International Association of Hydrogeologists
U.S. National Chapter
Newsletter

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Editor: Dave Kreamer, University of Nevada, Las Vegas

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- **2010 Geological Society of America (GSA) Annual Meeting, Denver, CO; October 31- November 3, 2010 – IAH USNC meeting Tuesday November 2 at 4:30 pm**
- **May 1-5, 2011; Baltimore, Maryland; 2011 Ground Water Summit and 2011 Ground Water Protection Council Spring Meeting, National Ground Water Association.**
- **ISMAR7 (2010 International Symposium on Managed Aquifer Recharge) October 9-13; Abu Dabai; Co-sponsored by IAH.**
- **September 25-26, 2011; in Porto de Galinhas, Brazil; World Water Congress of the International Water Resources Association.**
- **October 9-12, 2011; Minneapolis, Minnesota USA;Minneapolis Convention Center (http://www.geosociety.org/meetings/2011/) 2011 Geological Society of America - Annual Meeting**
- **Groundwater Resources Association of California 2010- 2011 Events**

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A NOTE FROM THE CHAIR

Greetings to all USNC members! The US National Chapter of IAH continues to be strong, vibrant chapter. The Executive Committee is very committed to keeping our US Chapter strong. We have been very active since the last newsletter in March. A meeting of the Executive Committee was held on April 13, 2010 in Denver during the NGWA Ground Water Summit meeting. Seven of the eight Committee members were present along with six guests. In July Lenny Konikow, Andrew Stone, and Vicki Kretsinger Grabert attended the Forward Look meeting hosted by the IAH Council in Reading, England. Thanks to Lenny, Andrew, and Vicki for representing the US Chapter at this meeting. A summary of the Forward Look meeting is included in this newsletter. The USNC was an active co-sponsor of a very good conference entitled Toward Sustainable Groundwater in Agriculture - An International Conference Linking Science and Policy. The USNC was well represented at the meeting. The USNC also co-sponsored a very successful Arizona Hydrological Society meeting in Tucson in September. The USNC website continues to improve and I hope everyone has checked out the information on the site. We have been working with Grant Ferguson, the President of the Canadian Chapter of IAH, along with Ken Howard and Steve Holysh to coordinate activities at the 2012 IAH Congress in Niagara Falls. Finally, the USNC was well represented at the 2010 IAH Congress in Krakow, Poland. The USNC had several members at the IAH Krakow Congress –please see the article in this newsletter. The next full Executive Committee will be held on November 2 (4:30 PM) at the GSA meeting in Denver. All USNC members and guests are invited. A meeting agenda will be sent out in advance of the November 2 meeting.

Mike Wireman,Chair – IAH-USNC Executive Board

Some IAH Members take a break at the Ground Water Summit in Denver, April 2010

A Note from the Vice President for North America

As a follow-up to the "Forward Look" focus in Hyderabad last September, IAH held a 2-1/2 day special "Forward Look" meeting July 2-4, 2010, in Reading, UK. I was able to attend and represent our interests there. I was very pleased that two other U.S. members were invited to attend also—Vicki Kretsinger and Andrew Stone, who both contributed greatly to the success of the meeting. In total, there were 24 participants from six continents. The goal was to evaluate where IAH wants to be in 2020 and assess how to get there. A questionnaire had been sent to all IAH members several months before the meeting, and nearly 70 members responded. Many issues were covered in Reading, and a consensus sought on outcomes from five smaller working groups. More details are included in the article by John Chilton later in this newsletter and in the August 2010 issue of News and Information (available at http://www.iah.org/news_information.asp).

There was much discussion of methods to increase membership and maintain financial viability of the organization. A primary area that I personally pushed was the need to increase the level of professionalism and scientific quality at future IAH Congresses and Meetings. IAH should increasingly rely on the Congress for an income stream, while partially shifting guidance and control from primarily the local organizing committee to partially IAH headquarters. IAH should use part or most of the income stream to provide software and staff to provide oversight and logistical support to the local organizing committees. This could be phased in starting around 2015. The goal would be to improve the quality of the Congress experience so that more people would attend, which would then generate more income, which could be used to further improve the quality of subsequent Congresses and help support IAH fiscally.

Also of special interest to North American members were the discussions on ways to increase collaboration with other societies—particularly NGWA. As a start in this direction, Art Becker (geologist, driller, and President-Elect of NGWA) organized and presented a free 3-hour training workshop on Sept. 12th at the Krakow Congress on "Drilling Technologies for Groundwater Extraction." The lectures identified and explained numerous drilling technologies used to construct water wells and distinguished their respective advantages and disadvantages, including costs of operation in relation to geologic site conditions.

I attended the Council meeting at the Krakow Congress, where a working strategy for implementation of the results of the Forward Look meeting was presented by Shammy Puri. Other items addressed there included a proposal to reform and revitalize IAH Working Groups and Commissions, and a proposal to slightly increase the IAH dues from 72 to 75 Euros (fortunately, with the recent changes in currency exchange rates, the U.S. dues in dollars will likely be slightly less than in 2010). There was also a joint meeting with representatives from the U.S. and Canada Chapters to discuss coordination of support for the 2012 Congress in Niagara Falls.

Lenny Konikow

Treasurer's Report October 2010

2010 USNC memberships:

- **As of September 13th, we have 286 new and renewing USNC members. The number of non-renewing 2009 members decreased from 90 in April to 48 currently.**
- **Individual members in the USNC have sponsored 13 developing country memberships this year (2010).**
- **The USNC is currently sponsoring 5 developing country members in 2010; we have the financial ability to sponsor a few more members next year (2011). Sponsorship is for a minimum 3-year time period**

2010 Financial Status:

- **We will receive about $2,500 in membership dues for 2010 (10% of the approximately $25,000 dues received to date from US National Chapter IAH members) and have received three donations (total of $525) from USNC members**
- **We currently have $35,900 in our JPMorgan Chase checking account, although a small portion of this will be sent to the International Secretariate as their part of IAH USNC membership dues paid by check to us.**
- **Vanguard Mutual Fund Account (Total Stock Market Index Fund) currently has about $9,500, with an additional $500 being automatically invested monthly.**

2010 Expenditures:

- **$180 to Kevin Blatt for Web design**
- **$200 to Curtis Rasmussen for tax preparation**
- **$60 to GSA for room at 2010 national meeting**
- **$514 to American Geological Institute (for membership dues)**
- **$50 for non-profit tax filing in Colorado**
- **$240 to sponsor 5 members from developing countries**
- **$50 for a 1-year student membership at GSA National Meeting student raffle**

