

Inland Geological Society

Newsletter of the Inland Geological Society

Volume 23 No. 9

This Meeting:
Thursday
Sept. 6th

Time:
Social: 6:00pm
Dinner: 7:00pm
Lecture: 7:30pm

NEW Location:
LSA Associates
1500 Iowa Ave
Suite 200
Riverside, CA
92507
(Map on Pg.4)

Coming to
Dinner?
Please RSVP:
By Tuesday 9/4
(951) 782-3295
food@inlandgeo.org
or
dlass@waterboards.ca.gov

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September Speaker:

Roy Herndon, Principal
Orange County Water District



Geochemical Imaging of Flow Near An Artificial Recharge Facility, Orange County, California[1]

Abstract

Critical for the management of artificial recharge operations is detailed knowledge of groundwater dynamics near spreading areas. Geochemical tracer techniques including stable isotopes of water, tritium/helium-3 (T/3He) dating, and deliberate gas tracer experiments are ideally suited for these investigations. These tracers were used to evaluate flow near an artificial recharge site in northern Orange County, California, where 200,000 acre-feet of water are recharged annually. T/3He ages show that most of the relatively shallow groundwater within ~2 miles of the recharge facilities

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has apparent ages of <2 years; further downgradient apparent ages increase, reaching >20 years at ~3.7 miles. Gas tracer experiments using sulfur hexafluoride and xenon isotopes were conducted from the Santa Ana and two spreading basins, respectively. These tracers were followed in the groundwater for more than two years, allowing subsurface flow patterns and flow times to be quantified. Results demonstrate that mean horizontal groundwater velocities range from <0.5 to >2.5 miles/year. The leading edges of the tracer patch moved at velocities about twice as fast as the center of mass. Leading edge velocities are important when considering the potential transport of microbes and other "time sensitive" contaminants and cannot be determined easily with other methods. T/3He apparent ages and tracer travel times agreed within the analytical uncertainty at 16 of 19 narrow screened monitoring wells. By combining these techniques, groundwater flow was imaged with time scales on the order of weeks to decades.

[1] Clark, Jordan F., G. Bryant Hudson, M. Lee Davisson, Greg Woodside, and Roy Herndon. Full article published in Ground Water, Vol. 42, No. 2, March-April 2004, pp. 167-174.

Biography:

Mr. Herndon is the chief hydrogeologist at the Orange County Water District, the agency responsible for managing the 350-square-mile Orange County groundwater basin in southern California. Mr. Herndon directs the activities of OCWD's Hydrogeology Department, including numerical groundwater flow modeling, performance evaluation and improvement of two seawater intrusion barriers, basin-wide and local water level and water quality investigations, and the operation of a comprehensive water resources data management system. He also serves on the Alamitos Seawater Barrier Management Committee and the MCAS El Toro Restoration Advisory Board. Current activities include enhanced recharge feasibility studies, VOC plume remediation, basin storage optimization, and coastal salinity monitoring. He holds a B.A. degree in Geology from The Colorado College, a M.S. degree in Hydrology and Water Resources from the University of Arizona, and is a California professional geologist and certified hydrogeologist.

Roy L. Herndon

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NEW IGS T-SHIRTS!

Shirts will be available for purchase during the meeting. Price: **\$17 each**. Shirts are sand colored and have a pocket on the front; sizes range from medium to 3X.



Old T-Shirt design shirts in size 2X are still available. See Maggie for discounted cost information.

Announcements/ Upcoming Events

AEG Anniversary Meeting—Golden Anniversary in the Golden State

September 24-29, Los Angeles, CA

<http://www.aegsc.org/2007-meeting>

Western States Seismic Policy Council, 2007 WSSPC Annual Conference, in conjunction with International Code Council's education program. "Risk Communication, Building Codes, and Consequences: The Future of Earthquake Safety in the U.S."

Sept. 30—October 3, 2007, Reno, NV

<http://www.wsspc.org/conference>
ac2007@wsspc.org

Upcoming IGS Talks

October 3, 2007 (Wednesday)

David Gaddie, County of Riverside, Planning Department
Geotechnical Reports

November 1, 2007 (Thursday)

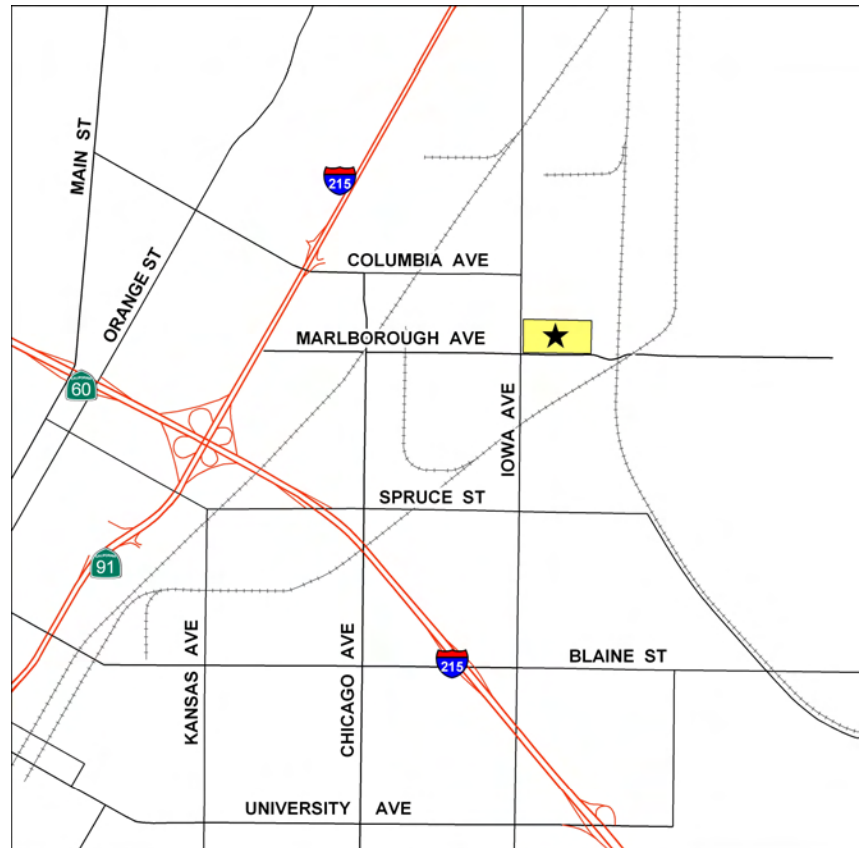
Kent Norton, Michael Brandman Associates
NEPA/CEQA

December 5, 2007 (Wednesday)

Eric Lindberg, Wildermuth Environmental, Inc.
Arlington Basin Study

IGS MEETING LOCATION:

**LSA Associates, Inc.
1500 Iowa Ave, Suite 200
Riverside, CA 92507**

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