International Association of Hydrogeologists
U.S. National Chapter
Newsletter

Vol. 39, no. 1: March, 2010

Editor: Dave Kreamer, University of Nevada, Las Vegas

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- **NGWA Ground Water Summit, Denver, CO, April 11-15, 2010 – IAH CoSponsorship, Executive Board Meeting USNC-IAH April 13th 4:00-5:00pm**
- **Toward Sustainable Groundwater in Agriculture - June 15-17, 2010; Burlingame, CA**
- **Joint Annual Meeting of the Cordilleran Section of the Geological Society of America (GSA) and the Pacific Section of the American Association of Petroleum Geologists (AAPG). May 27-29, 2010; Anaheim, California.**
- **ISMAR7 (2010 International Symposium on Managed Aquifer Recharge) October 9-13; Abu Dabai; Co-sponsored by IAH.**
- **Dryland Hydrology: Global Challenges, Local Solutions – Sponsored by the Arizona Hydrological Society in Concert with the USNC IAH; September 1-4, 2010.**
- **Groundwater Resources Association of California Events: 1. Solvent Release Sites: Characterization, Cleanup, and Closure, April 1, 2010 - Santa Clara, CA, 2. Geophysics at the Beach Course/Symposium/Field Demo, May 24 - 26, 2010, Santa Ana, CA, 3. Think Outside the Pipe ~ Exploring & Protecting Local Water Supplies, GRA 19th Annual Conference & Meeting, September 15-16, 2010 - Burlingame, CA**

Job Opportunities

- **SENIOR HYDROGEOLOGIST, Montgomery & Associates, Santiago, Chile**
- **Land & Mines Manager (GEOLOGIST), several locations -South Eastern US, , The MRC Group**

IAH/US NATIONAL CHAPTER: EXECUTIVE COMMITTEE 2009-20012

Chairman:	**Michael Wireman** **wireman.mike@epa.gov**	**U.S. Enivronmental Protection Agency** **(303) 312-6719**
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Director:	**William Alley**	**U.S. Geological Survey**
Director:	**Vicki Kretsinger Grabert**	**Luhdorff & Scalmanini, Consulting Engineers**
Director:	**Jim Lamoreaux**	**PE LaMoreaux & Associates, Inc.**

A NOTE FROM THE CHAIR

Greetings to all USNC members! In this edition of the Newsletter we are pleased to highlight articles about international work being conducted by USNC members. It is gratifying to see how active our members are and to read about the interesting work being done around the world. The Executive Committee welcomes participation by all USNC members. I want to thank everyone who has renewed their membership for 2010. In these difficult economic times, we appreciate your continued membership and we welcome new members. I hope to see some of you at the USNC Executive Committee meeting which will be held on April 13 during the NGWA Ground Water Summit in Denver. I will send an agenda with the time and place for the meeting. I want to thank Dave Kreamer and Vicki Kretsinger for once again producing an excellent newsletter and I want to thank Vicki for working to get the USNC website up and running.

Mike Wireman,
Chair – IAH-USNC Executive Board

A Note from the Vice President for North America

Sustainability and improved management are themes we hear often in reference to groundwater. But sustainability and improved management are also important objectives for organizations, such as IAH itself. With this long-term outlook in mind, IAH Council has undertaken a "Forward Look" initiative. A special preliminary one-day session was held at the Hyderabad Congress, which I participated in. But because of limited time, progress there was minimal. At the recent IAH Executive Meeting in Paris, a decision was made to further develop the Forward Look initiative. A focused and targeted 2-1/2 day working Council meeting is now planned--to be held at Reading University, UK, on July 2-4, which I plan to attend. The outcome of the meeting may guide the way IAH develops between 2010 and 2020. If anyone has comments or suggestions for me to consider or bring forth in Reading, please don't hesitate to contact me.

I hope many of you are considering attending the next IAH Congress in Krakow, Poland in September. It will be a great conference in a wonderful venue, and I look forward to seeing you there.

Lenny Konikow

Treasurer's Report March 2010

2010 is starting off well for the US National Chapter. As of March 1, we have about 220 new and renewing IAH US National Chapter members. We are hoping that those of you who have not yet renewed (about 110 remaining members from 2009) will do so soon so that subscriptions to Hydrogeology Journal and other member benefits will not be revoked. Please note that we now that we are a 501-C3 non-profit organization and are able to accept tax-deductible gifts for our endowment fund. With these donations and the proceeds from our membership dues (10% of the annual IAH membership), we are currently engaging in various philanthropic efforts, including the sponsorships of several developing country memberships and co-sponsoring of several groundwater conferences. We have also recently used some of these funds to update our USNC website. In addition, individual members in the USNC have sponsored nine developing country memberships this year.

Vic Heilweil

ARTICLES, REPORTS, NOTICES, AND ANNOUNCEMENTS

From Snowflake to Salt Crystal: International Workshop on Changes in Surface and Groundwater in the Tarim River Basin, Xi'an, China 23-27 November, 2009

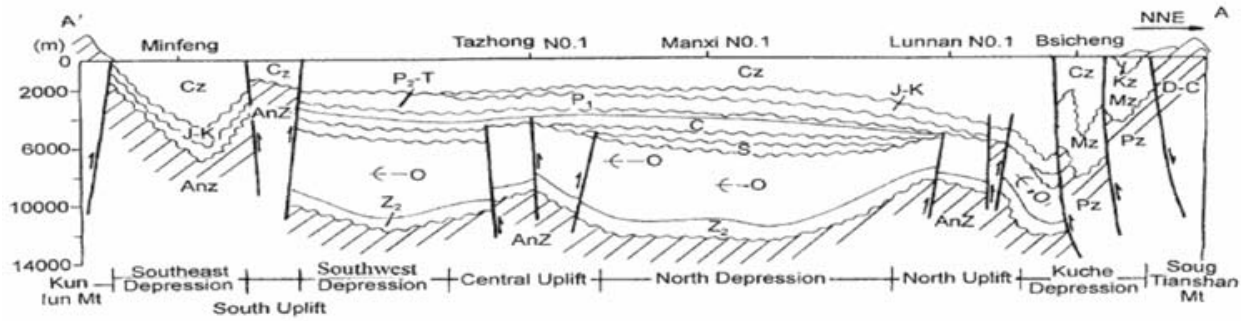
Trip report by Todd Jarvis, IWW/INR, Oregon State University

