

The Hydrogeologist

Newsletter of the
GSA Hydrogeology Division

Fall 2014
Issue No. 83



GSA Annual Meeting 2014 Vancouver, BC Canada October 19-22

The 2014 GSA Annual meeting in Vancouver is coming up, and the schedule is now final. Pages 10-12 list the topical sessions sponsored by the Hydrogeology Division; there are over 40 topical sessions. Remember to check the meeting website for many other co-sponsored topical sessions that are part of the technical program. Also remember to look for field trips, short courses, and other events on the meeting website and in the current issue of GSA Today.

As usual, the Hydrogeology Division will host a variety of events during the meeting, from business meetings to student receptions and all things in between. See page 6 for a schedule of these events.

We hope you can all join us at the meeting to reconnect with old friends, and make new ones, in the Hydrogeology Division.

Ben Rostron

Hydrogeology Division Joint Technical
Committee Program Chair



In This Issue:

Vancouver Meeting	1
Chair's Corner	2
O.E. Meinzer Award	3
George Maxey Service Award	4
Kohout Award	6
Hydro Division Events in Vancouver	6

Where in the World?	7
Morocco	7
Birdsall-Dreiss Lecture Announcement	8
Hydro Topical Session Schedule	10
IAH Award Announcement	12
Bulletin Board	13
From the Editor	14
Division Contacts	14

Chair's Corner...



**Alan Fryar, Chair
GSA Hydrogeology
Division**

*We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.*

T.S. Eliot, "Little Gidding"

I thought of these lines after floating down the Rainbow River during a family reunion in August. I was born and grew up in north Florida. Some of my most vivid memories are of swimming in clear, cool springs. Our house had a sulfur well; we got used to the taste, although I didn't think much about the cause. The summer before my senior year of high school, I was introduced to hydrogeology in a research program at the University of Florida, and I realized what I wanted to study. I feel incredibly fortunate to still be doing it 34 years later. What about you? What drew you to hydrogeology?

Serving as your Division Chair this year has been one of the highlights of my career. I've gotten to work with terrific people. Ben Rostron and Chris Gellasch have overseen the organization of 34 half-day oral sessions and 14 poster sessions for Vancouver. Charlie Harvey and Peter Knappett will be honored with the Meinzer and Kohout awards, respectively, for their ground-breaking studies on groundwater contamination by arsenic and pathogens in Bangladesh. Larry Band will complete his Birdsall-Dreiss tour and Cliff Voss will become the 2015 lecturer. Bob Ritzi, the Division's 2003 Chair, will receive the Maxey Distinguished Service Award. We'll recognize five students with Division research awards. One of these awardees, Amanda Pruehs, will become the first student member of the Division's Management Board. She'll join incoming Chair Maddy Schreiber, incoming First Vice-Chair Alicia Wilson, incoming Second Vice-Chair Abe Springer, and returning Secretary-Treasurer Eric Peterson. I'm grateful to these board members and all the Division's volunteers for their efforts.

If you're not already active in the Division, I urge you to get involved. Talk to a member of the Management Board about helping at the booth or the student reception during the Annual Meeting. Propose a topical session or field trip for the 2015 Annual Meeting in Baltimore or one of the 2016 sectional meetings. Become a Mann Mentor. Donate to the Division's funds, such as the Birdsall Fund, the Diodato Hydrogeology Student Travel and Beer Fund, the Hydrogeology Division Graduate Research Grant Fund, or the Kohout Early Career Award. Encourage a colleague or student to join. There are many ways to contribute.

Hope to see you soon!—Alan 

The Hydrogeologist

The Hydrogeologist is a publication of the Hydrogeology Division of the Geological Society of America. It is issued twice a year, to communicate news of interest to members of the Hydrogeology Division. During 1998, the publication moved from paper-based to electronic media. The electronic version may be accessed at: <http://gsahydrogeology.org>. Members of the Hydrogeology Division who have electronic mail will receive notification of all new issues. Other members will continue to receive paper copies.

