



Hudson – Mohawk Professional Geologists Association NEWSLETTER

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OCTOBER MEETING

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

Speaker: 2015 Birdsall-Dreiss Distinguished Lecturer –
Dr. Clifford I. Voss, Research Hydrologist - National Research
Program, U.S. Geological Survey

THURSDAY • October 22th, 2015

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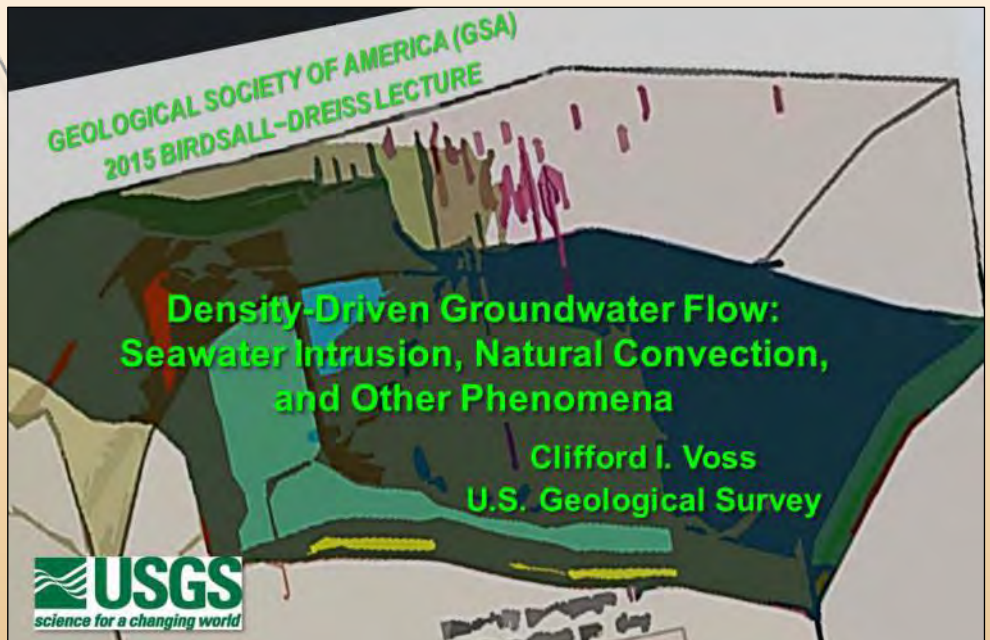


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Abstract: Difficulties in understanding and managing hydrogeologic systems with variable-density groundwater flow are often due to the common notion that groundwater flow is driven in the direction of decreasing water-table elevation or hydraulic head; i.e. 'downhill'. However, even small variations in groundwater density can drive flow in directions that have no

Continued on page 3

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MEETING INFORMATION

Location: Century House
997 New Loudon Road
Latham, NY 12110

When: Social Hour 5:00pm
Dinner 6:00pm
Program 7:00pm

Cost: Dinner & Program
\$10.00 for student members
\$20.00 for dormant geologists
\$25.00 for members
\$30.00 for non-members
Program only: Free

****Please note meeting is on
THURSDAY • October 22th, 2015****

Reservations are required by Monday

October 19, 2015

Whether attending the dinner
or only the presentation.

Register on-line at www.hmpga.wildapricot.org

or call or email Diane at **(518) 348-6995**,
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Dinner Sponsorships for Corporate Members

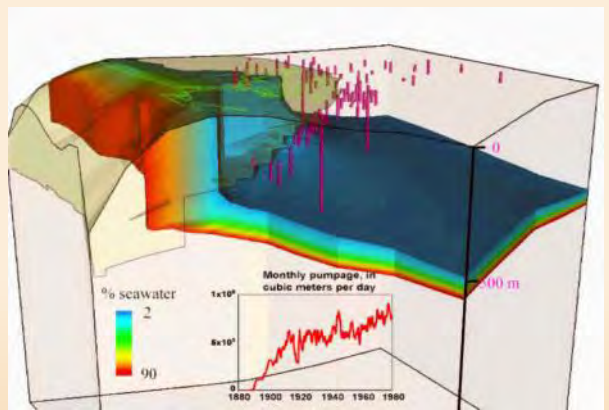
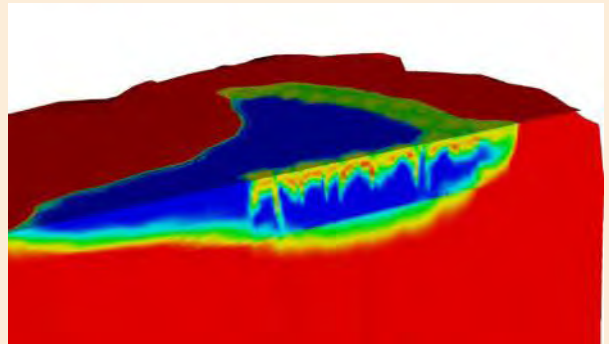
Dinner Sponsors receive free dinner, a display table set up for the social hour and a 5 minute presentation to the dinner audience, prior to the presentation. Please contact Sarah Benson at sbenson@chacompanies.com for more information or if you are interesting in sponsoring a dinner meeting!