The US National Science Foundation (NSF) together with the Chinese Academy of Sciences (CAS), National Natural Science Foundation of China (NSFC), University of Idaho, Cold and Arid Regions Environmental Engineering Research Institute (CAREERI), Xinjiang Institute of Ecology and Geography, Bureau of Water Resources, Xinjiang Province, China, Xinjiang University, Central Asian Institute for Applied Geosciences, Kyrgyzstan and Tajik National Academy of Sciences, Tajikistan and the Research Institute for Science and the Humanities (RIHN), Japan held a four-day-long scientific workshop on the changes in surface and groundwater in the Tarim River Basin (TRB). The conference conveners were Dr. Liu Shiyin of the Chinese Academy of Sciences and Dr. Vladimir Aizen of the University of Idaho.

Location map from
http://www.columbia.edu/itc/mealac/pritchett/00maplinks/overview/asiaphysical/asiaphysical.html

The Tarim River Basin (TRB), located in China north of the Tibetan plateau, is the world's largest arid-region endorheic basin (http://reference.findtarget.com/search/Endorheic%20basin/). The TRB is also the most densely populated closed basin in the world with over 10 million people. Water resources in the TRB are declining rapidly as result of climatic changes and high water use in Xinjiang Province of northwestern China. Similar situations are observed in many of the world's arid and semi-arid basins in North and South America, Asia, Africa, and Australia. Despite the presence of the large Takla Makan Desert (aka "The Sea of Death"), with its extremely dry climate, the high mountain ridges surrounding this desert hold one of the greatest concentrations of snow and ice in central Asia such as in the Tien Shan (aka "Heavenly Mountains"), and the Pamir, Karakoru, and Kunlun mountains which rise between 7,400 to 8,000 meters above sea level. With over 14,000 glaciers which provide up to 55 to 60% of the total river runoff, the high mountain areas constitute a vital source of water for the TRB's lakes and aquifers. It's a hydrologic setting very similar to the State of Oregon! Since the 1980s, land use has changed significantly within the Xinjiang Province which has become one of the most important regions for agriculture and energy resource development as China increases their efforts to become more energy independent.

Eighty-four scientists discussed the applications of new modeling theory related to entropy as it relates to uncertainty, remote sensing, cryospheric science, surface water and groundwater hydrology, soil science, social geography, and cultural anthropology, and conflict resolution as it relates to the future use and management of glaciers, glacial meltwater, oases, irrigation water, terminal lakes, qanats, and industrial water use in the emerging oil and gas industry in the TRB. The objective of the conference echoes most of the concerns in a changing world – how to better use the available water resources. From the perspective of the hydrogeology, very little is apparently known about the groundwater systems below 150 meters in depth despite the emerging oil and gas industry drilling and Cenozoic clastic deposits ranging in thickness from 2,000 to 11,000 meters. While the Paleozoic rocks are karstified in the nearby mountains and host some oil deposits in the basin, even less is known about the quantity and quality of water stored in these deeper rocks.



Structural cross section (approximately northwest – southeast orientation) of the Tarim basin. Sinian-Lower Paleozoic Unit (highly mature to post-mature marine carbonate sediments with thickness >9500m). Upper Paleozoic Unit (mature to highly mature clastic deposits with a maximum thickness of 4,500m). Mesozoic-Cenozoic Unit (terrestrial clastic deposits up to thickness of 11,000m in thickness in the sedimentary center). (According to Chen et al., 2000.)

Participation from the US included scientists from Northrup Grumman, Dartmouth College, California State University (Los Angeles), the University of California (Santa Barbara), the University of Idaho, Texas A&M University, and Oregon State University. A report will be forthcoming on recommendations for future research. Website: http://www.sci.uidaho.edu/cae/meetings/TRB2009.html

Participants in the Tarim River Basin Conference

Forest Service Geoscientists in East Africa

By Joe Gurrieri, Hydrogeologist, USDA Forest Service

The US Department of Agriculture Forest Service International Programs (USFS IP) has a long history of promoting sustainable forest, soil, and water management and conservation of biodiversity in Africa. USFS IP provides targeted technical assistance by working in collaboration with host-country governments, the US Agency for International Development (USAID), and local and international NGOs. By linking the skills of its field-based staff with partners overseas, the USFS IP provides its partners with access to the diversity of skills that the agency possesses.

Since 2005, my Forest Service colleagues and I have participated in technical assistance missions to Rwanda, Uganda, Ethiopia, and Tanzania focusing on watershed health, source water protection, and groundwater resource assessment, with a particular focus on the improvement of water supplies for local communities. These international experiences have given us an appreciation of the plight of third world countries to simply feed and supply clean water to their populations. The overwhelming pressure on governments to use up what remains of their finite natural resources is a constant threat to the few remaining intact ecosystems. In each country, we found a scarcity of hydrogeologic data and expertise. But we also found that a little groundwater knowledge and mentoring can go a long way towards supplying clean water to local communities.