Vic Heilweil

ARTICLES, REPORTS, NOTICES, AND ANNOUNCEMENTS

38th IAH Congress – Krakow, Poland

More than 450 people attended the 38th IAH Congress - held in Krakow, Poland from September 12-17, 2010. The Congress was hosted by the Polish Chapter of IAH and was held in the Jagiellonian University Conference Center. Jagiellonian University is one of the oldest Universities in Europe and the mix of Gothic architecture and modern buildings was wonderful. The Congress was very well organized and there were many excellent technical sessions as well as an excellent social program and interesting field trips -including a midweek excursion to the Wieliczka Salt Mine. The Wieliczka salt mine reaches a depth of 327 meters and is over 300 km long. The mine's attractions for tourists include dozens of statues and an entire chapel that has been carved out of the rock salt by the miners. The mine continuously produced table salt from the 13th century until 2007 as one of the world's oldest operating salt mines. A meeting of the Council of IAH was held on September 12 and a General Assembly meeting was held on September 15. In addition, for the first time at an IAH Congress, a meeting of Country Chapters and the IAH executive was held to discuss a way forward regarding more meaningful cooperation between Country Chapters and the IAH International in the United Kingdom. During the IAH Council meeting and the General Assembly meeting the results and action items from the Forward Look meeting (held in Reading, England in July 2010) were presented and discussed. The US National Chapter was represented at the Congress by Mike Wireman, Lenny Konikow, Jack Sharp, Jim LaMoreaux, Ward Sanford, Alan Mayo, Bob Michel, and John Moore. The USNC also met with the Canadian Chapter representatives to firm up and evolve plans for USNC Cooperation and participation at the 40th IAH Congress to be held in Niagara Falls, Ontario in 2012.

Mike Wireman

Willi Struckmeier, Ken Howard, Antonio Chambel, Shammy Puri and John Chilton at general Assembly meeting

John and Dickie Moore at General Assembly meeting

IAH Holds a ”Forward Look to 2020” Meeting in Reading, England

Some Participants of the July 2-4, 2010 ”Forward Look” IAH Meeting in Reading England. Countries represented from left to right are: Ireland, Brazil, Australia, U.K., U.K., U.S., Russia, Canada, Scotland, Netherlands, U.S., U.K. Algeria, Germany, Portugal, U.S., Columbia, Ethiopia, Netherlands, U.K., Spain, France

Successful and Productive Forward Look Meeting in Reading

Twenty four IAH members met for two and a half days in the conference facilities on Reading University’s attractive open, green and well wooded campus. The assembled group provided excellent representation of Council, Commissions, National Groups and the broader membership via the questionnaire responses.

Led and facilitated by IAH’s Secretary General Shammy Puri, the discussions comprised a mix of plenary sessions and smaller groups. From the initial Forward Look discussion in Hyderabad and taking account of the results from the Spring 2010 questionnaire responses, the meeting was structured around five key elements or themes for the future of IAH:

- **Enhancing the development of the science of hydrogeology;**
- **Enhancing our role in education, training and development;**
- **Informing and influencing global and national policy;**
- **Improving the internal operations of IAH – congresses, membership, funding, national groups;**
- **Strengthening alliances and partnerships with sister associations and external agencies.**

While these are not completely self contained and there are overlaps between them, this proved to be an effective approach to managing the meeting and directing the discussions. The first three elements could be

described as component parts of the overall purpose of the Association, and the final two as embracing many of the ways in which IAH might improve its ability to achieve the Associations' purpose.

Following a warm welcome from President Willi Struckmeier and introductions by each member of the group, Shammy outlined the expectations from the meeting and John Chilton provided a short summary of the key points from the questionnaires. This was followed by a lively debate about the vision and mission of IAH, and a draft from Lenny Konikow was tabled as a basis for the discussions which followed.

Then participants chose one of the five elements and in a sequence of small groups and plenary sessions firstly set out the components of each and identified those which needed to be extended or improved in the future. The groups then tried to answer the questions set to them of why these need to be done and how, who within the IAH should take responsibility for them and when. This approach made for active participation and produced some very lively exchanges and challenging views. The richness of the contributions and interventions meant that although attendees were able to prepare a general prioritisation for actions under each of the five elements they did not reach the point of having a fully defined future strategy that matched actions to financial and human resources. This is not really a problem as the Association needs a continuing process of involvement of the components of IAH to refine this strategy.

So what were the headline outcomes? A small group will be working on a revised mission and vision statement to put before the membership and it is clear that there is a need to re-establish a group to work on a strategy for meeting IAH educational objectives. Improved communication between the constituent parts of IAH – the members, national chapters, commissions, executive and secretariat is a priority and there is a need to use of the web. Targets for establishing more national groups and increased membership and ways of enhancing income were discussed, but there is a need to balance any commercial endeavours against the fact that IAH should remain a global family of groundwater professionals and colleagues. Overall, it was a highly productive meeting, and the fruits of this will be developed over the next ten years.

The Forward Look Questionnaires

To assist with the preparation of the Forward Look meeting and to find out members' views a questionnaire was prepared and distributed in April, 2010. Almost 70 responses were received. Some excellent, helpful and indeed challenging views and ideas were expressed, and formed the basis for invitations to several meeting participants.

There was strong support for IAH's scientific role, which was viewed as an existing strength and a continuing obligation, but with scope for improvement. There was broad consensus that the Hydrogeology Journal as the main focus of the Associations' scientific publication had been achieved and was maintaining a high standard. There was greater divergence of views about the scientific quality of IAH congresses and the publications arising from them. Some said that the congresses were excellent and we should have more of them; others that there were too many, too broad in subject matter and of uneven or poor quality. Instead IAH should consider a mix of meetings of different types, with some more focussed in subject matter, but with higher

quality presentations. As meetings are the Associations' science 'shop window' and key components of both membership benefits and the Associations' external profile, this was an important element of discussion in the Forward Look meeting.

The most consistent message from respondents was that IAH has key educational objectives which are presently not being met very well. While the IAH Council already knows this, the strength of response is both gratifying and challenging. "Education" in its broadest sense spans most of what IAH does, and means different things to different respondents - providing scientific and technical training, making technical knowledge available in various forms and formats, support for participation in conferences, being more active and visible at the science-policy interface and raising non-specialist/stakeholder/community awareness of groundwater issues at local, national and global levels.

