FastTIMES

December 2007
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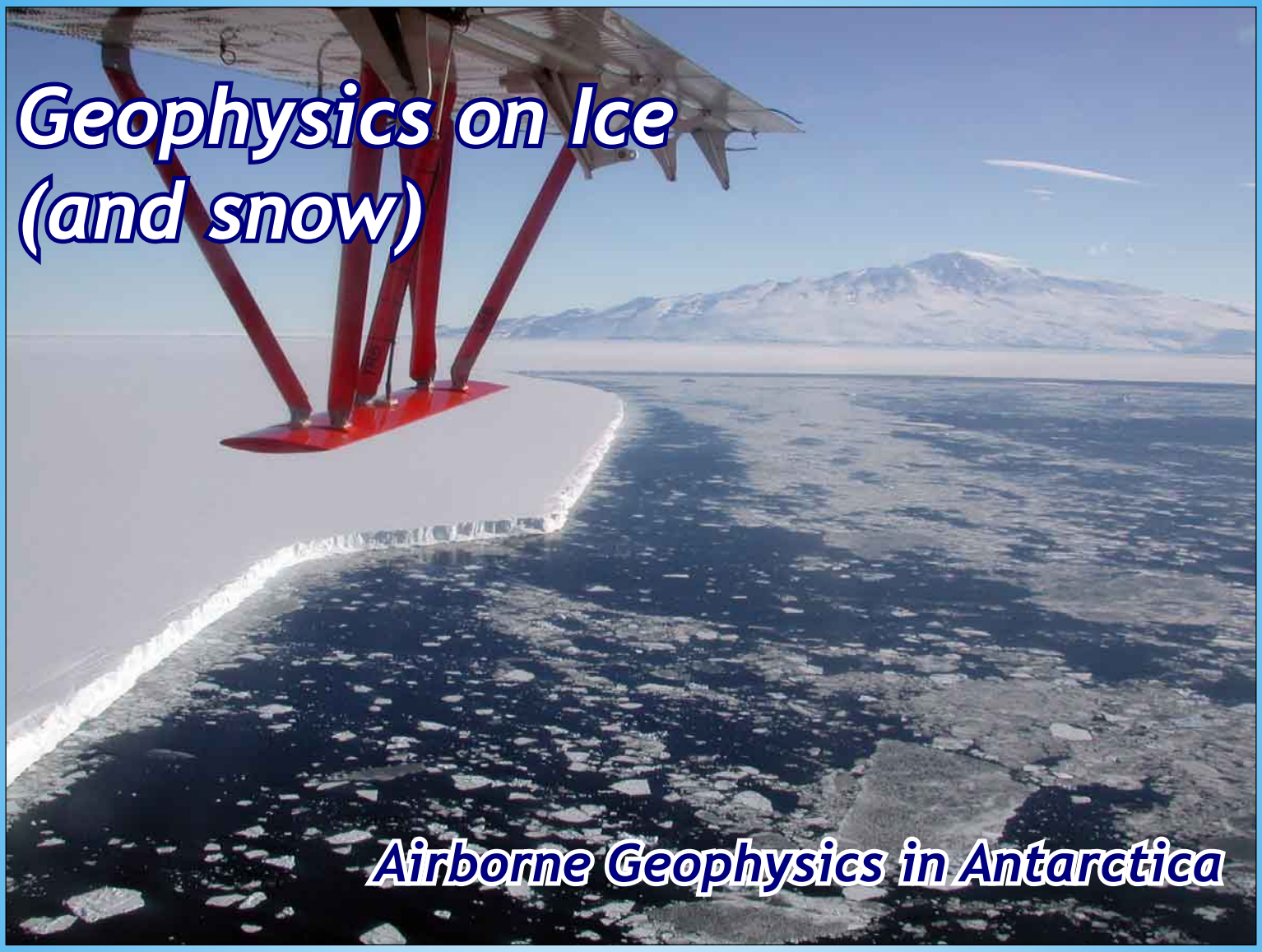
www.eegs.org

News for the Near-Surface Geophysical Sciences

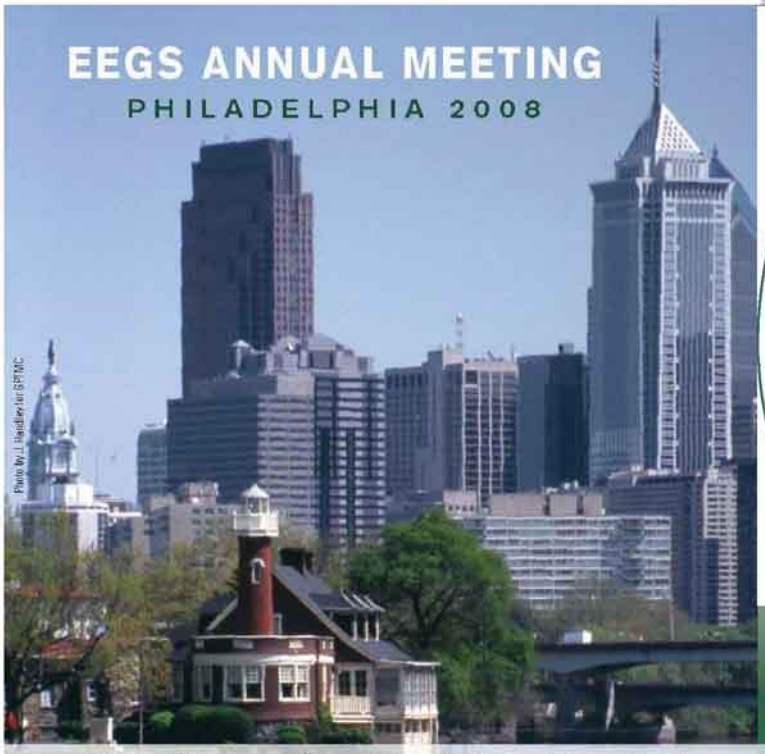
Published by the Environmental & Engineering Geophysical Society

Geophysics on Ice (and snow)



Airborne Geophysics in Antarctica

Also in this issue . . .



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2008

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CONFERENCE HIGHLIGHTS

- Technical Sessions, Special Sessions and Returning this Year—Poster Overviews and Viewing
- Keynote Speaker as well as our Technical Luncheon Speaker—the Inaugural Recipient of this year's EEGS/Geonics Early Career Award!
- Exhibitors Plus Outdoor Demonstrations near Independence and Constitution
- Spectacular Evening Event at Constitution Hall
- New this Year: EEG University—Parallel sessions introducing non-geophysicists (managers, regulators, consultants, teachers and students) to geophysics and its environmental and engineering applications
- Field Trips—Geological Bicycle Tour plus Trip to Gettysburg Field

On the Cover

Center: Ice-penetrating-radar-equipped Twin Otter surveying in Antarctica. Photo provided by Jack Holt for the story "Geophysics on Ice." Lower right: Christopher Hyde (Geological Survey of Canada) field-testing an early capacitive-coupled resistivity instrument on the Mackenzie Delta. Photo provided by James Hunter.

What We Want From You

The ***FastTIMES*** editors appreciate most any geophysical contribution, but for the March 2008 issue we wish to highlight water-borne instruments and applications. Successes, trials, and tribulations under difficult conditions are especially encouraged. We also always welcome photographs and brief noncommercial descriptions of new or innovative instruments with possible environmental or engineering applications, news from other geophysical or earth-science societies, notices of upcoming conferences, and brief reports from recent conferences. Please submit your items to a member of the ***FastTIMES*** editorial team by February15, 2008.

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Contents

FastTIMES

FastTIMES is published by the Environmental and Engineering Geophysical Society (EEGS). It is available electronically (as a pdf document) from the EEGS website (www.eegs.org).

About EEGS

The Environmental and Engineering Geophysical Society (EEGS) is an applied scientific organization founded in 1992. Our mission:

"To promote the science of geophysics especially as it is applied to environmental and engineering problems; to foster common scientific interests of geophysicists and their colleagues in other related sciences and engineering; to maintain a high professional standing among its members; and to promote fellowship and cooperation among persons interested in the science."

We strive to accomplish this mission in many ways, including (1) holding the annual Symposium on the Application of Geophysics to Engineering and Environmental Problems (**SAGEEP**); (2) publishing the ***Journal of Environmental & Engineering Geophysics (JEEG)***, a peer-reviewed journal devoted to near-surface geophysics; (3) publishing ***FastTIMES***, our society newsletter, and (4) establishing and maintaining relationships with other professional societies relevant to near-surface geophysics.

Joining EEGS

EEGS welcomes membership applications from individuals (including students) and businesses. Annual dues are currently $90 for an individual membership, $50 for a student membership with a ***JEEG*** subscription ($20 without ***JEEG)***, and $650 to $3750 for various levels of corporate membership. The membership application is available at the back of this issue, from the EEGS office at the address given below, or online at www.eegs.org.See the back for an explanation of membership categories.

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FastTIMES Submissions

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To advertise in ***FastTIMES***, contact:

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The next ***FastTIMES*** will be published in March 2008. Please send articles to a member of the editorial team by February 15. Advertisements are due to Jackie Jacoby by February 15.

Calendar

*Please send additions, errors, and omissions to a member of the **FastTIMES** editorial team.*

2008

January 11	Final SAGEEP 2008 papers due
March 9–12	*GeoCongress 2008*: New Orleans, Louisiana
March 30–April 3	*2008 NGWA Ground Water Summit*: Memphis, Tennessee
April 6–10	*SAGEEP 2008*, Philadelphia, Pennsylvania
April 30–May 2	*GARS 2008*: Symposium on Geophysics and Remote Sensing in Determination of Near-Surface Structures, Izmir, Turkey
May 27–30	*2008 Joint Assembly*, Fort Lauderdale, Florida
June 9–12	*70th EAGE Conference & Exhibition*, Rome, Italy
June 15–18	*ICEEG 2008*: 3rd International Conference on Environmental and Engineering Geophysics, Wuhan, China
June 15–19	*GPR 2008*, Birmingham, United Kingdom
July 6–10	*XVIII International Conference on Computational Methods in Water Resources*, San Francisco, California
August	*Workshop on Soil Magnetism:* Multi-disciplinary Perspectives, Emerging Applications and New Frontiers, Cranfield, UK
September 14–17	*Near Surface 2008*: 14th European Meeting of Environmental and Engineering Geophysics, Krakow, Poland
December 1–4	*2008 Highway Geophysics–NDE Conference*, Charlotte, North Carolina

2009

March 29–April 2	22nd SAGEEP, Fort Worth, Texas

President's Message

Progress at EEGS

Jeffrey G. Paine, President (jeff.paine@beg.utexas.edu)

There is a lot going on at EEGS these days! The end of 2007 seems like a good time to review where we are as a society, and talk a bit about what will be coming your way soon. It's truly an exciting time to be involved with EEGS and in the larger world of near-surface geophysics.

First of all, the EEGS team of staff and volunteers is busy putting together a compelling technical, educational, and social program for SAGEEP 2008. It's in Philadelphia in April, and it isn't too early to make your plans to attend (see the flyers elsewhere in this issue). We'll be based in a great hotel in downtown Philadelphia, a short walk from lots of restaurants and historical attractions. Jon Nyquist is the General Chair and Ron Kaufmann is overseeing the construction of a stellar technical program that attracted more than 170 papers covering a myriad of geophysical topics. New this year as part of SAGEEP will be the Environmental and Engineering University (EEGU). The U.S. Department of Energy has been asked to help sponsor this educational and outreach program, which is intended to introduce non-geophysicists, teachers, and students to the applications, benefits, and limitations of environmental and engineering geophysics. EEGU sessions will run concurrently with regular technical sessions, giving the nontraditional SAGEEP attendee something to do on each conference day. If you know managers, consultants, regulators, and educators who would benefit from knowing more about geophysics and its applications, please encourage attendance for one or more days of the EEGU program. Topics, instructors, and schedules will be announced soon. Space will be limited, so please register early.

We are making a strong effort to improve ties with other professional organizations. For example, the EEGS Board has approved an agreement with the Society of Exploration Geophysicists to include our ***Journal of Environmental and Engineering Geophysics*** (***JEEG***) and all past SAGEEP papers in the SEG Digital Library within the separately styled "EEGS Collection." This will greatly increase the exposure of the published articles and benefit all past and future authors. EEGS members will have access to those papers and the SEG Expanded Abstracts, and EEGS will share in the revenue from subscriptions and downloads. The agreement is nonexclusive; EEGS continues to disseminate electronic versions of our publications in other venues such as GeoScienceWorld. In fact, EEGS will soon be offering SAGEEP papers for individual download from the EEGS web site.

