Newsletter of the U.S. National Chapter, International Association of Hydrogeologists

In This Issue:

Upcoming IAH Meeting in Niagara Falls

Job Announcements

Student Opportunities

Dust and Groundwater Withdrawal in Iraq

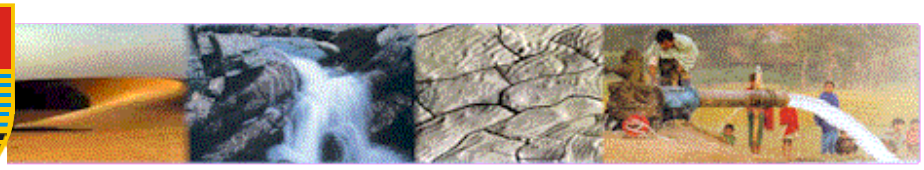
Radium in U.S. Principal Aquifers

New Publications and Reports

Groundwater Model Updates

March 2012, Vol. 41, No. 1

Photo: Elves Chasm, Grand Canyon National Park



International Association of Hydrogeologists
U.S. National Chapter Newsletter

Vol. 41, no. 1: March, 2012

Editor: Dave Kreamer, University of Nevada, Las Vegas

CONTENTS

A Note from the Chair – MIKE WIREMAN

ARTICLES, REPORTS, NOTICES, AND ANNOUNCEMENTS

- **IAH USNC Executive Board Meeting at joint National Ground Water Association/ Groundwater Protection Council Meeting, Garden Grove, CA, May 8, 2012, 4:30-5:30pm - All Members Welcome**
- **Abstract Deadline March 15, 2015 for the IAH 39th Congress, Niagara Falls, Canada, 16 – 21 September, 2012**
- **The U.S. National Chapter of IAH Launches a Program for Free Graduate Student Memberships**
- **USNC Establishes an Endowment Fund**
- **Apply for AGI's 2012 Summer Internships - Deadline March 15**
- **Radium in U.S. Principal Aquifers**
- **Photo Credit – Dr. Larry Stevens**
- **Blue Ribbon Commission Report on America's Nuclear Future**
- **New MODFLOW Model: MODFLOW-NWT**
- **EPA Releases New Technical Document**
- **IAH Meets in Minneapolis for the Geological Society of America**
- **New Book: Climate Change and Groundwater**
- **USGS Report: A Conceptual Model of the Great Basin Carbonate and Alluvial Aqifer System**
- **Characteristics of Regional Dust Storms Blowing Over Iraq**

CONFERENCES AND ASSOCIATED SOCIETIES

- **A Karst Waters Institute Symposium on *Carbon in Karst / Boundaries in Karst,* January 7 to 11, 2013, Carlsbad, New Mexico**
- **The Arizona Hydrological Society (AHS) 25th Annual Symposium, September 18 - 21, 2012, Phoenix, Arizona**
- **2012 GSA Annual Meeting & Exposition, Nov. 4-7, Charlotte, North Carolina**
- **Conference Updates**
- **Announcements from Groundwater Resources Association of California (GRA), *An Associated Society of the Geological Society of America***
- **Network on Groundwater and Ecosystems at the Niagara Falls IAH Congress**

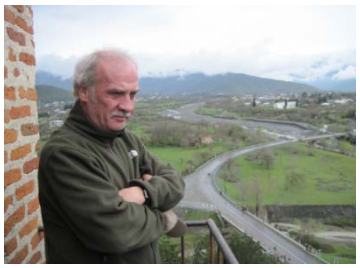
JOBS

- **Montana Tech**

IAH/US NATIONAL CHAPTER: EXECUTIVE COMMITTEE 2009-2012

Chairman:	**Michael Wireman** **wireman.mike@epa.gov**	**U.S. Enivronmental Protection Agency** **(303) 312-6719**
Vice President, North America:	**lkonikow@usgs.gov**	**Leonard F. Konikow U.S. Geological Survey**
Past-Chair:	**John M. (Jack) Sharp** **jmsharp@mail.utexas.edu**	**Univ. Texas, Austin**
Secretary:	**Dave Kreamer** **dave.kreamer@unlv.edu**	**University of Nevada, Las Vegas** **(702) 895-3553**
Treasurer:	**Victor Heilweil** **heilweil@usgs.gov**	**U.S. Geological Survey**
Director:	**William Alley**	**U.S. Geological Survey**
Director:	**Vicki Kretsinger Grabert**	**Luhdorff & Scalmanini, Consulting Engineers**
Director:	**Jim Lamoreaux**	**PE LaMoreaux & Associates, Inc.**

IAH Members at the Annual Meeting of the Geological Society of America: from left, Rick Gerber, Lenny Konikow, Ken Howard, Vicki Kretsinger Grabert, Mike Wireman, John Chilton, Vic Heilweil, Jack Sharp, Suzanne Pierce



A NOTE FROM THE CHAIR

It is hard to believe that this is the final year for the current USNC Executive Board. The first three years have gone by very quickly. Elections for new Board members will be held this year and the new Board will start their 4 year terms on January 1, 2013. I think I can speak for all of the Board members when I say that it has been an exciting and active time for the US Chapter of IAH. During our tenure we have tried to maintain strong communication with US members, maintain a strong membership and leadership group and move the US Chapter forward in terms of strengthening our relationship with IAH International, creating a US Chapter website, creating an endowment fund, developing new partnerships and participating in the planning for the upcoming IAH Congress in Niagara Falls, Ontario in September 2012.