Contributions and material are most welcome, and should be directed to the Editor. Submission as a Word or WordPerfect document is most expedient. **The deadline for the Fall issue is January 15, 2015.**

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Harvey 2014 O.E. Meinzer Award Recipient



Dr. Charles F Harvey

The O.E. Meinzer Award will be presented to Charles Harvey of the Massachusetts Institute of Technology, Department of Civil and Environmental Engineering at the Hydrogeology Division luncheon at the Vancouver GSA meeting. Charles received his B.A. in mathematics at Oberlin College and attended medical school for a year before working for the USGS water resources division in Richmond, Virginia. He then attended Stanford University, initially with a USGS fellowship at Menlo Park, to work with Steve Gorelick. He completed his PhD in 1996 with a thesis that focused on the theoretical aspects of solute transport and inverse models but that also contained reanalysis of natural-gradient tracer experiments conducted in Mississippi and argued that the aquifer contains regions where diffusion dominates solute transport and regions where advection dominates; he determined that the dual porosity model explained the data. His first faculty position was at Harvard, followed by a move to MIT. In the Civil and Environmental Engineering Department at MIT Charles shifted his work to field research, maintaining some focus on theoretical work. He has conducted research around the globe, including fresh/salt water interaction on Cape Cod, arsenic investigations in Bangladesh, and a carbon study in a Borneo peat swamp. Most recently he has been working with a new environmental program at the Earth Observatory of Singapore. From this work Charles has produced a large body of work, from which the award committee recognized three works as having significantly advanced the science.

In support of Charles' Meinzer Award, three works were cited (see insert). This work highlights his investigations of arsenic in South Asian groundwater. All three works are part of his

departure from theoretical mathematical research to geochemistry. Charles led and implemented an impressive set of field and laboratory investigations leading to not only a large number of publications, but also to a large number of colleagues seeking his advice. He has also strived to dissipate his work through conference presentations and sessions, and through the success of his students to whom he credits much of his research efforts.

Charles' citationist, Roger Beckie, calls him a "wonderful person: generous with his ideas, patient, open to new approaches and opinions." These attributes, combined with his many research achievements, and insights, make him an ideal awardee of this Hydrogeology Division award.

Given these vital contributions to hydrogeology illustrated by the three works cited here, Charles Harvey is this year's recipient of the

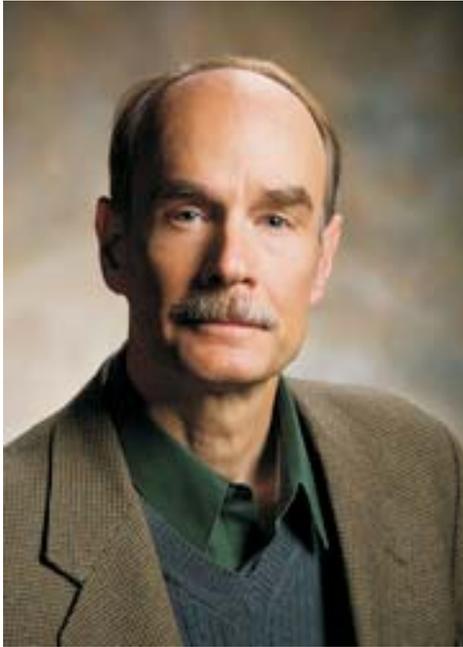
Papers Cited For The Meinzer

Harvey, C. F., C. H. Swartz, A. B. M. Badruzzaman, N. Keon-Blute, W. Yu, M. A. Ali, J. Jay et al. "Arsenic mobility and groundwater extraction in Bangladesh." *Science*, 298, 5598, 1602-1606, 2002.

Harvey, C. F., K. N. Ashfaque, W. Yu, A.B.M. Badruzzaman, M. Ashraf Ali, P. M. Oates, H. A. Michael, R. B. Neumann, R. Beckie, S. Islam and M. F. Ahmed, "Groundwater dynamics and arsenic contamination in Bangladesh." *Chemical Geology*, 228, 112-136, 2006.

Neumann, R. B., Ashfaque, K. N., Badruzzaman, A. B. M., Ali, M. A., Shoemaker, J. K., and Harvey, C. F. "Anthropogenic influences on groundwater arsenic concentrations in Bangladesh." *Nature Geoscience*, 3(1), 46-52, 2010.

Ritzi Receives the 2014 George Burke Maxey Distinguished Service Award



Dr. Robert W. Ritzi
Wright State University

The 2014 George Burke Maxey Distinguished Service Award is presented to Dr. Robert W. Ritzi. Dr. Ritzi received his B.S. from Wittenberg University, his M.S. from Wright State University, and his Ph.D. from the University of Arizona. At all three institutions he was strongly influenced by exceptional faculty who provided excellent examples for an academic career rich in professional service.

