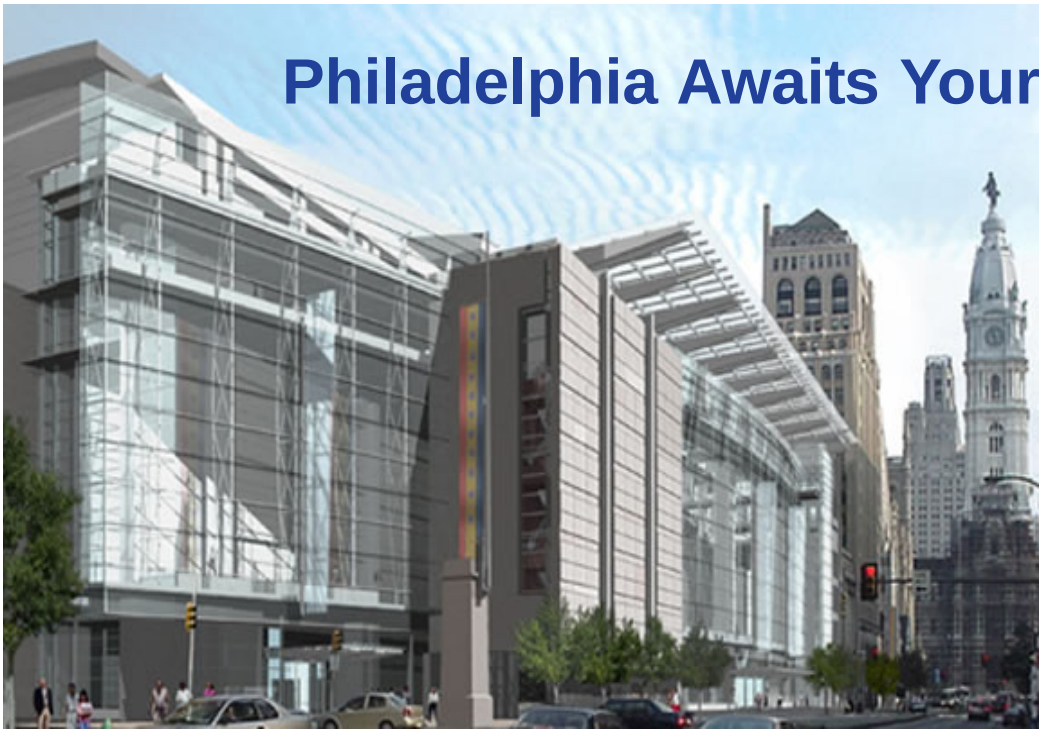
THE GEOLOGICAL SOCIETY OF AMERICA

The Hydrogeologist

Newsletter of the GSA Hydrogeology Division

October 2006
Issue No. 65

Philadelphia Awaits Your Arrival!



The Philadelphia Convention Center.

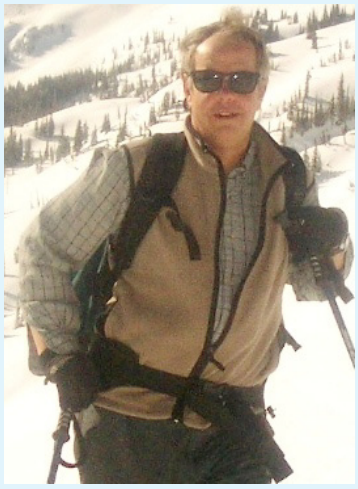
By Laura Toran & Mark Person, Co-Chairs 2006 Hydrogeology Division Program

There are really too many highlights for this exciting meeting to summarize in a brief newsletter. We have just as many sessions (about 35) and abstracts as last years meeting, so the change to an east coast venue has not curbed members' interest in hydrogeology at GSA. I would like to point out that we are again hosting both the National Ground Water Association Darcy Lecture and the GSA Hydrogeology Division Birdsall-Dreiss lecture. Eileen Porter, the Darcy lecture will speak at 5pm on Monday at the end of the session on Emerging and Innovative Approaches to Groundwater Modeling. Her talk is: All Models Are Wrong, How Do We Know Which Are Useful? David Blowes, the Birdsall-Dreiss lecture will speak at 4:30 on Tues as part of the session on Chemical and Hydrological Interactions in the Evolution and Control of Coal and Metal Mine Drainage. It is at the end of the poster sessions on Tues so there are no conflicting talks at this time. David's talk is titled: Predicting and Preventing Acidic Drainage From Sulfide Bearing Mine Wastes. Both of these talks are in a large lectures hall on the lower level of the convention center – don't miss them!

In This Issue:

EDITOR'S NOTE: A color version of this newsletter is available on the web at [http://gsahydrodiv.unl.edu]

Chair's Corner...

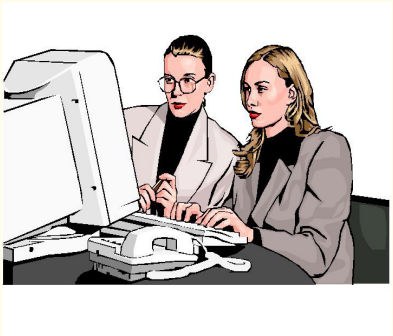


Kip Solomon, Chair
GSA Hydrogeology Division

Dear Hydrogeology Division Members:

I am looking forward to seeing many of you in Philadelphia. As you will see later in the newsletter, the technical program is outstanding (and large!) In addition to the technical program, the Birdsall-Driess and Darcy Lectures will be presented along with numerous great field trips, our awards luncheon and business meeting, and of course our student reception. Just prior to our awards luncheon on Tuesday, Don Siegel will be doing a kosher-Chinese cooking demo. Plan to arrive early as you won't want to miss Don and Scott Bair flipping dumplings filled with Chinese broccoli, shitaki mushrooms, and rice vermicelli. For a donation of just $20.00 you can walk away with one of Don's books; you too can learn to flip dumplings and at the same time support the Division's efforts to fund lectures, student research, etc. Furthermore, in honor of the 150th anniversary of Darcy's Law, we will reissue a commemorative version of the original Darcy Mug; you won't want to miss this either. All in all, the Annual Meeting promises to be intellectually stimulating and loads of fun. I truly hope to see you there.

As I end my 1 year term as the Chair of the Division, I would like to thank all of you for your support. Scott Tyler will take over as Chair and I trust that he will enjoy the same level of support and professionalism that I have experienced. While our Division Membership continues to grow, we are of course a small group in the grand scheme of things. Perhaps this sense of family is what makes me truly grateful to call the Hydrogeology Division my professional home.



