

## January 2007 Newsletter of the AGU Near-Surface Focus Group

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### 1. Summary of AGU NS Executive Committee Meeting, Fall AGU 2006

The meeting was held on Tuesday December 12, 2006. Updates were given on current and prior activities of the AGU NS community.

NS presentation numbers at AGU conferences:

Montreal 2004, Joint Assembly: 84

New Orleans 2005, Joint Assembly: 115

Baltimore 2006, Joint Assembly: 89

San Francisco 2006, Fall Meeting: 90

Acapulco 2007, Joint Assembly: 10 NS sessions proposed (refer to newsletter item 2)

NS membership: 235 primary affiliates and 646 secondary affiliates out of 45,038 active AGU members.

As this was the first Near-Surface Focus Group Executive Committee meeting at a Fall Conference with most members present, there was discussion and information given about committee member and NS volunteer terms of appointment. More information will follow in future newsletters.

Rhett Herman (Radford University) was introduced as the NS website editor and new executive committee member. Rhett is working with headquarters to have the NS website active early in 2007.

To facilitate communication among groups it was agreed that in future AGU meetings NS will cosponsor all sessions organized by the Hydrogeophysics Technical Committee. Also, the monthly NS-letter will distribute Hydrogeophysics Technical Committee news.

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2. Joint Assembly 2007, Acapulco, Mexico 2007, Approved Sessions

Abstracts can be submitted at <http://www.agu.org/meetings/ja07/> until 1 March 2007 23:59 UT

## NEAR-SURFACE GEOPHYSICS

**NS01 Near-Surface Geophysics: General Contributions** This session solicits contributions from a broad range of topics of general interest to the Near Surface Geophysics community. Abstracts focusing on data acquisition, modeling, interpretation and novel case studies are welcome.

Conveners: Lee Slater, Rutgers University, USA, email:  
lslater@andromeda.rutgers.edu

## NS02 Biogeophysics

Biogeophysics refers to the application of geophysical methods to observe microbial processes in the subsurface. Bacteria have been documented to play an important role in geologic processes, however, their role in the alteration of geophysical properties of rocks and sediments is not well understood nor has it been thoroughly investigated. Microbial activity is critical to the degradation of organic contaminants and to the removal of heavy metals from solution.

Consequently, biogeophysical methods may ultimately evolve into non-invasive tools for long-term monitoring of microbial processes.

Abstracts that focus on laboratory and field-scale studies of (1) geophysical properties of bacteria and their interaction with geologic matrices or contaminants, (2) the geophysical signatures associated with microbial processes in the earth, (3) microbial rock interactions (geomicrobiology) with implications for geophysical measurements, and (4) geophysical investigations of bacteria activity in extreme environments (e.g., extra terrestrial environments, deep ocean

biosphere) are solicited here. Biogeophysics student travel awards are available to student first authors and will be awarded on a merit basis.

Conveners: Estella Atekwana, Oklahoma State University, Boone Pickens School of Geology 105 Noble Research Center, Stillwater, OK 74078 USA,

Tel: 4057446361, email: estella.atekwana@okstate.edu, and Lee Slater, Rutgers University, Dept. Earth/Env. Sciences 101 Warren Street, Newark, NJ 07102 USA, email:

lslater@andromeda.rutgers.edu, and Eliot Atekwana, Oklahoma State University, Boone Pickens School of Geology 105 Noble Research Center, Stillwater, NJ 74078 USA, email:

eliot.atekwana@okstate.edu, and Dimitrios Ntarlagiannis, Rutgers University, Dept. of Earth/Environmental Sciences 101 Warren Street, Newark, NJ 07102 USA, email:

dimntar@pegasus.rutgers.edu

**NS03 Advanced topics of the Society of Exploration Geophysicists (SEG)** The use of technology has significantly increased in exploration geophysics during the past decades. Recently, the oil industry has been pursuing various advanced topics in seismic data acquisition, processing and interpretation as well as in new areas such as gas hydrate exploration and controlled source electromagnetics. This is being supported by a new generation of logging tools and computing methods.