After completing his Ph.D. he returned to Wright State as a faculty member in the Department of Earth and Environmental Sciences, where he still resides. His research focuses on how fundamental processes in subsurface fluid flow and mass transport are influenced by aquifer heterogeneity. Dr. Ritzi's current research relates solute dispersion and time-dependent retardation to hierarchical sedimentary architecture, and capillary trapping of CO₂ in georeservoirs. He has been primary advisor to sixty three graduate students, including M.S. and Ph.D. recipients in addition to postdoctoral scholars. The courses Bob teaches earn high praises in student evaluations.

Throughout his career Dr. Ritzi has made the Hydrogeology Division of GSA his primary professional home. He was technical program chair for the Hydrogeology Division in 2000, Chair of the Division in 2003, and has served within other division offices and committees. His citationist, Janet Herman, notes that his time of Division chair was a time of rapid expansion in Division activities and shrinking fiscal resources. He worked with both the Management Board and the membership to establish changes that accommodated these diverging issues. Herman also notes that Bob's single-handed effort to move funding for the Birdsall-Dreiss lectureship to a new level, fiscally and philosophically, by undertaking an extensive letter-writing campaign to the membership, transformed the financial basis of the Lectureship.

He is a Fellow of GSA, has convened numerous topical sessions at the annual meetings, and was primary organizer of environmental and hydrogeology sessions at the recent North-Central meeting in Dayton. He was recognized in 2010 with the Wright State University Outstanding Alumni Award based in part on his 25 years of volunteer public service in technical advisory roles to the Dayton region.

Citationist Herman notes that "Bob is one of the most selfless and steadfast of citizens serving the Hydrogeology Division... he is unfailingly patient and supportive.... Every effort to thank him for his help elicits the response, 'I like to be useful. I like to help if I can.'" Due to this attitude, and his contributions to the Division, the Hydrogeology Division is pleased to present Robert W. Ritzi with the 2014 George Burke Maxey Distinguished Service Award.



Knappett is the 2014 Recipient of the Kohout Early Career Award



Dr. Peter S.K. Knappett
Texas A&M University

The 2014 Kohout Early Career Award is presented to Dr. Peter Knappett of the Department of Geology and Geophysics at Texas A&M University. Peter holds a B.Sc. from the University of Waterloo Department of Earth Sciences. For his senior thesis he developed a method to extract C14 from spent ion exchange resins used in nuclear reactors. He then spent a year at the UFZ-Center for Environmental Research in Leipzig, Germany studying transport detection of waterborne pathogens with Mario and Kristen Schirmer. He returned to Waterloo, Canada to work in environmental consulting for Conestoga-Rovers and Assoc. for a year before returning to the University of Waterloo to complete an M.Sc. in Civil Engineering on viral and bacterial transport through saturated sand aquifers. He then moved to Knoxville, Tennessee to complete a Ph.D. at the University of Tennessee under the supervision of Larry McKay and Alice Layton. For his doctorate degree he performed field research on fecal contamination of drinking water aquifers in rural Bangladesh. In 2010 Peter began a post-doc within the Institute for Groundwater Ecology at the Helmholtz Center for Environmental Health in Munich where his roles included coordinating experiments of 5 Ph.D. students studying the response of a natural microbial ecosystem to exposure to toluene in an indoor aquifer and

modeling the transport and cycling of toluene and nutrients. In 2012 he began studying the impact of massive depressurization of the deep aquifer underlying Dhaka, Bangladesh on the surrounding rural population's access to arsenic-free drinking water while working under Alexander van Geen at Lamont-Doherty Earth Observatory of Columbia University. In 2013 Peter was hired by Texas A&M University as an assistant professor in the Department of Geology and Geophysics where he teaches Hydrogeology, Field Methods in Hydrogeology and Groundwater-Surface Water Interactions. His research interests range from processes causing groundwater quality impairments to mapping regional-scale groundwater flow and quality.

Peter's contributions to improving our understanding of the factors controlling occurrence and transport of fecal bacteria and sand aquifers provide the basis for this award. This work has produced 14 peer-reviewed publications in highly ranked journals. His drive and positive attitude has allowed him to prosper in non-ideal situations, and to impress his former supervisors and colleagues alike.

In light of Peter's impressive research and publication record in addition to his scientific curiosity, the Hydrogeology Division is proud to present Dr. Peter Knappett with the 2014 Kohout Early Career Award.



Want to know what's going on within the Division?