A meeting of the Executive Committee was held on October 10, 2011 during the GSA Annual Meeting in Minneapolis. Meeting notes were sent to all members via email. During that meeting the Board gave final approval to the establishment of a USNC Endowment Fund (see article in this newsletter). I would like to thank Jack Sharp for his long time support and effort on behalf of establishing the Endowment Fund.

Please plan to attend the 39th Annual IAH Congress in Niagara Falls in September 2012. A number of sessions are being chaired by USNC members and some short courses are being presented by USNC members. This is a great opportunity to network with International colleagues.

As always I want to thank all USNC members for your continued support. Our membership has grown to more than 300 as of the end of 2011. We have already signed up 25 new members in 2012. We have 10 sponsored members. The USNC sponsors 8 members; five from developing countries and 3 students. Two members are sponsored by individual USNC members. We are pleased to welcome three new sponsored students for 2012 – Rory Cowie, University of Colorado; Laura Hanna, Illinois State University; and Geansh Tripathi, University of Kentucky.

The next full Executive Committee meeting will be held on May 8, 2012 at the NGWA Ground Water Summit in Garden Grove, CA. I will let members know as soon as a location is determined. All USNC members and guests are invited. A meeting agenda is included in this newsletter. As always feel free to contact me or any of the Board members with questions, suggestions, requests, etc.

Mike Wireman, Chair – IAH-USNC Executive Board

ARTICLES, REPORTS, NOTICES, AND ANNOUNCEMENTS

Open to All IAH Members!

PLEASE PLAN TO ATTEND THE NEXT USNC BOARD MEETING in Garden Grove, CA, May 8, 2012, 4:30-5:30pm - All Members Welcome!

The Board Meeting will be held at the Ground Water Summit which is joint National Ground Water Association/ Groundwater Protection Council Meeting.

IAH is a co-sponsor for the Meeting

An email will be sent to all USNC members with information on the building and room

Agenda

Introductions
Secretary's report
Treasurer's report
Endowment Fund
Partnerships - Engineers Without Borders / Hydrogeologists Without Borders
2012 IAH Congress in Niagara Falls
USNC Board elections

Mike Wireman, Chair- USNC Executive Committee

Abstract Deadline March 15th for the 39th IAH Congress Niagara Falls, Ontario, Canada 16 to 21 September, 2012

In September 2012, Canada will host the 39th IAH Congress in Niagara Falls, Ontario. The 2012 Congress theme is Confronting Global Change. The Congress will allow researchers to present on a wide variety of new and evolving hydrogeological issues and opportunities. Sub-themes to be highlighted include:

- **Climate Change**
- **Source Water Protection**
- **Groundwater and Energy**
- **Groundwater/Surface Water Interaction**
- **Groundwater and Cities**
- **Aquitard Hydrogeology**

A variety of field trips will be available to participants both on the mid-week field trip day as well as post conference.

2012 is a special year for hydrogeology in Canada as it is the 40th anniversary of the formation of the Canadian National Chapter of the International Association of Hydrogeologists (IAH-CNC Inc.). Historical plenary sessions featuring some of Canada's most esteemed hydrogeologists are being planned to honor this occasion.

Please visit www.iah2012.org for more information on this exciting conference.

IMPORTANT DATES

- **Deadline for abstract submission – March 15, 2011**
- **Deadline for early discount registration -June 15, 2012**
- **Deadline for discounted conference room rate-August 17, 2012**
- **Check-in for the Congress -September 16, 2012**

Niagara Falls is the place to be for the 2012 IAH CONGRESS. Don't miss the fun!!

The U.S. National Chapter of IAH Launches a Program for Free Graduate Student Memberships

A new student membership initiative was launched this year. The IAH USNC had its first solicitation, encouraging all graduate students enthused about hydrogeology and learning more about hydrogeology in other countries to join IAH.

Each year, the USNC is providing the opportunity for a free, one-year student membership in IAH for up to 3 graduate students. To pursue this opportunity, the USNC requests the following:

- **Any university professor in a graduate hydrogeology program can nominate one hydrogeology graduate student (who will remain a graduate student at least through June of the following year) for a one-year membership.**
- **The professor should determine that the graduate student has an interest in and will benefit from this membership.**
- **The nominating professor will submit the following application information:**
  - **Submitting professor's name, academic affiliation and department, and contact information;**
  - **Student name, academic affiliation and department (confirm whether same or different), and contact information;**
  - **Student graduation month and year (anticipated date); and**
  - **Statement relating to student interest and potential benefit derived from IAH membership (1 to 2 sentences).**
- **Nominations are typically due near the end of each calendar year; application information is emailed to Vicki Kretsinger Grabert, USNC Board Member and Membership Liaison at vkretsinger@lsce.com.**

Following the close of nominations, the IAH USNC Executive Committee will tally the number of graduate student nominations, select awardees on a random selection basis if there are more nominees than can be selected, and notify winners (both the nominators and the winners). The IAH USNC will submit the applicant's contact information and payment to IAH headquarters for the student's IAH membership, including subscription to the *Hydrogeology Journal,* beginning with the first issue of the membership year.

The USNC looks forward to increasing student participation in IAH!

USNC IAH Announces Graduate Student Winners For 2012!