Answering questions about who IAH serves and which things the Association does well and not so well, some respondents were concerned about the "academic club" feel of IAH and the institutional age and gender balance. Addressing this means not just making better efforts to recruit more young members, but also enabling them to better participate in IAH conferences, commissions and national chapters.

While there is a considerable degree of satisfaction that IAH Council serves the membership quite well, there is a need to improve communication to IAH members about the work of the Association and have better publicity for meetings and other activities. After education, the second consistent message coming from respondents is that the IAH website is not used as well as it could be to further IAH objectives by: better internal and external communication, publicity, dissemination of groundwater information of different types, education, discussion groups and reporting the work of the commissions.

Many respondents found questions about the role of IAH and its external relationships more difficult to answer. While it is clear that IAH has a role to play in promoting the protection and management of groundwater for the benefit of society as a whole, it is less clear how this should be done. Some felt that although there are individual efforts (mainly at the top of the organisation), we don't make enough use of our collective voice or of the deep reservoir of our skills and experience. We have links to the UN system; but these are not strong enough and perhaps too many are on an individual basis.

Overall, there was clear consensus that IAH should have both science and policy threads to its work as an international, membership-based NGO, and establish a balance between these two. A key question, therefore, is where the balance should lie and what these two threads should contain, and how activities within each thread should be facilitated, funded, carried out and disseminated. From the respondents' point of view, both threads would have much stronger education components than they do at present.

John Chilton, Secretariat

Canadian IAH Meets in Calgary

The Canadian National Chapter was one of eight geoscience societies that participated in GeoCanada 2010 this spring in Calgary. The event, which explored nearly all aspects of geoscience, attracted nearly 5000 delegates. It was a somewhat different experience than our past meetings with the Canadian Geotechnical Society but we did manage to have a steady stream of groundwater sessions and had the opportunity to participate in other sessions on petroleum geology, geochemistry and climate change that we normally would not see at our conferences. The meeting also featured two excellent field trips, one to see thermal springs in Rockies led by Steve Grasby and another examining the hydrogeology of southwestern Alberta led by Bill Wilmot and Jamie Freeman. There were some concerns about the weather cooperating to allow these trips to happen after heavy snows the week leading up to the conference. However, the weather cooperated and the trips only got snowed on briefly on Sunday as they headed into the Rockies.

During our annual general meeting held during the conference, I had the pleasure of announcing that Robert van Everdingen would be this year's recipient of the Robert N. Farvolden Award. The Robert N. Farvolden Award is awarded by the IAH CNC and the Canadian Geotechnical Society to an individual or group in Canada for outstanding contributions to the disciplines of earth science and engineering that emphasize the role or importance of groundwater. Robert van Everdingen was selected as this year's recipient for the content and integrity of his scientific contributions to the hydrogeology and aqueous geochemistry of Western Canada and to the hydrogeology of permafrost. In the words of a former Farvolden Awardee, Professor Jozsef Toth of the University of Alberta, "he has richly contributed to both the theoretical and applied aspects of a great diversity of groundwater-related scientific and engineering problems". The formal award presentation w ill take place at a joint meeting of the Canadian Geotechnical Society and the International Permafrost Association this fall in Calgary.

The 2012 IAH Congress will be hosted by Canada during the 40th anniversary of the CNC. The congress, entitled "Confronting Global Change", will be held from September 16 to 23, 2012. Themes that are likely to be highlighted as part of the conference include climate change, source water protection, groundwater and energy, groundwater/surface water interaction, urban hydrogeology and aquitards. We have also invited a number of the luminaries of Canadian hydrogeology to give keynote lectures and will also feature the history of Canadian hydrogeology at the congress. We also plan to involve the USNC in Niagara Falls through sponsorship of technical sessions and short courses. The congress website (http://www.iah2012.org/) is up and running and will be updated as more information becomes available. I hope to see you in Ontario in 2012.

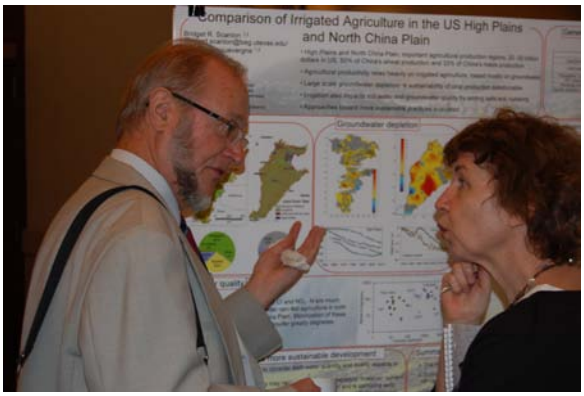
Grant Ferguson, President, IAH CNC

Panelists in the sustainable groundwater conference. From left to right: Jacob Burke, Jean Fried, Mark Giordano, Michael Campana, Margaret Catley-Carlson

Toward Sustainable Groundwater in Agriculture – An International Conference Linking Science and Policy

... was the title of the international conference held in Burlingame/San Francisco, June 14 – 18, 2010. The conference was organized by the University of California Davis and the Water Education Foundation with help from the Groundwater Resources Association. The meeting brought together leading scientists, policy analysts, policy and decision makers, and agricultural and environmental stakeholder groups to define and highlight the science, challenges, and potential policy solutions in agricultural groundwater resources management and agricultural groundwater quality protection that will provide a sustainable future at regional, national, and global scales. The US National Chapter of IAH was a key co-sponsor of this conference.

Groundwater is the lifeline for many rural and agricultural regions and their associated cultures and populations around the globe and a cornerstone of global food production. Groundwater constitutes nearly half the world's drinking water and much of the world's irrigation water supply. Population growth, overexploitation, salinization, nonpoint source pollution from agricultural activities (including animal farming, ranching, and forestry activities), impacts to surface water from groundwater depletion and degradation, and groundwater quality and quantity conflicts at the urban-rural interface have reached global dimensions and threaten the health and livelihood of this planet.



This international conference attempted to bridge the multiple disciplinary and geographic divides around groundwater in agricultural regions: between groundwater resources management and groundwater quality protection; between groundwater scientists working in agricultural regions, groundwater managers, and policy and decision makers governing agricultural groundwater basins; in the Southwestern, Central, and Eastern U.S., in northern, central, or southern Europe, in the Mediterranean, the Middle East, Africa, Asia (China, India, Pakistan foremost), Australia, and South America.