Then visit our website at:

<http://gsahydrogeology.org>

OR

Join the GSA Hydrogeology Division facebook group to catch up on the latest events or find out how you can become more involved with our activities

2014 Annual Meeting: Hydrogeology Division Events

For the 2014 Vancouver meeting, the Hydrogeology Division will continue its tradition of hosting exceptional events to reconnect with friends and meet new ones throughout the meeting. The Hydrogeology Division events are highlighted below.



Darcy Distinguished Lecture

Monday, October 20th 2014
5:00-6:00pm
Vancouver Convention Center - West
Ballroom C

Student Reception

Tuesday, October 21, 2014
5:30- 8:00pm
Vancouver Convention Center - West
Ballroom C

Luncheon, Awards & Business Meeting

Tuesday, October 21, 2014
11:30-3:30pm
Vancouver Convention Center - West
Ballroom D

Note that the Luncheon and Awards are a ticketed event. Tickets can be purchased when registering for the meeting.

Birdsall Dreiss Lecture

Tuesday, October 21, 2014
4:30-5:30pm
Vancouver Convention Center - West
Ballroom C

In addition to the Meinzer, Maxey and Kohout Awards, five Hydrogeology Student Research Awards will also be handed out. The awardees are: M.Aminul Haque, Charlene King, Mary Lusk, Jason Nolan and Amanda Pruehs. Please join us to congratulate all our awardees at the Luncheon!



Do you have an interesting idea for a short scientific article? Perhaps an opinion on a new policy or technique? Any exciting news in your professional life? Upcoming conference? An announcement of interest to the hydrogeological community? If so, why not publish it in *The Hydrogeologist*? Send your submission ideas to andrea@kgs.ku.edu

STUDENTS, WE WANT TO HEAR FROM YOU TOO!

Where in the World?



This edition's Where in the World photo is compliments of Google Maps.

Hint: Hopefully many of you will be nearby this location in a matter of days!

Submit your guesses to andrea@kgs.ku.edu

I also welcome any and all photos for upcoming newsletters. Show off your field site or your most recent hydro-related vacation pictures to all our members!



Grotte Wintimdouine Morocco

For the first time in the 'Where in the World' history, no one was able to identify Alan's location in the last edition of the newsletter. I'm sure the smirk on his face in that photo is even larger now, knowing he stumped our membership.

This photo was taken during Alan's time in Morocco. He is sitting in front of the entrance to Grotte Wintimdouine, which at more than 19 km long is one of the largest caves in Africa. The cave is in the High Atlas Mountains about 70 km from the city of Agadir. The name "Win-Timdouine" means "cave of lakes" in Amazigh, the native Berber language. Grotte Wintimdouine is the subject of ongoing research by scientists from several countries. It hosts about 200 species of animals, including bats, beetles, and mollusks. The stream draining the cave is a significant local water supply.

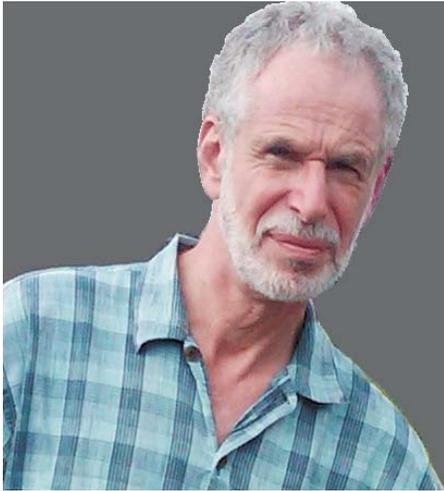
Sources: www.aujourd'hui.ma
terriermichel.wordpress.com



Alan at the entrance to Grotte Wintimdouine in Morocco. (Photo by Lhoussaine Bouchaou, Faculty of Sciences Agadir)



Voss to Tour as 2015 Birdsall-Dreiss Lecturer



Clifford I. Voss has been selected as the 2015 Birdsall-Dreiss Distinguished Lecturer by GSA's Hydrogeology Division. Cliff is a senior scientist with the National Research Program of the U.S. Geological Survey (USGS), currently working in Menlo Park, California. Cliff, an internationally recognized expert in groundwater modeling, has over 35 years of project management, implementation, field work and research experience in groundwater systems, including: computer model development and effective model use for scientific evaluation of hydrogeologic systems; groundwater resources development, management and protection; coastal and island groundwater resources subject to seawater intrusion; and use of the subsurface for energy production/storage and toxic waste isolation. Cliff advises extensively on groundwater system evaluation and management and he lectures worldwide on these and related subjects. His scientific interests in hydrogeology include addressing hydrogeologic heterogeneity, physics of solute and energy transport, behavior of fluids with varying density, phase change in geothermal and frozen systems, inverse modeling and network design, and evaluating extensive aquifer systems in light of sparse data.

