April 2019

LOS ANGELES BASIN GEOLOGICAL SOCIETY
MEETING ANNOUNCEMENT

April 25 (Thursday) – 11:30 AM

Ian S. McGregor

Master's Degree Candidate, Cal State Long Beach

RATE AND CHARACTER OF LATE QUATERNARY UPLIFT AND FOLDING IN THE SANTA MARIA BASIN, CALIFORNIA: IMPLICATIONS FOR ACTIVE FAULTING

Abstract

The onshore Santa Maria area in central California is an inverted basin with several kilometers of estimated shortening that has folded, faulted, and uplifted Miocene deep-water rocks. Abundant outcrop and subsurface data from active oil fields in the area describe the basin stratigraphy and general kinematics through time, however with little focus on the late Quaternary activity of these structures and Quaternary deformation rates, pertinent for seismic risk assessment. A detailed quantitative analysis on the structures within the Santa Maria Basin, in terms of the amount and rate of uplift, shortening, and fault slip that has occurred in the Quaternary, was conducted using the basal contact of a regional, late Pleistocene fluvial deposit as a marker of deformation. Results also aim to evaluate conflicting structural models proposed for present uplift and folding.

Structure contour maps of the late Pleistocene horizon show north-east verging asymmetric folding of distinct anticlines arranged in a left-stepping en-echelon pattern within the Casmalia Hills uplifted area. Folding within the Purisima Hills to the south contains a south-west verging asymmetry with decreasing structural relief to the west. Maximum vertical uplift, potentially accentuated by forelimb subsidence, occurs along the crest of the folds and ranges from 295 meters to 316 meters, with maximum regional uplift along the Casmalia Hills fold-trend. Line-length balanced horizontal shortening estimates range from 22 meters to 47 meters for the base Orcutt Formation horizon. These estimates are much lower than the computed fault slip for the base-Orcutt horizon from area-balanced forward models that yield reverse displacement estimates ranging from 684 meters to 730 meters.

Numerical ages from optically stimulated luminescence dating of the Orcutt Formation range from 125.7 Ka to 86.1 Ka, coincident with the 5e-a paleo sea-level high stands and regional depositional events. The range and distribution of ages suggests expansive relatively synchronous fluvial deposition across the fold trends after a period of erosion and planation. Using the maximum and minimum ages of the Orcutt Formation to calculate a range of the deformation rates, we estimate uplift rates of 1.9 mm/yr to 3.67 mm/yr, horizontal shortening rates of 0.18 mm/yr to 0.55 mm/yr, and fault slip rates of 5.4 mm/yr to 8.5 mm/yr.

Speaker's Biography

Ian McGregor is a master's degree candidate at CSU Long Beach, expecting to complete his thesis during summer 2019. He earned his Bachelor of Science degree in 2016 from San Francisco State University, completing a senior research thesis that involved resolving slip components for faults in the Santa Lucia Range of central California.

Ian has been an intern for the CSULB Office of Research and Sponsored Projects, and a Geological Society of America graduate grant recipient. He was the recipient of the CSULB College of Natural Sciences and Mathematics Richard D. Green Fellowship award in 2018.

His professional experience includes geophysical work, interpreting seismic data, and building structural models for basins world-wide.

Please join the LABGS for Ian's presentation!

Meeting Time, Place, Cost, and Reservations

When:

Thursday, April 25, 2019

Meeting Agenda

Lunch Served: 11:30 AM to 11:45PM
Announcements: 11:45 AM to 12:00 PM
Guest Speaker: 12:00 PM to 12:45 PM
Questions/Close: 12:45 PM to 1:00 PM

Place:

The Grand at Willow Street Conference Center located at 4101 East Willow Street, Long Beach, CA (562-426-0555). Take Lakewood Boulevard south from the San Diego Freeway (I-405), turn west onto Willow Street, and turn right onto Grand Avenue at the sign for the Center. Park for free in the multi-level garage structure.

Cost:

Lunch and Speaker:	$30.00 with reservations
	$40.00 without reservations
Retired:	$25.00
Student:	**$10.00**

PAYMENTS IN CASH OR CHECK ONLY

Meeting Reservations:

We encourage you to make your reservations using the LABGS web site, at www.labgs.org
(if problems, try using *Google Chrome*)
Or, call **Wanjiru Njuguna** at (818) 739-9154 or email her at wanjiru.njuguna@gmail.com.

Reservations must be made by:
10:00 AM Tuesday April 23rd
to receive reservations discount price noted above
(this *will be strictly adhered to*)
But, as always, walk-ins are welcome!

OUR WEB SITE ADDRESS:
www.labgs.org

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ANNOUNCEMENTS:

LABGS has expanded our meeting raffles. We would appreciate raffle prize donations! *Please bring donation items to the next meeting.*

We still need a new LABGS treasurer. *If interested, please contact a current officer and let us know a bit about you. The LABGS executive committee will select from the interested candidates.*

Do you know if your PSAAPG/LABGS membership is current?
If you don't, and want to, check via the PSAAPG website:
http://www.psaapg.info/cloud/miscellaneous/dues.php

Please inform a LABGS Board member if you have a pertinent announcement.