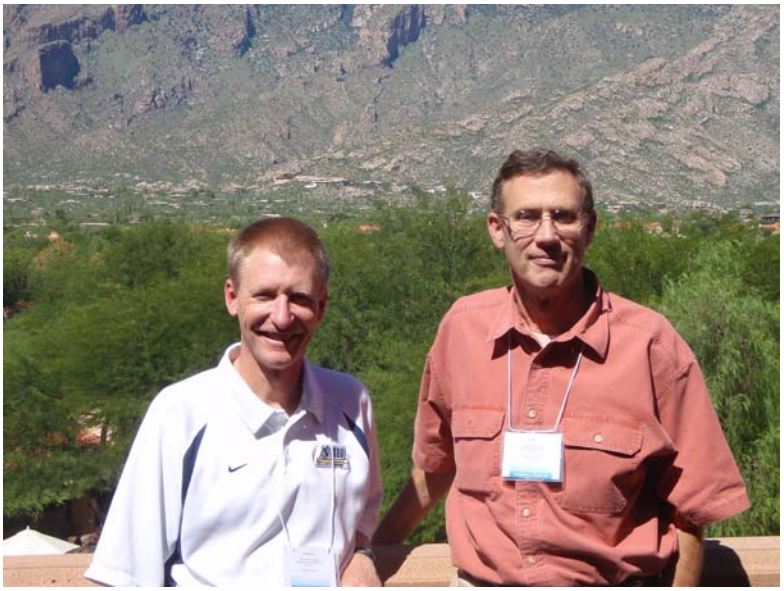
During the conference, each day began with a plenary session before the conference audience divided into four separate presentation tracks for the remainder of each day. On the last afternoon, the conference wrapped up with a forward looking plenary session offering lively discussion. Altogether, 35 conference sessions, including the four plenary session and a poster session were offered over the three days involving 135 speakers and 25 poster presenters.

The conference was an amazing gathering of movers and shakers, thinkers and tinkerers, decision-makers, policy makers, planners, farmers, ag-industry representatives, consultants, students, even high-school students, and researchers. The over 250 attendees came from California, from across the United States, and from around the globe - Asia, Africa, Europe, Latin America, Australia. All had one thing in common - a shared interest in groundwater resources of agricultural regions and in agriculture's role in sustaining groundwater resources for future uses in agriculture and for other uses.

Thomas Harter, University of California, Davis

Conference Field Trip

Robert Glennon signs copies of his new book, Unquenchable: America's Water Crisis and What to Do About It



Abe Springer and Steve Maflansky at the 2010 Arizona Hydrological Society Symposium in Tucson

Dryland Hydrology: Global Challenges Local Solutions

The Arizona Hydrological Society (AHS) had a very successful 2010 symposium in Tucson, September 1-4 with workshops, field trips, and two days of concurrent technical session. Over 255 attendees enjoyed provocative and practical plenary sessions on "the Future of Drylands" and "Sustainability Consensus Building for Our Water Future". There were workshops on several subjects including "Advanced Tecniques for Aquifer Test Analysis" and Well Rehabilitation and Evaluation". Lower Cienega Creek and and Biosphere 2 were two of the field trip destinations, and an evening showing of the movie "A River Reborn: The Restoration of Fossil Creek" was quite interesting. Technical sessions included topics such as: "Government Responses to Changing Hydrologic Conditions", "A Binational River - Watershed Hydrology of the Santa Cruz River and Transboundary Issues", " Rainwater Harvesting and Green Infrastructure", "Colorado River Management", and "Dryland Hydrology - International Studies". Student awards and scholarships were given out, and great speakers presented at the conference luncheons. The U.S. National Chapter, IAH co-sponsored this event. Kudos to AHS on their *Dryland Hydrology: Global Challenges Local Solutions* symposium!

David Kreamer, University of Nevada, Las Vegas

Highlight on New Students and International Professional Members Sponsored by the U.S. National Chapter IAH

Several new IAH members were recently sponsored by IAH USNC. Brief Descriptions of their background and activities follow.

Joseph sampling in the field

Joseph Asante

I sincerely thank the International Association of Hydrogeologists, USA chapter for sponsoring my IAH membership. I come from Ghana, formerly called Gold Coast. My interest in studying hydrogeology reached a pinnacle during my work at the Community Water and Sanitation Agency in Ghana, after I graduated in 1998 from the University of Ghana with a B.Sc. degree in geology, to supply water for the scattered rural and farming communities in the Upper West Region of Ghana. For the most part of the year the region's surface water dries up; therefore, groundwater is a valuable resource. During my work I was humbled by the communities' support to our teams siting, drilling, developing, and installing wells and the communities' joy and appreciation for every successful well. Sharing their joy and happiness was the most rewarding part of my job. The IAH sponsorship means that they are dedicated in helping to build the technical capacity needed especially in developing nations like Ghana to tackle the water problems of the 21st century.

For my PhD dissertation, I am studying the recharge sources, hydrochemical evolution, and groundwater movement and hydraulic interconnectivity in an intermountain basin. The data being used for this investigation are pH, temperature, and concentration of major ions, stable isotopes of water, and noble gases which are being collected from the lower Virgin River Basin, Nevada, Utah, and Arizona. The analytical techniques being applied are the multivariate statistics (Cluster analysis, Principal Component Analysis, and Discriminant function analysis), graphical analysis (Piper, chemical finger print, and compositional diagrams), spatial analysis (ArcGIS and geostatistics) and aqueous geochemical modeling.

This study's objectives are to integrate these methods in a way that will increase confidence in the hydrologic conclusions that one makes from interpretations of the data, to delineate hydrochemical facies, to determine the sources of recharge into the lower Virgin River Basin, to determine the possibility of hydraulic connection between the Virgin River and basin aquifers, and to decipher the hydrogeochemical processes in the basin. The picture above was taken during a field work at the lower Virgin River Basin.

New Sponsored Members (Continued)

Mel climbing Charlotte's Dome in the Sierra

Melanie Reed

I very much appreciate the sponsorship of IAH USNC. I am presently a Geoscience Masters Candidate studying at the University of Nevada Las Vegas focusing on solving water related problems in developing nations. I've studied the effects of fog harvesting while serving as a Peace Corps volunteer in the Cape Verde Islands in West Africa. Recently I was awarded the Ambassadorial Scholarship through Rotary International and plan to expand on research related to the artificial recharge of water collected from fog harvesting.