Rwanda/Uganda/Democratic Republic of Congo Transboundary Region

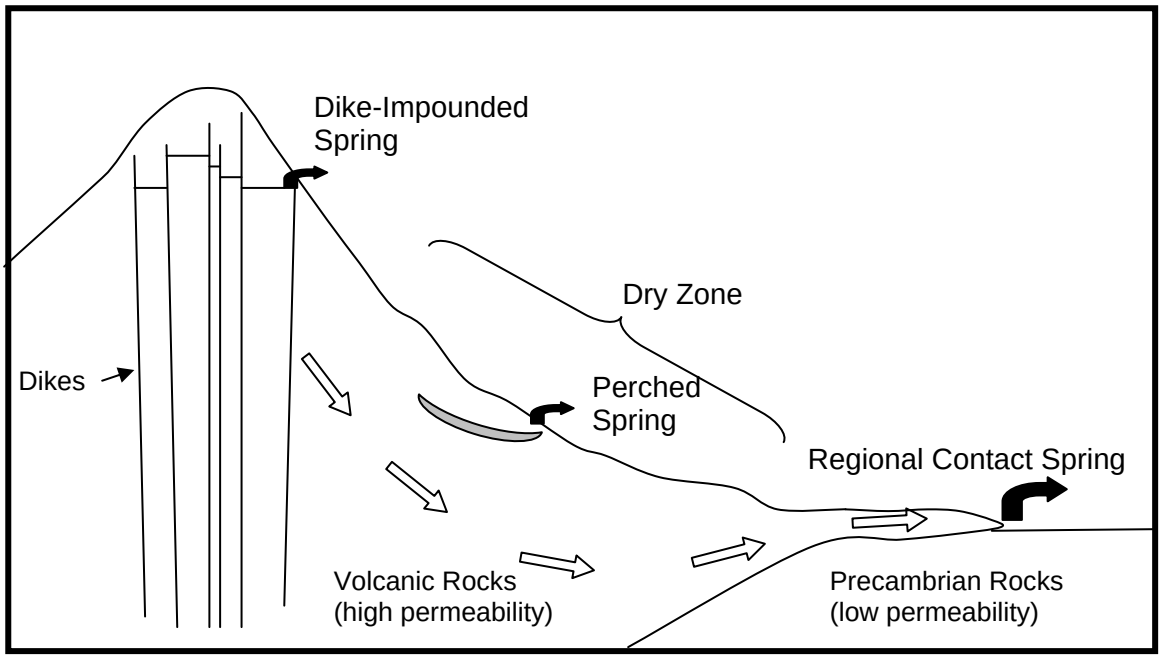
USFS IP was asked by the International Gorilla Conservation Programme and the African Wildlife Foundation to conduct a preliminary assessment of hydrologic systems, watershed health,

drinking water development potential, and threats to water and ecological resources of the Virunga Heartland.

The highlands of the Virungas and Uganda's Bwindi Impenetrable National Park are areas of incredible biodiversity sheltering the last mountain gorillas along with other primates, forest elephants, and a rich variety of avifauna. An important aspect of the work was the need to address water quality and quantity issues for local communities recognizing that, in addition to biodiversity, the national parks of the region contain springs that are existing or planned sources for gravity water schemes. Almost all developed and undeveloped water sources in the region are springs. People are forced to walk long distances to collect water, and many go into the parks illegally for water and while there set snares, collect fire wood, and disrupt wildlife.

Our team surveyed the region in 2005 and 2008 and identifyied data gaps, and formulated a conceptual hydrogeologic model for the region. Communities were visited and their current water supply infrastructure inspected. We also met with delegations and stakeholders from the three countries to explain the mission and to hear concerns.

While groundwater development using boreholes has met with success in many parts of Africa, this technology remains elusive in the Virunga/Bwindi region. Water well supply projects in these areas have a history of failure and are now often avoided because of their low success. Many of the areas facing poverty and poor health are where it has proved difficult to develop safe water supplies. The high infiltration rates in the lava zones on the flanks of the volcanoes make surface water and springs scarce, and the depth to groundwater makes dug wells and hand pumps impractical. The basement complex rocks of the Bwindi area support a low density of springs, and the success rates for boreholes are marginal. However, gaining an understanding of how groundwater occurs in these difficult areas can lead to successful groundwater projects being developed in areas where they were once avoided.



Hydrogeologic conceptual model and occurrence of springs in the Virunga volcanic transboundary area.

Ethiopia

The USFS IP was asked by the US Embassy, Addis Ababa Regional Environmental Team to provide technical assistance to the Amhara and Tigray Water Management Bureaus, as a component of a broader Integrated Water Resource Management (IWRM) project that is ongoing in Ethiopia. The assistance focused on improving the capacity of these water bureaus to evaluate, monitor, and manage degraded catchments, and evaluate the hydrogeology to aid in groundwater resource development. Forest Service specialists provided the water bureaus and IWRM project leaders with recommendations, strategies, techniques, procedures, necessary resources, and action plans. Some of our efforts included:

- Generating a preliminary hydrogeologic conceptual model for the Messena and Berki catchments.
- Sharing techniques to assess water resources and compute catchment water balances.
- Assessing availability of surface and groundwater resources that could be developed.
- Appraising the adequacy and availability of existing hydrologic, geologic, and meteorological data.
- Sharing techniques for hydrologic/geologic studies, including aerial photo interpretation.
- Conducting a water use inventory of boreholes, springs, hand dug wells, and surface water.

Hand dug irrigation well on the floodplain of the Berki River, Ethiopia.

Tanzania

The USFS IP, in conjunction with USAID, partnered with Africare in 2009 to provide water wells to twelve villages in the Tabora and Rukwa regions of western Tanzania. The purpose of this mission was to visit the villages selected for wells in order to: develop a hydrogeologic conceptual model of the local basement rock aquifers to help inform groundwater development design and placement; increase the capacity of officials and villagers to implement sanitation and source water protection practices; encourage compliance with Tanzanian law regarding community investments in water developments and equal gender representation among water user groups; and promote project sustainability.