The ***FastTIMES*** electronic-only experiment, begun in December 2006, has been a success. Each issue is sent directly to members by email and offered by download link to members of other interested societies, including the Geological Society of America, the American Geophysical Union, SEG, the ASCE Geo-Institute, the National Ground Water Association, and the European Association of Geoscientists and Engineers, among others.

EEGS has chosen Fort Worth, Texas as the destination for SAGEEP 2009. The new Omni Fort Worth Hotel, located in the heart of downtown adjacent to the convention center, is convenient to DFW Airport and within walking distance of cultural centers, restaurants, and nightlife. Doug Laymon, the technical chair for the 1992 SAGEEP in Chicago, has agreed to serve as general chair. I'm sure Doug, future EEGS President Bill Brown, and incoming SAGEEP Vice President Susan Pullan would appreciate

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your help and suggestions as we begin planning that meeting. You hold the keys to continued improvement of SAGEEP!

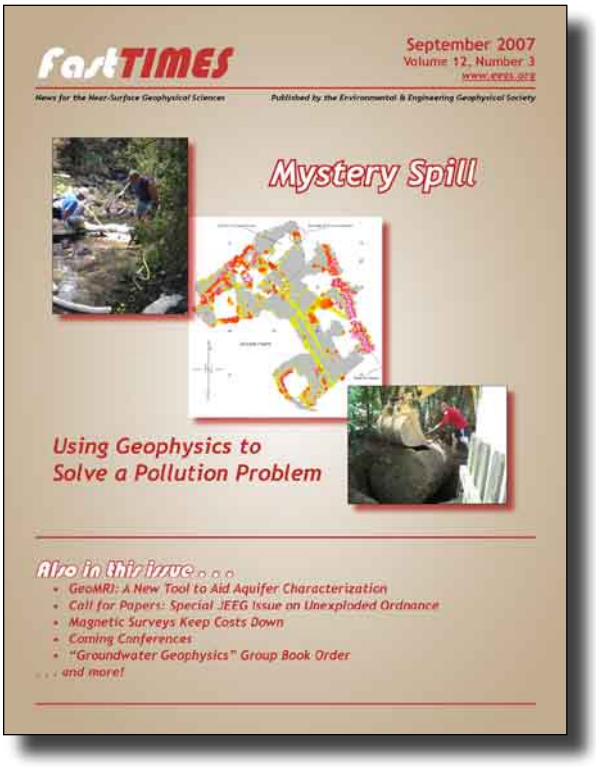
It's a minor thing, but we've also tried to make it easier for you to join EEGS or renew your membership by adding that capability to the EEGS web site. Now that the 2008 renewal notices have gone out, feel free to try out the process. Your dues are the second-largest source of support for the society's activities, trailing only SAGEEP.

In addition to paying your dues and attending SAGEEP, another important "duty" is to vote in the EEGS elections. Please watch for your ballot in early January. We have another strong field of candidates who deserve your attention.

Finally, I sincerely hope you will join Jon Nyquist, Ron Kaufmann, EEGS staff, all the conference volunteers, and your international colleagues attending SAGEEP in Philadelphia in April! From the Icebreaker on Sunday to the EEGS Town Hall bash on Wednesday evening, there's a lot to learn, see, and do.

From the FastTIMES Editorial Team

FastTIMES is distributed as an electronic document (pdf) to all EEGS members, is sent by web link to several related professional societies, and is available to all for free download from the EEGS web site at www.eegs.org/fasttimes/latest_issue.cfm. More than 8100 copies of the most recent issue (September 2007, cover image below) have been downloaded from the site, and past issues of ***FastTIMES*** continually rank among the top downloads from the EEGS web site. Your articles, advertisements, and announcements receive a wide audience, both within and outside the geophysics community.



To keep the content of ***FastTIMES*** fresh, the editorial team strongly encourages submissions from researchers, instrument makers, software designers, practitioners, researchers, and consumers of geophysics—in short, everyone with an interest in near-surface geophysics, whether you are an EEGS member or not. We welcome summaries of recent conferences, notices of upcoming events, descriptions of new hardware or software developments, professional opportunities, problems needing solutions, advertisements for hardware, software, or staff positions, and short research articles or descriptions of geophysical successes and challenges. Contact a member of the editorial team to discuss your ideas!

The *FastTIMES* Editorial Team

Jeffrey G. Paine *(jeff.paine@beg.utexas.edu)*

Roger Young *(ryoung@ou.edu)*

Brad Isbell *(bisbell@hgiworld.com)*

Intersociety Activities

by Bruce Smith, U.S. Geological Survey and EEGS Board Member (*bsmith@usgs.gov*)

A critical component of EEGS' mission is to communicate, cooperate, and collaborate with societies and organizations that use (or could use) near-surface geophysics in a broad range of applications. Much of this activity is occurs through EEGS members who are also members of these national and international organizations. Recent activity with several of these organizations is highlighted below.

Geological Society of America (GSA)

EEGS is recognized as an an "Associated Society" by the Geological Society of America (GSA). Representatives of Associated and Allied societies meet at the annual GSA meeting and at a spring meeting in Boulder, Colorado to discuss topics of mutual interest. As an Associated Society, EEGS is given booth space at the annual meeting. This year, EEGS made use of a booth donated by Mt. Sopris to exhibit at GSA. Bruce Smith worked with EEGS staff to prepare the display, which included a contribution from the American Geophysical Union (AGU) Near Surface Focus Group.

One of the GSA Associated and Allied Society activities is to develop programs for accreditation of geoscience courses in high school. EEGS has maintained an interest in the geophysics component of such programs. This could complement the growth of the Environmental and Engineering University, a virtual outreach and education entity being formed by EEGS.

The 2008 GSA Annual Meeting will be in Houston. EEGS is working with the Geophysics Division of GSA to sponsor an applied geophysics session at the meeting. The GSA meeting is being held jointly with the Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, the Gulf Coast Association of Geological Societies, and the Gulf Coast Section of SEPM, presenting an opportunity to explore the application of geophysics with diverse groups with interest in the near-surface environment.

National Ground Water Association (NGWA)

A cooperative agreement with NGWA has been formulated. During the GSA Annual Meeting, Bruce Smith and Robert Masters discussed developing joint programs such as workshops at our respective annual meetings. Examples might include a near-surface geophysics overview at the NGWA meeting and hydrology workshops at SAGEEP. The NGWA also sponsors specialized workshops during the year that might be a venue for mutual activities. John Jansen, a former NGWA board member, has greatly facilitated communication with NGWA.

American Geophysical Union (AGU)

Bruce Smith has been communicating regularly with the AGU Near-Surface Focus Group about participating in the fall committee meeting in San Francisco. Hopefully this will lead to formalized programs between the two organizations.

Geophysical Societies in India

The September issue of ***FastTIMES*** describes a groundwater geophysics text published by the Association of Exploration Geophysicists, India that is being offered to EEGS members at a discount. Sachin Shah (*sdshah@usgs.gov*) offered to aid intersociety communications with other professional organizations in India, including the Geological Society of India and the Indian National Section of the International Association of Hydrogeologists to identify areas of mutual interest.

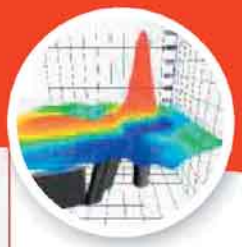
Choosing The Right Magnetometer

Archaeology

Perform environmentally-friendly digital prospection and reduce survey costs

Forensics

Identify ferrous objects, graves, disturbed ground, or other subtle features in soils



Mapping

Define and characterize bedrock depth, geologic structure, soils and lithologies

Urban

Locate utilities, buried tanks (USTs), reinforced foundations, wellheads and more

UXO

Locate and magnetically characterize targets efficiently with multi-sensor arrays

Magnetic applications in near surface geophysics are broad; including archaeology, environmental and engineering, and UXO detection. Moreover, the responses from buried materials are remarkable - susceptibilities vary over more than eight orders of magnitude! With this range of applications and responses, it is important to choose the right magnetometer for the work at hand.

The Versatility of Overhauser

For general work and teaching, many practitioners find the unique Overhauser instrument works well; with its low power consumption, 5 times per second sampling and no directional (i.e. heading) errors. The sensitivity at 1 sample per second is comparable to Caesium systems but for lower cost. Moreover, Overhauser is made for efficiency with its light weight yet robust console, and intelligent surveying options.

The Power of Potassium

For sensitive work and research, the ultimate solution is the Potassium magnetometer / gradiometer ... a proprietary offering with up to an order-of-magnitude higher sensitivity than Caesium. The K-Mag samples at a leading 20 times per second for acquisition of high resolution results. It also features minimal directional errors plus high gradient tolerance for culturally "noisy" projects.

To Find Your Solution

With diverse earth science challenges, it is essential to have choices. And, choice is precisely what GEM offers with each system delivering clear advantages for near surface work. A special report is now available to help you learn more about today's advanced technologies. To get your FREE copy of "A Brief Review of Quantum Magnetometers", visit www.gemsys.ca/review

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EEGS Sponsorship Opportunities

There are always sponsorship opportunities available for government agencies, corporations, and individuals who wish to help support EEGS's activities. Two specific opportunities are listed below.

Online Delivery of SAGEEP Papers

EEGS already has one founding sponsor (Exploration Instruments) supporting development of an online delivery system to enable SAGEEP papers to be served from the EEGS web site. We are seeking additional sponsors to support maintenance and annual updates. Contact Jeffrey G. Paine, EEGS President, if you are interested (*jeff.paine@beg.utexas.edu*).

SAGEEP 2008 Sponsorship

SAGEEP would not be possible without the generous support of government and industry sponsors. Sponsorship opportunities are available at all levels, including general conference, individual session, icebreaker, conference bag, speaker and session chair gifts, and the planned Environmental & Engineering Geophysics University sessions. Contact Micki Allen (*mickiallen@marac.com*; 905-474-9118) for more information.

Renew your 2008 EEGS Membership (Now You Can Do It Online)!

Be sure to renew your EEGS membership for 2008! In addition to the more tangible member benefits (including a print subscription to ***JEEG***, ***FastTIMES*** delivered to your email box quarterly, discounts on EEGS publications and SAGEEP registration, and benefits from associated societies), your dues help support EEGS's major initiatives such as producing our annual meeting (SAGEEP), publishing ***JEEG***, making our publications available electronically, expanding the awareness of near-surface geophysics outside our discipline, and enhancing the functionality of our web site to enable desired capabilities such as membership services, publication ordering, and search and delivery of SAGEEP papers. Please watch for the renewal notices arriving by mail and email and renew promptly!

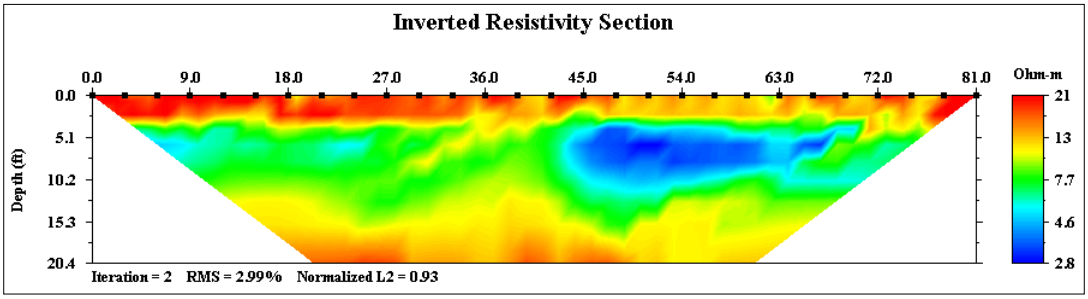
As always, members can renew by mail or fax. In addition, EEGS has just implemented an online renewal system. Visit *www.eegs.org* to take advantage of this capability.

Decaying Transients: Finding Nemo!

by Mustafa Saribudak (ega@pdq.net), Environmental Geophysics Associates, www.environgeophysics.com
9211 Colony Pond Drive, Spring, TX 77379 Telephone (281) 370-7066, Fax (281) 370-7099

We were collecting resistivity data last summer in north Texas. After each roll-along section, I was inverting the data to check the quality and identify possible anomalies. During one of these moments, I heard my geotech, who was watching the inversion process over my shoulder, say jokingly: "Hey Doc, I think we found Nemo!" He was referring to the recent computer-animated movie "Finding Nemo" about the adventures of a clownfish. Yes, the anomaly (shown below in blue) has the shape of a fish; but this was a giant fish with a big tail, not a small clownfish!