The practical methodology and models that Cliff and his colleagues developed are now widely used for managing both the quantity and quality of water supply. In particular, the *SUTRA* computer code, developed and maintained by Cliff and USGS colleagues, has been a standard tool for groundwater resource assessment ever since

USGS made it publicly available in 1984. *SUTRA* has made possible hundreds of practical and research investigations worldwide since its release.

Examples of Cliff's work include: nuclear waste repository safety (Germany, Japan, Sweden), transboundary water resource management (Nubian Aquifer of Egypt, Libya, Sudan, Chad), sustainability of water supply (arsenic-free groundwater supply from the Bengal Aquifer of India, Bangladesh), groundwater management in coastal areas subject to saltwater intrusion (USA), evaluation of water resources emergency (2004 tsunami in Thailand), and assessment of climate-change impacts on permafrost-mediated hydrology in cold regions (Alaska, USA), in part using simulation methodology for groundwater flow with freeze/thaw developed by Cliff and colleagues.

Cliff is the Executive Editor of *Hydrogeology Journal*, the official journal of the International Association of Hydrogeologists (IAH), which has become a premier venue for worldwide progress in theoretical and practical hydrogeology and groundwater-resource management under his twenty years of leadership. *Hydrogeology Journal* is co-sponsored by GSA's Hydrogeology Division.

For more information on Cliff's work and a list of his publications, please visit <https://profile.usgs.gov/cvoss>.

Lecture Information: The Birdsall-Dreiss Distinguished Lecturer tour is sponsored by the GSA Hydrogeology Division. GSA will pay travel expenses, and the host institution will provide local accommodation and meals and, if needed, some local travel expenses. Cliff needs to organize several lectures in each region to make effective use of the travel funds, so lecture requests received by **15 December 2014** will be given priority when Cliff organizes his tour schedule.

Upon request, Cliff will present one of the three lectures listed below. All three lectures are appropriate for a general audience with some science background or interest.

To request a visit to your institution: Please use the lecture request form on this website:

<http://water.usgs.gov/nrp/2015-Birdsall-Dreiss-Lecture-Voss/>

Informing Management of the World's Largest Groundwater Systems with Simply-Structured Model Analysis

During the 50 years since its development, groundwater flow modeling has become the tool of choice that, when used wisely, provides deep insight into the functioning of aquifer systems that can become a foundation of effective water-resources management. This presentation reviews typical difficulties in characterizing aquifer systems (due to heterogeneity and data scarcity) and argues that simply-structured models are the most-effective means of dealing with inevitable uncertainties. Two examples of simply-structured model analyses of very large aquifer systems with sparse data will be presented. (1) In West Bengal, India, and Bangladesh, dissolved arsenic concentrations exceeding world standards exists in the drinking water of about 50 million people, making this the world's largest groundwater contamination problem. Previous scientific and technological efforts aimed at solving the problem had been largely directed towards understanding the chemistry of arsenic occurrence and release, but this groundwater modeling study is unique in providing a possible region-wide solution to the problem. (2) The Nubian aquifer is the world's largest non-renewable groundwater resource. It is a transboundary aquifer belonging to Chad, Egypt, Libya, and Sudan. International questions regarding resource fate, equitable use of the resource by each country (most current usage is by Egypt and Libya), and adverse impacts of cross-border pumping drawdown on shallow wells and oases were the reason for development of this model as part of a four-country Global Environmental Facility (GEF) project led by the International Atomic Energy Agency (IAEA). Simply-structured model development provided robust answers to these questions, and provided a relatively simple tool that could be adopted and used by water managers in each country.

Density-Driven Groundwater Flow: Seawater Intrusion, Natural Convection, and Other Phenomena