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

Then visit our website at <http://gsahydrodiv.unl.edu> to catch up on the latest events or find out how you can become more involved with our activities.

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://gsahydrodiv.unl.edu>*. 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 of material are most welcome, and should be directed to the Editor. Submission as Word or WordPerfect document is most expedient.

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Deadline, Spring Issue

May 1, 2007

Pruess 2006 O.E. Meinzer Award Recipient

by Michael Celia

Dr. Karsten Pruess, 2006 O.E. Meinzer Award Recipient

The 2006 O.E. Meinzer Award recipient is Dr. Karsten Pruess of Lawrence Berkeley Laboratory. For more than 25 years, Dr. Pruess has been at the forefront of scientific studies of complex problems involving fluid flow in natural porous media. His work has strong scientific content, important practical value, and has impacted and involved many other researchers.

Pruess earned his PhD in Theoretical Physics in 1972 and arrived at LBL in 1975 as a Research Fellow in the Nuclear Theory Group. In 1977, he joined the Earth Sciences Division at LBL where he is currently employed. He has authored more than 125 journal papers across a range of important topics and he authored the TOUGH2 family of computer codes.

Dr. Pruess's first hydrogeology research focused on geothermal systems, which was a natural extension of his background in physics. After working on this problem for the better part of a decade, Karsten began to work on other problems involving non-isothermal and multi-phase flow in porous media. These included high-level radioactive waste disposal, steam injection to remove non-aqueous-phase liquid (NAPL) contaminants, multi-phase flow in fractures, the role of preferential flow in unsaturated soils, fundamental numerical simulation methods for multi-phase and unsaturated-zone flow systems, and the incorporation of geochemistry into non-isothermal multi-phase simulations. Most recently, he has been working on the problem of injection of supercritical CO_2 for the purpose of carbon mitigation, where the idea is to capture CO_2 before it is emitted to the atmosphere, and inject it into deep subsurface formations so that it remains out of the atmosphere for hundreds to thousands of years, or more. Dr. Pruess has taken a leading role in the scientific investigations of the hydrogeological aspects of this strategy. He and his coworkers have looked particularly at storage capacities and the influence of subsurface heterogeneities, at possible leakage pathways and their impact on the efficacy of the approach, at geochemical responses of the system and the overall long-term fate of the injected carbon, and at the complex role of phase-change and thermodynamics on possible catastrophic releases to the land surface.

Dr. Pruess embodies the best in research and scientific study: he produces outstanding science, he works on problems that have tremendous societal impacts, and he does so with humility, grace, and quiet confidence. For these reasons, the GSA Hydrogeology Division presents its 2006 O.E. Meinzer Award to Dr. Karsten Pruess.

O.E. Meinzer Award Papers

Pruess, K., J.S.Y. Wang, and Y.W. Tsang. On Thermohydrological Conditions Near High-Level Nuclear Wastes Emplaced in Partially Saturated Fractured Tuff. Part 1. Simulation Studies With Explicit Consideration of Fracture Effects, Water Resour. Res., 26(6), 1235-1248, 1990.

Pruess, K. The TOUGH Codes-A Family of Simulation Tools for Multiphase Flow and Transport Processes in Permeable Media, Vadose Zone J., 3,738-746,2004.

Bahr Receives Distinguished Service Award

By Janet Herman

2006 Distinguished Service Award Recipient Dr. Jean M.Bahr

The award for Distinguished Service is presented to Jean M. Bahr in recognition of her exceptional service to the profession of hydrogeology. The award specfically acknowledges her propensity for unconditional commitment and zealous efforts on behalf of others, including students, professional geoscientists, and citizens.

Serving as Chair of the Division, Jean didn't finish her year satisfied with a well attended annual meeting, a fine technical program, and a successful awards ceremony. Instead, she followed that effort by transforming the Student Reception into a not-to-be-missed extravaganza of professional networking accompanied by a wealth of door prizes that went beyond what any previous Chair had even imagined. This reception is now the envy of all other GSA Divisions. Having set "the bahr" for future Past Chairs of the Division, she then moved on to serve as Birdsall-Dreiss Distinguished Lecturer. She used a 14-month time-span to deliver 64 lectures, but in so doing enriched the Division in novel ways. First, she didn't drain the lectureship budget because she drove to most of her venues in her hybrid car. Second, she followed her service by conceiving and executing a fund-raising effort that will carry the Distinguished Lectureship into the future. She followed her tour of duty as Lecturer by immediately signing on to GSA Council where she has been a friend of our Division while also invigorating the Society. Add in earlier service adjudicating the Meinzer Award and contributing to several Society-level committees and we recognize Jean's service to GSA as being significant and uninterupted since 1994, just one year after earning tenure.

Do not believe for an instant that Jean was doing nothing but GSA service during this period. She was contributing to the National Research Council, initially as member and then as chair of "the Everglades" committee addressing complex and contentious issues at the intersection of society and water resources. She was evaluating worthy research for funding on multiple National Science Foundation panels thereby impacting the future direction of hydrogeology. She is also Full Professor and Chair of her home department – Geology and Geophysics at University of Wisconsin – where she directs student research, teaches classes, and chairs faculty meetings. Not content to influence just future generations of hydrogeologists, she invests energy in guiding women to pursue their interests in various fields of science and engineering through an innovative residential learning program.

Do not believe for an instant that Jean was doing nothing but professional work during this period. She has time to showcase the roof of her home as an electricity generator – nudging others toward environmental responsibility, to celebrate her love for her parents – reminding us of the importance of family, and to support her many many friends – enriching those of us lucky enough to know Jean Bahr.

For her lasting impact on the Division and its present and future members as well as the wider community of geoscientists and citizens, the Hydrogeology Division takes great pride in presenting Jean M. Bahr with the Distinguished Service Award for 2006.

Scanlon Named 2007 Birdsall-Dreiss Lecturer

Bridget Scanlon 2007 Birdsall-Driess Lecturer

Bridget Scanlon of the Bureau of Economic Geology, University of Texas at Austin (UT), has been selected as the 2007 Birdsall-Dreiss Distinguished Lecturer, sponsored by the GSA Hydrogeology Division. The Bureau of Economic Geology is one of three units within the newly formed Jackson School of Geosciences. Host institutions may select one of two lectures that Dr. Scanlon will present for audiences interested in broad aspects of water resources. The topics are ecological controls on water cycle response to climate variability and impacts of land use and land cover change on water resources.