For sale HMPGA glasses \$5 and T-shirts \$15

Density-Driven Groundwater Flow **Abstract:** | continued from Page 1

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.

About the Speaker: Dr. Clifford I. Voss has been selected as the 2015 Birdsall-Dreiss Distinguished Lecturer by the Geological Society of America (GSA) 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 globally 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.

Background of the Birdsall-Dreiss Lectureship

The Birdsall Lectureship began in 1978, as part of a bequest left to the Geological Society of America – Hydrogeology Division in memory of John Manning Birdsall. Mr. Birdsall was a prominent geologist, retired from the Water Resources Division of the U.S. Geological Survey. He was a scientist, a dedicated public servant and a gentleman. The bequest was used to provide travel funds for outstanding scientists working in the field of hydrogeology to visit other institutions and give talks on their research. The first lecturer, Dr. Jacob Bear from the Israeli Institute of Technology, visited only the University of Wisconsin – Madison, which hosted one of the premier hydrogeology programs of that era. The subsequent list of Birdsall-Dreiss lecturers includes many outstanding scientists from academia and government. The number of

institutions visited by each lecturer grew rapidly, with recent lecturers typically giving 40 to 50 talks, mainly in the U.S. and Canada, but also in Europe, Asia and Australia.

One of the most popular Birdsall Lecturers was Dr. Shirley Dreiss from the University of California – Santa Cruz. Shortly after her very successful 1992 lecture tour, Shirley was killed in an auto accident. Her many friends and admirers honored her by contributing to the GSA Birdsall Lectureship, which was renamed the Birdsall-Dreiss Lectureship. The Birdsall-Dreiss Lecturer is chosen each year by a panel of former B-D lecturers. There are no applications for this position and they make their choice solely on the reputation of perspective candidates for their research excellence and ability to communicate.



Dr. Shirley J. Dreiss



John Manning Birdsall

The Birdsall-Dreiss endowment pays for part of their travel and candidates typically obtain additional travel funds from their home institution. Universities or other institutions wishing to host a Birdsall-Dreiss lecture send in their application in the fall, with the tour officially starting each January and ending at the fall meeting of the Geological Society of America.

Birdsall-Dreiss Distinguished Lecturer Description:
The lecturer shall be selected based on outstanding contributions to hydrogeology or a closely related field through original research and public communication, and the potential for continued contributions to the profession.



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P R E S I D E N T ' S M E S S A G E

Presidents Message October 2015

I was reading in bed Saturday night when there was thud like a gust of wind buffeting the old house. My first thought was, maybe a distant explosion or a bad car wreck. The rumbling sound lasted a couple seconds then faded. The next morning the USGS website reported a magnitude 3 earthquake, about 8 miles deep, near the New York Power Authority's Pumped Storage Power Project in Gilboa.



The USGS records show a total of 20 earth quakes in this area over the last 40 years, mostly clustered in an area south of Berne, so this latest location is a bit of an outlier. After the hurricane Irene in 2011, much concern was raised about the structural integrity of the Gilboa dam located just south of the Pumped Storage Project. Now, 4 years later, I found no mention of the earthquake in the Schoharie newspaper.

I hope you will enjoy this month's presentation by Cliff Voss of the USGS. We are lucky to have speakers of this caliber. See you on Thursday!

Frank Williams, PG
President 2015-2016

PROGRAM DIRECTORS

Being active in HMPGA is a fully volunteer activity that often demands a great deal of attention. The following members chair this year's committees and we thank them:

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Mr. Phela's

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CLUE: B equals D and each letter of the expression is substituted by another letter.