Rafael Matamoros

I am very thankful for the USNC sponsorship of my IAH Membership. My professional interests as a hydrogeologist correspond with the investigation, protection, and management of aquifers in Costa Rica. I'm interested in learning new techniques for aquifer research that can be applied towards investigating groundwater characteristics, potential recharge, and vulnerability of groundwater to contamination. In particular, I am pursuing the use of geochemistry, including major ions, isotopes, and CFCs, for the verification of numerical groundwater models of aquifers along the Pacific coast of Costa Rica.

I plan to apply the resulting hydrogeologic information to groundwater management issues. I believe that the role of hydrogeology isn't only for aquifer investigation, but must then focus on communicating this information and working with water-resources managers and water users. It is necessary that hydrogeologists inform people about aquifers and groundwater protection, emphasizing the importance of water for both humans and the environment. I believe that hydrogeologic investigation techniques must be utilized for the sustainable management of groundwater resources.

Dr. Badri Mkheidze and Dr. Ludmila Glonti are members of the Republic of Georgia Chapter of IAH. Dr. Mkheidze is the Manager of the Hydrogeology Branch, and Chairman of the Board of Science at the LEPT Institute of Hydrogeology and Engineering Geology in Tbilisi, Georgia. Dr. Glonti is a Senior Researcher in the Department of Hydrogeology at the LEPT Institute. The following two articles provide a brief summary of two hydrogeologic research efforts underway in Georgia. The LEPT Instutute is within the Ministry of Education and Science of Georgia.

Hydrogeological Zoning and Hydrogeochemical Zonality of Caucasus

Dr. Badri Mkheidze

Introduction

The Caucasus is a complex mountain-folded construction caused by its geotectonic position on a joint of the Arabian and Skiff plates. Here the diversified rocks range in age from Precambrian to the modern. The sharp contrast of relief and climate (which varies from humidus to arid), and the presence of strongly folded structures and gently folded intermountain and foothill depressions contribute to creation of various conditions that control groundwater occurrence and flow.

The hydrogeology of the Caucasus regions is described in some detail in aseries of monographs issued in the middle of last century: "Hydrogeology of USSR" volume IX - "North Caucasus", volume X –"Georgia", volume XI "Armenia" and volume XII "Azarbaijan". In these monographs different and mainly old principles of hydrogeological region-dividing and zoning are used. The folded zone of the Caucasus includes hydrogeological regions of special types, which are delineated based on their geological structure and water-bearing features of the rocks. These include: platform, intermountain, slope and medial artesian basins (porous, fissure-porous and fissure-karstic ground waters), hydrogeological massifs, admassifs and intermassifs (fissure, fissure-bedded, bedded-fissure and fissure-karstic ground waters) and volcanogenic basins (porous-fissure ground waters of lava flood).

According to recent principles of hydrogeological zoning and considering the variegated geological and hydrogeological structure of folded zone of Caucasus - hydrogeological regions of first, second and third order hydrochemical zones and sub zones are being delineated for: artesian basins and massifs, admassifs and intermassifs. The result of this work will be presented in: "Schematical map of Caucasus hydrogeological zoning and hydrochemical zonality".

Project Goals

Using the general principles from the USSR monographs, and modern views of hydrological structures and zones, the project team is developing new schematic maps of hydrogeological region-dividing and hydrochemical zoning for the whole Caucasus region with explanatory text attached.

Preliminary Results

At the moment, actual data and cartographic materials of Caucasus hydrogeology are assembled.

Expected Results

Created maps and explanation texts will contribute to full and efficient development of Caucasus drinking, mineral, thermal and industrial ground waters.

Project Participants

Head of Hydrogeological Department, Ph.D Badri Mkheidze, leading scientist Ph.D Berdi Zautashvili, scientist doctoral candidate Temuri Pitava. Work terms 2010-2012.

Temperature Distribution in Middle Eocene Aquifer Interfaces of Tbilisi's Thermal Waters Deposit (Republic of Georgia)

Dr. Ludmila Glonti

Currently about 250 natural and artificial springs with temperature between 30-110 °C have been registered in the Republic of Georgia. The springs are grouped in 44 deposits; most of them are located in the East Georgia Tbilisi deposit of thermal waters, and many are also located in the west Georgia area of Zugdidi-Tsaishi (Figure 1).

Studying the thermal field of the Tbilisi deposit is especially urgent due to the need for power resources. A renewable, ecologically pure and relatively cheap energy deposit near a megalopolis makes it very valuable. For testing of thermal water resources and rational development of the Tbilisi deposit we are conducting hydrothermal and hydrodynamic research of thermal, productive and filtration properties (heat conductivity, thermo gradient, heat flow, temperature, pressure, efficiency and filtration factors, permeability, the skin-factor, etc.) of layers and bores in situ.

Figure 1

Tectonic fractures divide the investigation area into three sites: Lisi-Saburtalo, Central and Oil prospecting area. Ten bores were drilled in Lisi-Saburtalo, 20 bores in Central and 7 bores in the Oil prospecting area.

The primary objective of the hydrogeothermal research is the water-bearing complex in low and middle Eocene sediments. The main goal is determination of temperature conditions at the top and bottom of the aquifer. Initial tasks include evaluation of the rocks' thermal characteristics by the method of impulse flat heat source and the method of a regular thermal mode, studying and the analysis of literature and compilation of thermogram data.

Data on the average heat conductivity coefficient and heat flow for each layer are given in the Table 1. The maximum values of heat conductivity are in the Central area. One of the reasons for this may be the presence of a hydrogeology window on the Central region and heightened moisture of rocks there.

Table 1

Region	**Average value of heat conductivity coefficient (Vt/m°C)**					**Average value of heat flow 10^3(Vt/m^2)**
	Bore	**Oligocene layer**	**Upper Eocene layer**	**Middle Eocene layer**	**Low Eocene layer**	
Lisi-Saburtalo	1.65	1.35	1.68	1.88	1.96	42
Central	1.91	-	1.75	1.86	2.09	48
Oil prospecting	1.57	1.13	1.44	1.56	1.90	47

The heat flow value is more stable and rather low in comparison with the Ajara-Trialeti folded system that, perhaps, is connected not only with geotectonic construction, but with underground water dynamic. The calculation of temperatures on interfaces of a water-bearing complex is done using the formula:

$$T_N=T_{N-1}+1 / \lambda_N \bullet qH_N,$$

Where T_N – temperature on N layer bottom, T_{N-1} - temperature on (N-1) layer bottom, λ_N – value of N layer rock's heat conductivity, and H_N – N layer thickness, q - value of heat flow in the given bore. Temperature distribution on Middle Eocene aquifer interfaces is shown in Table 2.