Nominating Professor: Eric W. Peterson, PhD
Associate Professor, Graduate Coordinator Hydrogeology Program
Department of Geography-Geology, Illinois State University; Normal, IL

Student: Laura Hanna
University: Illinois State University
Department: Department of Geography-Geology
Anticipated graduation date: December 2013

Laura has already shown a desire to work internationally as she obtained an internship opportunity working at the American University in Cairo, Egypt for the year after graduating from undergraduate from the University of New Hampshire. Laura plans to work internationally after her Master's at Illinois State University and she hopes to meet and learn about potential internship/job opportunities through the IAH network.

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Nominating Professor: Alan E. Fryar, PhD
Associate Professor, Director of Graduate Studies,
Department of Earth and Environmental Sciences, University of Kentucky; Lexington, KY

Student: Ganesh N. Tripathi
University: Department of Earth and Environmental Sciences University of Kentucky; Lexington, KY
Department: Department of Earth and Environmental sciences, University of
Anticipated graduation date: January 2013

Ganesh's research is related to surface water/groundwater interaction. He is doing his PhD while on leave from the Nepal Department of Mines and Geology. He feels this is a great opportunity for any Hydrogeology student to be a part of IAH.

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Nominating Professor: Mark Williams, PhD
Professor, Geography and Fellow, INSTAAR, University of Colorado-Boulder

Student: Rory Cowie
University: INSTAAR, University of Colorado-Boulder
Anticipated graduation date: August 2013

Rory won the student award at last year's NGWA Ground Water Summit. Rory's research interest is surface water/groundwater interactions in mountain catchments.

USNC ESTABLISHES ENDOWMENT FUND

At the October 10 USNC Executive Board meeting a decision was taken to formally establish an Endowment Fund. The Board approved the mission statement below. These funds are invested in an extended market index fund. We welcome any comments and thoughts from USNC members. Please consider donating to the Endowment fund. These funds will allow the USNC to be more effective in promoting the mission of IAH and providing opportunities for USNC members.

Mike Wireman, Chair –USNC Executive Board

Mission Statement

Endowment Fund

United States National Chapter–International Association of Hydrogeologists

January 2012

Pursuant to a decision taken at the Oct 10, 2011 Board meeting, the Executive Board of the US Chapter of the International Association of Hydrogeologists has established an Endowment Fund. The Endowment Fund will be managed as a separate fund and a portion of earnings from this fund would be available for various uses related to promoting the mission of IAH and the USNC. As of January 10, 2012 the Endowment Fund has a balance of $10,000. Fund donations will be allowed to accumulate until a minimum balance is achieved and then an amount approved by the Board would be invested to generate income. The Endowment Fund will be managed by the USNC Treasurer. Donations to the Endowment Fund will be encouraged from the USNC members.

Monies from the Endowment Fund could be used for a number of purposes. These include: (1) sponsor international members, (2) sponsor student members, (3) provide travel grants to students, (4) fund activities / efforts related to water development and management in developing countries, and (5) support local chapters in developing countries and, (6) other uses not currently anticipated. The use of Endowment Fund monies for any given purpose / activity will require approval by the USNC Executive Committee.

Apply for AGI's 2012 Summer Internships

Deadline March 15

The American Geosciences Institute's Geoscience Policy program offers summer and semester internship opportunities for geoscience students (undergraduates and/or Masters students) with an interest in public policy and in how Washington impacts the geoscience community. Interns gain a first-hand understanding of the legislative process and the operation of executive branch agencies while enhancing their writing, research, and web publishing skills. Deadlines for online submission of applications are March 15 for summer, April 15 for fall, and October 15, 2012 for spring 2013. For more information, go to: http://www.agiweb.org/gap/interns/index.html

Radium in U.S. Principal Aquifers

What are the most important factors affecting dissolved radium concentrations in principal aquifers used for drinking water in the United States? Results of a new USGS study reveal where radium was detected and how rock type and chemical processes control radium occurrence. Knowledge of the geochemical conditions may help water-resource managers anticipate where radium may be elevated in groundwater and minimize exposure to radium, which contributes to cancer risk. The report indicates that concentrations of radium in principal aquifers used for drinking water throughout the United States generally were below 5 picocuries per liter (pCi/L), the U.S. Environmental Protection Agency (USEPA) maximum contaminant level (MCL) for combined radium - radium-226 (Ra-226) plus radium-228 (Ra-228) - in public water supplies. About 3 percent of sampled wells had combined radium concentrations greater than the MCL. Elevated concentrations of combined radium were more common in groundwater in the eastern and central United States than in other regions of the Nation. About 98 percent of the wells that contained combined radium at concentrations greater than the MCL were east of the High Plains. The highest concentrations of combined radium were in the Mid-Continent and Ozark Plateau Cambro-Ordovician aquifer system and the Northern Atlantic Coastal Plain aquifer system. More than 20 percent of sampled wells in these aquifers had combined radium concentrations that were greater than or equal to the MCL. Radium-226 and Ra-228 occur most frequently together in unconsolidated sand aquifers, and their presence is strongly linked to groundwater chemistry. Three common geochemical factors are associated with the highest radium concentrations in groundwater: (1) oxygen-poor water, (2) acidic conditions (low pH), and (3) high concentrations of dissolved solids. The Fact Sheet on this topic is available for downloading from a link at: http://pubs.usgs.gov/fs/2010/3113/

Correction: Photo Credit

Last Month's Newsletter cover included a stunning photo of Vasey's Paradise in Grand Canyon National Park, but unfortunately did not give recognition the photographer, Dr. Larry Stevens of the Museum of Northern Arizona, who graciously allowed this photo to be included. Thanks Larry!