The three-week field visit enabled us to review existing geologic, climatic, hydrologic and borehole data, and assess existing drinking water sources.

Some of the recommendations made by our team were:

- Utilize geophysical surveys to help target locations for drilling and improve success rate.
- Budget for two or three exploratory, small diameter boreholes to improve success rate.
- Retain a qualified independent supervising hydrogeologist at the drill site to ensure proper installation.
- Archive drilling logs to aid in future well development efforts.
- Analyze chemical water quality samples collected at the time of borehole completion, with bacteriological samples collected after hand pumps are installed.
- Create and fence a 30 meter radius, restricted activity, source water protection zone around the wells.
- Properly abandon unused shallow dug wells to remove contaminant pathways into aquifers.

Desert Research Institute Activities with World Vision's Ghana Rural Water Project

A report by James Thomas and Alexandra Lutz, Desert Research Institute

The affiliation between the Desert Research Institute (DRI) and World Vision's Ghana Rural Water Project (GRWP) spans nearly two decades and has focused on a variety of technical issues. Early work emphasized assisting GRWP with the implementation of technologies designed to improve drilling success rates. More recently, work has come to include much more than drilling success rates. In 2002, the West Africa Water Initiative (WAWI) was initiated and work expanded into neighboring countries via the Mali Rural Water Project (MRWP) and the Niger Rural Water Project (NRWP), and WAWI included 14 partner organizations. The goal of WAWI is to improve upon the health and socio-economic well-being of poor vulnerable rural and urban people in the beneficiary communities. The partnership, however, has also served as an educational platform. With the cooperation of WAWI partners, master's theses, dissertations, sabbaticals, Fulbright Scholarships, and colleague exchanges have taken place.

Ladies Collecting Water

Children acompanying Scientist Measuring Water Levels

Within the WAWI partnership, the role of DRI expanded from well-siting technologies to water quality analysis, water resource sustainability, and hydrologic data management. It was during this time that scientists at GRWP, though skilled and holding advanced degrees, conveyed the desire for more hands-on experience and training with software. It was also during this time that DRI staff experienced, first hand, difficulties faced by GRWP staff working under extreme conditions with limited resources. Thus, a common thread throughout all of these activities has been training and technology transfer with the express intent of building the long-term capacity of GRWP, MRWP, and NRWP.

The ultimate goal of the GRWP, MRWP, and NRWP is to provide potable water to rural populations in their home countries. The demand for access to water will increase due to factors that include industrialization, population growth, increased irrigated agriculture, and the United Nations' Millenium Development Goals (MDG). Providing year-round access to water, and sustainability of the resource, poses a challenge. DRI provides ongoing assistance to the water projects with consistent re-assessment. Well-siting technologies and methodologies, for instance, vary in the context of the physical setting (e.g., hydrology, soil, geology). Building in-country

GRWP Water Quality Scientists

Modeling Instruction

Modeling Instruction

capacity for water quality analyses is critical as governments begin implementing drinking water quality criteria, which are often based on World Health Organization guidelines. Year-round access to safe drinking water brings to light issues regarding sustainable yield of the resource (i.e. MDG number seven Ensure Environmental Sustainability). Finally, this work is generating vast amounts of information and management of hydrologic data is becoming increasingly important.

Water Quality Sampling

Water Quality Sampling

Groundwater Modeling Classes in the Horn of Africa

IAH member, Pat Tucci, retired from the USGS in 2007 but he is keeping his hand in the international groundwater scene. His most recent endeavor has been to help the USGS teach groundwater modeling classes in East Africa through a program funded by the U.S. Dept. Defense's Combined Joint Task Force Horn of Africa (CJTF-HOA) program. IAH members Eve Kuniansky, who coordinated the USGS effort, and Wes Danskin also were instructors for the classes.

The CJTF-HOA mission is focused on detecting, disrupting, and ultimately defeating transnational terrorist groups operating in the region – denying safe havens, external support, and material assistance for terrorist activity. Additionally, CJTF-HOA will counter the re-emergence of transnational terrorism in the region through civil-military operations and support of non-governmental organization operations – enhancing the long-term stability of the region. Its area of responsibility includes Kenya, Somalia, Sudan, Eritrea, Djibouti and Ethiopia in Africa, and Yemen on the Arabian Peninsula. Part of that program is devoted to capacity building, and the Navy has also sponsored classes on geophysics, surface-water modeling, and remote sensing. The USGS and the Navy have also developed a region-wide groundwater database (HAGRD) that is based on a database developed for Ethiopia by the USGS and the International Atomic Energy Agency.

The groundwater modeling classes were conducted in Addis Ababa, Ethiopia and Nairobi, Kenya during 2009. Two or three instructors with extensive modeling backgrounds taught the classes. Introductory classes were conducted in Ethiopia and Kenya, and an advanced modeling class was also conducted in Ethiopia. The classes primarily used MODFLOW and other readily accessible (free) software, and included both lectures and practical exercises. Class topics included MODFLOW basics and packages, use of spreadsheets and creating computer .bat files, importance of collecting good data, model calibration, uncertainty and sensitivity analyses, common modeling errors and pitfalls, and advances in MODFLOW. Class size ranged from 15 to 25 students of various backgrounds and experience levels. Most students were professionals from government agencies (Geological Survey, Ministry of Water Resources), but some were University professors and students. The largest challenge for the instructors was the variety of students' expertise. Several lectures and exercises had to be shortened or skipped because many students did not have the computer or basic groundwater experience to keep up with others in the class. Power outages and computer viruses added to the slow-going of classes in Ethiopia. The lesson learned was to not cover too much in the class. Overall, though, the in-country class coordinators felt that the classes were successful, and the instructors felt fortunate to be able to work with the students, learn about the different cultures of the two countries, and also do a bit of sight-seeing.