Table 2

Region	**Average Depth of Middle Eocene(m)**		**Average Temperature of Middle Eocene(°C)**	
	Top	Bottom	Top	Bottom
Lisi-Saburtalo	2102	2625	67	83
Central	420	960	16.8	34
Oil prospecting	1300	3730	55	124

As follows from the calculation in Lisi-Saburtalo region, a depth of about 2100 m is associated with high temperatures waters (~70ºC). Temperatures of a water-steam mix (~130ºC) in the Oil prospecting area occur at a depth of 3700 m. This research is being conducted in collaboration with staff of Seismic Center of Ilia University (Tbilisi): E.Sakvarelidze takes part in geothermal researching, G.Melikadze- in hydrodynamic bores testing and G.Kobzev – in software realization.

USNC – IAH Web Site

The new US National Chapter IAH 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;
- Historical newsletters from October 2000 to March 2010;
- Contact information;
- Articles of Incorporation and Bylaws;
- History of the USNC, 1972-2008
- Information about sponsored members;
- Information on USNC Meetings;
- 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.

Hydrogeology Library – Columbian National Chapter IAH

The IAH chapter in Bogota, Columbia is currently setting up a ground water technical library. Carlos Molano and Mario Cuesta, members of IAH Columbia, will manage the library which will place emphasis on providing books to students. The library was started with 20 books from the Ivan Johnson collection.

All IAH-USNC members - please consider donating technical books related to hydrogeology, water resource management, contaminant hydrology, engineering, etc.. They should be sent to John Moore (Past President IAH), 1730 Grape, Denver CO 80220 He will forward them to Columbia.

Mike Wireman

Publication of New Infiltration Technique for Managed Aquifer Recharge

According to a USGS Press Release, the journal Hydrological Processes has recently published an article describing a new low-cost recharge technique entitled "*Trench Infiltration for Managed Aquifer Recharge to Permeable Bedrock*". Managed aquifer recharge (MAR) to permeable bedrock is increasingly being utilized to enhance resources and maintain sustainable groundwater development practices. Techniques currently being used include injection wells and surface spreading basins, which are typically expensive and/or less efficient because of evaporation losses and clogging. Infiltration rates during a trench experiment on outcropping Navajo Sandstone were an order of magnitude higher, while evaporation loss was much less than a previous surface-spreading experiment at the same site. The higher infiltration rates were caused by removal of lower permeability soil and caliche, access to open fractures, and a reduction in both physical and gas clogging. Less evaporation occurred because water in the trench was not exposed to the atmosphere. This pilot study illustrates the viability and cost-effectiveness of trench infiltration to permeable bedrock, both within the Colorado Plateau Province of the western U.S. and similar permeable bedrock aquifers in arid climates worldwide.

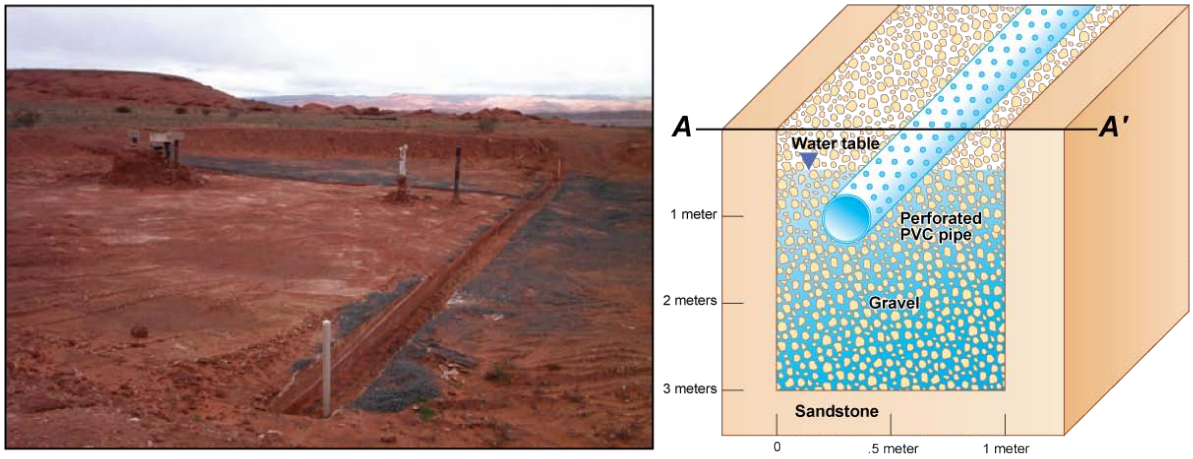


Photo (left) and cross-section (right) of the infiltration trench site at Sand Hollow, southwestern Utah.

An electronic version of the article, entitled "***Trench Infiltration for Managed Aquifer Recharge to Permeable Bedrock***" can be downloaded from the USGS web site (http://ut.water.usgs.gov/projects/navajosandstone/) .

USGS WaterAlert

The U.S. Geological Survey WaterAlert service sends e-mail or text messages when certain parameters measured by a USGS data-collection station exceed user-definable thresholds. The development and maintenance of the WaterAlert system is supported by USGS and its data-collection partners, including numerous federal, state, and local agencies.

UNEP Calls for 'Greener' Laws to Avert World Water Crisis

The United Nations Environment Programme (**UNEP**) has just released a new publication,

The Greening of Water Law: Managing Freshwater Resources for People and the Environment.

Governments and law-makers need to integrate environmental concerns into water-use legislation to avert an impending global water crisis, according to a new report from the United Nations Environment Programme (UNEP), titled "*The Greening of Water Law*". According to the report, launched September 7, 2010 at World Water Week in Stockholm, Sweden, competition is increasing between the rapidly growing human population-which needs water for drinking, sanitation, food production and economic development-and species and ecosystems, which rely on water to sustain their existence. The key challenge now facing governments across the world is how to meet the growing water needs of human society, while maintaining freshwater ecosystems and supporting environmental sustainability.