Difficulties in understanding and managing hydrogeologic systems with variable-density groundwater flow are often due to the common notion that groundwater flow is driven in the direction of decreasing water-table elevation or

hydraulic head; i.e. 'downhill'. However, even small variations in groundwater density can drive flow in directions that have no relation to decreasing elevation or head. Groundwater density varies due to spatial or temporal differences in temperature and concentration of dissolved solids. These differences in density can lead to interesting and sometimes unexpected flow patterns. In coastal aquifers, seawater intrusion (and contamination of groundwater supplies) occurs because denser salty sub-sea groundwater pushes laterally inland below less-dense fresh groundwater flowing seaward. Saltwater also occurs above fresher groundwater (in sabkhas, salt ponds, areas of coastal sea incursion) and here, denser saltwater 'falls' downward through the fresher less-dense groundwater, also salinizing the aquifer. Vertical density-driven flow giving rise to natural convection similarly occurs where warmer groundwater exists below cooler water, such as in geothermal, volcanic and ocean-ridge regions. This presentation reviews variable-density groundwater flow phenomena and their importance in practical settings. It is shown that the flow pattern in cases of lateral density differences is rather uniform in comparison with the flow pattern generated by vertical density differences, which exhibits fascinating variety and evolution. Examples of lateral and vertical density-driven flows in coastal aquifers show how modeling variable-density groundwater flow can be used to understand and effectively manage coastal resources.

Ground Ice and Permafrost – 'Foundations' of the Hydrology of Cold Regions

As much as one third of the earth's land surface undergoes yearly freezing and one quarter of the earth's land surface is underlain by perennially-frozen ground – permafrost. There is limited knowledge about the hydrogeology of these dominant cold regions of earth because most human population lives in temperate-climate areas. This knowledge base, cryohydrogeology, is the study of the dynamic interaction of groundwater with freezing and thawing processes. Subsurface ice is a barrier to flow, thus, the pattern of frozen ground is a major control on surface and subsurface water flows. Consequently, ice distribution controls cold-regions hydrology, which

2014 GSA Annual Meeting Program Schedule

Hydrogeology Division

DIVISION SPONSORED SESSIONS	TIME/DATE/LOCATION
T47. Soil Development: Its Role in Geological Processes	19 Oct., 8:00 AM – Noon, VCC-West Room 213
T51. Geology and Hydrology of the National Parks: Research, Mapping, and Resource Management I	19 Oct., 8:00 AM – Noon, VCC-West Room 214
T158. Assessing Vulnerability of Water Supply Wells from Wastewater: Sources, Contaminants, Tracers, and Pathways	19 Oct., 8:00 AM – Noon, VCC-West Room 114/115
T159. Groundwater in Cold Environments: Current Understanding and Challenges	19 Oct., 8:00 AM – Noon, VCC-West Room 109
T163. Satellite Remote Sensing Applications in Hydrology and Geology	19 Oct., 8:00 AM – Noon, VCC-West Room 110
T191. What Do We Know about Fluids Produced from Unconventional Reservoirs?	19 Oct., 8:00 AM – Noon, VCC-West Room 215/216
T95. Frontiers in Environmental and Engineering Geology (Posters)	Posters: 19 Oct., 9:00 AM – 5:00 PM, VCC-West Exhibition Hall C
T57. Digital Geology Sandpit I (Digital Posters)	Posters: 19 Oct., 9:00 AM – 5:00 PM, VCC-West Exhibition Hall C
Recent Advances in Hydrogeology (Posters)	Posters: 19 Oct., 9:00 AM – 5:00 PM, VCC-West Exhibition Hall C
T168. The Interaction of Geophysics, Geochemistry, and Hydrogeology with Ground-Source and Other Geothermal Systems (Posters)	Posters: 19 Oct., 9:00 AM – 5:00 PM, VCC-West Exhibition Hall C
T47. Soil Development: Its Role in Geological Processes (Posters)	Posters: 19 Oct., 9:00 AM – 5:00 PM, VCC-West Exhibition Hall C
Recent Advances in Hydrogeology	19 Oct., 1:00 PM – 5:00 PM, VCC-West Room 202/203
T51. Geology and Hydrology of the National Parks: Research, Mapping, and Resource Management II	19 Oct., 1:00 PM – 5:00 PM, VCC-West Room 214
T152. Transport of Micropollutants in Groundwater	19 Oct., 1:00 PM – 5:00 PM, VCC-West Room 114/115
T155. The Role of Groundwater in the Eutrophication of Surface Waters	19 Oct., 1:00 PM – 5:00 PM, VCC-West Room 109
T168. The Interaction of Geophysics, Geochemistry, and Hydrogeology with Ground-Source and Other Geothermal Systems	19 Oct., 1:00 PM – 5:00 PM, VCC-West Room 110
P3. Energy Resource Development and Groundwater: Looking Broader and Deeper I	20 Oct., 8:00 AM – Noon, VCC-West Ballroom A
T59. A Grand Tour of the World's Most Important Geological Sites on Google Earth	20 Oct., 8:00 AM – Noon, VCC-West Room 217/218
T169. It's a Cold, Cold World: Permafrost and Glacial Hydrogeology	20 Oct., 8:00 AM – Noon VCC-West Room 110
T153. Characterization and Remediation of Fractured Rock	20 Oct., 8:00 AM – Noon, VCC-West Room 114/115
T237. Carbonate Reservoirs—Characterization, Geochemical Modeling, and Case Studies	20 Oct., 8:00 AM – Noon, VCC-West Room 207
T57. Digital Geology Sandpit II (Digital Posters)	Posters: 20 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C