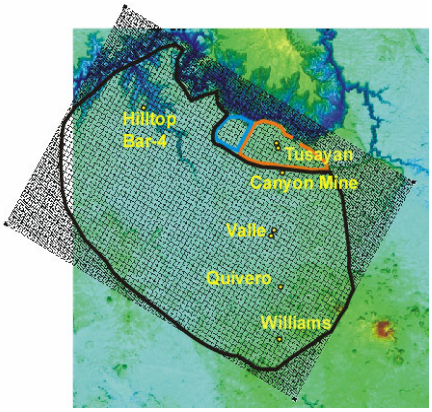
Contributions for future Newsletter covers of springs, wells, or anything groundwater are welcomed!

Blue Ribbon Commission Report on America's Nuclear Future

On January 26, the Blue Ribbon Commission on America's Nuclear Future (BRC) released their final report, which consists of recommendations to create a safe, long-term solution to managing and disposing the nation's nuclear waste. The *Report to the Secretary of Energy* was commissioned two years ago by President Obama to identify strategies to manage more than 65,000 tons of spent nuclear fuel stored at about 75 operating and shutdown reactor sites around the country. Copies are available for downloading: http://brc.gov/sites/default/files/documents/brc_finalreport_jan2012.pdf

One of the BRC's main proposals is to hand over the responsibility of managing nuclear waste from the Department of Energy to a federally chartered corporation founded for that purpose. Though the commission was not instructed to evaluate the suitability of any particular waste site, the report recommended an immediate search for a geologic repository for the long-term storage of waste and an interim site until the long-term site is developed. Referring to the tens of billions of dollars paid to the government by utility companies since 1998, the report recommended restructuring the Nuclear Waste Trust Fund so that the money will only be spent for its intended purpose. As it stands, the money that utilities pay to the fund every year goes into general government funds.

Source: AGI



New MODFLOW Model: MODFLOW-NWT

A new version of MODFLOW-2005 has been developed and released that improves numerical stability and accuracy for many nonlinear problems, such as those involving water-table conditions with drying and rewetting of cells. MODFLOW-NWT is a standalone program that uses a Newton formulation to solve the groundwater flow equation (as opposed to the standard Picard formulation). MODFLOW-NWT is described in the USGS documentation report by Niswonger, Panday, and Ibaraki (2011). The report, the code, and related materials can be downloaded from links at: http://water.usgs.gov/nrp/gwsoftware/modflow_nwt/ModflowNwt.html

Image Courtesy of Abe Springer, Northern Arizona University

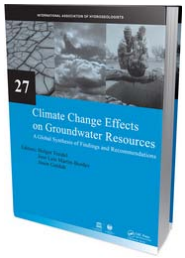
EPA Releases New Technical Document

EPA recently released a new technical document entitled *Identifying and Protecting Healthy Watersheds: Concepts, Assessments, and Management Approaches*. This document provides state water quality and aquatic resource scientists and managers with an overview of the key concepts behind the Healthy Watersheds Initiative (HWI). The HWI is intended to preserve and maintain natural ecosystems by protecting our remaining healthy watersheds, preventing them from becoming impaired, and accelerating our restoration successes. The HWI encourages states to take a strategic, systems approach to protecting healthy watersheds and preventing future water quality impairments.

This new technical document provides examples of approaches for assessing components of healthy watersheds, integrated assessment options for identifying healthy watersheds, examples of management approaches, and some assessment tools and sources of data. The document is available at http://water.epa.gov/polwaste/nps/watershed/index.cfm.

IAH Meets in Minneapolis for the Geological Society of America

The International Association of Hydrogeologists met at the Geological Society of America Meeting, October 9-12, 2011. IAH had a display booth in the Conference Hall, held an Executive Board Meeting for the U.S. National Chapter, and had guests from the United Kingdom and Canada. Photos from an informal dinner below include: Mike Wireman, Joseph Asante, John Chilton, Vic Heilweil, Ken Howard, Dennis Peach, Rick Gerber, Lenny Konikow, Vicki Kretsinger Grabert, and Bill Alley.



New Book: Climate Change and Groundwater

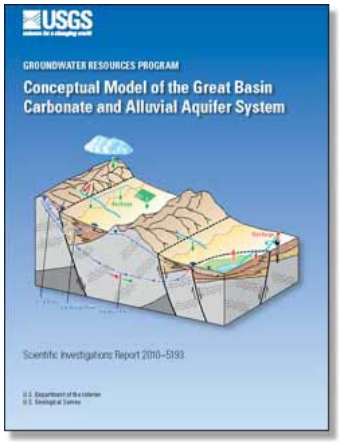
Climate Change Effects on Groundwater Resources: *A Global Synthesis of Findings and Recommendations*
Edited by Holger Treidel, Jose Luis Martin-Bordes, and Jason Gurdak

Climate variability and change is modifying the global hydrological cycle and affecting the quantity and quality of freshwater resources. This is also true for groundwater resources that are a critical source of drinking water for almost half the world's population, supply irrigated agriculture and sustain streams, wetlands, and ecosystems. But despite this importance our knowledge on how groundwater resources respond to the pressures of climate variability & change and increased human activities has remained limited compared to climate change effects on surface water.