The Human Toll

Nearly 1.8 million children under the age of five die annually from diarrheal diseases (such as cholera, typhoid, and dysentery) attributable to a lack of safe drinking water and basic sanitation. The UNEP report warns that if the international community fails to take action to improve freshwater supplies for drinking, sanitation, and hygiene purposes, as many as 135 million preventable deaths could occur by 2020.

Impacts on Ecosystems and Biodiversity

The unsustainable use of freshwater is a major contributor to biodiversity loss - and the effects are being felt in rivers, lakes and wetlands across the world. In North America, for example, around 27% of continental freshwater fauna populations are now threatened with extinction as a result of depleted and contaminated freshwater resources. And in Croatia, over a third of all freshwater fish species are currently under threat.

Greening Water Law

With more communities than ever before facing both human and environmental water crises, how can changes to the law help to tackle the problem? "Simply put, it's the law that provides the structure through which new policies can be implemented", says Professor Gabriel Eckstein, lead author of the report and IAH US National Chapter member. "Achieving a better balance between human and

environmental water needs will require significant changes in legislation - and you need legal tools to achieve this."

The report cites several examples of green water laws that have already been introduced across the world. In New South Wales in Australia, the State's Water Management Act dictates that in the event of a severe water shortage, freshwater will be allocated first to meet basic domestic and municipal needs, then in response to the needs of the environment, and thereafter for all other purposes. Similarly, in Paraguay, the Water Resources Act ranks the water needs of aquatic ecosystems as second only to humans and ahead of agriculture, power generation and industry. "These laws recognize the immense value of freshwater resources", says Eckstein. "Take wetlands for example - for humans to recreate their natural benefits, we would have to build massive water treatment plants at huge cost. Protecting these resources makes economic sense."

Economic Gain

Protecting freshwater resources in national and internal law can bring economic gains. For example, the world's wetlands have been calculated to provide as much as US$15 trillion in ecosystem services. This includes benefits such as water purification and detoxification through their ability to extract and absorb pollutants from contaminated waters.

Freshwater resources are also among the 11 sectors being addressed under UNEP's Green Economy Initiative. The initiative is designed to assist governments in 'greening' their economies by refocusing policies and spending towards clean technologies, renewable energies, water services, waste management and other sustainable strategies.

Managing freshwater resources also forms a central pillar of The Economics of Ecosystems and Biodiversity (TEEB) project, hosted by UNEP. TEEB aims to develop guidance for policy makers at international, regional and local levels in order to promote sustainable development and better conservation of ecosystems and biodiversity.

Today, freshwater resources are under greater strain than ever before. Regional and national governments must therefore be encouraged to seek a more balanced approach to water use - with regard to both environmental and human needs. The life and wellbeing of people and the natural environment are intertwined. The greening of water laws represents an historic opportunity - and a real challenge - for communities around the world to ensure both human progress and environmental sustainability.

--- *UNEP Press Release, September 7, 2010*

Karst Information Portal

The Karst Information Portal is a digital library resource aimed at linking scientists, managers, and explorers with quality information resources concerning karst environments. Their revised web site can be accessed at: http://www.karstportal.org/

CONFERENCES AND ASSOCIATED SOCIETIES

2010 Geological Society of America (GSA) Annual Meeting

Denver, CO; October 31- November 3, 2010

The United States National Chapter (USNC) of the International Association of Hydrogeologists (IAH), as an Associated Society of the Geological Society of America (GSA), is pleased to co-sponsor three sessions at the 2010 GSA Annual Meeting and Exhibition in Denver, CO on October 31- November 3, 2010. This year's overall conference theme is "Reaching New Peaks in Geoscience."

IAH USNC Meeting at GSA Conference
Date: Tuesday November 2 at **2:30 pm**.
(Please note: This is a different time than is listed on the GSA Program)

This meeting is open to all members and the public.

SESSION T3. The Hydrogeological Effects of Urbanization

This session is being co-convened by Jack Sharp and Barry Hibbs at the University of Texas, Austin. Session co-sponsors include the IAH USNC, GSA Hydrogeology Division, GSA Engineering Geology Division, GSA Quaternary Geology and Geomorphology Division, and the GSA Geology and Society Division. This session examines how urbanization affects groundwater systems, including recharge rates, flow patterns, stream and spring flows, water quality, climatic effects, geotechnical design, and urban planning.

SESSION T8. Flow in Fractured and Karstic Aquifers: Models and Methods

This session is being co-convened by Carol Wicks at Louisiana State University and Todd Halihan at Oklahoma State University. Session co-sponsors include the IAH USNC, GSA Hydrogeology Division, and the Karst Waters Institute. Fractured and karstic aquifers remain difficult to characterize, but significant advances have been made in field methods and modeling of flow and transport through these systems. This session will examine these advances.

SESSION T10. The Hydrogeologic and Regulatory Environments of Phosphate Mining and Processing

This session is being co-convened by Gerry V. Winter at the Idaho Department of Environmental Quality and Neil Coleman at the Department of Geology and Planetary Science, University of Pittsburgh at Johnstown, Pennsylvania. Session co-sponsors include the IAH USNC, GSA Hydrogeology Division, and the GSA Geology and Health Division. This session will discuss the hydrogeologic and regulatory environments related to mining and processing of phosphate ore and the impact of both on the economics of mining.

The 2011 Ground Water Summit and 2011 Ground Water Protection Council Spring Meeting taking place **May 1-5** in **Baltimore, Maryland**, will bring together a mix of federal and state regulators, practitioners, natural resource managers, policymakers, municipal planners, remediation site owners, attorneys, climatologists, and those who supply knowledge and technology needed to address and influence key water issues.

This year's theme is **"Meeting Groundwater Challenges in Uncertain Times."** Economic conditions have placed enormous stresses on the resources of government, private industry, and academic and research institutions, which affect our ability to respond to the challenges of understanding, protecting, restoring, and managing the complexities of the nation's groundwater resources. This conference focuses on the critical need for cooperation and collaboration to raise and address issues affecting groundwater resources.

Call for abstracts

Abstracts are being sought for the Summit. There is a 300-word limit. Abstracts are due by 11:59 p.m. ET, November 21, 2010. The program will be determined in December 2010.