Please see [Meeting](#) on Page 11

Meeting from Page 10

DIVISION SPONSORED SESSIONS	TIME/DATE/LOCATION
T124. Trace Elements and Organics in Environmental and Urban Geochemistry (Posters)	Posters: 20 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
T51. Geology and Hydrology of the National Parks: Research, Mapping, and Resource Management (Posters)	Posters: 20 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
T160. Environmental Effects of Oil and Gas Development on Water Quality: Toward Sustainability and Stewardship (Posters)	Posters: 20 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
P3. Energy Resource Development and Groundwater: Looking Broader and Deeper II	20 Oct., 1:00 PM – 5:00 PM, VCC-West Ballroom A
T83. Karst Systems and Processes in Mountainous and Alpine Terrain	20 Oct., 1:00 PM – 5:00 PM, VCC-West Room 109
T98. Environmental and Engineering Geology Student Research Competition	20 Oct., 1:00 PM – 5:00 PM, VCC-West Room 213
T124. Trace Elements and Organics in Environmental and Urban Geochemistry I	20 Oct., 1:00 PM – 5:00 PM, VCC-West Room 204
T161. Application of Isotopes of Water to Characterize Hydrogeological Processes in Mine Environments	20 Oct., 1:00 PM – 5:00 PM, VCC-West Ballroom C
T162. Hydrogeology of Arid Region Endorheic Basins: Groundwater Flow, Geochemical Evolution, and Hydrostratigraphy	20 Oct., 1:00 PM – 5:00 PM, VCC-West Room 110
T82. Enhancing the Toolkit for Karst Investigations	21 Oct., 8:00 AM – Noon, VCC-West Room 208/209
T124. Trace Elements and Organics in Environmental and Urban Geochemistry II	21 Oct., 8:00 AM – Noon, VCC-West Room 204
T157. Joint Sustainability of Water Resources and Petroleum Energy Production	21 Oct., 8:00 AM – Noon, VCC-West Room 114/115
T164. Dynamics of Groundwater Temperature: From Recharge to Discharge Zones	21 Oct., 8:00 AM – Noon, VCC-West Room 109
T170. Physical and Biogeochemical Measurements That Characterize Groundwater–Surface Water Interactions: Where to Go from Here?	21 Oct., 8:00 AM – Noon, VCC-West Room 110
T98. Environmental and Engineering Geology Student Research Competition (Posters)	Posters: 21 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
T82. Enhancing the Toolkit for Karst Investigations (Posters)	Posters: 21 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
T116. Water Contamination and Treatment in Developing Countries	21 Oct., 1:00 PM – 5:00 PM, VCC-West Room 204
T103. Mining and the Environment: Addressing Common Challenges Faced across the Mining Industry	22 Oct., 8:00 AM – noon, VCC-West Room 202/203
T154. Groundwater and Surface-Water Arsenic: From Source to Sink I	22 Oct., 8:00 AM – noon, VCC-West Room 110
T166. Gas-Water Interactions in the Subsurface	22 Oct., 8:00 AM – noon, VCC-West Room 114/115
T171. Leading Edge of Produced Water Research: Impacts, Fingerprinting, and Science of Brines Associated with Hydrocarbon Production	22 Oct., 8:00 AM – noon, VCC-West Room 109

Please see **Meeting** on Page 12

DIVISION SPONSORED SESSIONS	TIME/DATE/LOCATION
T103. Mining and the Environment: Addressing Common Challenges Faced across the Mining Industry (Posters)	Posters: 22 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
T114. The Fate of Passive Acid Mine Drainage Treatment Systems: Results, Solutions, and Advances for Continued Improvement of Impaired Waters (Posters)	Posters: 22 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
T170. Physical and Biogeochemical Measurements That Characterize Groundwater–Surface Water Interactions: Where to Go from Here? (Posters)	Posters: 22 Oct., 9:00 AM – 6:30 PM, VCC-West Exhibition Hall C
T154. Groundwater and Surface-Water Arsenic: From Source to Sink II	22 Oct., 1:00 PM – 5:00 PM, VCC-West Room 110
T156. Agricultural Impacts on Water Quality: Are We Making Progress?	22 Oct., 1:00 PM – 5:00 PM, VCC-West Room 114/115
T160. Environmental Effects of Oil and Gas Development on Water Quality: Toward Sustainability and Stewardship	22 Oct., 1:00 PM – 5:00 PM, VCC-West Room 109