Contributions that demonstrate how such new technologies are advancing the 3D characterization of the earth are solicited here.

Conveners: Nader C. Dutta, Schlumberger, 10001 Richmond Ave, Houston, Tx 77079 USA, Tel: 713-689 6370, Fax: 713 689 6372, email: Ndutta@slb.com, and Kurt Martin Strack, KMS Technologies, 6420 Richmond Ave, Suite 610, Houston, TX 77057 USA, Tel: (713) 532-8144, Fax: 832.204.8418, email: kurt@kmstechnologies.com

NS04 Quantifying and assessing the impact of uncertainty in geophysical estimation We invite papers that examine the uncertainty present in geophysical data acquisition, data processing, forward model building, inversion, and rock-physics transforms. The session is intended to address the need to evaluate the causes and impact of uncertainty at each of these stages, and the way in which uncertainty propagates from one stage to the next. We seek to illustrate various techniques for quantifying and integrating the degree of uncertainty in resultant models. This session will ultimately help us to effectively communicate uncertainty to end users, making geophysical methods more accessible to a wider range of near-surface applications.

Conveners: James Irving, Universite de Lausanne, CHE, email: jdirving@pangea.stanford.edu, and Vanessa Mitchell, Stanford University, Dept of Geophysics 397 Panama Mall , Stanford, CA 94305 USA, Tel: 650.724.9939, email: vmitchel@pangea.stanford.edu, and Partha Routh, Boise State University, 221A Math and Geo Building 1910 University Drive , Boise, ID 83725 USA, Tel: 208.426.2757, Fax: 208.426.4061, email: routh@cgiss.boisestate.edu, and Chester Weiss, Geophysics Department, Sandia National Laboratories, PO Box 5800 MS-0750, Albuquerque, NM 87185 USA, Tel: 505.284.6347, Fax: 505.844.7354, email: cjweiss@sandia.gov

NS05 Recent trends in exploration geophysics for imaging complex geological settings Recent advances in data acquisition and processing have advanced the range of geophysical imaging to increasingly complex geologic media.

Challenges in describing subsurface properties in such realistic media, require the integration of different sources of information and the understanding of phenomena which were neglected in the past. Complex imaging problems such as subsalt characterization can benefit from the integration of potential and seismic methods. A particular topic of interest corresponds to the use of rock physics models and petrophysical information for constraining seismic inversion. Description of novel seismic modeling and inversion methods, as well as integration of seismic with non-seismic methods are encouraged for the session.

Conveners: Carlos Calderón-Macías, GX Technology, 2101 City West Blvd Building 3m Suite 900, Houston, TX 77042 USA, Tel: 713-789-7250, email: ccalderon@gxt.com, and Carlos Ortiz-Alemán, Mexican Institute of Petroleum, Eje Lázaro Cárdenas Norte 152 Col. San Bartolo Atepehuacan Del. Gustavo A. Madero, Mexico City, 07730 MEX, Tel: 52-55-9175-6489, email: jcortiz@imp.mx, and Jaime Ramos-Martinez, Mexican Institute of Petroleum, Eje Lázaro Cardenas Norte 152 Col. San Bartolo Atepehuacan Del Gustavo A. Madero, Mexico City, 07730 MEX, Tel: 52-55-9175-6489, email: jrmartin@imp.mx

NS06 Geophysical characterization of fractures and fractured media Fractured rock aquifers are becoming increasingly important as sources of groundwater supply. At the same time, fractures are potential pathways for the migration of contaminants in near surface geologic environments. The characterization of fractured rock aquifers is particularly difficult due to anisotropy, heterogeneity and the effect of scale. Geophysical methods provide unique opportunities for either

(1) the non-invasive, direct detection of fractures, or (2) the quantification of anisotropy due to fractures in porous media. Abstracts focused on laboratory-scale, field-scale and/or numerical studies of fractured media using geophysical methods are solicited here.