Dr. Scanlon received a B.S. in Geology at Trinity College, Dublin (Ireland) and completed her M.S. at the University of Alabama, performing karst fieldwork in Ireland. Her Ph.D. at the University of Kentucky (Lexington) involved flow and transport studies in karst. She joined the Bureau of Economic Geology in 1987 and currently holds the position of Senior Research Scientist. At the Bureau she leads a research group whose primary objective is to assess sustainability of water resources, including both quantity and quality, within the context of climate variability and land use/land cover change. Studies integrate physical, chemical, and isotopic analyses and numerical modeling. Much of the research focuses on impacts of climate variability (ENSO) and conversion of natural ecosystems to agriculture on groundwater recharge in semiarid regions. Impacts of natural and anthropogenic sources of contamination, including nitrate and arsenic, on water quality are also addressed in many of the group's research studies. Dr. Scanlon has taught Vadose Zone Hydrology in the Departments of Geological Sciences and Environmental and Water Resources Engineering at UT. She has participated in focus groups on global groundwater recharge issues for the International Atomic Energy Agency, as well as serving on National Academy of Science (NAS) committees related to low-level and high-level radioactive waste disposal. Dr. Scanlon currently serves on an NAS committee on Integrated Observations on Hydrologic and Related Sciences.

To request a visit to your institution, contact Bridget Scanlon, Bureau of Economic Geology, Jackson School of Geosciences, University of Texas at Austin, J. J. Pickle Research Campus, Bldg. 130, 10100 Burnet Rd., Austin, TX 78758-4445; 512-471-8241; or bridget.scanlon@beg.utexas.edu. The deadline for requests is November 31, 2006. The Hydrogeology Division is particularly interested in including liberal arts colleges in the itinerary. The Division will pay transportation expenses, and the host institution will provide local accommodations.

Talk Topics

Implications of Climate Variability for Groundwater Resources and Waste Disposal in Semiarid Regions—A Look at Ecological Controls from Annual to Millennial Timescales

Understanding impacts of climate variability on groundwater recharge is essential for management of water resources and waste disposal. Semiarid regions are particularly vulnerable to climate variability because low soil-water contents provide little buffering against dry climate extremes. Water scarcity is a critical issue in these regions because of limited supplies and increasing demand associated with greater population growth relative to wetter regions. Approximately 40% of the U.S. population growth between 1960 and 2000 occurred in semiarid states of the southwestern United States. Potential contaminant transport by recharge to groundwater is a significant concern because deserts are favored sites for waste disposal; for example, the U.S. high-level nuclear waste site at Yucca Mountain, Mojave Desert, Nevada. A key question, is How do climate variability and related vegetation dynamics impact groundwater recharge? The importance of linkages between ecology and hydrology is being increasingly recognized in the emerging field of ecohydrology.

This talk will explore the role of vegetation dynamics in regulating the impact of climate variability on groundwater

Please see **Lecturer** *on page 12.*

2006 GSA Annual Meeting Program Schedule
Hydrogeology Division

Saturday October 21	Sunday October 22	Monday October 23	Tusday October 24	Wednesday October 25
7:00 a.m. - noon	**7:00 a.m. - noon**	**7:00 a.m. - noon**	**7:00 a.m. - noon**	**7:00 a.m. - noon**
Field Trips 6:00 am Departure Short Courses 8:00 am - 5:00 pm	President's Student Breakfast (FREE) 7:00 - 8:30 am (Marriott Grand Ballroom, Salon A-F) Technical Sessions 8:00 am - 12:00 pm **Hydrogeology Div. Management Board Meeting** **11:00 am - 1:00 pm** **(Marriott Indepen. Rm, Salon III)**	Technical Sessions 8:00 am - 12:00 pm Exhibits Open 9:00 am - 5:30 pm Ground Water Journal Editors Meeting 11:00 am - 1:00 pm (Marriott 401/402/403)	Technical Sessions 8:00 am - 12:00 pm Exhibits Open 9:00 am - 5:30 pm **Don Siegel's Kosher-Chinese Cooking Demo** **11:15 am -12:00 pm** **(Marriot Grand Ballroom, Salon E)**	**Hydrogeology Division Management Board Meeting** **7:00 - 11:45 am** **(Marriott 305/306)** Technical Sessions 8:00 am - 12:00 pm Exhibits Open 9:00 am - 2:00 pm
Luncheon:			**Hydrogeology Division Luncheon, Awards, Business Meeting** **noon - 3:00 pm** **(Marriott Grand Ballroom, Salon E)**	
1:30 - 5:30 p.m	**1:30 - 5:30 p.m**	**1:30 - 5:30 p.m**	**1:30 - 5:30 p.m**	**1:30 - 5:30 p.m**
GSA Presidential Address & Awards Ceremony 7:00 - 9:00 pm (PCC Auditorium Lecture Hall)	Technical Sessions 1:00 - 3:30 pm **Welcoming Party & Exhibit Hall Opening** **5:30 - 7:30 pm**	Technical Sessions 1:30 - 5:30 pm **NGWA Darcy Distinguished Lecture** **5:00 - 6:00 pm** **(PCC 204C)**	Technical Sessions 1:30 - 5:30 pm **Hydrogeology Division Luncheon, Awards, Business Meeting** **noon - 3:00 pm** **(Marriott Grand Ballroom, Salon E)** **Birdsall-Dreiss Distinguished Lecture** **4:30 - 5:30 pm** **(PCC 103C)**	Technical Sessions 1:30 - 5:30 pm GSA Annual Meeting Ends at 5:30 pm
Receptions:		Alumni Night: Various University Receptions	**Hydrogeology Division Student Reception** **5:45 - 7:30 pm** **(PCC Ballroom Foyer)**	

Hydrogeology Division Sponsored Technical Program Schedule for the 2006 Phili Meeting