We found conductivity and magnetic anomalies over the "fish" as well. Excavation and soil sampling indicated that the anomaly was caused by two pipes that crossed each other at a depth of 4 feet, and that the soil was contaminated by leakage from these pipes.



The JEEG Pages

*The **Journal of Environmental & Engineering Geophysics (JEEG)**, published four times each year, is the EEGS peer-reviewed and Science Citation Index (SCI®)-listed journal dedicated to near-surface geophysics. It is available in print by subscription, and is one of a select group of journals available through GeoScienceWorld (www.geoscienceworld.org). **JEEG** is one of the major benefits of an EEGS membership. Information regarding preparing and submitting **JEEG** articles is available at http://jeeg.allentrack.net.*

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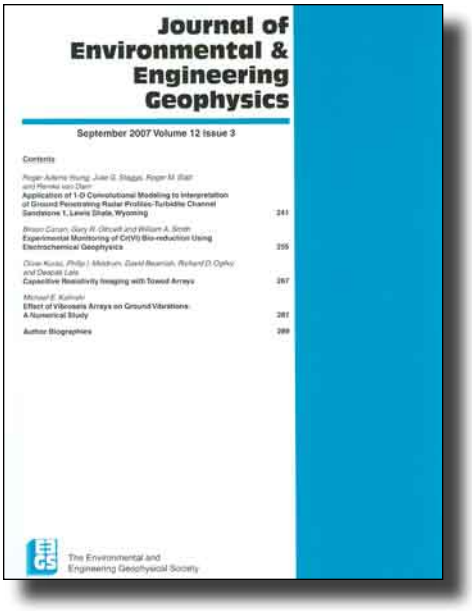

Journal of Environmental & Engineering Geophysics,

v. 12, no. 3, September 2007

Locating Faults in the Southern Mesilla Bolson, West Texas and Southern New Mexico, Using 3-D Modeling of Precision Gravity Data, *S. Khatun, D.I. Doser, E.C. Imana, and G.R. Keller*

Application of 1-D Convolutional Modeling to Interpretation of Ground Penetrating Radar Profiles-Turbidite Channel Sandstone 1, Lewis Shale, Wyoming, *Roger Adams Young, Julie G. Staggs, Roger M. Slatt, and Remke van Dam*

Experimental Monitoring of Cr(VI) Bio-reduction Using Electrochemical Geophysics, *Birsen Canan, Gary R. Olhoeft, and William A. Smith*

Capacitive Resistivity Imaging with Towed Arrays, *Oliver Kuras, Philip I. Meldrum, David Beamish, Richard D. Ogilvy, and Deepak Lala*

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The Active Line Source Temperature Logging Technique and its Application in Fractured Rock Hydrogeology, *Peeter E. Pehme, John P. Greenhouse, and Beth L. Parker*

Constraining Aquifer Architecture with Electrical Resistivity Imaging in a Fractured Hydrogeological Setting, *Scott F. Rayner, Laurence R. Bentley, and Diana M. Allen*

A Seismic Inversion Experiment to Identify Scatters in a Granite Outcrop, *Tatiana Toteva and Timothy Long*

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EAGE's Near Surface Geophysics Journal, December 2007

*As a courtesy to EAGE and the readers of **FastTIMES**, we reproduce the table of contents from the December issue of EAGE's **Near Surface Geophysics** journal. The journal is the continuation of the **European Journal of Environmental and Engineering Geophysics** published by the former Environmental and Engineering Geophysical Society — European Section.*

ALSO INTERESTING

Near Surface Geophysics

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EAGE
EUROPEAN ASSOCIATION OF GEOSCIENTISTS & ENGINEERS

New Tools

*New tools, whatever the source, are one of the key ingredients to innovation in near-surface applications of geophysics. We continually solicit contributions describing new tools with near-surface promise and have highlighted several instruments in the last few issues. These entries are written by representatives of the companies that make the tools and have been only lightly edited. Of course, these descriptions are provided as a professional courtesy only and neither the **FastTIMES** editors nor EEGS have verified the information presented herein. The **FastTIMES** editors welcome new submittals, to be considered for publication in **FastTIMES** as space is available. We encourage short, noncommercial descriptions that focus on technical capabilities, specifications, and possible applications.*

AutoSeis — A Portable, Automated, Shear-Wave Seismic Source

by Alec McGillivray, Georgia Institute of Technology (alec@gatech.edu)

Figure 1. AutoSeis shear wave seismic source.

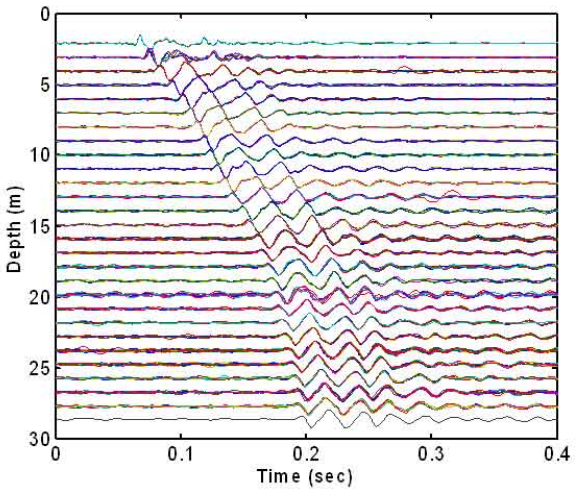

Figure 2. AutoSeis traces.

Developed at the Georgia Institute of Technology in Atlanta, Georgia, AutoSeis (Figure 1) is a portable surface seismic source, automating the generation of horizontally polarized, vertically propagating shear waves for shear-wave velocity profiling within the upper 30 meters.

The device consists of an electric motor and a system of gears for raising and releasing a spring-loaded hammer, all of which is contained within a rugged, water-tight, steel enclosure. The hammer strikes are initiated remotely from the digital control box. The control box also has banana jacks for interfacing with the built-in hammer switch. The desired number of hammer strikes can be pre-programmed to facilitate signal stacking, or continual hammer strikes can be generated at a user-selectable rate for continuous-push measurement at regular intervals during penetration with an instrumented probe. Electrical power can be supplied through an inverter connected to the electrical system of the testing vehicle or portable generator.

AutoSeis is manufactured by Finite Designs, Inc. of Ball Ground, Georgia. The results shown (Figures 2 and 3) are from a 30 m seismic cone penetration test (SCPT) performed at the Cooper River Bridge in Mt. Pleasant, South Carolina.

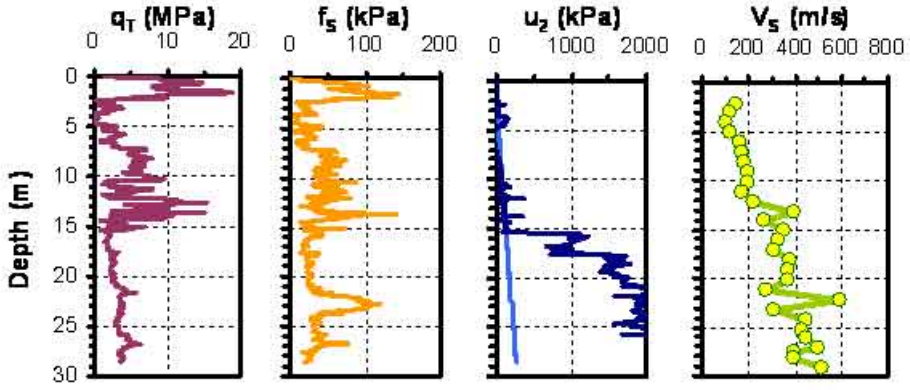

Figure 3. AutoSeis physical property profiles.

Development of a Capacitive-Coupled Resistivity Method for Permafrost Surveys in North America: Melinki Russkas (A Little Russian Tale)

by J. A. Hunter (*jhunter@nrcan.gc.ca*)and Marten Douma, Geological Survey of Canada

It may be of interest for permafrost geophysicists to learn of the development of one capacitive-coupled resistivity method in North America that took place during the late 1980's and early 1990's. There are Canadian, Soviet, and American threads to the tale.

In the early 1980's the Canadian government entered into an agreement with the then USSR for scientific information exchange and cooperative research on arctic problems. There were several subdivisions of this agreement covering various social and technological areas specific to arctic regions. One of these was concerned with the detection and mapping of permafrost using geophysical techniques. Several of us at the Geological Survey of Canada (GSC) were involved in these "exchanges" throughout the '80s and 90's. However, it took us quite a while to find our opposite numbers on the Soviet side wherein we could go beyond the usual exchange of scientific papers and towards meaningful joint work.

Our direct connection came in 1989 with the institute called VSEGINGEO which was the acronym for the All-Union Institute for Hydrogeology and Geotechnical Engineering, a "modest" Soviet applied research organization of 2200 people.

The GSC was invited to spend part of the summer of 1990 working with Soviet geophysicists on the Yamal Peninsula of western Siberia, north of the city of Nadym. Here the terrain was very similar to that of the Mackenzie Delta area of the Canadian Western Arctic or the North Slope area of Alaska with high ice-content surficial materials, both thick and thin ice-bonded permafrost, and thawed zones (called taliks). Also, the Yamal area was a hot oil and gas prospect with plenty of well drilling and production problems in permafrost.

We Canadians came bristling with all sorts of seismic and electromagnetic geophysical tools that we had been using in our arctic areas. The Soviet equipment was largely analog and primarily built in-house (the units didn't look pretty, but they functioned). What they lacked in current technology was offset by their in-depth knowledge derived from their broad permafrost geophysical experience. Their team was led by Dr. N. N. Gorianov, the "grand old man" of the eastern block near-surface geophysics community.

One of the major permafrost engineering problems encountered in this geological setting, both in Siberia and in the North American Arctic, is the definition of ground ice occurrence. From our North American experience, electromagnetic tools could be used very efficiently to determine presence or absence of ice-bearing permafrost, but in well ice-bonded conditions, these tools failed to discriminate between massive ice and ice-rich sediments. Most EM systems were "on-the-peg" between about 1000 and 10,000 Ohm-meters, whereas differentiating between ice-rich sediments and massive ice commonly took place at higher ranges (up to 40K Ohm-meters). Furthermore, conventional resistivity techniques requiring good electrical contact with the ground for arrays of electrodes were touch-and-go at best under North American summertime artic conditions, and next to useless in winter or early spring conditions when most of our arctic surveying is done.

We discovered a Soviet technique called VCHEP, an acronym for "capacitive-coupled resistivity system," which had been designed and built by Dr. Vladimir I. Timofeev as part of his Ph.D. thesis in the late 1960's. Since that time, he had been working at VSEGINGEO where he had perfected the apparatus

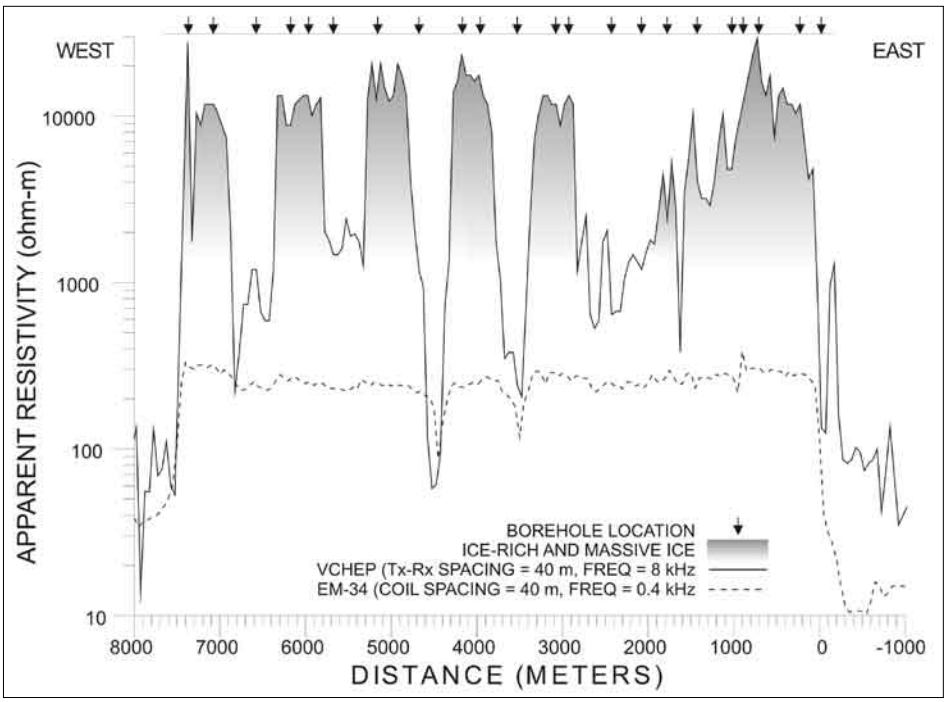

Figure 1. VCHEP and EM-34 survey over an area of ice-rich sediments with massive ice lenses in thick permafrost at a GSC test site in the Mackenzie River Delta in the Western Arctic region of Canada. Low apparent resistivity values correlate with areas of fine-grained sediments containing lower ice-content.

and the field techniques for near-surface permafrost mapping. We first saw VCHEP in operation over a well-defined buried massive ice lens on the Yamal peninsula and we were able to compare and contrast the resolution with our various EM units. VCHEP could map resistivities as high as 50–70 K ohm-m and faithfully reproduce variations in this high resistivity range which were correlatable with changing ice-content (ground truthing came from borehole sampling and geophysical measurements from our joint research).