Groundwater a Big Part of Global Environment Facility, International Waters: Science Project Review

Trip report by Todd Jarvis, Oregon State University

The United Nations University, International Network on Water, Environment, and Health (UNU-INWEH) convened the first technical meeting on the Global Environment Facility (http://www.gefweb.org/), International Waters (GEF IW:Science) from 25-28 January, 2010 in Macao. GEF is the largest funder of research on transboundary water issues with a portfolio approach USD$4 Billion. Sixty-four participants from 34 countries were represented. The working groups covered Large Marine Ecosystems and Open Oceans, Coastal Zone and Near Shore Environment, Groundwater, Lake Basins, and River Basins. The meeting was convened to begin the process of reviewing projects in the IW:Science Document Database.

The Groundwater Working Group is coordinated by Jac van der Gun (formerly of IGRAC, The Netherlands) and Ofelia Tujchneider (National University of El Litoral & National Council of Scientific and Technical Research, Argentina). Nineteen scientists, engineers, and legal scholars are participating in the Groundwater Working Group representing China, United Kingdom, Italy, Jakarta, Spain, Namibia, Canada, France, Ghana, France, The Netherlands, Brazil, and the US. Secretary General of IAH, Shammy Puri, was an active participant (see Photos). The next meeting is scheduled for late August or early September 2010 at a location yet to be chosen.

Secretary General Shammy Puri of IAH with the Groundwater Working Group

USNC-IAH Meets in Portland at the 2009 Geological Society of America Meeting

The Executive Committee and other members of the US National Chapter of the International Association of Hydrogeologists met in Portland, Oregon for the Annual Meeting of the Geological Society of America, October 20, 2009. Topics of discussion included: a Secretary and Treasurer's report, a website report, a report on the International IAH Congress in Hyderabad, India Sept 6 -12, 2009, a report on the activities of the American Geological Institute, and a report on the April meeting of the USNC – IAH at National Ground Water Association's Ground Water Summit in April 2010.

Some USNC-IAH Members at GSA Portland. From left to right (back row): John Moore, Lenny Konikow, Vicki Kretsinger Grabert, Alan Fryar, Brad Wolaver, Jack Sharp, (front row) Jim LaMoreaux, Bill Alley, and Dave Kreamer.

Next IAH Congress in Krakow, Poland

The 38th IAH Congress will be held in Krakow, Poland from September 12-17, 2010. The Congress will be hosted by the Polish Chapter of IAH and the AGH University of Science and Technology. The theme of the Congress will be "Groundwater Quality and Sustainability." The website for the Congress is www.iah2010.org, or the conference organizers can be reached at office@iah2010.org.

USNC – IAH Web Site

The new US National Chapter IAH web site was launched in July. The web site address is http://www.iah.org/usa/. The new site is a subdomain to the main IAH site, but it also contains lots of USNC-specific information, including:

- The most recent USNC newsletter (March 2010);
- Historical newsletters from October 2000 to October 2009;
- Contact information;
- Articles of Incorporation and Bylaws;
- History of the USNC, 1972-2008
- Information about sponsored members;
- Information on USNC Meetings (the spring meeting will be at the Ground Water Summit which is the joint 2010 NGWA and 2010 Groundwater Protection Council Spring Meeting,);
- Photos from USNC activities around the globe; and
- Upcoming events.

Periodically, the web site is updated. Information for posting on the Events page is welcome. Suggested additions to the Education page are also welcome. Please forward event information or other web site suggestions to Mike Wireman at Wireman.Mike@epa.gov or Vicki Kretsinger at vkretsinger@lsce.com.

2010 *HJ* theme issue: "Saltwater and Freshwater Interactions in Coastal Aquifers"

The first, theme-focused issue of the year of the *Hydrogeology Journal* (Vo. 18, No.1) characteristically covers a topic of broad, timeless applicability and interest. The 2010 issue is no exception. Guest Editors Vincent Post of the Department of Hydrology and Geo-Environmental Sciences at VU University in Amsterdam and Elena Abarca of the Department of Civil and Environmental Engineering Parsons Lab at the Massachusetts Institute of Technology in Cambridge, MA have assembled a comprehensive collection of papers for the 2010 *HJ* theme issue that address saltwater and freshwater interactions in coastal aquifers. The twenty selected papers demonstrate the latest research in coastal hydrogeology and present a review of the extent of saltwater-intrusion problems around the world.

A sampling of the papers included in the theme issue cover modeling methodology (including a benchmark test to confirm correct simulation of 3D variable-density flow and transport simulators and the correct solution of governing flow and transport equations), model applications related to water resources management (including evaluation of aquifer storage and recovery schemes and migration pathways of treated wastewater injected in a saline aquifer), and geophysical studies (including investigation of the shape of a freshwater lens and possible approaches to improving spatial resolution of subsurface resistivity distribution). The theme issue also covers a series of papers that describe the state of coastal aquifers and the occurrence of saltwater intrusion on each continent. The global geographic regions described include several seawater intrusion examples in Africa; the potential threat of sea level rise to small island countries in the Pacific Ocean; different modes of seawater intrusion along the coasts of the US, Mexico, and Canada; 15 coastal aquifers in South America; classical European seawater issues; and seawater intrusion cases in Australia. Missing from this issue was an overview of the status of coastal aquifers in Asia. However, the Guest Editors encourage readers to contribute to a future *HJ* issue.

Lastly, in addition to the comprehensive compilation of papers contained directly in the 2010 issue, the theme issue also provides a wealth of literature references that readers may investigate further on this technically and socially critical problem.