Conveners: DeBonne Natalie Wishart, Rutgers University, 101 Warren St, Newark, NJ 07102 USA, Tel: 9733535100, Fax: 9733531965, email:

debonnewishart@yahoo.com, and Christopher Juhlin, Uppsala Universitet, SWE, email: Christopher.Juhlin@geo.uu.se

NS07 Archaeological geophysics: Recent developments Recent developments in instrumentation and methods have opened new avenues for innovative geophysical studies in archaeological investigations, with increased spatial resolution. New approaches in archaeological research focusing more on the social, cultural and economic roles of archaeological landscapes and settlement areas may be effectively supported by high resolution geophysical techniques and remote sensing methods including new airborne applications. We seek contributions that highlight the relationship between archaeological objectives, geophysical prospection techniques and the final archaeological interpretation. Geophysical investigations of archeological sites in urban areas are particularly encouraged.

Conveners: Luis Barba, Universidad Nacional Autonoma de Mexico, Instituto de Investigaciones Antropologicas, UNAM, Ciudad Universitaria, Delegacion Coyoacan, Mexico, 04510 MEX, email: barba@servidor.unam.mx, and Cornelius Meyer, Archaeology, DEU, email: cornelius@eastern-atlas.com

NS08 Applications of near-surface geophysics to soil studies: from local processes to climate studies Soils perform many physical, chemical and biologic functions, and therefore constitute one of our most important natural resources. Soils are directly related to carbon and nutrient cycling, and play a major role in regulating atmospheric fluxes. However, the understanding of soil processes and soil-atmosphere fluxes is still incomplete and techniques capable to contribute to this knowledge with enough temporal resolution and spatial coverage are lacking. Abstracts focusing on laboratory and field-scale studies of (1) geophysical monitoring of soil heterogeneities and their interaction with biogeochemical cycles, and/or

(2) the geophysical signatures associated with soil-atmosphere fluxes, are solicited here. Studies ranging from single point measurements (e.g.

time-domain reflectometry (TDR), TDR-like methods) to larger scale methodologies with implications for the monitoring of geochemical and/or microbiological processes related to climate modeling in soils are of particular interest.

Conveners: Xavier Comas, University of Maine, USA, email:

xcomas@pegasus.rutgers.edu, and Dimitrios Ntarlagiannis, Rutgers University, USA, email: dimntar@pegasus.rutgers.edu

NS09 New and ongoing technological developments in near-surface geophysics In geotechnical and hydrological investigations, humanitarian endeavors and resource exploration, new technologies and the continuing development of existing technologies are needed to enhance resolution, increase efficiency and recover physical properties from geophysical measurements. Developments are needed in instrumentation and software for land, marine and airborne systems. We invite papers that are advancing GPR, seismic, geoelectric, electromagnetic and potential fields methods. New and ongoing developments in instrumentation, processing, modeling or inversion as applied to the near surface are welcome.

Conveners: Louise Pellerin, Green Engineering, Inc, 2215 Curtis St, Berkeley, CA 94702 USA, Tel: 510 704 1566, email: pellerin@ak.net, and Esben Auken, Department of Earth Sciences, University of Aarhus, Høegh-Guldbergs Gade 2, Århus C, 8000 DNK, Tel: +45 8942 9441, Fax: +45 8942 9406, email: esben.auken@geo.au.dk

#### NS10 Gas hydrates in the Americas

Some of the best documented occurrences of natural gas hydrates are in the Americas, ranging from permafrost deposits from the North Slope of Alaska to massive deposits in the Middle America trench to disseminated gas hydrate off Peru. Naturally occurring gas hydrates are known from a variety of geologic settings but questions persist about their potential roles as energy resources, as seafloor hazards, and in global climate change. Numerous field, laboratory, and modeling studies are revealing the distribution and properties of natural gas hydrates in ways that are beginning to answer questions about the ways to produce them for energy, the processes that form and dissociate them from local to regional scales, the unusual life forms sometimes associated with them, the characteristics and nature of fluid fluxes in the hydrate reservoir, and how to best measure, control, and observe these varied phenomenon. This session offers the opportunity to present and exchange the latest research on naturally occurring gas hydrates in the Americas.