Session Title	Day	Time	Room
Hydrogeology: Fluids at Plate Boundaries and Aquifer System Analysis	SU	8:00 AM - 12:00 PM	PCC 113C
T1. High Resolution Quaternary Records from Cave Environments	SU	8:00 AM - 12:00 PM	PCC 109AB
T29. The Use of Molecular Techniques to Asses Microbial Community Structure and Function in Aquifer Systems	SU	8:00 AM - 12:00 PM	PCC 112B
T39. Innovative Watershed Based Approaches for Integrating Research and Education	SU	8:00 AM - 12:00 PM	PCC 113A
T43. Addressing Present and Future Energy, Mineral, and Water Issues in the Classroom: The Need to Prepare Both Educated Citizens and Geoscientists	SU	8:00 AM - 12:00 PM	PCC 113B
T73. Nonpoint Source Pollution: Sources, Proceses, Prediction, and Solutions	SU	8:00 AM - 12:00 PM	PCC 104A
T76. Detecting and Characterizing Fluxes of Water and Dissolved Constituents Across the Groundwater Surface-water Interface I	SU	8:00 AM - 12:00 PM	PCC 103A
T82. Reactions at Mineral-Water Interfaces: The Role of Solute Adsorption on Contaminant Co-Adsorption, Mineral Dissolution and Colloid Behavior	SU	8:00 AM - 12:00 PM	PCC 103B
T31. Geomorphology and Hydrology of Montane Tropical Streams	SU	1:30 PM - 5:30 PM	PCC 113B
T74. Pharmaceuticals and Other Emerging Contaminants in the Environment—Transport, Fate, and Effects	SU	1:30 PM - 5:30 PM	PCC 103C
T76. Detecting and Characterizing Fluxes of Water and Dissolved Constituents Across the Groundwater Surface-water Interface II	SU	1:30 PM - 5:30 PM	PCC 103A
T83. Salinization Processes and Problems in Coastal and Inland Aquifers	SU	1:30 PM - 5:30 PM	PCC 104A
T90. Three-Dimensional Geological Mapping for Groundwater Applications	SU	1:30 PM - 5:30 PM	PCC 109AB
T92. Innovations in Characterizing Physical and Chemical Heterogeneity in Sedimentary Aquifers	SU	1:30 PM - 5:30 PM	PCC 103B
T14. Arsenic, Lead, and Mercury in Urban and Rural Watersheds (Posters)	SU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
Environmental Geoscience (Posters)	SU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T68. Gradients at Hydrologic Interfaces as Indicators of Key Earth-Surface ("Critical-Zone") Processes (Posters)	SU	1:30 PM - 5:30 PM	PCC Exhibit Hall C

Session Title	Day	Time	Room
T82. Reactions at Mineral-Water Interfaces: The Role of Solute Adsorption on Contaminant Co-Adsorption, Mineral Dissolution and Colloid Behavior (Posters)	SU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
Geomicrobiology (Posters)	SU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T129. Geologic Mapping: Innovations and Interoperability (Posters)	SU	6:00 PM - 8:00 PM	PCC Exhibit Hall C
T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges I	MO	8:00 AM - 12:00 PM	PCC 204B
T35. Watershed-based Approaches to River Restoration	MO	8:00 AM - 12:00 PM	PCC 113A
T69. Groundwater Availability and its Sustainability within Regional Aquifer Systems	MO	8:00 AM - 12:00 PM	PCC 103B
T77. Epikarst to Conduits: Quantitative Methods Applied To Monitoring and Modeling of Karst Aquifers	MO	8:00 AM - 12:00 PM	PCC 103C
T88. Innovative Sensors, Technologies and Strategies for Performance Monitoring of Waste Disposal Facilities and Remediation Approaches	MO	8:00 AM - 12:00 PM	PCC 104A
Hydrogeology (Posters)	MO	8:00 AM - 12:00 PM	PCC Exhibit Hall C
T18. Collegiate Watershed Research Projects: Opportunities for Student Learning and Community Involvement (Posters)	MO	8:00 AM - 12:00 PM	PCC Exhibit Hall C
T76. Detecting and Characterizing Fluxes of Water and Dissolved Constituents Across the Groundwater Surface-water Interface (Posters)	MO	8:00 AM - 12:00 PM	PCC Exhibit Hall C
T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges II	MO	1:30 PM - 5:30 PM	PCC 204B
T66. Emerging and Innovative Approaches to Groundwater Modeling	MO	1:30 PM - 6:00 PM	PCC 204C
T79. Ground Water Age Dating: Current Issues and Applications	MO	1:30 PM - 5:30 PM	PCC 103C
T86. Peatland Patterns and Hydrological Processes: From the Subarctic to the Subtropics	MO	1:30 PM - 5:30 PM	PCC 104A
T69. Groundwater Availability and its Sustainability within Regional Aquifer Systems (Posters)	MO	1:30 PM - 5:30 PM	PCC Exhibit Hall C

Session Title	Day	Time	Room
T77. Epikarst to Conduits: Quantitative Methods Applied To Monitoring and Modeling of Karst Aquifers (Posters)	MO	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T85. New Approaches to Understanding the Cycling of Water in Urban Landscapes (Posters)	MO	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T91. GPS and InSAR in Groundwater Investigations (Posters)	MO	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges III	TU	8:00 AM - 12:00 PM	PCC 204B
T71. Groundwater's Role in the Survival of Threatened and Endangered Ecosystems	TU	8:00 AM - 12:00 PM	PCC 103B
T72. Heat as a Natural Tracer in Hydrologic Systems: Current Understanding, Innovation and Application	TU	8:00 AM - 12:00 PM	PCC 104A
T75. Chemical and Hydrological Interactions in the Evolution and Control of Coal and Metal Mine Drainage I	TU	8:00 AM - 12:00 PM	PCC 103C
T80. Impact of Past Glaciations and Climate on Present-day Subsurface Water Resources: Geochemical, Hydrogeological and Modeling Studies	TU	8:00 AM - 12:00 PM	PCC 103A
T19. Distribution of Arsenic and Related Metalloids in Surface and Ground Waters: Controls and Challenges (Posters)	TU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T46. Teaching Hydrogeology in the 21st Century (Posters)	TU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T66. Emerging and Innovative Approaches to Groundwater Modeling (Posters)	TU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T75. Chemical and Hydrological Interactions in the Evolution and Control of Coal and Metal Mine Drainage (Posters)	TU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T94. The Spatial and Temporal Variability of Ground Water Recharge (Posters)	TU	1:30 PM - 5:30 PM	PCC Exhibit Hall C
T75. Chemical and Hydrological Interactions in the Evolution and Control of Coal and Metal Mine Drainage II - Birdsall-Dreiss Distinguished Lecture: Predicting and Preventing Acid Drainage From Sulfide Bearing Mine Wastes	TU	4:30 PM - 5:30 PM	PCC 103C
Geochemistry, Aqueous	WE	8:00 AM - 12:15 PM	PCC 111AB