The system, as we saw it in Western Siberia, consisted of a dipole-dipole arrangement of electrodes. The poles of each dipole were arranged as antennas of carefully braided wire. The antenna lengths, separation of dipoles, and distances between dipole pairs could be easily altered depending on the surface materials and target depths of interest. However, the crew commonly consisted of up to five people, who were required to tow the arrays over the tundra and to read and adjust both the transmitter current and the receiver voltages.

The Soviet research group made the return visit to the Mackenzie Delta of the western Canadian Arctic in the spring of 1991, where we were mapping high ice-content overburden conditions associated with zones where future gas and oil pipeline routes were being planned. Here again we made a comparison of EM versus the VCHEP capacitive-coupled resistivity system (Figure 1). Some of the results were published in Timofeev and others (1994) and Douma and others (1994).

Of note during the Canadian tests were the modifications made by Vladimir Timofeev when he discovered the utility of snowmobiles. Rather than traversing the ground on foot in a manner that we had done using the EM units, he redesigned the VCHEP system using the metal runners of the snowmobile for one element of the transmitter dipole, along with two sleds towed in line with a long rope, for the other pole of the transmitter dipole and for the receiver dipole. So the arrangement called for a Canadian driving, Timofeev on the second seat of the snowmobile facing backwards and operating the transmitter unit, a second Russian (E. Melnikov) on the first sled taking notes on positions and transmitter and receiver readings, and a third Russian (A. Skvortzov) on the second sled reading the receiver dials. This bizarre arrangement was a sight to see. Just imagine the scene: a snowmobile coming over the hill in a remote area of the Canadian Arctic near a DEW Line site, with three Russians yelling numbers at each other (pa ruski) over the sound of the 2 cycle engine. Yes, the cold war was indeed thawing!

With this rig, Timofeev was able to complete the traverse in an afternoon, compared to the two and a half days that it took us to walk each of the EM units over the same ground.

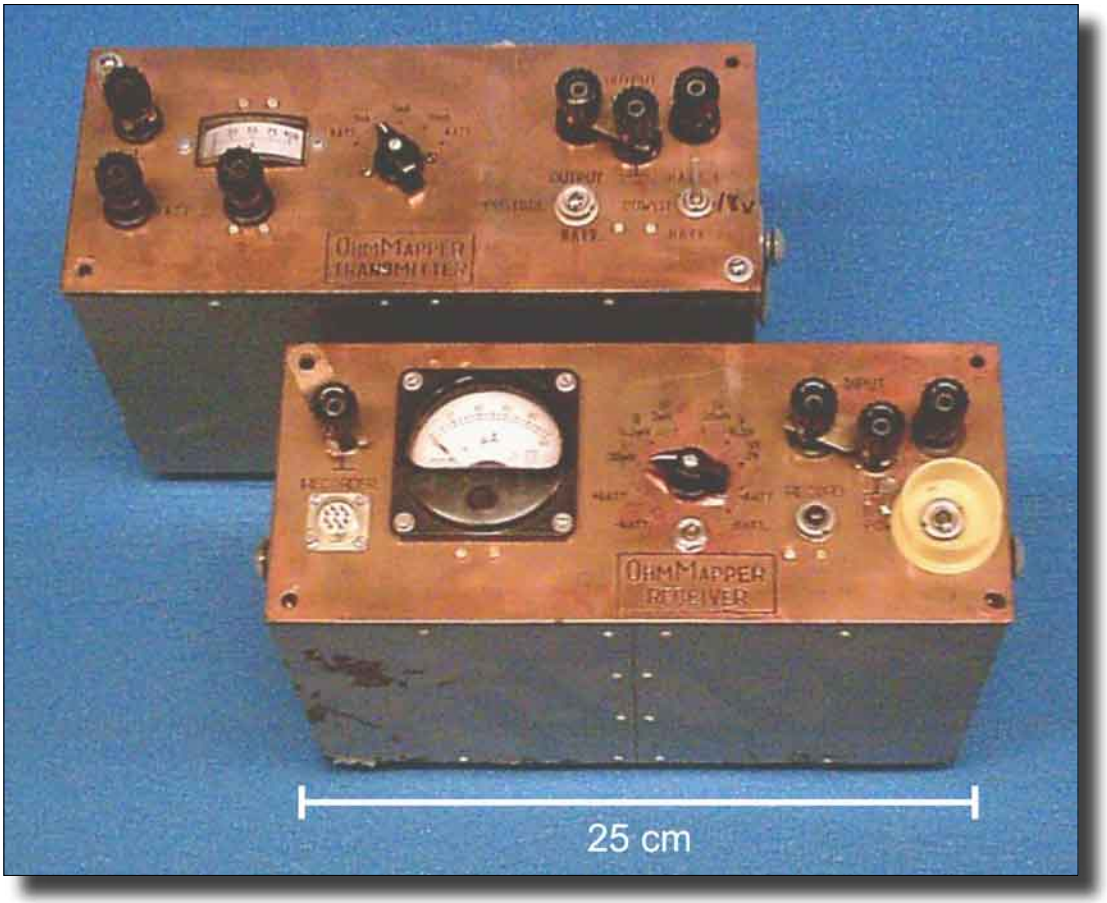

Figure 2. Analog transmitter and receiver of the North American prototype of the Russian-built VCHEP system as delivered to Geometrics. A second copy, shown here, came to the Geological Survey of Canada, and is still in good working order.

We attempted to introduce the VCHEP concept to both Canadian and U.S. geophysical companies who we thought might be interested in taking up the challenge. Over the next few years, Timofeev developed several new refinements to the system making it more robust for differing applications. Eventually, Geometrics, Inc. reached an agreement with Timofeev, and began to build their unit based on his latest VCHEP prototype. The Russian-built transmitter and receiver featured polished brass face-plates inscribed in English (Figure 2) and by agreement of both parties (despite the language barrier), was dubbed OhmMapper.

The basic modern-day commercial system (owned by the GSC) is shown in Figure 3. This unit is a far cry from the prototype that we first saw and worked with in both Siberia and in the Mackenzie Delta.

From recent conversations with Doug Groom of Geometrics, the only thing Russian left in the current model is the concept; this unit is stuffed full of high tech interface electronics and digital communications, along with support software processing packages that were not available back in the 90's. Today we understand that OhmMapper is especially in high demand for both arctic and desert projects where problems of ground contact resistance exist with conventional electrodes.

So, here is a salute to Vladimir Timofeev, for his invention and his painstakingly careful development, and to Geometrics for boldly developing this new technology.

Eta Pravda!

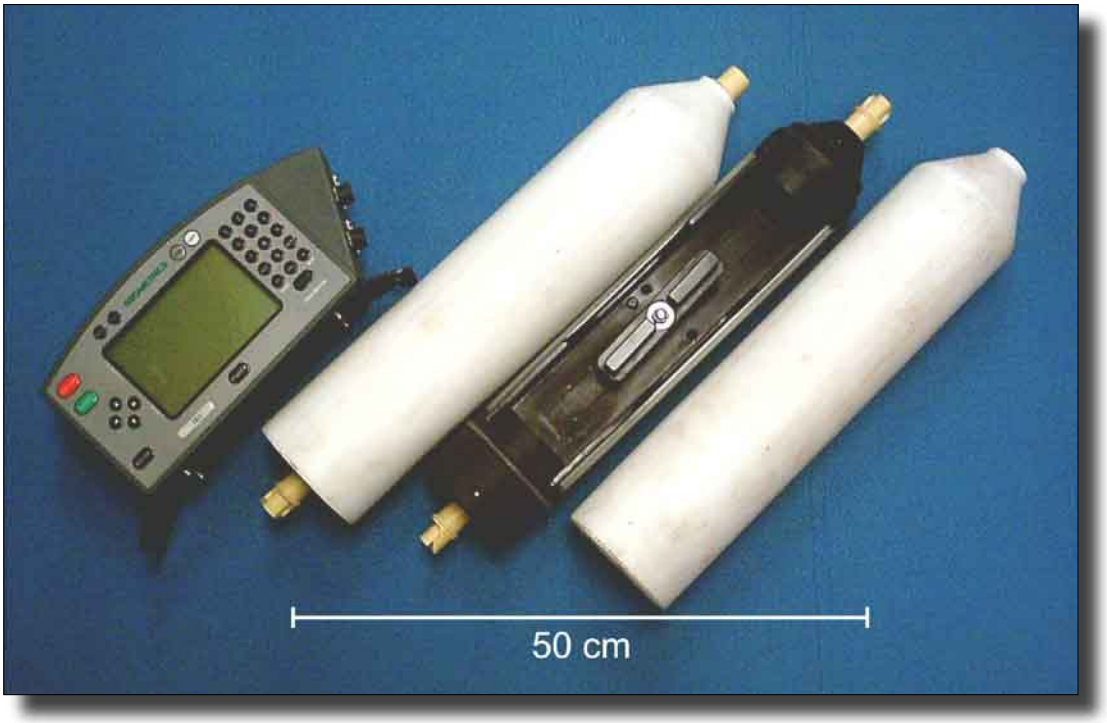

Figure 3. Transmitter and receiver and digital recorder modules of the basic commercial OhmMapper system.

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Success with Geophysics: Stories from the Field

***FastTIMES** welcomes short descriptions of successful (or unsuccessful, for that matter; it can be therapeutic to admit a momentary setback!) applications of geophysics to near-surface engineering or environmental problems.*

Geophysics on Ice: Antarctica

by John W. Holt, Institute for Geophysics, Jackson School of Geosciences, The University of Texas at Austin (jack@ig.utexas.edu)

When most people think of Antarctica, they think of penguins and icebergs. I immediately think of a flat, white vastness extending to the horizon in all directions underneath a deep blue sky, and 24-hour sunlight. I also think about how that white vastness is an ice sheet kilometers thick, nearly covering an entire continent with enormous mountains, deep trenches extending kilometers below sea level, giant freshwater lakes and other mysteries yet to be discovered. The ice itself holds a history of climate change that is important for predicting future sea level rise. Without geophysics we would know almost nothing about what lies beneath this moon-like surface, or what the future may hold as the ice sheet responds to climate change.

Figure 1. Aircraft over Thwaites Glacier field camp. Note radar antennas mounted below each wing.

Background

Early surface traverses, like those carried out in the 1957–58 International Geophysical Year, carried seismic instruments (and of course explosive charges, a topic of many entertaining stories…), magnetometers, and gravimeters to learn about the subsurface of Antarctica. Although crucial for the first discoveries, and still necessary for high-resolution studies of specific features, this is clearly a slow, arduous way to map an entire continent. First efforts to use an airplane for geophysics to expand coverage consisted of towing a magnetometer. This worked well but was limited by the available instrumentation, and had its own challenges. A number of airplanes crashed due to weather, rough landings on skis, fuel issues, and the unknown surface topography (an uncharted mountain peak hiding in a cloud can ruin your whole day; see Behrendt, 2005 for first-hand accounts of this highly adventurous period). The advent of ice-penetrating radar in the 1960's changed this, and a large international program in the 1970's resulted in reconnaissance scale, radar-based airborne mapping of sub-ice topography for large portions of the continent. After this program ended, a group of scientists decided in the 1980's that it was time to take things to the next level, and the University of Texas Institute for Geophysics (UTIG) spearheaded the first-ever integration of an ice-penetrating radar with a magnetometer, a gravimeter, and a laser altimeter on a single airborne platform to simultaneously recover information about surface elevation, ice stratigraphy, sub-ice topography, and geology. This system first took flight in 1990 and since then we have acquired over 300,000 line-kilometers of multi-instrumented data in 11 field seasons.