Conveners: Deborah R. Hutchinson, US Geological Survey, Woods Hole Science Center, 384 Woods Hole Road, Woods Hole, MA, USA 02543, Tel: 508-457-2263, email: dhutchinson@usgs.gov, and Roberto A Figueroa, Pemex-PEP, MEX, Tel: 52-993-310-6262 x 23862, email: rfigueroaab@pep.pemex.com

## HYDROLOGY-HYDROGEOPHYSICS

H18 Hydrogeophysics: Geophysical imaging and characterization of subsurface hydrological properties and processes Knowledge of shallow subsurface hydrological properties and processes is essential to address a wide range of societal issues, including evaluation and management of water and land resources, and monitoring and remediation of contaminated soils and groundwater. Hydrogeophysics integrates non-invasive geophysical imaging and characterization techniques with hydrogeological data and/or hydrological models to provide insights into soil and aquifer properties and processes. This session will present recent advances in hydrogeophysical approaches and applications, ranging from the laboratory to the field and regional scale. It will bring together hydrologists and geophysicists to examine the latest developments in this interdisciplinary field, as well as to explore emerging areas of research. We encourage contributions focusing on the imaging and characterization of hydraulic properties

governing water flow and solute transport; the imaging, monitoring, and characterization of water dynamics, contaminant plumes, and preferential flow; as well as the monitoring and characterization of biogeochemical system transformations, associated for instance with remedial activity.

Contributions on hydrogeophysical modeling and inversion approaches, data fusion methods, as well as petrophysical parameter relationships linking measured geophysical properties to the hydrological parameters and state variables of interest are likewise welcome. Given the venue of the conference, we particularly encourage contributions that describe research of relevance to Central and South America.

Conveners: Andreas Kemna, Agrosphere Institute (ICG-IV), Forschungszentrum Jülich, , Jülich, 52425 DEU, Tel: +49 2461 61 4077,

Fax: +49 2461 61 2518, email: a.kemna@fz-juelich.de, and Niklas Linde, ETH-Swiss Federal Institute of Technology, Institute of Geophysics, , Zürich, CHE, email: linde@cerege.fr, and Thomas Günther, Leibniz Institute of Applied Geosciences, Hannover, DEU, email: thomas.guenther@gga-hannover.de

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### 3. Teaching Geophysics in the 21st Century, from Sarah Kruse

This summer, the NSF-funded program "On the Cutting Edge" will offer a week-long workshop on Teaching Geophysics in the 21st Century.

We are looking for faculty participants who either teach an undergraduate course in geophysics or who have expertise in geophysics and experience in integrating geophysics concepts into other undergraduate courses in the geoscience curriculum in a significant way.

If this is you, we hope that you will apply to attend. We would also be grateful if you could pass this email on to colleagues who might be interested.

The workshop will be held from August 12-15, 2007, with an optional field trip on August 11. The tentative locale for the workshop is the University of Michigan's Rocky Mountain Field Station in Jackson, Wyoming.

You can find the on-line application and more information about the workshop at <http://serc.carleton.edu/NAGTWorkshops/geophysics07/index.html>. The application deadline is February 1, 2007. If you are interested in attending the workshop, we hope that you will apply early. If more qualified applicants apply for the workshop than we have space for, we may choose to use the date of application as one factor in determining the final workshop participant list.

Details about the workshop:

The workshop will be a collaborative effort focused on enhancing the teaching of geophysics concepts at the undergraduate level. This workshop will bring together college and university faculty to explore a wide variety of topics related to teaching geophysics effectively both in geophysics courses and as parts of other courses taught in the geoscience curriculum.

Participants will share exemplary laboratory and classroom activities, discuss course content and curriculum, explore strategies for integrating geophysics concepts and activities across the curriculum, and address issues in teaching and learning geophysical concepts and processes.