CONFERENCES AND ASSOCIATED SOCIETIES

IAH-USNC Meeting at the Ground Water Summit Conference

Date and Place: 4:00 to 5:00 pm, Tuesday April 13, 2009, Board Room

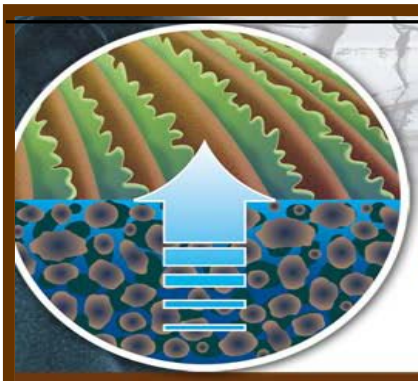
This meeting is open to all members and the public.

Tentative Agenda for the April 13 IAH - USNC Executive Committee Meeting

Opening remarks - Chair (Mike)
Secretary report (Dave)
Treasurer report (Vic)
VP - North America comments (Lenny)
Update on USNC Website – (Vicki)
Membership - How to retain and increase - (all)
Update on Krakow – (Mike)
USNC Participation in 2012 Congress -Niagara Fall – (Mike and Lenny)
Time for non-Board members to offer information and make requests
Adjourn

The 2010 NGWA Ground Water Summit and the 2010 Ground Water Protection Council Meeting will be held at The Westin Tabor Center, 1672 Lawrence Street in Denver, CO from April 11-15, 2010. The event seeks to integrate cutting-edge science with the leading edge of practice and will focus on the theme "Groundwater for a Thirsty World." Thirty sessions have been approved by the organizing committee, and several sessions have an international theme. A field trip to the Denver Basin is being organized by the Colorado Geological Survey. Information on the sessions and the field trip can be obtained at http://ngwa.org/summit2010/index.aspx . The USNC-IAH is a co-sponsor of the Ground Water Summit, and will meet at the Conference.

A faculty round-table on "Water in the Developing World" will be held in the Continental C Room at 12:30 to 1:20 pm on Wednesday April 14, 2010.



Toward Sustainable Groundwater in Agriculture

An International Conference Linking Science and Policy

June 15-17-2010

Hyatt Regency at the San Francisco Airport
Burlingame, CA

Organized by Water Education Foundation and UC Davis
IAH is Among the Co-Sponsors

This three-day international conference will provide scientists, policymakers, agricultural and environmental stakeholders, local, state and federal governmental officials, and consultants with the latest scientific, management, legal and policy advances for sustaining groundwater resources in agricultural regions around the world.

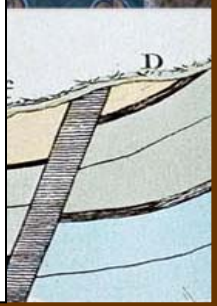
Specific topics include:

- Conjunctive Use, Agricultural Water Use, and Groundwater Management, Policy, and Regulation
- Agricultural Groundwater Quality and Contamination
- Socioeconomic Aspects of Agricultural Groundwater
- Climate, Energy, and Agricultural Groundwater
- Groundwater at the Agriculture-Urban Interface
- Groundwater Linkages to Surface Water and Estuaries

Speakers include:

- Bill Alley, Chief of the U.S. Geological Survey's Office of Groundwater
- Jacob Burke, Senior Water Policy Officer for the FAO (Food and Agricultural Organization)
- Margaret Catley-Carlson, Canadian Water Network
- Mark Giordano, International Water Management Institute
- Mike Campana, Oregon State University
- Robert Glennon, Author of "Unquenchable: America's Water Crisis and What to Do About It"
- Tushaar Shah, Senior Fellow for the International Water Management Institute in India
- Michael Hightower, Sandia National Laboratories, author of Congressional report "Energy Demands on Water Resources"
- Karen Burow, National Water Quality Assessment Program, USGS

The preliminary program, including more than 150 presenters, is posted at **http://www.ag-groundwater.org/.** Watch for updates.



Joint 2010 Annual Meeting
Cordilleran Section of GSA — Pacific Section of AAPG
May 27-29, 2010

Plan to attend the 2010 Joint Annual Meeting of the Cordilleran Section of the Geological Society of America (GSA) and the Pacific Section of the American Association of Petroleum Geologists (AAPG) on May 27-29, 2010 at the Anaheim Marriott, in Anaheim, California. The Cordilleran Section meeting is being hosted by California State University Fullerton. See the meeting web site for details http://www.geosociety.org/sectdiv/cord/2010mtg/index.htm.

More than 30 technical sessions span most Earth Science disciplines, and 10 field trips, both pre- and post-meeting, are scheduled. One of the technical sessions is on **Managing Groundwater in the Cordillera.** W. Richard Laton and John Foster at California State University (CSU)-Fullerton, Matthew W. Becker at CSU-Long Beach, and Barry Hibbs at CSU-Los Angeles are the conveners. This session will focus on groundwater management in the multi-varied basins of the Cordillera.

FOR MORE INFORMATION: Contact Jeffrey Knott (Technical Program Chair), Associate Professor at the Dept. of Geological Sciences, California State University Fullerton at jknott@fullerton.edu or Phil Armstrong (Joint Meeting Chair), Associate Professor of Geology, Department of Geological Sciences, California State University Fullerton, parmstrong@exchange.fullerton.edu if you have any questions.

THE 7TH ANNUAL INTERNATIONAL SYMPOSIUM ON MANAGED AQUIFER RECHARGE ABU DHABI, OCTOBER 9-13, 2010

ISMAR 7 2010 is held under the patronage of His Highness Sheikh Hamdan Bin Zayed Al-Nahyan, Ruler's Representative in the Western Region Abu Dhabi and Chairman of The Environment Agency - Abu Dhabi.

REGISTRATION
EVENT INFO
TOP REASONS TO ATTEND
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Join the global leaders in subsurface water management at the world's pre-eminent conference devoted entirely to aquifer recharge. ISMAR7 is your opportunity to access cutting-edge innovations, industry-leading knowledge and expertise, and insight into the latest developments in aquifer storage and recovery.