Instrumentation

Each time we travel to Antarctica we outfit the same Twin Otter aircraft (Figure 1) with geophysical instrumentation that has evolved over the years. The current system uses a state-of-the-art radar sounder partially developed by NASA as a testbed for sounding the icy moons of Jupiter. Unlike most ground-based GPR systems, it is chirped with a center frequency of 60 MHz (5 meters wavelength in

air), 15 MHz of bandwidth, and 8 kilowatts of peak power (fortunately, the FCC doesn't extend its reach that far south!). This radar sounds many kilometers of ice while imaging internal layer structure (Figure 2). The latest gravity meter we have used is a LaCoste & Romberg Air-Sea II, and it complements a towed Geometrics cesium-vapor magnetometer and a fixed, nadir-pointing Riegl laser altimeter. A pair of geodetic carrier-phase GPS receivers are used in the aircraft and the base station to provide positioning at an accuracy of 10 cm in three dimensions every half second. A laser ring gyro inertial navigation system also provides precise attitude information critical for the laser altimetry.

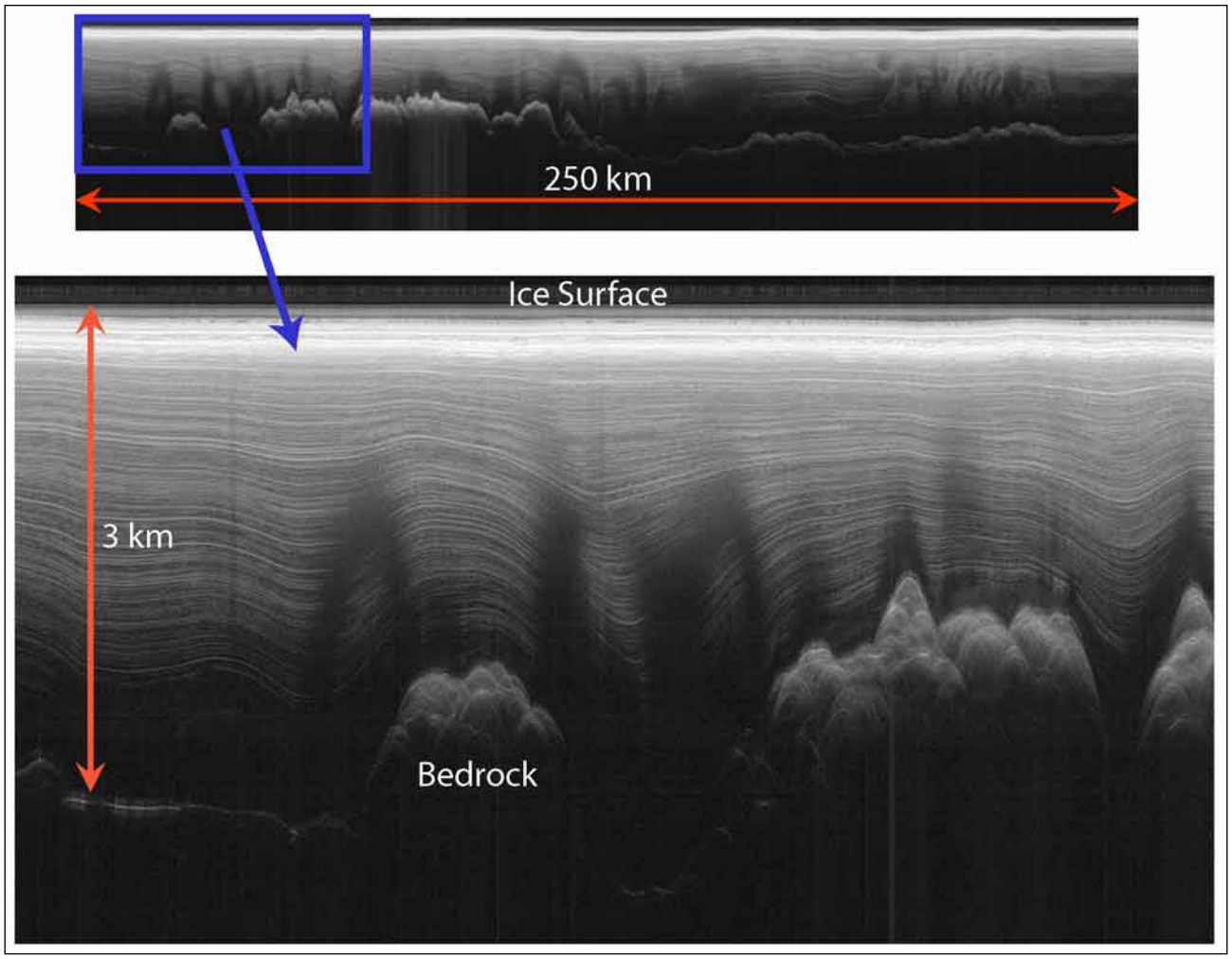

Figure 2. Example of radar sounding data from West Antarctica. Layers are isochrones, deformed by subglacial topography and flow. These can be correlated with ice-core data to extend age and depth relationships over great distances.

Getting Out There. Waaay Out There

Working in such a far-flung environment makes one plan for every possible contingency. We ship all of our instrumentation, tools of all types, spares, extra parts for the spares, computers, printers, paper, notebooks, pens, you name it… about 15,000 lbs of cargo, in late July for a late October deployment. We travel to New Zealand and then via military transport to McMurdo Station on the coast, where we receive the aircraft (owned and operated by Kenn Borek Air, Ltd. of Calgary) outfitted with skis. This aircraft has ferry tanks installed in the cabin to make the journey, so we configure it for geophysical surveying on site. After two to three weeks of unpacking all gear, building the equipment racks and installing them in the airplane, installing external antennas, etc., we run full ground tests of the airborne system

and verify the ground data systems. Local flight tests ensue, and once the kinks are worked out, we are usually off to a remote, temporary camp built and supported by the U.S. Antarctic Program to survey an area that is too far from McMurdo to efficiently operate. A ski-equipped LC-130 Hercules takes our team of 10 to 12 people and cargo to the remote camp where a 10,000 foot skiway is groomed by a hard-working ground crew driving tracked vehicles. Fuel for the next 8 to 12 weeks is (hopefully) provided by a stream of LC-130 tankers bringing up to 3,000 gallons of fuel at a time. It is stored in rubber fuel bladders that hold up to 10,000 gallons. We aim to keep them nearly empty by flying our airplane around the clock. This is accomplished by having two complete flight crews (two pilots and two to three science personnel for each set) operating up to three 4.5-hour flights per day covering about 1,000 km each. We normally skip the 6-hour period of the day that has the highest geomagnetic noise, and this also gives the aircraft engineer time to perform routine maintenance and inspections.

Challenges

The top three challenges are sometimes cited as the cold, the weather, and the cold weather. We only operate during summer, thankfully, and depending on the elevation of our camp, the peak temperatures can range from just below freezing near the coast to -55° C in the interior at over 3,000 meters (where one is standing on 4 kilometers of ice, yet it's as flat as Kansas and bedrock is below sea level). The airplane can handle the coldest temperatures fairly well, as long as we keep heaters on the engines when it's sitting for very long. The instruments and the humans aren't quite so happy at those temperatures, though! A cabin heater in the aircraft is essential at all times. We strap an electric heater directly on the laser altimeter. Although the bottom viewport is covered with Plexiglas, it requires holes for the magnetometer cable and the laser beam so the rear of the cabin often reaches -15° C during surveys (a common sight is the aft equipment operator in full cold-weather gear including parka, fleece hat, huge boots, and gloves while the front operator just a few meters away near the cockpit is stripped down to a t-shirt, wind pants and socks). At the higher elevations we must use oxygen during flight, and the oxygen bottles have to be stored in a heated structure and pulled out to the airplane on a sled to refill the onboard system each time.

Monitoring weather is one of the most critical parts of the operation, as there aren't many options if weather goes down at the camp while on the survey flight which can put us 500 kilometers away. We can usually find a place to land and wait if need be, but there's no guarantee of a smooth surface, and with the radar antennas hanging beneath the wings and the gravity meter requiring constant power, an off-field landing means risking the success of the entire field season. We also avoid in-flight icing like the plague, as the ability of our external radar antennas to cope with ice is uncertain and the magnetometer can perform some wild oscillations if its cable picks up much ice.

The isolation can be a major challenge, especially when combined with the long work hours for both the flight crews and the ground crews who plan flights, download data from each flight, perform quality control checks, and archive the data. Therefore, attention is paid to keeping people healthy and happy during the two to three months we are in the deep field. Food is plentiful (if not fresh), but showers are rare (and short) and the only place to have any privacy is in the icy latrine or in your tent (you can guess which is more pleasant).

The Payoff

After the team is extracted from the deep field, the equipment is packed, the survey aircraft goes away, and everyone heads to New Zealand (some for a much-needed vacation) and on home, the payoff begins. Raw data is read from tape and we begin the process of reducing it into products that are well

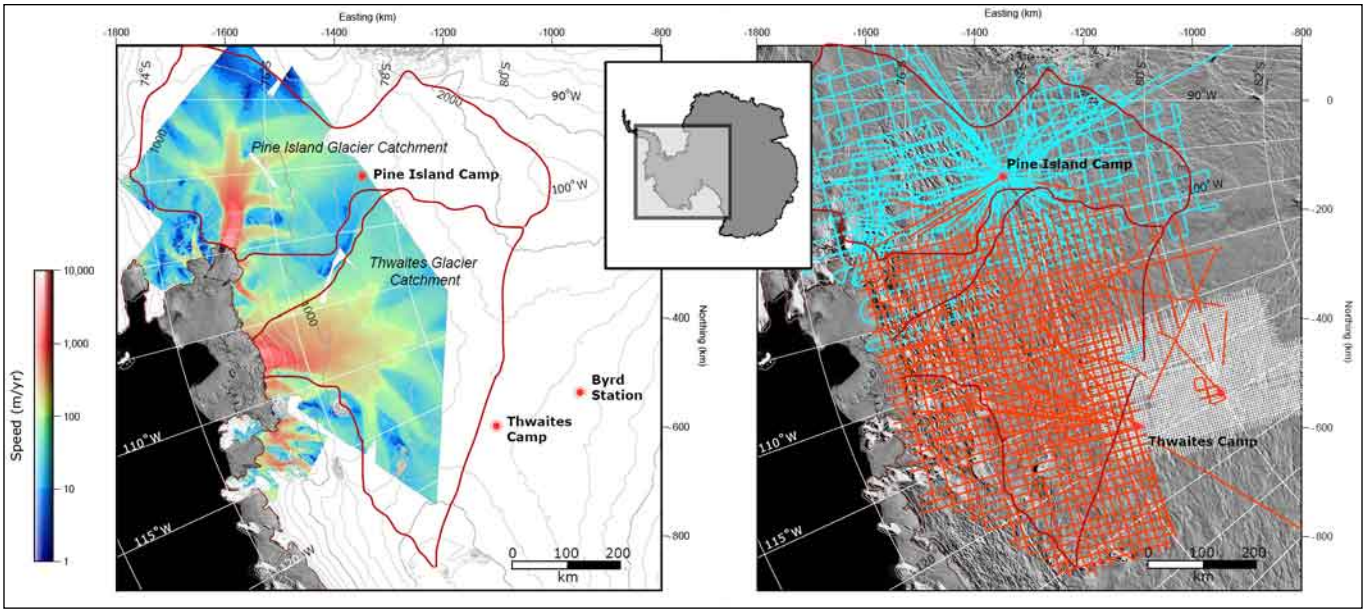

Figure 3. Glaciers of the Amundsen Sea Embayment, West Antarctica with surface ice velocity field (left) from Rignot and others (2004) and survey lines (right) from the 2004–05 campaign. UTIG flights shown in orange, BAS in blue; white are previous UTIG surveys. Catchment boundaries of Pine Island Glacier and Thwaites Glacier are indicated in red.

calibrated and useful. The resulting views of the landscape beneath the ice, internal ice layering, basal conditions, and geology based on the potential fields data provide unprecedented views of Antarctica. Furthermore, putting all of these geophysical measurements together makes possible studies that could never be accomplished with one or two types of data.