This workshop will be patterned after the very successful workshops on Teaching Mineralogy (1996) and Teaching Petrology (2003), Teaching Structural Geology (2004), Teaching Hydrogeology (2005), and Teaching Sedimentary Geology (2006). Participants will help develop an on-line Geophysics Teaching Materials Collection and review selected items in the collection.

Applicants for this workshop must hold a faculty teaching position at a two- or four-year college or university and either teach a geophysics course or have expertise in geophysics plus experience in integrating geophysics in a significant way into other courses in the curriculum. We welcome applications from all academic ranks. This workshop is funded by the National Science Foundation (CCLI-ND Program, Grant DUE-0127310), which covers the cost of meals, lodging and workshop activities for participants from the U.S. and its territories; travel costs to/from the workshop must be borne by the individual or home institution.

Sincerely,

Workshop co-conveners Barb Tewksbury, Larry Braile, Vince Cronin, John Geissman, Sarah Kruse, and Michael Wyssession.

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#### 4. Medals Nominations for 2007

It is time to consider who among our colleagues should be nominated for medals and to line up individuals to prepare the nomination and provide supporting letters. The deadline for nominations was moved to 15 March partly to assure that preparation of nominations for medals was not in competition for time to prepare Fellows nominations.

There are several medals for which NS affiliates are well suited. The description of medals and a link to the former recipients can be found at <http://www.agu.org/inside/honors.html>

Instructions for preparation of nominations can be found at <http://www.agu.org/inside/awardnom.html>

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#### 5. Student Opportunities

Two Ph.D. positions in Hydrogeophysics at ETH-Zürich

The Applied and Environmental Geophysics Group of ETH Zurich anticipates openings for two Ph.D. positions in hydrogeophysics to be carried out within a multidisciplinary river restoration project in the vicinity of Zurich. One of the positions will be dedicated to fully coupled

hydrogeophysical inversion using time-lapse crosshole electrical resistance tomography, whereas the other will focus on developing three-dimensional hydrological models from inversions of surface-based geophysical and hydrological data.

The successful candidates should hold a Diploma or Masters degree in geophysics, physics, environmental engineering or computational hydrology, and should have a keen interest and preferably some experience in geophysical and/or hydrological forward modeling and inversion. The candidates must be willing and able to perform extensive field work. We are a dynamic international research group working on a wide variety of high profile topics in applied and computational geophysics. The working languages in our group are English and German.

Specific questions regarding the PhD projects can be directed to Dr.  
Laurent Marescot

<[http://www.earthworks-jobs.com/cgi-bin/mailto.pl?laurent\\*aug.ig.erdw.ethz.ch](http://www.earthworks-jobs.com/cgi-bin/mailto.pl?laurent*aug.ig.erdw.ethz.ch)>

and Dr. Niklas Linde

<[http://www.earthworks-jobs.com/cgi-bin/mailto.pl?linde\\*aug.ig.erdw.ethz.ch](http://www.earthworks-jobs.com/cgi-bin/mailto.pl?linde*aug.ig.erdw.ethz.ch)>.

Interested candidates should send their Curriculum Vitae and the names and addresses of three referees by February 15, 2007 to:

Dr. Laurent Marescot

<[http://www.earthworks-jobs.com/cgi-bin/mailto.pl?laurent\\*aug.ig.erdw.ethz.ch](http://www.earthworks-jobs.com/cgi-bin/mailto.pl?laurent*aug.ig.erdw.ethz.ch)>

and/or Dr. Niklas Linde

<[http://www.earthworks-jobs.com/cgi-bin/mailto.pl?linde\\*aug.ig.erdw.ethz.ch](http://www.earthworks-jobs.com/cgi-bin/mailto.pl?linde*aug.ig.erdw.ethz.ch)>

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More information on the ETH Applied and Environmental Geophysics Group can be obtained at  
<http://www.aug.geophys.ethz.ch> <<http://www.aug.geophys.ethz.ch/>>

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To contribute material to the NS-letter e-mail before the first of the month to:

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