Session Title	Day	Time	Room
T25. Water-Quality Issues in Sole-Source and Principal Aquifers in the U.S.	WE	8:00 AM - 12:00 PM	PCC 104B
T70. Groundwater Flow and Contaminant Fate, Transport and Remediation in Fractured Soil, Sediment and Rock	WE	8:00 AM - 12:00 PM	PCC 103C
T78. Geochemical and Hydrologic Linkages Between Shallow and Deep Groundwaters	WE	8:00 AM - 12:00 PM	PCC 104A
T87. Stream-hyporheic Interactions: Hydrology, Geochemistry, and Biology	WE	8:00 AM - 12:00 PM	PCC 103A
T94. The Spatial and Temporal Variability of Ground Water Recharge	WE	8:00 AM - 12:00 PM	PCC 103B
T65. Detection of Voids, Tunnels and Collapse Features	WE	1:30 PM - 5:30 PM	PCC 103B
T81. Physical, Chemical, and Biological Controls on Remediation of Chlorinated Solvents in Fractured Rock	WE	1:30 PM - 5:30 PM	PCC 105AB
T84. Novel Applications of Tracers to Characterize and Distinguish Multiple Transport Phenomena at Various Scales	WE	1:30 PM - 5:30 PM	PCC 103A
Geochemistry, Aqueous (Posters)	WE	1:30 PM - 5:30 PM	PCC Exhibit Hall C

Hydrogeology Related Field Trips

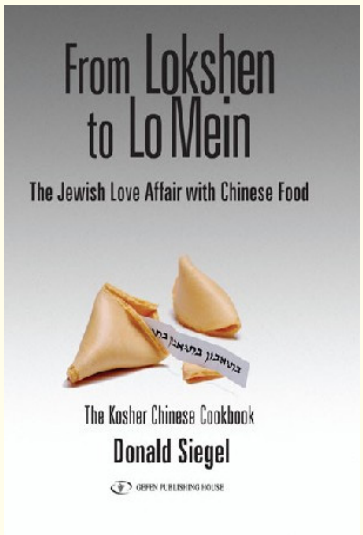
Field Trip	Day
Buried Holocene Streams and Legacy Sediment: Late Pleistocene to Historical Changes in Stream Form and Process and Implications for Stream Restoration, Mid-Atlantic Piedmont Region	SAT, Oct 21
Coastal Hydrology and Processes of Atlantic Barrier Islands	SAT, Oct 21
Bicycle Tour of the Geology and Hydrology of Philadelphia	TUE, Oct 24
Philadelphia Urban Hydrology	WED, Oct 25
Arsenic in Groundwater in the Newark Basin	THU, Oct 26
Geologic, Hydrogeologic, and Biogeochemical Controls on Natural and Enhanced Degradation of Industrial Solvents in Fractured Rocks	THU, Oct 26
Karst and Environmental Hydrology in Central Pennsylvania	WED-FRI, Oct 25-27

Special Event Sponsored by the Hydrogeology Division

Don Siegel

Don Siegel's Kosher-Chinese Cooking

Tuesday, October 24
11:15 am to 12:00 pm
(*Prior to Hydrogeology Division Luncheon & Awards Banquet*)
Marriott, Grand Ballroom, Salon E



Report on Birdsall-Dreiss Fundraising

By Bob Ritzi

Four years ago the Hydrogeology Division began a concerted effort to bolster the interest-bearing accounts which support the Birdsall-Driess Distinguished Lectureship. In this time, the Management Board has appealed for donations in order to increase the principal in these accounts and thereby increase the interest-generated revenue supporting future lecture tours.

To date, there have been 189 donations totaling $46,455. Of these, 36 donations totaling $29,299 have come from former Birdsall-Dreiss lecturers through a special matching-funds appeal. The remaining 153 donations totaling $17,156 have come from the division membership at large.

Many division members responded to an initial appeal to pledge a contribution of $25 per year over four years. If you are one who made this pledge, thank you both for your past contributions and for following through with your final installment. Hopefully you share in a sense of collective pride among those of us who have joined together to help. Please give very strong consideration to continuing your $25 contribution in future years, and perhaps making it an annual tradition of giving in support of the lectureship and the division, your professional home.

Our efforts to increase the principal in the lectureship accounts, along with the recent increase in interest rates, and a recent increase in Division dues, will together create better funded lecture tours in the near future. However, much more is needed in order to establish the level of interest income and support that the distinguished lecture tour truly deserves. We have taken some steps in the right direction, but please look for future appeals and respond to them as we continue work towards putting the lectureship on a firm financial foundation.

If you have not yet joined us in helping to support the Birdsall-Dreiss Lectureship, please do so now. Donations can be made in any amount and pro-rated over any number of years. Donations can be made through the GSA Foundation at: https://rock.geosociety.org/donate/donate.asp or by calling Joan Bell, GSA Foundation, (303) 357-1067. When making a contribution, please clarify that you are contributing to the Birdsall-Dreiss Lectureship Funds. In reality there are two separate accounts (the Birdsall Fund and the Dreiss Fund), but in practice they are treated as one. They are listed separately on the Foundation's web page pull-down menu under "Where do you want your contribution to go?" You may make your full pledge to one or the other of these funds, or split it between them. Any of these approaches will have the identical, positive effect in supporting the lectureship.

Thank you for your support!

Lecturer *from page 5*

recharge. Climate variability at interannual timescales is dominated by the El Niño-Southern Oscillation (ENSO), a coupled atmospheric-oceanic cycle that increases winter precipitation in the southwestern U.S. ENSO cycles would therefore be expected to increase groundwater recharge. Results from a unique field data set from weighing lysimeters (large, soil-filled concrete containers) beneath nonvegetated and vegetated systems in the Mojave Desert, Nevada, however, unequivocally demonstrate that vegetation dynamics controls the impact of ENSO on groundwater recharge. The long-term lysimeter (8-yr) record fortuitously included the largest El Niño (1997–1998) of the last century. The lysimeter data indicate that rapid increases in vegetation productivity in response to 2.5 times normal winter precipitation reduced soil-water storage to half that in the nonvegetated lysimeter, thereby precluding deep drainage below the root zone that would otherwise result in groundwater recharge. Vegetation dynamics provides negative feedback to ENSO precipitation. Satellite data allowed quantification of biomass productivity over large regions and provided regionalization of the "point scale" lysimeter results. Chloride and pressure-head profiles in thick unsaturated zones at sites across the southwestern U.S. provide natural archives of past conditions. These archives indicate that similar feedbacks have minimized interstream basin-floor recharge since the last glacial period, 10,000 to 15,000 years ago. Native plants maintain dry soil conditions and upward soil-water flow across broad regions. Strong correlations between satellite-based vegetation productivity and interannual precipitation variability related to ENSO in deserts in Australia, South America, and Africa indicate that the processes described in the southwestern U.S. may apply to deserts globally. The two-way coupling between the water cycle and vegetation dynamics is critical in controlling how climate variability influences water resources, with important implications for waste disposal in semiarid regions.