The Case of the Missing Ice

The Amundsen Sea Embayment (ASE) of West Antarctica is of special interest because satellite altimetry recently indicated that the ice surface there is dropping, and it is the only portion of Antarctica with a clearly negative mass balance (see Vaughan and others, 2007 for review). This Texas-sized region is also one of the most remote areas of the continent, known for its poor weather and visited by only a few surface and airborne traverses. In the austral summer of 2004–05, UTIG teamed with the British Antarctic Survey (BAS) to undertake a joint survey of the ASE to acquire a comprehensive aerogeophysical data set and begin an international effort to understand what is happening there, and what may happen in the future. With two geophysical survey aircraft covering such a large area, this was the most ambitious single-season survey undertaken in Antarctica.

The ASE is essentially comprised of the catchments of two enormous glaciers — Thwaites Glacier and Pine Island Glacier. UTIG focused on Thwaites Glacier and acquired nearly 50,000 line-km of data in 77 flights over its full catchment (Figure 3) while BAS focused primarily on Pine Island Glacier. The subglacial topography results based on radar sounding (Holt and others, 2006; Vaughan and others, 2006) immediately showed that Thwaites and Pine Island Glaciers are completely different beasts (Figure 4). Thwaites Glacier is underlain by a broad erosional basin fed by large tributary valleys leading to the deepest parts of West Antarctica, as much as 2.5 km below sea level where the ice is over 4 km thick! In contrast, the main trunk of Pine Island Glacier is confined to a narrow (but deep), straight valley suggestive of tectonic control. A narrow sill near the coast separates the deep Thwaites Glacier basin from the ocean near the grounding line and may currently act as a pinning point. If the grounding line retreats past that rise, accelerated retreat impacting the entire ASE is a distinct possibility. For context,

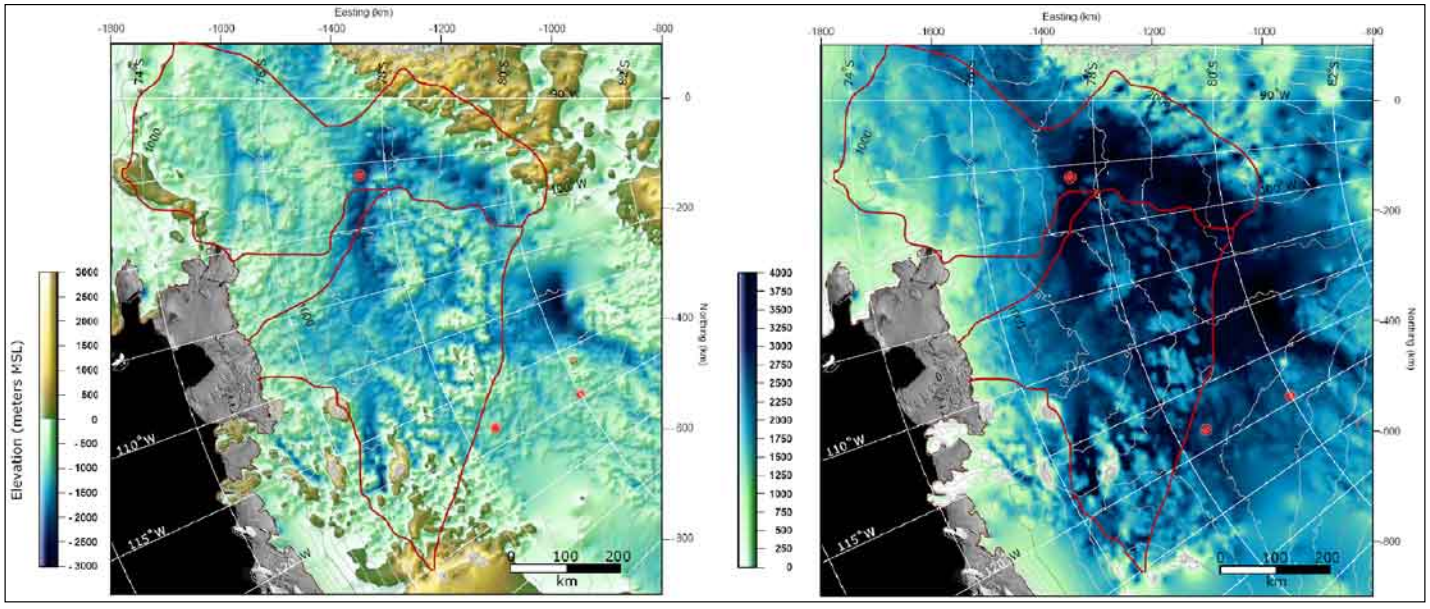

Figure 4. Sub-ice topography (left) and ice thickness (right) in the Amundsen Sea Embayment based on radar sounding results. Note that the deepest basins lie more than 2.5 km below sea level, where ice thickness approaches 4 km.

if the ASE drained completely, it would add roughly 1.5 meters to global sea level and almost certainly impact (perhaps destabilize) neighboring catchments containing additional ice.

Besides the topographic factors, the role of underlying geology on ice sheet stability is a major question; zones of increased geothermal flux could contribute to faster ice flow through enhanced basal melting (e.g. Blankenship and others, 1993). Potential fields results for the Thwaites Glacier catchment (Figure 5) indicate at least one major microplate boundary and possibly an extension of the West Antarctic Rift System (WARS) exist in this area. The analysis of these data sets is ongoing, with the eventual goal of understanding the complex coupling between geology, oceans, ice sheets and the atmosphere so that models of ice sheet dynamics can more accurately predict the impacts of climate change on global sea level.

Future Work

In the current International Polar Year of 2007–2009 (yes, it's two years), the 50th anniversary of the 1957–1958 IGY, we hope to usher in a new era of Antarctic exploration by migrating our aerogeophysical system to a larger aircraft with longer range. Coincidentally, it would be the same DC-3 airframe type used in the first aeromagnetic studies in Antarctica, but with many modern updates. If our plan is approved, an international partnership will undertake an even larger study than our 2004–2005 effort in the ASE, but this time with a single aircraft over the higher, thicker and colder East Antarctic Ice Sheet. This would take place in 2008–2010 and may include operations from U.S., Australian, Italian, and French stations with additional major support from the United Kingdom. Now, have I mentioned how good the food is at the Italian and French bases…?

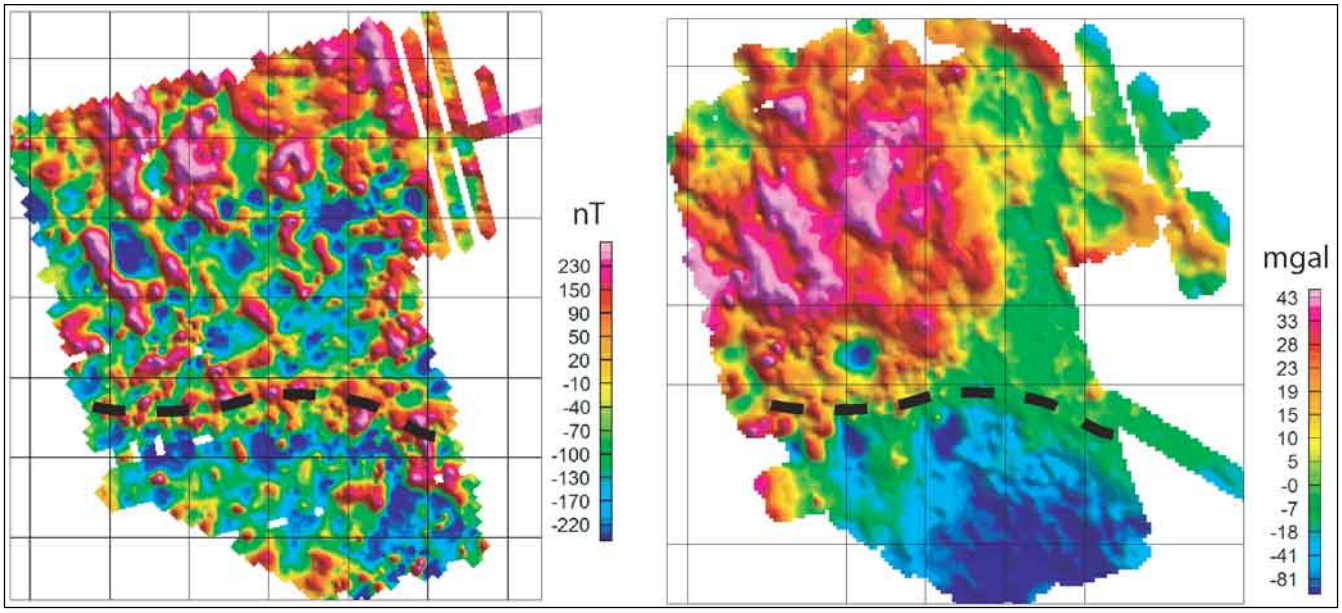

Figure 5. Preliminary magnetic anomaly data (left) and Bouguer gravity anomaly data (right) for the Thwaites Glacier catchment (area of orange survey lines in Figure 3). Possible microplate boundary shown as dashed line.

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Coming Events

FastTIMES *highlights upcoming events of interest to the near-surface community. Send your submissions to the editors for possible inclusion in the next issue.*

SAGEEP 2008: 21st Symposium on the Application of Geophysics to Engineering and Environmental Problems

April 6–10, 2008, Philadelphia, Pennsylvania

The Environmental and Engineering Geophysical Society (EEGS), General Chair Jon Nyquist, and Technical Chair Ron Kaufmann invite you to attend the 21st Annual Symposium on the Application of Geophysics to Engineering and Environmental Problems (SAGEEP) to be held in the Marriott Hotel in downtown Philadelphia. Philadelphia is a wonderful city, filled with historic sites, and home to the largest municipal park system in the world. Philadelphia is also one of the best dining-out towns in the U.S.; from 5-star restaurants to the Italian market, many excellent choices lie within walking distance of the Marriott.

We have an exciting technical program. More than 170 technical talks and posters cover a wide range of subjects, including recent developments in near-surface methods, innovative uses of geophysics for challenging engineering and environmental problems, and many interesting case histories. Pre- and post-meeting short courses will expose attendees to state-of-the-practice geophysical techniques.

New this year will be the Environmental & Engineering Geophysics University (EEGU). EEGU will consist of a series of classroom-style sessions in which near-surface methods and their applications are presented non-technically for new students of the discipline, teachers, and managers or technical staff who are considering geophysics in an environmental or engineering investigation but wish to know more before proceeding. These sessions will be concurrent with the technical program and will be open to single- or multiple-day registrants.

The Gala will be special. It will be held in the National Constitution Center, “America’s most interactive history museum.” Located just two blocks from the Liberty Bell and Independence Hall, “it is the only museum devoted to the U.S. Constitution and the story of *we, the people*.” (www.constitutioncenter.org). It should be a night to remember!

Speaking of Independence Hall, we have permission to demonstrate our equipment on the lawn directly in front of this beautiful facility (www.nps.gov/inde/). National Park Service personnel have expressed interest in attending. Who knows? Perhaps our exhibitors will make an historic discovery.

The first of our two field trips is a bicycle tour of the geology and hydrology of Philadelphia on Sunday, April 6th. Unwind from your travels and join us for a leisurely ride along Schuylkill River and Fairmount Park bike trails with numerous stops to examine the geology and a tasty treat at the end. Then, on Thursday, April 10th you can board a bus and travel to the site of the famous battle of Gettysburg (www.nps.gov/gett/) to learn how Mesozoic events and processes impacted American history.

A strong technical program, fine dining, and a chance to explore a city rich in American history -- you won’t want to miss SAGEEP 2008!!! For the latest information, visit the conference web site at www.eegs.org/sageep/index.html or contact SAGEEP 2008 General Chair Dr. Jonathan Nyquist, Temple University, e-mail: nyq@temple.edu. See you in Philadelphia!

Register by February 8, 2008 to Save $100 on Your Full Congress Registration!