In the framework of UNESCO's GRAPHIC project (Groundwater Resources Assessment under the Pressures of Humanity and Climate Change) numerous case studies have been carried out over the past years, investigating the effects of climate change and human activities on groundwater resources. 20 of these case studies from diverse aquifer systems and climatic settings in over 30 countries around the world have now been published with Taylor and Francis – CRC Press in cooperation with the International Association of Hydrogeologists (IAH). This book presents a current and global synthesis of scientific findings and derived policy recommendations for scientists, water managers and policy makers towards adaptive management of groundwater sustainability under future climate variability and change.

Learn more about UNESCO GRAPHIC: http://www.unesco.org/new/en/natural-sciences/environment/water/ihp/ihp-programmes/graphic/

Link to the new book: http://www.crcpress.com/product/isbn/9780415689366



USGS Report: A conceptual model of the Great Basin carbonate and alluvial aquifer system

Scientific Investigations Report 2010–5193

U.S. Department of the Interior
U.S. Geological Survey

Groundwater pumping, which has been increasing since the 1940s, now accounts for about one third of the estimated annual flow from the aquifers of the eastern Great Basin. In parts of this region, groundwater pumping exceeds the rate of natural discharge, leading to land subsidence and declines in water levels and spring flow.

U.S. Geological Survey scientists recently published a report examining groundwater recharge (replenishment) and discharge for the eastern Great Basin. The study examined 110,000 square miles across Utah, Nevada, California and Idaho, and the report covers groundwater conditions from Death Valley in the southwest to Cache Valley in the northeast.

"Groundwater resources are not only a critical part of present water supplies in this area, but are likely to increase in importance in the future because the region is facing population growth and limited surface water supplies," said Kevin Dennehy, coordinator for the USGS Groundwater Resources Program. "The results of the study have the potential to aid state and local agencies to better manage their future water supplies."

"This USGS publication evaluates the groundwater resources of the eastern Great Basin, a part of the United States that is predominantly desert yet is under considerable pressure for continued development," said Hugh Hurlow, a senior scientist with the Utah Geological Survey. "The USGS used the most advanced techniques available and the report thoroughly explains the data sources and methods of analysis. This work improves understanding at a regional scale, providing an essential template for more local, focused analyses."

The primary uses for groundwater withdrawals in this area are for irrigation, municipal purposes and industrial water. There are several large water development projects currently being considered for transporting groundwater from rural valleys to urban areas in order to supply cities with municipal water for future growth.

USGS scientists developed a new three-dimensional model of the area's geology, providing insights into how carbonate (bedrock) and alluvial (loose sediment) aquifers are connected over much of the eastern Great Basin. Hydrologic data from hundreds of previous reports were compiled to map directions of groundwater flow and develop a regional groundwater budget (analysis of recharge and discharge) of the aquifer system.

USGS Scientific Investigations Report 2010-5193, "Conceptual Model of the Great Basin Carbonate and Alluvial Aquifer System," can be viewed online. The report consists of multiple chapters documenting various aspects of the aquifer system, along with plates, appendices, auxiliary files and GIS data sets.

This report is a product from the four-year study funded by the USGS Groundwater Resources Program as part of a national assessment of groundwater availability.

Characteristics of Regional Dust Storms Blowing Over Iraq

Prof. Dr. Moutaz Al-Dabbas, Science college – University of Baghdad, Baghdad, Iraq, (profaldabbas@yahoo.com)

Identified regional dust storms by satellites imagery, which blow over Iraq and the Middle East, were studied from December 2008 to March 2009. The collected dust storm samples were from the middle and south Iraq, (Figure 1). The climatic elements with the dust storm types were studied. The average mean annual rainfall (in mm), evaporation (in mm), temperature (in ºC), and relative humidity indicate that there were remarkable variations in values, with increase of the number of days / years of the dust storms which reflected the effect of the regional climatic change. The results of particle size analyses indicate the texture most of samples range from sandy clayey silt (75%), and clayey sandy silt (25%). The result of roundness analysis of quartz grains showed 15% rounded, 85% sub rounded. Moreover, the dust samples were analyzed and identified using XRD analyses, reflecting the following minerals: quartz, feldspars, calcite, with small amount of gypsum. The clay minerals Chlorite, Illite, Montmorillonite, Palygorskite and Kaolinite were recognized. The microscopic analyses of heavy mineral percentage were carried out. The results of pollen distribution, in descending order, were

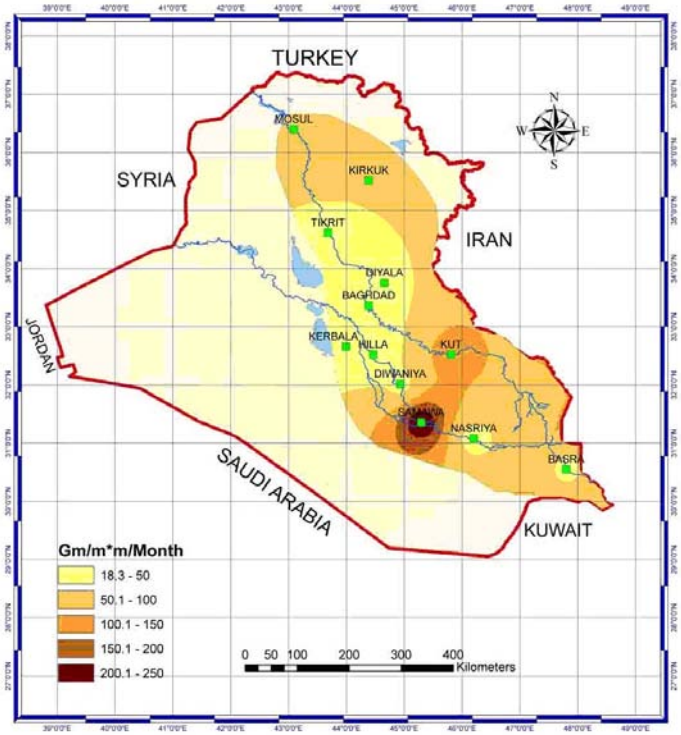


Figure 1: Location map of Iraq, show the mean monthly fallen dust weights in gm/ m2 ,for years (1993-2008).