**Announcement of:
International Association of Hydrogeologists / US National Chapter (IAH USNC)
International Service Award**

Motivation: The IAH USNC seeks to recognize the efforts of hydrogeologists based in the United States who have shown an outstanding commitment to assisting the international community with groundwater-related needs.

Criteria: The award will be presented to one individual each year who has performed exceptional work in assisting those outside of the US (particularly in developing countries) with developing, managing, or protecting groundwater resources for public and/or ecosystem benefit. These efforts may be scientific, educational, humanitarian, engineering-focused, or technological in nature.

Selection Process: Candidates must be nominated by at least one hydrogeologist other than themselves, who is a current member of either IAH or GSA. Nominations for the 2015 award should be sent to the IAH US National Chapter's GSA liaison (amanning@usgs.gov) by July 1st, 2015. Nominations need to include the nominator's name and contact information, the nominee's name and contact information, and a written justification for why the nominee should receive the award, not to exceed 500 words. A panel consisting of three IAH USNC members will select the award winner from the field of nominees. Note that if there are an insufficient number of nominees, the award may not be granted for that particular year.

Presentation: At the Geological Society of America's (GSA) Annual Meeting at the Hydrogeology Division Luncheon.

Award: Engraved Plaque.



BULLETIN BOARD

AGU Fall Meeting

The AGU Fall Meeting will be held December 15 - 19 in San Francisco in the Moscone Convention Center. Registration fees will increase after November 14, so register today!

NGWA Ground Water Expo

The NGWA Ground Water Expo will be held December 9-12 in Las Vegas, NV. Registration fees will increase after November 7, so register today!

GSA 2015 Baltimore, MD

Upcoming deadlines:
Field Trip Proposals - Dec. 1, 2014
Technical Session Proposals - Feb 1, 2015
Short Courses Proposals - Feb.2, 2014

GSA Section Meetings

Northeastern: Bretton Woods, NH, Mar. 23-25 2015
Southeastern: Chattanooga, TN, Mar. 19-20 2015
South-Central: Stillwater, OK, Mar 19-20 2015
North Central: Madison, WI, May 19-20 2015
Cordilleran: Anchorage, AK, May 11-13 2015
Rocky Mountain: Casper, WY, May 21-23 2015

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Voss from page 9

in turn affects cold-regions geochemistry and ecology. Motivated by international concern regarding global warming impacts on ground ice distribution and resulting changes to ecosystems, and by the opportunity to study the intriguing hydrological processes mediated by water-ice phase change, recent work by the U.S. Geological Survey and partner institutions have focused on a permafrost region of interior Alaska. This presentation describes some results of that work, including: observed cold-region hydrologic phenomena, efforts to understand the ground ice and water flow mechanisms that control them, and, assessment of likely hydrologic changes resulting from climate evolution. The study produced extraordinary maps of permafrost distribution and

thickness (from airborne geophysical surveys), never before obtained for such large regions. The study found that complex inter-related ice-hydrology mechanisms cause surface-water bodies to shrink and expand, and permafrost continuity affects groundwater discharge to rivers (impacting river chemistry). A new model that simulates groundwater flow with heat transport and groundwater freezing and thawing, being finalized as part of the effort, has already allowed evaluations of paleoclimate-change permafrost evolution and of future climate-change scenario impacts on today's permafrost. It is found that groundwater flow and permafrost formation and thaw are strongly-coupled processes; where groundwater flows in cold regions, it accelerates permafrost thaw during climate warming.



From the Editor....

I can't believe it is fall already. This is probably quite evident given the lateness of this newsletter. With any luck it will catch all of you before our annual meeting in Vancouver, as this edition has highlighted many of the events, awards, and technical sessions that will be occurring there. I hope to see many of you in Vancouver, it is a wonderful city, and it should be a terrific meeting.

As usual, if you have any comments or article ideas please pass them on to me at andrea@kgs.ku.edu.



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