Jxxaao namvbfps'q japbhpgx qgapgmjapzco
eipqq qpst gcmq qtsj ycxs gcxo qgpagxb thg
ts nmxib gamzq: "Jtssp gpdx p qxbmfxsgpao
kthasxo."

Answer in the November 2015 HMPGA Newsletter.



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HEALTH AND SAFETY CORNER

The most dangerous part of the day for any employee is the time they spend in their vehicle with a crash occurring every 5 seconds, property damage occurring every 7 seconds, an injury occurring every 10 seconds, and a motor vehicle fatality occurring every 12 minutes

DRIVE SAFELY TO WORK WEEK IS OCTOBER 5TH – 9TH



NETS (Network of Employers for Traffic Safety) has a toolkit with all the materials you'll need to promote safe transportation options at your workplace. Visit www.trafficsafety.org for the free toolkit.

FIRE PREVENTION WEEK IS OCTOBER 4TH-10TH

NFPA has free downloads and toolkits (for purchase). Fire Prevention week encompasses home and work fire safety. Consider activities you can do for your kids' schools as well as for work. <http://www.nfpa.org/safety-information/fire-prevention-week>



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The HMPGA newsletter welcomes the submission of photos or anything of a geologic nature for inclusion in future newsletters. Please send your submissions to:
Liz Haight • lhaight@aztechenv.com.



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From Fish Skin to Our Teeth Tracing the Origin of Enamel

By Andrew Alden, KQED Science Contributor



[Link to article at http://ww2.kqed.org/science/](http://ww2.kqed.org/science/)

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HMPGA Committees: HMPGA is a volunteer-run organization. If you have any interest in volunteering to help our group thrive, we always welcome members on our various committees. Contact Sarah if you are interesting in being a more active member!

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Eastern New York (ENY) Chapter of the Air & Waste Management Association (MASS-A&WMA). They encompass the greater Capital District and Hudson Valley region of eastern New York State. A professional non-for-profit association of engineers and scientists working in the environmental field, with a particular focus on issues related to air and waste. www.awmanenychapter.wildMAYicot.org



The Geological Society of America (GSA) strives to be a leader in advancing the geosciences, while enhancing the professional growth of its members, and promoting the geosciences in the service of humankind. www.geosociety.org



The New York State Museum is a major research and educational institution. It is dedicated to promoting inquiry and advancing knowledge in the fields of geology, biology, anthropology, and history, through the investigation of material evidence germane to New York State's past, present and future. www.nysm.nysed.gov



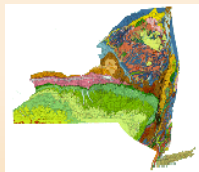
New York State Council of Professional Geologists (NYSCPG) strives to strengthen and advance the geologic sciences as a profession, promote the protection of public health and welfare and the environment through the professional practice of geologic sciences, and create high standards of ethical conduct among its members and within the profession of geology, as well as the legal standing of geologists and their ability to practice geology in New York State by promoting the licensing of geologists in New York State through statutory regulation. www.nyscpge.org

Environmental Breakfast Club

The Capital District Environmental Breakfast Club is an informal group of environmental professionals that meets monthly to discuss current environmental issues. Each meeting features a speaker on a topic of interest, a regulatory update, and an open forum. Meetings are held on the first Friday of each month except July and August. The Environmental Breakfast Club meets at the Holiday Inn Turf on Wolf Road in Colonie, New York. Meetings start at 7:30 am. The cost is \$15 per person, which includes a full breakfast buffet. www.youngsommer.com



Buffalo Association of Professional Geologists (BAPG) conducts regular membership meetings on the third Wednesday of the month, January through June and September through November. Meetings feature distinguished speakers and interesting topics. Field trips and technical seminars sponsored by the BAPG encourage the exchange of scholarship and expertise. www.bapg.org



Central NY Association of Professional Geologists (CNYAPG) conducts regular meetings on the second Thursday of each month, unless otherwise posted, from September to May. Meetings feature dinner and distinguished speakers whose presentations invite comment and discussion. www.cnyapg.org



Long Island Association of Professional Geologists (LIAPG) is a not-for-profit professional organization dedicated to the professional and business needs of geologists located in the Long Island / Metro New York area. www.lipg.org



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