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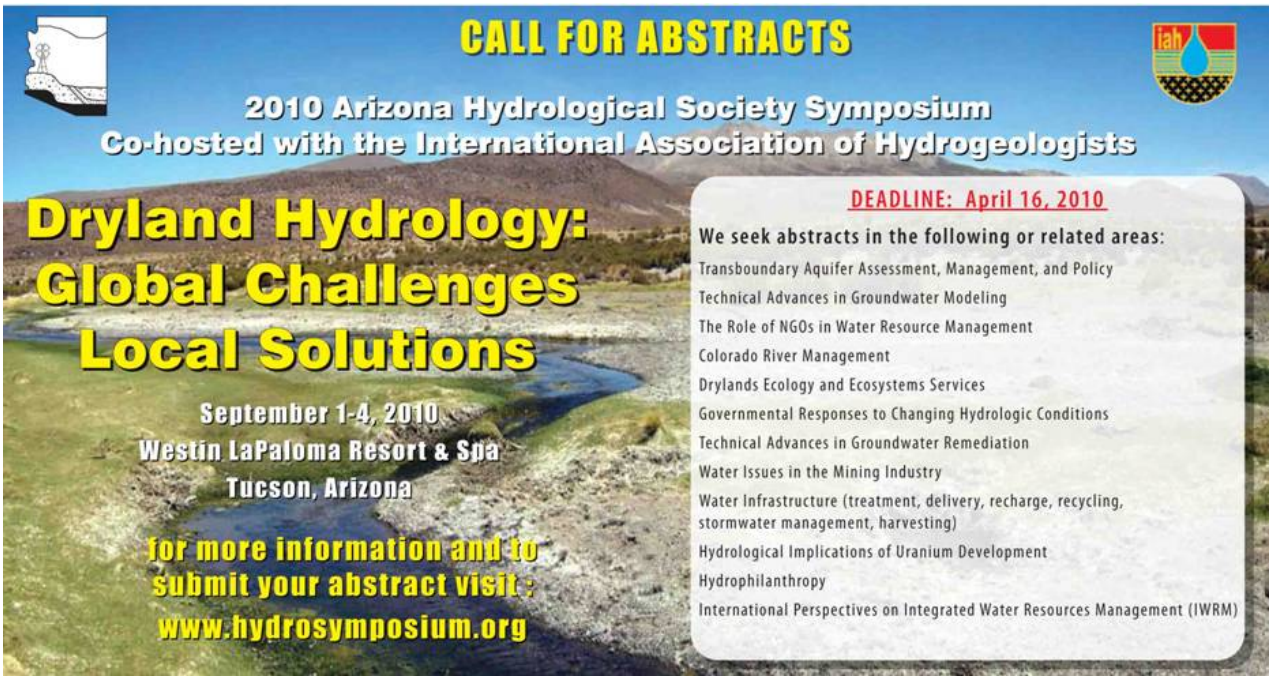

Groundwater Resources Association of California (GRA)

An Associated Society of the Geological Society of America

2010 Events

by Vicki Kretsinger

The USNC/IAH has been a cooperating organization for a number of Groundwater Resources Association of California (GRA) events. As members of a cooperating organization, IAH members enjoy GRA member rates to attend these events.

IAH members are welcome to express their interest in assisting with the planning of 2010 or 2011 events or participating as a session organizer or presenter by contacting GRA. Learn more about GRA, or the programs in which IAH is participating with GRA as a cooperator, on the GRA web site at http://www.grac.org , or by telephone, 916-446-3626.

Upcoming GRA Conferences

Solvent Release Sites: Characterization, Cleanup, and Closure

April 1, 2010 -Santa Clara Marriott Hotel, Santa Clara, CA
Web Site: http://www.grac.org/solventreleasesites.asp

This symposium will provide a forum for dissemination of leading-edge research and innovative field applications that demonstrate advances in solvent site characterization, remediation, and closure.

- Innovative tools in site characterization, including field applications, high-resolution data collection, and evaluation of biodegradation processes with compound-specific isotope analysis, biotraps, and molecular probe techniques.
- Source cleanup using innovative technologies or treatment train approaches.
- Plume management, including mass flux and mass discharge measurement and emerging technologies for monitored natural attenuation assessment.
- Alternative site closure strategies.

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Geophysics at the Beach Course/Symposium/Field Demo
in cooperation with Environmental & Engineering Geophysical Society

May 24 - 26, 2010 - Doubletree Club Hotel Orange County Airport, Santa Ana, CA
and Peninsula Park, Newport Beach, CA
Web Site: http://www.grac.org/geophysics.asp

More reliance on groundwater in the future means an increasing need for better information on subsurface hydrogeology, water quality, and improved predictability of returns on groundwater storage projects. Geophysics utilizes a suite of high resolution tools that will play an increasing role in clean water and contaminant hydrogeologic investigations to obtain high quality and cost-effective subsurface information to make better informed decisions.

Geophysics at the Beach includes the following optional program elements:

Short Course (May 24): Basic and Advanced Borehole Geophysics. The course will discuss the physical principles of the logging technologies, the respective limitations and applications of the logging technologies, and also challenge attendees to work through real-world data interpretation.

Symposium (May 25): Presentations will cover the following topics (and more):

- New applications of geophysics at the USGS;
- Groundwater mapping with seismic methods;
- Use of geophysical logs to inform development of a groundwater flow and transport model;
- Geophysical mapping of saltwater intrusion;
- Examining scales and physical drivers of submarine groundwater discharge using 222Rn and multi-electrode resistivity;
- Characterization of a proposed groundwater recharge and recovery site;
- High-resolution geophysical data collection for stratigraphic analysis and improved conceptual site models; and
- Time lapse resistivity imaging applied to monitoring subsurface fluid injections.