Chenopodiaceous, Graminea, Pine, Artemisia, Palmae, Olea & Typha, (representing 79%, 69%, 63%,53%,17%,9%,&7% of the counted pollen grains, respectively). The results of microorganism analysis (i.e. isolated bacteria and fungus), in descending order, were the gram–positive *Bacillus* species (42.9 %), *Aspergillus* species plus *Candida albicans* (13.8%), and (8.4%) respectively, the gram-negative rods, *Escherichia coli* (9.5%), the gram-positive *Cocci streptococcus pneumonia* (6.7%), and the gram-negative rods *Enterobacter Cloacae* (4.3%), *Staphylococcus epidermidis* and *Staphylococcus* (3.9% and 1.9%), respectively. The remaining Gram-negative microorganisms were *Pseudomonas aeruginosa* (2.7%). Regarding the viral etiology; there were no viral isolates among the work results. The allergens commonly associated with dust storms include fungal spores, plant and grass pollens, and organic detritus represent an agricultural area pollens grains, (Figure 2).

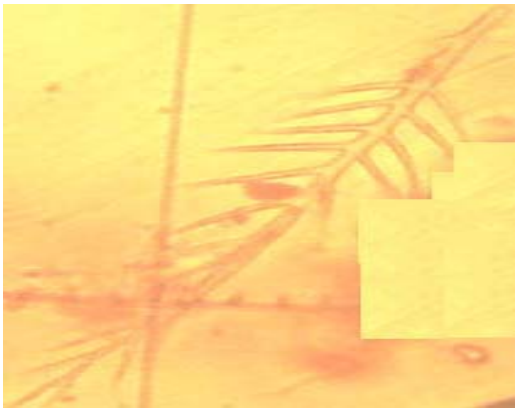


Figure 2: Micro Spine in the studied dust storms samples of Baghdad, (relatively small at 18 to 25 µm).

<u>The present study has given rise to the following conclusions:</u>

1-The results indicate that Iraq and Middle East region were affected by global climatic change, as shown by the increase of temperature, evaporation, and decrease of rainfall, relative humidity from the year 1967 to 2007. Concurrently, there is a remarkable increase in the number regional dust storms blowing in Iraq, doubling during 2008 .

2- The results of particle size analyses indicated that the main texture of most dust samples were sandy clayey silt, and to less extent clayey sandy silt, that depend on the energy and velocity of the wind from the regional dust storms which carry these grains. The results of roundness of quartz grains suggest that they were transported over long distances.

3- The desert land, different geological formations, Sabkha, irrigated land, and agricultural land were considered as sources of dust storm loads which were transported with regional dust storms from different locations.

4- The studied pollens reflect a wet-moist climate, as indicated by the pollen grains. Such results may give good evidence that regional dust storms originated in far-away places as shown by the pine pollens that have sacs to keep pollen afloat. This pollen can be carried great distances by the wind, perhaps from northern Syria, Turkey, or transported from other countries which have the same climate.

5- During the strong dust storms affecting Baghdad and other Iraqi locales, reports from the Iraqi Ministry of Health, and statistical analyses carried out by researchers on numerous case studies from many hospitals in Baghdad and the governorates, indicated that many people were taken to hospitals after sustaining breathing problems, asthma, bronchitis, and lung diseases.

The author, Prof. Dr. Moutaz Al-Dabbas, pictured at left with Dr. J. David Betsill (Sandia National Laboratory), and Dr. Dave Kreamer (UNLV)

CONFERENCES AND ASSOCIATED SOCIETIES

PRELIMINARY ANNOUNCEMENT

A Karst Waters Institute Symposium on
Carbon in Karst / Boundaries in Karst
January 7 to 11, 2013, Carlsbad, New Mexico

There is growing interest in the dynamics of both inorganic and organic carbon in karst systems, and in the flux of carbon and nutrients between surface and subsurface, and between different components in the subsurface of karst. This meeting will highlight recent advances in biology, geology, and hydrology that are helping us understand the dynamics of karst aquifers, especially with respect to carbon. There will be both invited lectures and contributed posters covering the following topics:

- **Fluxes and reservoirs in and through epikarst**
- **Fluxes and reservoirs in and through the phreatic zone**
- **Lateral inputs into karst—insurgences**
- **Lateral outputs in karst—resurgences**
- **CO_2 storage in karst**
- **Organic carbon sources and carbon quality in karst**
- **Large scale models and synthesis**

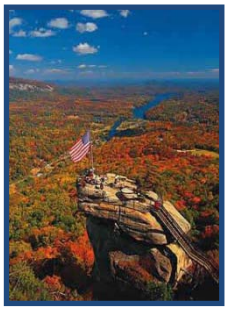
The meeting will be held at the headquarters of the newly constructed National Cave and Karst Research Institute (NCKRI), which is co-sponsoring the symposium. In addition to the invited talks, there will be two evening poster sessions and a day long field trip to Carlsbad Caverns National Park, including a visit to the cave. The meeting is close not only to Carlsbad Caverns National Park but also Guadalupe Mountains National Park, and makes an ideal starting place for a visit to the many parks and features of the desert southwest. For more information, contact Daniel Fong (program chair, dfong@american.edu), David Culver (meeting chair, dculver@american.edu), or visit our web site at www.karstwaters.org.

