

SAN DIEGO ASSOCIATION OF GEOLOGISTS

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SDAG MEETING ANNOUNCEMENT

WEDNESDAY, June 15TH, 2011

The Ramona Plutonic Complex: a mid- to upper-crustal zoned intrusive complex in the western zone of the Peninsular Ranges batholith

Presented by

Dr. Victoria R. Todd

Where: El Adobe de Capistrano 31891 Camino Capistrano - San Juan Capistrano, CA 92675



When: 5:30 pm – Social Hour
6:30 pm – Dinner
7:15 pm – Program

Dinner: Mexican Buffet

Cost: \$30 per person, \$5 discount for members, STUDENTS: \$20. Walk-Ins and 11th Hour Reservations, please add \$5.

Reservations: Make your reservation **online** at www.sandiegogeologists.org, **No later than noon, Monday, June 13th**.

SPEAKER BIO

SPEAKER: DR. VICTORIA R. TODD

Undergraduate college: Cornell University, 1954-1958; BA in Anthropology
1958-1965: Senior social caseworker in Adoption, Westchester Co., New York
Graduate school: Stanford University, 1966-1973; MS and PhD in geology

USGS Geologic Division 1972-1995; mapping projects in NW Utah, north-central Washington, and southern California

Part-time instructor, Palomar College Geology Department, 1997-2004

Volunteer for California Geological Survey, 2007-present; quadrangle mapping in northern San Diego County

SPEAKER ABSTRACT

The Ramona plutonic complex: a mid- to upper-crustal zoned intrusive complex in the western zone of the Peninsular Ranges batholith

Victoria R. Todd, USGS (retired), 1740 Clarion Drive, Williamsport, PA 17701, vtodd@chilitech.net

The Ramona plutonic complex (RPC) is a remarkable example of a mid- to upper crustal (9-14 km depth at crystallization) zoned intrusive complex considered to occupy the site of an Early Cretaceous magma chamber that was active for at least 10 m.y. in the western zone of the Peninsular Ranges batholith (PRB). The RPC is large (~200 km²), elliptical in shape, has a NE-trending axis, and is characterized by steeply dipping contacts, both internally between plutons and externally with surrounding country rocks. In contrast to classical patterns of zonation of arc-related plutons/intrusive complexes, the RPC is compositionally zoned inward from leucogranodiorite (Kcm, ~114(?) Ma) at the margin, through hornblende tonalite (Kjv, 101 Ma) and quartz diorite (Ka, 107 Ma), gabbro-diorite (Kc), trondjemite and leucogranodiorite (Klp; ages 110, 106, and 101 Ma), hornblende tonalite (Kjv), to a core of hypersthene-biotite tonalite and quartz gabbro (Klb, ages 102 and 101 Ma). Screens consisting of two prebatholithic units (Kmv and KJvs) and Middle Jurassic gneissic granite (Jcr) are locally intersheeted with the plutonic rocks. Swarms of La Posta-related pegmatite dikes, locally gem-bearing and with a ⁴⁰Ar/³⁹Ar age of 98.7 Ma, ring the RPC on its western and southern sides.

The RPC intrudes the cryptic contact between amphibolite-facies prebatholithic rocks of the PRB western zone: on the west, metavolcanic rocks of unit Kmv, ~119 Ma, and on the east unit KJvs, which is a mixture of metasedimentary and metavolcanic rocks with up to 50% orthoamphibolite of MORB affinity. Unit KJvs, which has yielded Middle Jurassic and Early Cretaceous ages, is spatially associated with a Late Jurassic-Early Cretaceous suture zone that extends for >800 km along the batholithic axis and separates western and eastern zones. By inference, the eastern part of the RPC also intrudes the suture.

While the RPC has some of the attributes of a ring complex, it more likely represents a solidified magma chamber possibly connected to a now-eroded, overlying ring-dike complex that in turn fed dikes and subvolcanic plutons of the type that occur in the westernmost part of San Diego County.

Ring complexes at shallow depths in the PRB are speculated to have underlain Cretaceous stratovolcanoes with possible caldera subsidence. The possibility of pyroclastic eruptions in the western zone is suggested by compositions of Kmv screens that include silicic and intermediate meta-tuffs and tuff-breccia, silicic flows, and minor metabasalt.

Recently proposed models for the origin of zoned intrusive complexes in Cordilleran batholiths favor emplacement of successive magma batches into long-lived mid- to upper crustal magma chambers. Processes of material transfer are considered to predominantly involve vertical transport: rise of magma from the lower crustal zone of partial melting linked with downward transport of country rocks and older rocks of the intrusive complex. The same magmatic plumbing system was utilized for both processes. Paterson and Vernon (1995) favored a model of nested diapirs constructed from multiple pulses of evolved magma to explain the emplacement of roughly spherical zoned plutons.