Impacts of Changing Land Use and Land Cover on Subsurface Water Resources

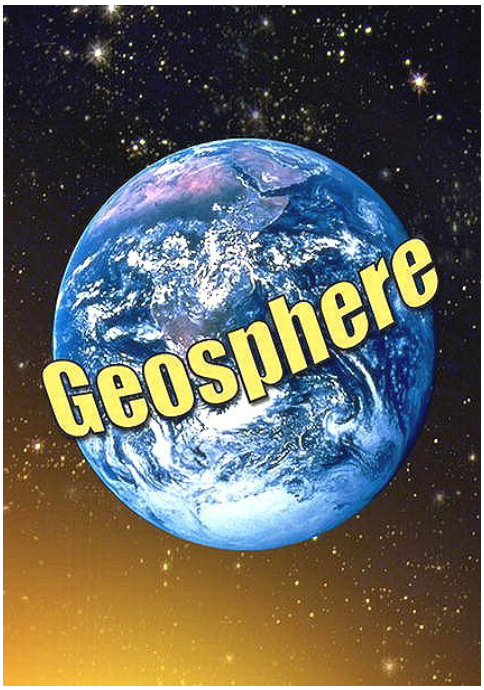
Most widespread changes in land use and land cover have occurred because of agricultural expansion. In the last 300 years, cultivated cropland has increased almost 70 fold in the U.S. and about 5 fold globally. Total irrigated agriculture has doubled globally in the past 4 decades, and agricultural lands are projected to increase ~20% globally in the next 50 years. Irrigated agriculture accounts for about 70% of global water withdrawals and 90% of global water consumption. What impacts have these land use/land cover changes had on water resources?

This talk will show that measurements of energy status, chemical composition of pore water above the water table (the vadose zone), groundwater levels, and groundwater quality provide an archive of system response to past land use/land cover changes. The presentation will focus on the Texas Southern High Plains, which is one of the largest agricultural areas in the U.S. This region consists of 44% natural rangeland, 44% nonirrigated (rain-fed) agriculture, 11% irrigated agriculture, and 1% other. Although irrigated land use represents only 11% of the area, it accounts for 94% of total water consumption. Cultivation of rangelands has changed the system from discharging through evapotranspiration to recharging. Evidence of discharge (no recharge, upward water movement) under natural rangeland ecosystems includes upward hydraulic-head gradients, high chloride concentrations, and no change in groundwater levels over time. These natural rangelands have been discharging since Pleistocene times (~10,000 to 15,000 yr). Recharge under rain-fed agricultural lands is shown by downward hydraulic-head gradients, high matric potentials, low chloride concentrations, and rising groundwater levels. Groundwater-level rises have ranged from 2 to 23 m and averaged 7 m over a 3,400-km2 area of predominantly rain-fed agriculture during the last few decades, indicating recharge rates from 5 to 50 mm/yr (median 21 mm/yr, 5% of precipitation). Change from discharge to recharge conditions reflects long fallow periods (~7 months/yr) associated with cultivation. Recharge under irrigated agricultural lands is shown by downward hydraulic-head gradients and high matric potentials. Low irrigation rates (0.3 to 0.6 m/yr) in this region result in accumulation of chloride and nitrate in shallow soils that may ultimately cause soil salinization. Large groundwater-level declines (as much as 75 m) under irrigated areas indicate that irrigated agriculture is not sustainable. Thick unsaturated zones under natural rangelands contain a reservoir of salts that are mobilized by recharge caused by cultivation, resulting in degradation of groundwater quality (for example, increased salinity, nitrate, and perchlorate). Results from land use/land cover changes in this region will be compared with those from other regions globally. Although past land-use changes had unintended impacts on the water cycle, a comprehensive understanding of these impacts could be used to alter land use/land cover for better management of water resources. Further increases in water resources may be achieved through expansion of rain-fed agriculture with potentially minimal negative environmental impacts.

Special Collection of Papers on Reactive Transport Is Now Published in Geosphere, GSA's New Electronic Journal

Geosphere is an entirely electronic publication, introduced by the Geological Society of America in 2005. The creation of *Geosphere* was largely motivated by a desire to include the state of the art in scientific visualization and animation within published articles. The second volume of *Geosphere*, published this year, has a special collection of papers on reactive transport.

The special collection is an outgrowth of a session held at the 2004 annual meeting on the topic of "Modeling Flow and Transport in Chemically and Physically Heterogeneous Media." The session included 23 presentations (*GSA Abstracts with Programs* - Vol. 36, No. 5). It was decided that the scientific community would benefit from the development of peer-reviewed articles from among the talks given in the session, and that the animations and other graphics would especially appropriate for publication in *Geosphere*. Eight articles were contributed to the special collection and have been published on an 'as-ready' basis. The articles are organized within the journal as follows:



April 2006, Volume 2, Issue Number 2

Larry Lemke and Linda Abriola, "Modeling DNAPL Mass Removal in Nonuniform Formations: Linking Source Zone Architecture and System Response."

Yunwei Sun and Xinjian Lu, "A Chlorinated Transport Model for Identifying Sequential Bio-Reactive Systems of Chlorinated Solvents"

Jeremy Koonce, Zhongbo Yu, and Irene Farnham, "Geochemical Interpretation on Groundwater Flow in the Southern Great Basin"

Javier Samper and Changbing Yang, "Stochastic Analysis of Transport and Multicomponent Competitive Monovalent Cation Exchange in Aquifers"

June 2006, Volume 2, Issue Number 4

Steven Carle, Bradley Esser, Jean Moran, "High-Resolution Simulation of Basin Scale Nitrate Transport Considering Aquifer System Heterogeneity"

Zhenxue Dai, Javier Samper, and Robert Ritzi, "Identifying Geochemical Processes by Inverse Modeling of Multicomponent Reactive Transport in the Aquia Aquifer "

Timothy Scheibe, Yilin Fang, Christopher Murray, Eric Roden, Yi-Ju Chien, Scott Brooks, and Susan Hubbard, "Transport And Biogeochemical Reaction Of Metals In A Physically And Chemically Heterogeneous Aquifer"

July 2006, Volume 2, Issue Number 5 (in press)

V. Teles, F. Delay, and G. de Marsily et al. "Comparison of Transport Simulations and Equivalent Dispersion Coefficients in Heterogeneous Media Generated by Different Numerical Methods: a Genesis Model and a Geostatistical Gaussian Simulator"

The articles can be freely accessed through the link: http://www.gsajournals.org/gsaonline/?request=get-archive&issn=1553-040X&volume=2

The Editor of *Geosphere*, Randy Keller, hopes that the hydrogeology community will be well represented among the author's submitting manuscripts and among the members of the editorial board. Feel free to contact him at:

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NGWA and GSA: Collaborating in Pursuit of Scientific Advancements and Good Data

By Vicki Kretsinger, AGWSE Past Chair, NGWA/GSA Science Liaison

Vicki Kretsinger

As an Associated Society of the Geological Society of America (GSA), the National Ground Water Association/ Association of Ground Water Scientists and Engineers (NGWA/ AGWSE) is pleased to co-sponsor two sessions at the 2006 GSA Annual Meeting and Exhibition in Philadelphia, Pennsylvania. Kudos to Rob Young, of Western Carolina University, 2006 Technical Program Chair, along with Laura Toran of Temple University and Mark Person of Indiana University, Hydrogeology Program Co-chairs, for assembling a great technical conference on behalf of GSA's Hydrogeology Division!