The Arizona Hydrological Society (AHS) is pleased to announce its AHS 25th Annual Symposium:

Confluences -25 Years Bringing Water, Science, & People Together

September 18 - 21, 2012
Desert Willow Conference Center
4340 E. Cotton Center Boulevard
Phoenix, Arizona

The Annual AHS Symposium is a premier event in the southwest for hydrology and water resources science, engineering, and public policy. Look for details at: www.azhydrosoc.org/2012symposium.html.



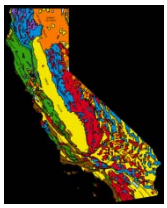
SAVE THE DATE

2012 GSA Annual Meeting & Exposition

NOVEMBER 4-7, CHARLOTTE, NORTH CAROLINA, USA

GEOSCIENCES: INVESTING IN THE FUTURE

Conference Updates: Full IAH conference listings can be found at http://www.iah.org/conferences.asp



Groundwater Resources Association of California (GRA)

An Associated Society of the Geological Society of America

2012 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 2012 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

90 Minute GRA-Cast Series: ***Abandoned Wells and Improperly Constructed Wells Are a Continuing Threat to California's Groundwater Resources***
Part Two - Other State's Approaches to Addressing Abandoned and Improperly Constructed Wells: Minnesota, Nevada, Oregon, & Texas

Wednesday, March 14, 2012 from 12:00 pm – 1:30 pm PST

Speakers/Presenters:
Michael P. Convery, Minnesota Department of Health
Thomas K. Gallagher, Nevada Division of Water Resources
Ivan Gall, Oregon Water Resources Department
David Gunn, Texas Department of Licensing and Regulation
Tim Parker, Parker Groundwater, GRA Director – Moderator

Upcoming GRA Conferences (continued)

90 Minute GRA-Cast Series: ***California Statewide Groundwater Elevation Monitoring (CASGEM) Program***

Tuesday, March 27, 2012 from 12:00 pm – 1:30 pm PST

Speaker/Presenter: Brett Wyckoff, California Department of Water Resources (DWR)

26th Symposium in GRA's Series on Groundwater Contaminants:

Salt and Nitrate in Groundwater: Finding Solutions for a Widespread Problem

June 13-14, 2012, Radisson Hotel & Convention Center, Fresno, CA

GRA in collaboration with the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) Initiative and Central Valley Regional Water Quality Control Board; Co-sponsored by the University of California Water Institute

The United Nations' visit to Tulare County and subsequent report on safe drinking water and sanitation for low-income communities in the San Joaquin Valley highlighted growing concerns about the decades-old problems of salt and nitrate in California's groundwater. Nitrate concentrations in groundwater exceeding the drinking water standard pose a difficult challenge for disadvantaged communities and in private water supply wells that serve rural residences. Salt accumulating in the soil and groundwater in the San Joaquin Valley and other areas of California threatens agricultural viability and the sustainability of California's water systems.

This Symposium will focus on finding solutions to these problems, featuring topics such as:

- **The research and work conducted by the University of California and others in response to SBX2-1 (Perata, 2008) to compile, analyze, and synthesize nitrate data and assess potential solutions, their estimated costs, and challenges facing California to address this issue;**
- **Challenges on the road to finding solutions from the perspective of the state agencies, local governmental bodies, environmental justice groups, private business interests, and researchers and consultants;**
- **The State Water Board's Recycled Water Policy directives for salt and nutrient management across the State;**
- **Cutting-edge strategies, technologies, and solutions that are being implemented to control, manage, and treat salt.**

Look for the Call for Posters and further details on the GRA website, *www.grac.org*.

For more information, contact Michael Steiger (650-292-9100; msteiger@ekiconsult.com), Thomas Harter (530-752-2709; thharter@ucdavis.edu), or Vicki Kretsinger 530-661-0109; vkretsinger@lsce.com

Upcoming GRA Conferences (continued)

GRA 21st Annual Conference & Meeting

October 4-5, 2012 Conference and Meeting;
October 3, 2012 Optional Field Trip & Dinner
DoubleTree by Hilton Hotel, Rohnert Park, CA in Sonoma County

Special Features Include:

- **California Water Plan Update 2013: DWR's Plans for Significantly Enhancing Groundwater Information including State-Wide Inventory of Groundwater Management Plans and Program Activities, Approach to Estimating the Change in Storage in Basins/Sub-basins, and Climate Change Impacts on Groundwater Supply and Storage**
- **Advances and Updates in Data Management: CASGEM and GeoTracker**
- **ACWA's Groundwater Management Framework Action Plan Priorities**
- **Stanford Woods Institute Center for the Environment/John Lane American Water in the West: Best Management Practices for Groundwater**
- **Stanford University USA and Queensland University Australia: Comparative Groundwater Law and Policy**
- **AB 359: Mapping Groundwater Recharge Areas**
- **SB918: Adopting uniform health standards for recycled water**
- **Groundwater Recharge and Storage: State Water Board Recycled Water Policy, Central Valley Regional Water Board Draft ASR General Order, California Water Commission Hearings**
- **CV-SALTS and the SBX2-1 State Water Board Nitrate Study: Progress to-date and State-wide Implications**
- **State Water Board Groundwater Strategy**
- **2012 David Keith Todd Lecturers: Dr. John Cherry and Dr. Bill Alley**
- **Collegiate Groundwater Colloquium**
- **Optional pre-conference Field Trip lead by the Sonoma County Water Agency**
- **Optional pre-conference Dinner: Mixing Wine and Local Geology**

Cooperating Organizations

University of California Water Institute, California Department of Water Resources, Cal/EPA Department of Toxic Substances Control, Water Education Foundation, US Geological Survey, Association of California Water Agencies

Call for Abstracts coming soon. More details will be available on GRA's website, www.grac.org, as they develop.