A current model for the generation of silicic and intermediate melts in deep crustal hot zones (Annen et al., 2006) has relevance for the origin of PRB zoned intrusive complexes. A deep crustal hot zone begins to form when mantle-derived hydrous basalts are emplaced as a series of sills into the lower crust. As the basalt sills crystallize, water-rich residual melts are produced, which, together with heat from ongoing sill emplacement, promote partial melting in the lower crust. Annen et al. (2006) argue that the probability of mixing between basalt residual melts and crustal melts in the lower crust provides a vehicle for the chemical and isotopic diversity observed in PRB plutons and intrusive complexes.

References:

Paterson, S.R., and Vernon, R.H., 1995, Bursting the bubble of ballooning plutons: A return to nested diapirs emplaced by multiple processes; *Geological Society of America Bulletin*, v. 107, no. 11, p. 1356-1380.

Annen, C., Blundy, J.D., and Sparks, R.S.J., 2006, The genesis of silicic and intermediate magmas in deep crustal hot zones; *Journal of Petrology*, v. 47, no. 3, p. 505-539.

2011 SDAG MEETING SCHEDULE - Mark your Calendars!

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

July 20, 2011	Mark Legg - Tsunami Hazards in the San Diego Region
August 17, 2011	Tom Rockwell - EQ recurrence in So Cal versus other parts of the world

2011 EXECUTIVE COMMITTEE

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PRESIDENTS CORNER, JUNE 2011

Well, we're half way through 2011 with some great speakers and presentations behind us and more to come! Our June meeting is the annual joint meeting with SCGS in San Juan Capistrano. Vicki Todd will be presenting her work on the Ramona pluton complex of the western Peninsular Ranges batholiths. Please be sure to join us at El Adobe for this meeting.

I'd like to mention our other summer meetings coming up. On July 20, Mark Legg will be discussing tsunamis at Bali Hai, an appropriate venue for his talk since the dock at Bali Hai was damaged by the tsunami resulting from the Chilean earthquake in February 2010. The attached photo, courtesy of Bali Hai, shows the damage. On August 17, Dr. Tom Rockwell will be presenting a talk. I'm not sure of the exact topic, but look for such phrases as "seismicity," "recurrence interval," and "surface rupture." The venue is not quite set in stone, but Tom Ham's Lighthouse has it all but in the bag.



Please continue to keep in mind the 2011 field trip and, particularly, getting papers in to Todd for the guidebook. The 2010 fieldtrip guidebook was great, we expect no less of the 2011 guidebook! The trip planning continues to come together. Whether you plan to publish in the guidebook, or just perish in the Southern California/Western Arizona desert, be sure to make your plans to join SDAG for this great trip.

Finally, SDAG would like to thank Lowell and Diana Lindsay for opening Sunbelt Books for our May meeting. Their dedication and contributions to SDAG are vast, and we all appreciate their generosity.

Chuck Houser



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ANNOUNCEMENTS:

2011 SDAG Field Trip: Picacho State Recreation Area and the Cargo Muchachos: The Latest!

Plans for this year's field trip and accompanying guidebook are progressing well. We'll be staying at the group sites (very cozy) at the Picacho State Recreation Area November 4 through 6, 2011. You may have heard that Sacramento has scheduled Picacho SRA for closure next summer. So far, it doesn't appear that this will affect us, so all systems are go.

Original articles are still being solicited for the guidebook. While Dr. Gary Girty and his students at SDSU will be making significant contributions to the field trip and guidebook for the area around Picacho, much of the geology in and around the Cargo Muchacho Mtns. hasn't been addressed since the 1980's, and a fresh look is warranted.

Volunteers are requested to conduct a little research- in Yuma. The Yuma branch of the Arizona Historical Society has a vast repository of archival photos, articles and books on mines and mining in the area. I need some old-time mine photos to dress-up guidebook papers. Also, the Imperial County Historical Society might be worth looking into as well.

Finally, I have discovered that this area of California possesses a wealth of not only geology, but a long and colorful history. I am doing my best to incorporate as much as possible to produce an informative, as well as enjoyable, volume. To accomplish this, I'm requesting the assistance of **sponsors** to help make this possible. The use of archival photos, historic newspaper articles, and reprints of technical papers all require a bit of spare change (ok, maybe a little more). The guidebook is developing into a real "gem" and a little help will polish it up nicely.

Please contact your VP Todd Wirths at 858-337-0098 or todd@wirths.com for any suggestions, comments, etc. More to come, thanks!

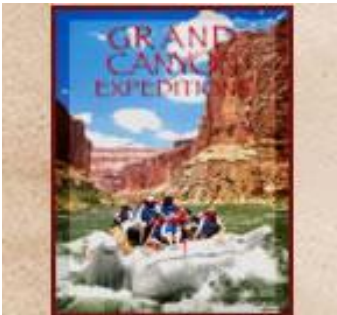


Request for Sponsors: 2011 SDAG/SDGS and Publication SPONSORS

On behalf of the San Diego Geological Society, Inc. (SDGS), a public benefit 501(c)3 nonprofit educational corporation, we would like to request tax deductible Donations at our San Diego Association of Geologists (SDAG)

The list of paid Sponsors and the forms to become a Sponsor are located on the SDAG web site at: <http://www.sandiegogeologists.org/Sponsors.html>.