Field Demonstration (May 26): See manufacturers and vendors demonstrate the latest in geophysical equipment. Talk to experts on the acquisition and processing of geophysical data. Handle the gear and learn how it is used in the field. Listen to field presentations on the application and capabilities of several common geophysical tools.

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Think Outside the Pipe ~ Exploring & Protecting Local Water Supplies
GRA 19th Annual Conference & Meeting; presented in cooperation with:
Department of Toxic Substances Control & International Association of Hydrogeologists

September 15-16, 2010 - Hyatt Regency at the San Francisco Airport, Burlingame, CA
Web Site: http://www.grac.org/am2010.asp

This two-day conference will provide the latest scientific, management, legal and policy information regarding sustainable use of local water resources in urban regions. The conference will cover opportunities and solutions for increasing water use efficiency, integrating local and alternative supplies, reducing and capturing urban run-off, minimizing conveyance and energy costs, issues associated with the protection, enhanced recharge, and expanded use of local groundwater supplies.

Some of the topics include:

- Stormwater capture and reuse - permitting and water rights
- Urban water recharge – water quality and permitting
- Conjunctive use and local storage potential
- Contaminant site water reuse
- Groundwater policy
- Brackish water supplies – inland and coastal
- Recycled water reuse and challenges
- Water demand – using less and growing more
- Emerging contaminants
- Role of non-traditional local water supply in integrated water supply plans

GRA Events Being Planned for 2010

Check the web site at www.grac.org for more information.

- **Groundwater Modeling Short Course --** September 13-15, 2010.
- **Diagnostic Tools and Techniques for Diagnosing Well Performance Problems –** Summer 2010.
- **Forensic Geochemistry and Isotopes Short Course** – Fall 2010.
- **Groundwater Statistics – Handling Non Detects** – Fall 2010.

Job Opportunities

SENIOR HYDROGEOLOGIST

Montgomery & Associates, Santiago, Chile

Montgomery & Associates is a water resources consulting firm with a 25-year history of providing effective water resources and environmental solutions to mining, industrial, municipal, and power sector clients, as well as to public and private water entities. The firm has offices in Tucson and Phoenix, Arizona, as well as a growing Santiago, Chile office that serves clients in several South American countries.

Job Description: Oversee drilling/testing/monitoring program for fractured-rock aquifer for large-scale open-pit mining operation in northern Chile

Requirements:

Minimum 10 years experience in hydrogeology

- Experience in large-scale drilling/testing projects and management of field personnel
- Ability to live in Santiago or Iquique and commute weekly to job site
- Ability to work in high-altitude environment
- Advanced basic to mid-level Spanish language skills
- Preferred minimum 18 month commitment
- Experience in fractured-rock aquifer systems and/or dewatering projects
- Experience in report writing

Please contact Michael Rosko at mrosko@elmontgomery.com

MRC is presently seeking candidates for our client(s) for the following...

Title: **Land & Mines Manager (GEOLOGIST)**
Location: Open - several locations in South Eastern US
Compensation: DOE + Bonus
Relocation: Paid --- North American Candidates ONLY need apply ---

Summary:
Responsible for maintaining all land records and managing these assets, mine planning & design, including computerized modeling and mapping, annual reporting and reconciliation of reserves, and development of all North American Mineral deposits.

Qualifications:
- Minimum of B.S. Degree in Geology or Mine Engineering
- 10 years + experience & knowledge of mine planning, geological exploration, budgeting.

If these positions are not a fit for you personally, do not hesitate to share this information with colleagues as appropriate. For more information on MRC, on these roles as well as others, we welcome you to give us a call and/or visit our website: www.MiningSearch.com and click on 'Job Postings.'

Lindsey E. Schultz, Corporate Vice President, The MRC Group of Companies), 480.659.5847 AZ, USA
Lschultz@HRsearch.com www.HRsearch.com www.mrcGroupofCompanies.com

Summary Calendar of Upcoming Events and Deadlines (see above for more information)

2010

April 1; Solvent Release Sites: Characterization, Cleanup, and Closure, Santa Clara, CA; Groundwater Resources Association of California in Cooperation with IAH

April 11- 15; Denver, Colorado. NGWA Ground Water Summit Meeting - *"Ground Water for a Thirsty World"*, Co-sponsored by IAH. **Executive Committee Meeting USNC-IAH April 13th 4:00-5:00pm.**

May 24-26; Geophysics at the Beach Course/Symposium/Field Demo, Santa Ana, CA; Groundwater Resources Association of California in Cooperation with IAH

May 27-29; Anaheim, California. The 2010 Joint Annual Meeting of the Cordilleran Section of the Geological Society of America (GSA) and the Pacific Section of the American Association of Petroleum Geologists (AAPG).

June 13-18; Zurich, Switzerland. IAHS Groundwater Quality 2010.

June 15-17; San Francisco, CA. Toward Sustainable Groundwater in Agriculture.

July 13-15; Seattle, WA. Universities Council on Water Resources Annual Meeting.

September 1-4, 2010; Dryland Hydrology: Global Challenges, Local Solutions – Sponsored by the Arizona Hydrological Society in Concert with the USNC IAH

September 15-16; Think Outside the Pipe ~ Exploring & Protecting Local Water Supplies, Groundwater Resources Association of California 19th Annual Conference & Meeting, Burlingame, CA; in Cooperation with IAH

October 9-13; Abu Dabai; ISMAR7 (2010 International Symposium on Managed Aquifer Recharge) Co-sponsored by IAH.

October 17-22; Quaeretaro, Mexico. EISOLS – 8th International Syposium on Land Subsidence.

Also see:
http://www.iah.org/usa/events.php
http://www.iah.org/usa/conference.asp