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- *Save $100 on your Full Congress registration when you register by February 8, 2008*
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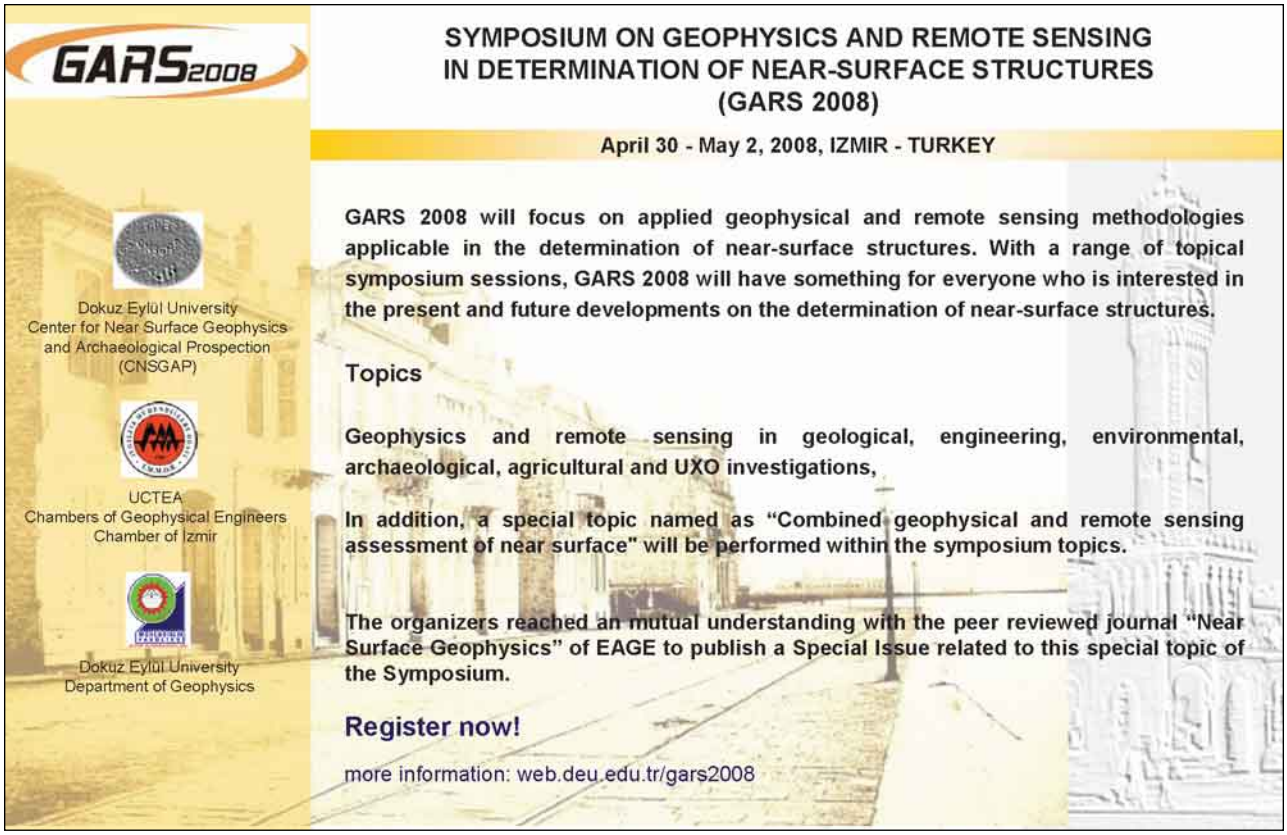


XVIII International Conference on Computational Methods in Water Resources

July 6–10, 2008, San Francisco, California

The XVIII International Conference on Computational Methods in Water Resources (CMWR) will take place in San Francisco, July 6–10, 2008. The CMWR conference offers a great opportunity to present your latest developments in hydrogeophysics to the world's leading hydrological modelers and to catch up with new methods and applications in computational hydrology. Please visit *www-esd.lbl.gov/CMWR08/* for more information. The deadline for abstracts is January 25.

Niklas Linde (*linde@aug.ig.erdw.ethz.ch*) is convening a special session on hydrogeophysics at CMWR. Don Vasco (Lawrence Berkeley National Laboratory) and Warren Barrash (Boise State University) have kindly agreed to give invited talks in this session, described in detail below.

CMWR Special Session:
Hydrogeophysics: Parameter Estimation and Evaluation of Flow and Transport Models

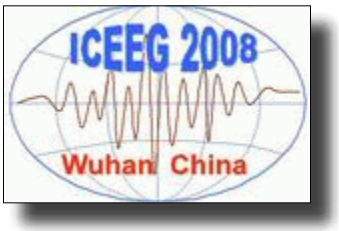
Geophysical data that are sensitive to hydrological properties or dependent variables can provide independent information in hydrological modeling and inversion studies. Successful applications include: (i) estimating lithological zonations, (ii) providing direct constraints on hydrological parameters, (iii) incorporating geophysical data in hydrological inversions, and (iv) testing hydrological models and model predictions with geophysical models and time-lapse data. Complications in hydrogeophysical studies

are often caused by non-unique relationships between geophysical models and data on the one hand, and hydrological properties and dependent variables on the other. Furthermore, the optimal target resolution in nonlinear inverse problems is difficult to define, such that error estimates of the resulting models and predictions are uncertain at best.

This special section will include method-oriented contributions that emphasize novel approaches for incorporating surface-based and crosshole geophysical data in quantitative hydrological flow and transport studies. Theoretical contributions and presentations based on field or laboratory experiments are most welcome. Research related to the integration or joint inversion of diverse data sets, model appraisal, ways to deal with space- and method-varying resolution, uncertainty estimation, and new hydrogeophysical rock physics models are also sought.

ICEEG 2008: 3rd International Conference on Environmental and Engineering Geophysics

June 15–18, 2008, Wuhan, China



With the acceleration of global urbanization and the dramatic increase in population, human activities on the surface of the Earth have greatly expanded. For example, the construction of large-scale artificial structures and the increased requirements for exploration and utilization of groundwater have caused geologic deformation, and even instability. Therefore, geological disasters have frequently been witnessed and the near-surface environment on which we rely has become very dynamic. As a branch of geophysics, near-surface geophysics is mainly applied in the detection and assessment of geologic and hydrologic units, voids and artificial underground structures. The geophysical techniques are non-intrusive, cost-effective, large-scale or small-scale, and can remotely acquire three-dimensional, and even four-dimensional representations of underground media. Due to the broad application of geophysical techniques in the environmental and engineering fields, they are of great significance for the sustainable development of human society.

Having successfully convened the 1st and 2nd International Conference on Environmental and Engineering Geophysics in 2004 and 2006, respectively, we are once again pleased to be hosting the 3rd International Conference on Environment and Engineering Geophysics in Wuhan, China, June 15–18, 2008. It is our pleasure to invite you to participate in this exciting event and to enjoy the hospitality of Wuhan.

This conference is designed to be a wonderful opportunity for all attendees to share your knowledge, experience, and friendship. We strongly believe that you will find great value in your participation in the conference and exhibits. Please do not miss this historic opportunity to present your work.

This conference will offer an opportunity to all geophysicists and engineers to present recent achievements including case studies and theoretical studies in related techniques, software and instruments. The manuscript should not exceed 6 pages (including figures) with an abstract of about 300 words.

Manuscripts should be submitted via email to iceeg.tech@gmail.com. ***The deadline for manuscripts is December 31, 2007***. Visit www.iceeg.cn for more information.

12th International Conference on Ground Penetrating Radar (GPR2008)

June 15–19, 2008, University of Birmingham, U.K.

GPR2008 seeks to showcase not only the best in terms of academic and applied papers and posters, but also the cutting edge of GPR and related technology. A full conference programme, technical exhibitions, practical demonstrations and poster sessions will combine to make GPR2008 a very successful conference.

Welcome from the organisers:

"GPR2008 in Birmingham will include all the normal activities of a thoroughly professional academic conference. Supported by four GPR departments within the University of Birmingham and the GPR industry from both the UK and Europe it promises to be a very memorable event held in an exciting and vibrant city"

Dr. Chris Rogers
Deputy Head of Civil Engineering, University of Birmingham
Co-Chairman GPR2008

Dr. Richard J Chignell
Technical Director, PipeHawk plc
Co-Chairman GPR2008

Welcome from the University

"The University of Birmingham is one of Britain's leading research institutions. We seek to promote academic excellence through research of the highest standard, partnered by strong links with industry and commerce to effectively transfer knowledge and technology to the wider community. The University enthusiastically supports the GPR2008 Conference and welcomes the opportunity to engage with such a prestigious international scientific organisation."

Professor Mike Cruise
Pro-Vice-Chancellor (Research and Knowledge Transfer)

Further details on GPR2008 can be found at www.gpr2008.org.uk.

Workshop on Soil Magnetism: Multi-disciplinary Perspectives, Emerging Applications and New Frontiers

August 2008, Cranfield University, UK

Cranfield University, UK will host a workshop on 'Soil Magnetism: Multi-disciplinary Perspectives, Emerging Applications and New Frontiers' in Summer 2008. Magnetic properties of soils have been highlighted as a primary detrimental environmental effect on the performance of geophysical sensor systems designed to detect buried metallic objects, particularly those of military and humanitarian interest such as landmines, unexploded ordnance, and other explosive devices. The objective of this

workshop is to identify key areas for research and development investment to enhance developments in demining, environmental, and geoscience activities related to soil magnetism.

In recent years it has become increasingly evident that magnetic susceptibility and particularly frequency dependent (FD) magnetic susceptibility of soils can have strong effects on the performance of electromagnetic induction and magnetic sensors for detection of underground targets. In soils with high concentrations of FD minerals, the 'ground effect' is so severe that detection by electromagnetic induction is sometimes not possible. Frequency-dependent properties in natural soil environments are almost unique to superparamagnetic iron oxides.

Currently, understanding of the spatial heterogeneity of soil magnetic properties in natural soil environments is limited. Information in soil surveys describes the spatial extent of different soil types but does not provide information on magnetic properties, as currently this is not part of any standard soil description procedure. Therefore, little information is available globally that is relevant to landmine detector technologies. Magnetic properties of soils have traditionally been investigated in the environmental science and geophysics communities to indicate soil development, climate, pollution, and as a rapid tool for archaeological prospecting. The application in mine and UXO detection and clearance is a relatively new consideration and communication between the academic community and mine clearance users is essential to further developments in soil magnetism and applications in demining technologies.

This workshop will bring together researchers and technologists from a broad spectrum of disciplines to discuss the theoretical base of soil magnetism and to identify emerging applications of soil magnetism in environmental, geological, and soil sciences. Keynote addresses will be given by specialists in the fields of environmental soil magnetism and archeology, measurement and characterization, soil mapping, planetary science, soil microbiology, chemistry and weathering processes, geophysical sensor technology, and demining operations. Break-out sessions will define the current state of understanding, identify knowledge gaps, and determine priority areas for research and technology development. The workshop will benefit knowledge transfer between academia and the demining community by furthering the understanding of environmental drivers that result in the development of magnetic minerals temporally and spatially in soil systems and by finding solutions to optimize the detection capability of electromagnetic induction detectors in soil systems. Key research outcomes identified during the break-out sessions will be documented in a report that will be distributed to workshop participants and made available to the research and technology development community at large. For more information, please contact:

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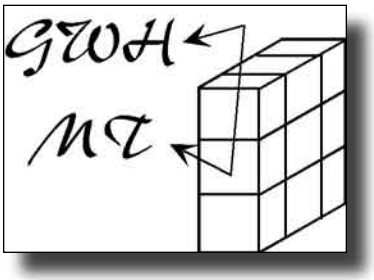
Don't forget to VOTE in the EEGS Elections in January!