Collaborative activities between GSA and NGWA/ AGWSE are important for many reasons. Now is an especially important time for such collaborations because of the opportunities created to bring together the science community to discuss the science and data needs relating to developing a better understanding of future groundwater availability. In a recent member survey conducted by NGWA, it was learned that among AGWSE members, 70 percent reported being "somewhat to very challenged" in their professional work by the issue of the sustainability of ground water. Through NGWA's Government Affairs Committee and its annual Fly-In, NGWA has been trying to increase groundwater awareness and the need for good groundwater data on Capitol Hill. Bev Herzog, Chair of the AGWSE Division and Assistant to the Chief for Environmental Initiatives of the Illinois State Geological Survey, recently learned that groundwater sustainability is important to Speaker of the House Dennis Hastert. The Speaker called a press conference in a small town in Kane County, just west of Chicago and part of Hastert's district, to announce $1.4 million in grants to the county for water resources planning. Bev reports that most of these funds are going for an ongoing study by the Illinois State Geological Survey and the Illinois State Water Survey to map the aquifers, monitor ground water levels and quality, and model the groundwater system beneath the county as a basis for water resources planning. The remainder will go for floodplain mapping. In making the announcement, Hastert stated, "Given its incredible growth, Kane County must provide an additional 60 million to 80 million gallons of water per day to serve 400,000 additional residents by the year 2030. This federal investment will allow the county to examine how to make that happen in a way that is cost-efficient and environmentally responsible."

The two NGWA co-sponsored sessions promote the spirit of GSA's theme, "The Pursuit of Science", and also, promote the effective collection, analysis, and application of good data, including formulation of conceptual models and development and calibration of numerical models, to address current and future groundwater quantity and quality issues. A related session, "Groundwater Availability and Its Sustainability" (Topical Session 69), convened by Bill Alley and Kevin Dennehy of the U.S. Geological Survey, also speaks to these objectives, including groundwater monitoring and assessment to address issues of the long-term sustainability of aquifer systems at the regional scale, including storage depletion, water-quality impacts, land subsidence, and streamflow depletion.

One of the NGWA co-sponsored sessions at the 2006 GSA annual meeting is "Water-Quality Issues in Sole-Source and Principal Aquifers in the U.S." (Topical Session T25) which is being co-sponsored by GSA's Hydrogeology Division and NGWA/AGWSE and organized by Brian Katz and Mike Focazio of the U.S. Geological Survey (USGS) in Florida and Virginia, respectively. In recent years, concerns have emerged about water quality in many of the 62 principal aquifers in the U.S. In some of these systems, sole-source aquifer designations have been used to protect drinking water

supplies especially where few or alternative sources of water exist. This session highlights research on anthropogenic and natural factors that control water quality in sole-source and principal aquifers in the U.S.

A second session co-sponsored by GSA's Hydrogeology Division and NGWA/AGWSE is "Emerging and Innovative Approaches to Groundwater Modeling" (Topical Session T66). This session, convened by Abe Springer of Northern Arizona University and Linda Zhang of the University of Michigan, focuses on the evolution and widespread application of groundwater models and innovative approaches in modeling. Session presentations will highlight innovative approaches in development, application, effective parameter determination, uncertainty of models, and other topics. NGWA's 2006 Darcy Lecturer Eileen Poeter, currently a Professor of Geological Engineering at the Colorado School of Mines and Director of the International Ground Water Modeling Center, will provide her Darcy Lecture "All Models Are Wrong: How Do We Know Which Are Useful?" in coordination with this session. Eileen's lecture will presented on Monday October 23 at 5:00 pm and details how the groundwater profession today is searching for appropriate approaches to developing conceptual models, evaluating which are useful, and describing the uncertainty associated with their predictions.

Planning Underway for 2007 AGWSE Ground Water Summit

Many thanks to GSA's Hydrogeology Division as a continuing co-sponsor of the new AGWSE annual technical conference, the "Ground Water Summit", launched in 2005. Summit co-chairs Bill Alley and Erik Block, AGWSE Board members, are leading the planning activities for the 2007 AGWSE Ground Water Summit that will take place April 29-May 3, 2007 at the Convention Center in Albuquerque, New Mexico. The Summit engages local, national, and international science partners to facilitate the exchange and dissemination of technical information and new science developments, allow a means for discussing policy and regulatory issues pertaining to groundwater, and promote goodwill among groundwater professionals worldwide. Highlights of the 2007 Summit include: keynote speaker John Wilson of New Mexico Tech, workshops, Darcy Forum, platform and poster presentations, distinguished lecturers (including 2007 NGWA Darcy Lecturer, James Butler, and the 2007 GSA Birdsall-Dreiss Lecturer, Bridget Scanlon), field trips, student mentoring program, student project presentations, and student awards for platform and poster presentations.

The Summit includes 39 sessions with subject matter that ranges from more environmentally and emerging contaminant-focused topics to water resources systems analysis, management, and policy issues. Co-sponsors include the U.S. Geological Survey, the Geological Society of America's (GSA) Hydrogeology Division, U.S. National Chapter/International Association of Hydrogeologists, the Groundwater Resources Association of California (GRA), National Onsite Wastewater Recycling Association, and the Illinois State Geological Survey.

Call for Abstracts: Abstract instructions are posted on the NGWA web site on the Ground Water Summit Page at **http://www.ngwa.org/e/conf/0704295095.cfm#submissions**. Abstracts will be received until midnight (EDT) **November 10, 2006**.

Summit session details and other Summit information are provided at **http://www.ngwa.org/e/conf/0704295095.cfm** ; a few highlights follow.

