wide variety of technical presentations, poster sessions, short courses and field trips.

The themes for the conference will include exploration, development and reservoir characterization case studies, technology applications and recent advances, alternative energy, environmental geology and geohazards in resource development, and petroleum systems in Alaska, the circum-Arctic and the western US.

For this to be a successful meeting we need you, your ideas, and your participation. We look forward to a series of stimulating and insightful sessions that will continue to address and lead to solutions for many of the technological, environmental, and political challenges the industry is faced with today.

You are invited to get involved and help shape this conference by submitting an abstract for an oral or poster presentation in the technical program. So, please review your recent work and put together an abstract for a contribution to the technical program. Abstract submissions can be made at the following website between **October 1, 2010 and February 11, 2011**. http://aapg2011ps.abstractcentral.com

For additional information please contact: David Hite, PS-AAPG, General Co-Chair: <u>hiteconsult@acsalaska.net</u> Sandy Phillips, PS-AAPG, Oral Session Chair: <u>sandra.phillips@bp.com</u> Steve Wright, PS-AAPG, Poster Session Chair: <u>sswr@chevron.com</u>



Pacific Section American Association of Petroleum Geologists



Society for Sedimentary Geology



Society of Exploration Geophysicists



Alaska Geological Society



Society of Petroleum Engineers



PACIFIC SECTION AAPG P. O. Box 1072 Bakersfield, CA 93302 PRESORTED STANDARD U.S. POSTAGE PAID BAKERSFIELD, CA PERMIT NO. 1163

George Harper Account Representative Baker Hughes



Western US/US Land/Baker Atlas Office: +1 661.334.3800 X 215 | Fax: +1 661.334.3808 Cell: +1 661.805.5984 | george.harper@bakerhughes.com http://www.bakerhughes.com | Advancing Reservoir Performance