Recent Events

***FastTIMES** presents contributed summaries of recent events to inform readers who were unable to attend. As a service to other readers, please send the editors summaries of events you attend for possible inclusion in future issues.*

3DEM-4: New Horizons — A Success in Freiberg, Germany

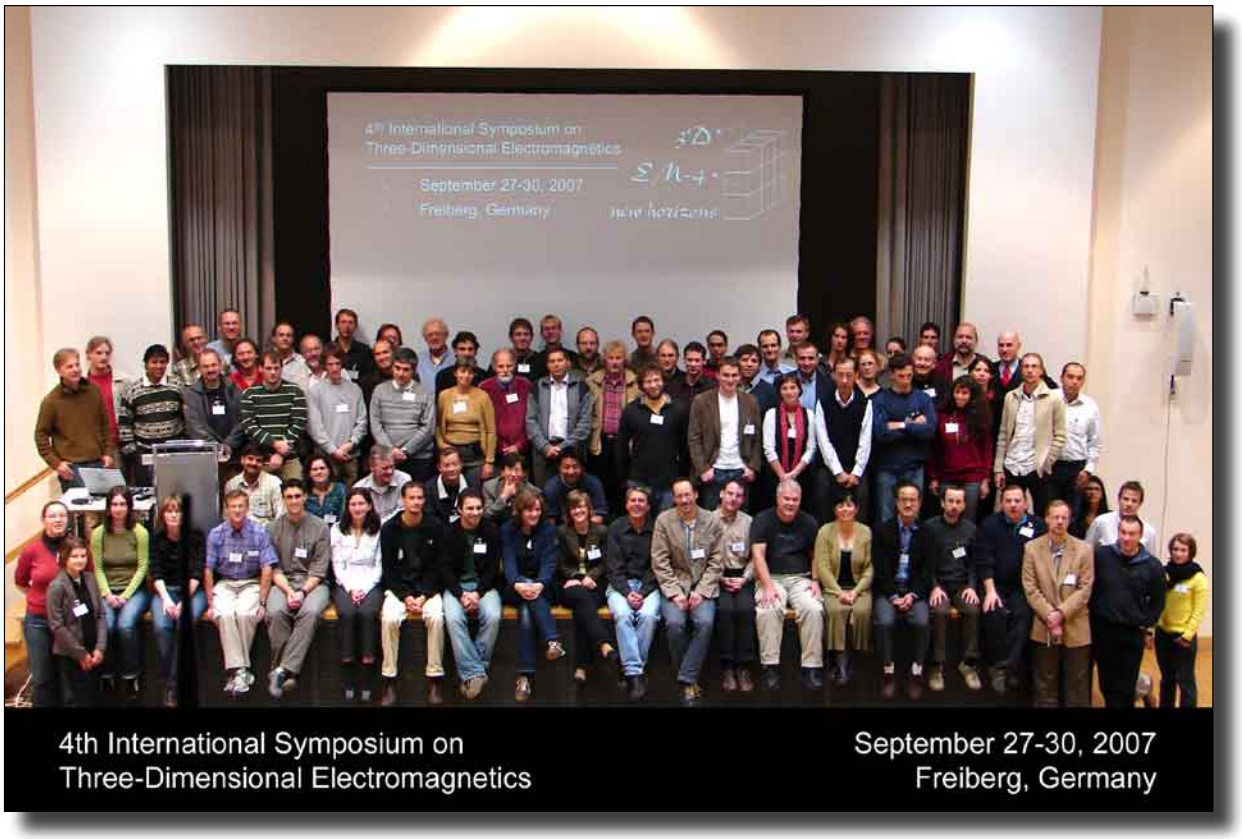
by Louise Pellerin, Green Engineering, Inc. (*pellerin@ak.net*)



Eighty-five earth scientists, engineers, and explorationists from 22 countries came to Freiberg, Germany on September 27–30, 2007 for the 4th International Symposium on Three-Dimensional Electromagnetics, sponsored by the Gerald W. Hohmann Memorial Trust and the Technical University Bergakademie Freiberg, with additional support from KMS Technologies-KJT Enterprises, Houston, EMGS, Metronix, Geosystem Milan, Zonge Engineering, Chinook Geoconsulting, Inc., and Schneider & Berger.

Klaus Spitzer and Ralph-Uwe Boerner arranged and chaired the symposium, with assistance from Peter Weidelt and Chet Weiss as technical co-chairs. Twenty-two oral and thirty-six poster presentations were organized around the theme New Horizons. Topics included:

- *Theory: Forward modeling*
- *Theory: Inversion and resolution analysis*
- *Theory: Data analysis*
- *Applications: Model studies*
- *Applications: Alternative developments*
- *Applications: Case histories*



At the conference banquet, the 2006 Hohmann career achievement awards were presented to Adele Manzella of the Institute of Geosciences and Earth Resources, Italy, and Toshihiro Uchida of the National Institute of Advanced Science and Technology, Japan, for outstanding application of electrical and electromagnetic methods to the study of geothermal resources.

In addition to a charming environment and much good cheer of old and new friends, the symposium coincided with the 82nd Bach Festival in Freiberg and the attendees had a chance to enjoy wonderful cultural events.

About the Gerald W. Hohman Memorial Trust for Teaching and Research in Applied Electrical Geophysics

Established in November 1992, the Gerald W. Hohman Memorial Trust raises funds through personal donations and special events that are re-invested into education and training in electrical and electromagnetic geophysics. Special events have included an informal workshop at the University of Utah in 1993, a short course on electrical and electromagnetic methods at the 1994 Symposium for the Application of Geophysics for Environmental and Engineering Problems (SAGEEP), and four International Symposia in Three-Dimensional Electromagnetics: 1995 in Ridgefield, Connecticut, USA, 1999 in Salt Lake City, Utah, USA, 2003 in Adelaide, Australia, and 2007 in Freiberg, Germany. The Trust supports dedicated projects: the GWH undergraduate and graduate scholarships established through a matching fund program with the Society of Exploration Geophysics (SEG) Foundation, and the career achievement award established in recognition of outstanding contributions to the profession in the manner of G. W. Hohmann.

The Trust is an active memorial to the work of Gerald W. (Jerry) Hohmann as a scientist and educator. Jerry was an international leader in the theory and application of electrical and electromagnetic methods for the exploration of the earth's crust. His work helped establish the modern field of applied electrical geophysics. Jerry was also an outstanding teacher. As Professor of Geology and Geophysics at the University of Utah, he trained the next generation of geophysicists, who are now applying electrical and electromagnetic methods in mineral, hydrocarbon, and geothermal exploration; in groundwater, geotechnical, and environmental studies; and in regional geophysics. Jerry died from cancer on May 23, 1992 at the age of 51.

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News from Other Organizations

***FastTIMES** publishes contributions from allied, associated, and affiliated societies. The article below was contributed by the Near-Surface Geophysics Section of the Society of Exploration Geophysicists.*

SEG Near-Surface Geophysics Section Annual Meeting

by Partha Routh, Past President SEG NSGS (*routh@cgiss.boisestate.edu*)

The Near-Surface Geophysics Section (NSGS) annual meeting, held on September 25, 2007 during the SEG Annual Meeting in San Antonio, was well attended by more than 60 members. We also had colleagues who became new members of NSG as well as new student members from several countries. The annual dinner reception was held at Rio Rio Cantina, a Mexican restaurant on the riverwalk in San Antonio, Texas. The business meeting was held prior to the dinner. Below I highlight some of the main items from the business meeting:

- Discussed growing interest in near surface geophysics across several focus areas: hydrology, environmental, military, mining and petroleum. It is a unique area in many respects where the science from different field is applied and integration is a key aspect.
- Our finances are strong for the year 2007. We have healthy cash balance and our expenditure has been less than our revenues. We should be in position to consider new initiatives.
- We discussed our evolving plans in building strong relations with other societies such as EEGS and AGU.
- We discussed how we should position ourselves as a near surface society to welcome papers and presentations related to problems in other areas. For example, there is interest in near-surface problems in both ground water and the petroleum industry. Although this year, due to lack of publications, the SEG near surface workshop in Bahrain was cancelled, momentum to have this workshop at the next SEG or in 2009 is active.
- Introduced our new executive committee with two new officers in the committee: Robert Jacob as President Elect from Brown University and Emily Hinz as Newsletter Editor from Boise State University.
- We thanked our past officers Louise Pellerin (Past President) and Matthew Ludwig (Newsletter Editor). The enthusiasm and commitment Louise has given to our near surface geophysics society as a whole is tremendous! Louise is now Second Vice President of SEG. We thank Matthew for his help with the Newsletter in 2007.
- The Harold Mooney award for 2007 was given to Deborah Underwood for her contribution to the near surface geophysics society. In particular I would like thank her for her tremendous dedication and effort she put together in giving a new life to our NSGS website!
- Proposed activities were discussed during this meeting listed in the section on presidential initiatives.
- Among the proposed publications:
    - Rick Miller announced upcoming publication themes in The Leading Edge
    - NSG-focused theme in Geophysics
    - NSG activities in EEGS Newsletter
    - JEEG and SAGEEP papers in SEG DCI
- We discussed ideas for SEG 2008, the 15-year anniversary of NSGS.

Multiple Hires in Earth Surface and Hydrologic Processes

Jackson School of Geosciences, The University of Texas at Austin

The Jackson School is building a premier education and research program in Earth Surface and Hydrologic Processes. We seek outstanding scientists at the forefront of their disciplines who are attracted to challenging areas of scholarship that require collaboration across disciplines and programs. We seek to address compelling questions in surface and hydrologic processes within the broad theme of determining how surface and hydrologic processes are influenced by their dynamic setting at the interface of the lithosphere, atmosphere, hydrosphere, and biosphere.

Over the next three years, the Jackson School plans to hire six or more faculty and scientists who complement our existing strengths. We are interested in a range of research areas from quantitative geomorphology to hydrologic-biologic interactions to societal impacts and resource sustainability, and capabilities ranging from modeling landscape dynamics to remote sensing, near-surface geophysics, aerogeophysics, and monitoring groundwater and coastal systems. We also encourage innovative scientists in other areas related to surface and hydrologic processes to apply. More information can be found at www.jsg.utexas.edu/hiring/hydro.html.

AAPG Announces April 2008 Short Course on Near-Surface Seismic Reflection Processing

Contributed by Cynthia L. Dinwiddie, Division of Environmental Geosciences Vice Chair, AAPG 2008 Coordinating Committee (cdinwiddie@cnwra.swri.edu)

The AAPG Division of Environmental Geosciences announces its April 2008 short course, Near-Surface Seismic Reflection Processing. The course will be held on Saturday, April 19 from 8:30 a.m. to 5 p.m. (with an optional evening session 6–7:30 p.m.) and Sunday, April 20 from 9 a.m. to 12 noon at the Computer Training Laboratory of Southwest Research Institute® in San Antonio, Texas. Roger Young (University of Oklahoma, Norman, Oklahoma) will be the instructor. Registration is limited to 20 and is $385.

Includes: A Lab Manual of Seismic Processing (EAGE book) and a CD-ROM containing all short course notes, the complete SPW processing software package keyed to the seismic data set, the seismic data and all intermediate processing results generated during the short course. Fee also includes breakfast snacks, lunch, and refreshments. Optional Saturday-evening session includes a pizza dinner and a lecture on the spectral decomposition method of transforming seismic data to a higher frequency representation (comparable to a sonic log) and a hands-on opportunity to implement same.

Intended audience: Environmental geoscience professionals, graduate students, and undergraduates seeking a practical understanding of seismic methods.

Course objective: To come to an understanding, through a hands-on processing experience, of the consequences of model simplifications and mathematical assumptions imposed on the real earth during the processing of seismic data.

Course description: This is an interactive computer-based course of instruction in fundamentals of seismic reflection processing. The course was designed to extend the understanding of principles taught by lectures in an introductory college course in seismic exploration; it consists of lectures and a sequence of 12 computer laboratory exercises:

- *Lab 1 Reformatting seismic data; assigning geometry to seismic trace headers*
- *Lab 2 Trace gathering*
- *Lab 3 Velocity analysis: making semblance maps*
- *Lab 4 Comparing semblance maps*
- *Lab 5 Picking a semblance map; picking reflection events*
- *Lab 6 Normal moveout correction; stacking CMP gathers*
- *Lab 7 Editing: killing and muting traces*
- *Lab 8 Testing and applying statistical deconvolution; bandpass filtering*
- *Lab 9 Residual statics correction*
- *Lab 10 Residual statics correction/velocity analysis iteration*
- *Lab 11 Final stack*
- *Lab 12 Post-stack time migration*

To register for this course and the AAPG 2008 meeting in San Antonio, Texas, please visit: www.aapg.org/sanantonio/courses.cfm.

Join EEGS Now!

Environmental and Engineering Geophysical Society

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*Payments are not tax deductible as charitable contributions although they may be deductible as a business expense. Consult your tax advisor.

Membership Information

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Member receives annual subscriptions to ***JEEG*** and ***FastTIMES*** along with discounts for EEGS publications, SAGEEP registration, and other EEGS functions.

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