Other GRA Events Being Planned for 2012

- **GRACasts, approximately quarterly Webinars (Well Abandonment and Construction; Parts 3 and 4)**
- **Effects of Petroleum Practices on Water Resources, including Hydrofracking**
- **Fractured Rock Symposium**
- **Subsidence**
- **Groundwater Modeling Short Course**
- **Dry Cleaners Symposium**

INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS

NETWORK on GROUNDWATER & ECOSYSTEMS

Meeting Announcement

Join us for the first gathering of this new network during the 39th IAH Congress, in Niagara Falls, Canada

Date of meeting :
TBA

Become a member or a leader! Contact one of the caretaker directors below

Network Leadership

Director: Joe Gurrieri
US Forest Service, Denver, Colorado
jgurrieri@fs.fed.us

Co-Director: Mike Wireman
US Environmental Protection Agency, Denver , Colorado
Wireman.Mike@epamail.epa.gov

Co-Director: Vacant

Photo: Kendall Warm Springs, Wyoming USA (inset: the endemic Kendall Warm Springs Dace)

What is the IAH Network on Groundwater and Ecosystems all about?

This network is dedicated to improving our understanding of the relationship between groundwater and ecological resources. To achieve this goal, the Network's key objective is to promote inter-disciplinary research, collaboration and exchange of ideas among hydrogeologists, biologists, physical, and social scientists regarding the relationship between groundwater and ecology.

NETWORK ACTIVITIES

Sponsor sessions and workshops

Social networking to exchange ideas and opportunities

Develop educational materials

"When you drink the water, remember the Spring"
Chinese Proverb

Job Opportunity

Montana Tech
THE UNIVERSITY OF MONTANA

Professional Scientist or

Assistant Research Hydrogeologist/Geologist

DEPARTMENT:	Montana Bureau of Mines & Geology
Closing Date:	March 16th , however position will remain open until filled
Employment Detail:	Permanent, Full-Time
Salary	Title and pay scale will be determined based on successful candidate's education and experience.

Primary Duties

Successful candidate will be based in Butte, Montana. Depending on qualifications, individual will be hired as either a Professional Scientist, or Assistant Hydrogeologist/Geologist within the Ground Water Assessment Program (GWAP) at the Montana Bureau of Mines and Geology. Primary duties will be the analysis of hydrogeologic and geologic data to develop regional interpretations of hydrogeologic frameworks, groundwater flow systems, and groundwater quality. These interpretations will be compiled into maps and reports. Successful candidate should have knowledge of the geology and hydrogeology of Montana, and familiarity with the Montana Ground Water Information Center (GWIC) online database. Other tasks include planning and assisting with field activities such as: measuring groundwater levels; collecting water quality samples; design and supervision of monitor well installation; planning and execution of aquifer tests; geologic mapping; and stream gauging. Successful candidate will be expected to work individually and as part of a team to write reports and develop map products; make presentations at public and scientific meetings; routinely work on more than one project; and answer public inquiries. Successful candidate will be required to travel including some overnight stays. Duties will require candidate to work safely alone in isolated areas, be able to lift 50 lbs., and may require walking up to 2 miles.

Knowledge, Skills & Education Required

- A Bachelors degree in hydrogeology, geology, or related field and a minimum of 3 years experience (or a Masters degree in hydrogeology, geology, or related field) for the Professional Scientist level;
- a Masters degree in hydrogeology, geology, or related field and a minimum of 3 years groundwater project experience (or a Ph.D. in hydrogeology, geology, or related field) for the Assistant level.
- Good verbal and written communication skills.
- Proficiency with common word-processing and spreadsheet software (e.g. Microsoft Office).

Preferred Education & Experience

- Hydrogeologic and/or geologic field experience.
- Experience with GIS analysis and hydrogeologic/geologic map compilation using GIS (ARCMap preferred).
- Experience in synthesizing, interpreting, and managing hydrogeologic data.
- Experience in interpreting well-log data and characteristics of stratigraphic units to develop aquifer relationships.
- Ability to produce high-quality written reports.
- Familiarity with water-level and field water-quality instruments, data loggers, stream gauging equipment, and GPS receivers.
- Familiarity with water-quality and groundwater flow modeling software.

To apply, please submit the following items:

- Cover letter which specifically addresses the above-mentioned qualifications
- Detailed resume
- Name and contact information for 3 professional references
- Authorization for Criminal Background Investigation

The items listed above should be sent to:

Any offer of employment is contingent upon a satisfactory criminal background check. An authorization for a criminal background check form must be submitted with application material www.mtech.edu/employment

Montana Tech Personnel Office ■1300 West Park Street■Butte, MT 59701

Phone: 406-496-4380 ■ Fax: 406-496-4387 ■e-mail: cisakson@mtech.edu

EEO / AA