Your donation will further the SDGS mission to promote geology and related fields in the greater San Diego region, operating through the San Diego Association of Geologists (SDAG), a committee of SDGS. To achieve our primary educational objective, we organize frequent field trips and maintain a program of monthly meetings featuring speakers on current geological topics. We also publish field trip guidebooks and other publications related to geology and natural history. We encourage scholarship and research by awarding scholarships from the elementary through graduate levels. With your \$100 "EMERALD" donation, your name/business will be listed as a sponsor on the SDAG web site (<http://www.sandiegogeologists.org/>) and in the monthly SDAG meeting newsletters. With your \$500 "RUBY" or \$1,000 or more "DIAMOND" level donation, your business card will also be included on the SDAG web site and in the monthly SDAG meeting newsletters. In addition, as a "\$1,000 or more DIAMOND" level donation you will be presented with a thank you plaque. Should you have any questions regarding a Sponsorship, please contact our non-profit SDGS Secretary (Diane Murbach) at 619-865-4333.



Grand Canyon Raft Trip, June 24 - July 1, 2011 :

Want to join your geo-pals on an eight-day Colorado River raft trip through the geological wonderland of Grand Canyon National Park? If there is enough interest, Sue Tanges will again organize a chartered raft trip for rock hounds, their families and friends. She will accompany us on the trip. This is the last time Sue will organize a chartered Grand Canyon raft trip! The trip is tentatively scheduled for June 24 through July 1, 2011. The raft company will be Grand Canyon Expeditions Company of

Kanab, Utah (<http://www.gcex.com/>). They have excellent river guides and the trip costs include the following:

- Round-trip transportation from Las Vegas, Nevada, to/from the river
- Sleeping bag, pad, ground cloth, and tent
- Waterproof river bags for sleeping gear and clothing
- Waterproof ammo box for camera and personal items
- All meals while on river, prepared with fresh meats and produce
- Utensils, cups, and plates
- Generous supply of soft drinks, juice, and a river-full of water
- Bring your own alcoholic beverages if desired
- Great fun and memorable experience (ask former river rats!!)

Two rafts are chartered and each will hold 14 passengers. We have space for 28 of us! Reservations will be on a first-come, first-serve basis. A waiting list for cancellations will be maintained. The price of the trip is not finalized but is likely about \$2,500. (There is a savings off the brochure price!) To express your interest, email Sue at grcynsue@att.net. Deposits will be required by September. More info will follow, if there is enough interest to fill the rafts! See you in the river in 2011!!!

MEETINGS AROUND THE REGION:

AAAS, Pacific Division, 92nd Annual Meeting, SAN DIEGO, CA June 12 - 16, 2011 on the campus of University of San Diego - Call for Symposium and Workshop Proposals Questions? Contact Dr. Roger Christianson, Executive Director, AAAS Pacific Division, Southern Oregon University, Ashland, OR 97520. Phone: 541-552-6747; e-mail: rchristi@sou.edu.

The **Coastal Engineering Practice Conference**, to be held in San Diego August 21-24, 2011. The conference is recommended for all engineers, geologists, and consultants seeking solutions to coastal engineering and development problems.

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Qualifications Summary and Objective: I have 14 years experience directing surface water quality monitoring programs with a proven record of excelling in monitoring plan implementation, quality control, public notification and continuous improvement in operational effectiveness and efficiency. I have built and maintained relationships with key staff in academia, industry, and all levels of government in San Diego and California. I have a widely applicable skill set which includes: analytical thinking, communication and writing skills, data analysis and management, inter and intra- agency project coordination, and staff supervision and training. My objective is to obtain a career position with an industry leader where I can contribute my skills to build the success of my employer as well grow professionally. Detailed work experience, education and more at www.linkedin.com/in/cbclifton2010. Email cbc2006@cox.net or 619-964-1776. Contact: **Clay Clifton**

Please Make a Note! The San Diego Association of Geologists has a new mailing address:

San Diego Association of Geologists (SDAG)
3130 N Evergreen Street
San Diego, CA 92110

We've consolidated and therefore replaced the address formerly intended for membership correspondence: PMB 157, 5694 Mission Center Road, Suite 602, San Diego, CA 92108

We also replaced the address used for the ordering of publications: P.O. Box 191126
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Don't forget! Send in your 2011 membership form, available at:

<http://www.sandiegoeologists.org/MemberForm.pdf>

And check out our publications available for order at:

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Reminder: Annual Membership Dues for 2011!

SDAG Membership dues are always accepted! If you have not already done so, please complete the form located here <http://www.sandiegoeologists.org/MemberForm.pdf>, with a check for \$25, to keep yourself in good standing. We pro-rate into the following year, so that's \$2.08 per month, what a bargain!