There will be several sessions dealing with international groundwater issues including:

4072 **Evaluating Water Resource Availability and Sustainability in a Water-Constrained World**
Session Chair - John R. Jansen, Ph.D., PG

4054 **Groundwater Quality Assessment and Remediation in the Developing World**
Session Chairs - Donald E. Jones and Ira May

3833 **The Future of Hydrophilanthropic Efforts and Funding for Universities and Professionals**
Session Chair - David K. Kreamer, Ph.D.

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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2011 World Water Congress

The XIV[th] World Water Congress (http://www.worldwatercongress.com/) of the International Water Resources Association is scheduled for 25-29 September 2011 in Porto de Galinhas, Brazil. Consider submitting an abstract for a presentation (due 1 November 2010). Generally recognized as the springboard event for the World Water Forum, the last triennial Congress in 2008 (http://www.worldwatercongress2008.org/) was a resounding success and was attended by more than 1,000 participants from around the world.

2011 Geological Society of America - Annual Meeting

Archean to Anthropocene – the past is the key to the future

9-12 October 2011 • Minneapolis, Minnesota USA, Minneapolis Convention Center
http://www.geosociety.org/meetings/2011/

Topical Session Proposal deadline: 11 January 2011
Registration deadline: Standard, 1 June thru 6 September 2011
Abstract deadline: 26 July 2011

Groundwater Resources Association of California (GRA)

An Associated Society of the Geological Society of America

2010-2011 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 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 telephone, 916-446-3626.

Upcoming GRA Conferences

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Interpreting Non-Detect Data Correctly
November 2, 2010
DoubleTree Ontario Hotel, Ontario, CA
Web Site: http://www.grac.org/nondetectdata.asp

Measurements of trace chemicals in environmental media (water, air, soils, biota) frequently result in values reported only as less than the laboratory reporting limit ("nondetects", or "qualified values"). The most commonly-used method for incorporating nondetects is to substitute one-half the reporting limit and continue as usual. This produces invasive data that may obscure patterns and trends that are present, or create those that are not present in the original data. It is fraught with error.

Standard methods for interpreting this type of data exist in medical and industrial applications, but have rarely been applied to environmental data. Methods are available for computing summary statistics, hypothesis tests, and regression equations. Their results are unequivocal, powerful, and accurate. This course introduces methods from the author's textbook ***Nondetects and Data Analysis: Statistics for censored environmental data***, published in 2005 by John Wiley.

Topics to be addressed include:

1. Why not use 1/2 the detection limit as a substitute for nondetect values. What are the problems? Are they serious? (yes, they are)
2. What better methods are out there, and how do they work?
3. What resources are available for the practical scientist (papers, software, etc.)?
4. How best to compute the mean and its UCL95 (as an example of a common analysis task) for data with nondetects?

Instructor:
Dr. Dennis Helsel, Principal of Practical Stats in Highlands Ranch, CO. He has 30 years experience applying statistics to environmental science. He is the lead author of the popular textbook "Statistical Methods in Water Resources" (USGS,2002) and of "Nondetects and Data Analysis" (Wiley, 2005) as well as many technical articles.

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2011 North American Environmental Field Conference and Exposition: *Advances and Innovations in Environmental Site Characterization, Sampling, Monitoring & Remediation Technology*

Organizer: Nielsen Environmental Field School, Co-Sponsors: GRA, ASTM, CRC, and many others
January 10 -13, 2011; Hilton Resort Hotel on Mission Bay, San Diego, California
Web Site: http://www.envirofieldconference.com/
Early Registration Deadline: November 10, 2010

Those involved or interested in practical applications of or leading-edge research on environmental site characterization, sampling, monitoring or remediation technology will wish to mark their calendars for this event.

Highlights of the 2011 Event:
Featuring papers presented by some of the world's foremost authorities in the field, discussing cutting-edge field-based technologies and methods for environmental site characterization, sampling, monitoring, and remediation.

- More than 60 hours of interactive indoor workshops on topics ranging from new environmental applications of direct-push technology to advances in hydraulic conductivity testing to improved drilling and borehole grouting methods to innovative soil and groundwater sampling methods to accelerated natural attenuation and site remediation using surfactants and enhanced oxidation techniques.
- More than 30 hours of hands-on, interactive outdoor workshops and equipment demos featuring the latest environmental field methods and equipment.
- Featuring 39 indoor exhibits and 20 outdoor exhibits showcasing state-of-the-science environmental field equipment and services.

GRA Events Being Planned or Considered for 2011
Check the web site at www.grac.org for more information.

- Forensic Geochemistry and Isotopes Short Course, February 2011
- Introduction to Watersheds Short Course, February/March 2011
- Emerging Issues, Spring 2011
- All About Wells, Joint GRA and California Groundwater Association event, Spring/Summer 2011
- Diagnostic Tools and Techniques for Diagnosing Well Performance Problems, Summer 2011
- GRACasts, approximately quarterly Web Seminars
- Subsidence Due to Groundwater Withdrawal, Summer/Fall 2011
- Groundwater Modeling, Fall 2011
- Biennial Groundwater Conference, October 2011
- Field Class Training – Monitoring Well Sampling, Fall/Winter 2011

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

2010

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.

October 25-26; Chapel Hill, NC; Water and Healh: Where Science Meets Policy.

October 31- November 3; Denver, CO; 2010 Geological Society of America (GSA) Annual Meeting. IAH USNC Meeting at GSA Conference., Tuesday November 2 at 4:30 pm.

November 1-4; Philadelphia, PA, Loews Philadelphia Hotel; Annual Water Resources Conference; American Water Resources Association.

November 2, 2010; DoubleTree Ontario Hotel, Ontario, CA; Interpreting Non-Detect Data Correctly, GRA.

2011

January 10 -13; Hilton Resort Hotel on Mission Bay, San Diego, California; 2011 **North American Environmental Field Conference and Exposition:** ***Advances and Innovations in Environmental Site Characterization, Sampling, Monitoring & Remediation Technology***

May 1-5; Baltimore, Maryland; 2011 Ground Water Summit and 2011 Ground Water Protection Council Spring Meeting, National Ground Water Association.

September 25-26; in Porto de Galinhas, Brazil; World Water Congress (http://www.worldwatercongress.com/) of the International Water Resources Association.

9-12 October 9-12; Minneapolis, Minnesota USA;Minneapolis Convention Center (http://www.geosociety.org/meetings/2011/) 2011 Geological Society of America - Annual Meeting.

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