2007 Darcy Forum

The Darcy Forum launched in 2005 at the first Summit was created to provide perspectives and insights by renowned panelists and prompt an exciting exchange among the panelists and Summit attendees. This year's topic is:

"Surface and groundwater interactions – where science and policy meet."

The 2007 Darcy Forum will be moderated by Bill Woessner, Professor at the University of Montana.

2007 Summit Workshops and Courses

Springs Ecosystems Inventory, Classification, and Monitoring
Abe Springer, Northern Arizona University, and Larry Stevens, Environcon Systems

Environmental Aqueous Geochemistry Short Course
Patrick Longmire, Los Alamos National Laboratory

Ground Water Management in New Mexico
Tim Parker, Schlumberger Water Services

The AGWSE Board welcomes continued Summit session and other event co-sponsorship by GSA's Hydrogeology Division. Check the NGWA web site at www.ngwa.org for Summit details. The AGWSE Board also

extends many thanks to GSA for embracing continued opportunities for geoscience collaboration! We look forward to more opportunities to demonstrate the value of allied efforts.

Groundwater Resources Association of California — Events

November14-16, 2006

High Resolution Site Characterization and Monitoring
Westin Hotel, Long Beach, California
Cooperating Organizations Include: University of Waterloo, U.S. Geological Survey, USEPA, California State Water Resources Control Board, California Department of Toxic Substances Control, IAH/USNC, and NGWA.
The full agenda and more program and field trip details are posted at http://www.grac.org/hires.asp

September 18-19, 2007

26th Biennial Groundwater Conference & 16th Annual GRA Meeting
Sacramento, California
Sponsors include the University of California Center for Water Resources, California Department of Water Resources (DWR), California State Water Resources Control Board (SWRCB), Groundwater Resources Association of California (GRA), Water Education Foundation (WEF), and U.S. Geological Survey (USGS).

Preview of Other 2007 Symposia & Workshops

Watch for details at GRA's web site www.grac.org

*Groundwater Rights and Policy, March 2, 2007, San Francisco, CA
*Artificial Recharge II, Spring 2007
*Environmental Information Management Systems II
*Introduction to Groundwater Modeling
*DNAPL II, Summer 2007
*Exit Strategies for Contaminated Sites, Fall 2007
*Using Stable Isotope Methods in Groundwater Resource Studies
*Introduction to Groundwater Hydrology and Watersheds

CSM Offering Assistantships & Fellowships

The Hydrologic Science and Engineering Program at the Colorado School of Mines is seeking applications for several teaching and research assistantships (TA/RAs) and one Graduate Fellowship. The TAs may be appointed to teach Geology, Geophysics, or Environmental Engineering classes. RAs are needed in several areas, including hydrologic modeling, contaminant transport and remediation, and surface-ground water interaction. The Graduate Dean's Fellowship in Hydrology is awarded to the top applicant and funds discretionary research aligned with the recipient's interests. A list of participating faculty advisors, along with general application procedures, is listed at www.mines.edu/hydro.

In addition to the standard application, applicants for these positions should draft a short letter explaining their research interests, potential advisors, and/or teaching interest and experience. Send the additional letter to:

John McCray, Director
Hydrologic Science and Engineering
Colorado School of Mines
Golden, CO 80401
jmmcray@mines.edu

Hawley Receives UI Alumni Award

Division member John W. Hawley, is the recipient of the 2006 Alumni Achievement Award from the University of Illinois-Urbana, Department of Geology (Ph.D. 1962); and following the award presentation on November 10, he will review his current research on "development of digital hydrogeologic models of basin-fill aquifer systems in the binational Paso del Norte region of New Mexico, Trans-Pecos Texas, and Chihuahua, Mexico. John is an Emeritus Senior Environmental Geologist with the Bureau of Geology Division of New Mexico Tech; and he is currently an adjunct faculty member contributing to hydrogeology/GIS research programs at NM Tech, the Water Resources Research Institute at New Mexico State University, and the Universidad Autónoma de Ciudad Juárez, Centro de Información Geográfica. He will also receive the 2006 Distinguished Career Award from the Geological Society of America—Quaternary Geology & Geomorphology Division at the Society's Annual Meeting, and he was the 2005 recipient of the GSA Engineering Geology Division Distinguished Practice Award.

BULLETIN BOARD

Ongley Appointed Associate

Lois K. Ongley has been appointed Associate Professor of Chemistry at Unity College in Maine (www.unity.edu).

2006 NGWA Ground Water Expo

This year's NGWA Ground Water Expo - Better Together! will be held in Las Vegas, Nevada on December 5-8. For more information visit the NGWA webpage at <http://www.ngwa.org/>.

2006 AGU Fall Meeting Draws Near

The 2006 AGU Fall Meeting will be held on December 11-15 in San Francisco, California. For information on sessions see the AGU web site at: <http://www.agu.org/meetings/fm06/>.

Plan Now For the 2007 GSA Annual Meeting

When: October 28-31
Where: Denver, CO
For more information visit the GSA webpage at <http://geosociety.org/meetings/2007/

2006 AWRA Annual Water Resource Conference

When: Nov 6-9
Where: Baltimore, MD
For more information visit the AWRA webpage at <http://www.awra.org/>.

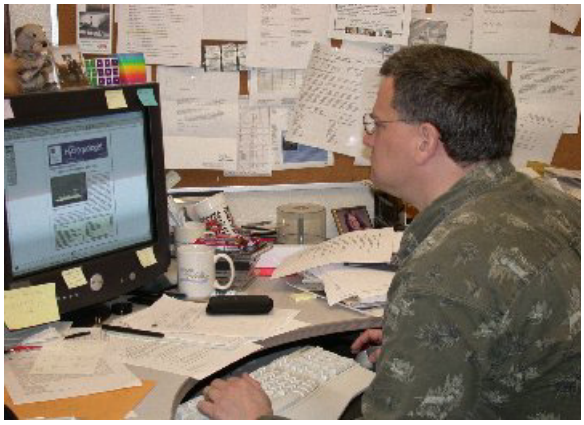
21st Century Ground Water Systems Conference

When: Oct 12-13
Where: Costa Mesa, CA
For more information visit the NGWA website <http://www.ngwa.org/>.

From The Editor...

Ah, the end of another publishing season. Thanks to everyone who contributed an article, commentary, announcement, photo, etc., to this issue. The newsletter would not be possible without each of you. If you have comments, suggestions, or an idea for a column or article, please contact me at <feharvey1@unl.edu>.

F. Edwin (Ed) Harvey, Editor
The Hydrogeologist



Hydrogeology Division Contacts

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