

September 2009 Newsletter of the AGU Near-Surface Focus Group

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Recent announcements of interest to the NS community (conferences, academic positions, graduate student opportunities etc.) can be found at the AGU NS-Focus Group Web Page: www.agu.org/focus_group/nsg/

AGU NS Membership as of June 2009: Primary affiliation 635 members; Secondary 2107 members

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- 1) 2009 Fall AGU Meeting (<http://www.agu.org/meetings/fm09/>)

This year's Fall AGU meeting is December 14-18 in San Francisco, California, USA. The abstract submission deadline is Thursday, 3 September 2009, 23:59 Eastern Daylight Time (EDT) or 03:59+1 GMT

(http://www.agu.org/meetings/fm09/program/abstract_submissions.php).

Near-Surface, Hydrogeophysics and NS co-sponsored sessions are listed below. We look forward to seeing you in San Francisco!

Near Surface Geophysics Sessions:

NS01: Near Surface Geophysics General Contributions

This session provides the opportunity for contributions that fall within the broad spectrum of Near Surface Geophysics.

Conveners: Chester J Weiss, Virginia Polytechnic Institute and State University, USA, Tel: +1-540-231-3651, email: cjweiss@vt.edu; Leif Cox, Montana Tech, Dept of Geophysical Engineering, USA, Tel: +1406-496-4888, email: lcox@mtech.edu

NS02: Advanced Inverse Strategies for Improved Characterization and Assessment of Ground-Water, Mineral, and Petroleum Resources

In geophysical imaging and ground-water or petroleum reservoir model calibration, inverse methods typically use a single type of data sensitive to a single physical property. Combining several types of data collected over the same region potentially can reduce ambiguity and enhance inversion results. We welcome contributions demonstrating advanced inversion strategies using data sets 1) sensitive to the same physical property, 2) responsive to different physical properties between which there is an analytic relationship, and 3) disparate data sets where there is no analytic relationship between the properties. This session encourages

contributions that describe combined, Bayesian, joint, and cooperative inverse approaches, regularization strategies, worth of combined data, and uncertainty assessment.

Conveners: Michael Friedel, USGS, USA, email: mfriedel@usgs.gov, and Behnam Jafarpour, Texas A&M University, USA, email: behnam@pe.tamu.edu

NS03: Back to Basics: Inversion of Electrical Resistivity Imaging Data

Electrical resistivity imaging (ERI) can be used to obtain information about subsurface structure, properties, and processes for a wide range of near-surface applications. A critical step in the use of ERI is the inversion of the acquired data to obtain an image that displays the magnitude of the electrical resistivity throughout the subsurface region of interest. In obtaining this image, the geophysicist is immediately faced with several critical choices – such as, which inversion algorithm, its implementation and the incorporation of prior geologic knowledge and constraints – which can significantly affect the obtained resistivity image in ways that are not often documented or well understood. This “Back to Basics” session will be a community discussion about the inversion of ERI data. Synthetic and field data sets will be posted at the AGU Near-Surface Focus Group website (nsg.agu.org), along with information about the acquisition parameters and some limited information about the geology at the site. We ask that volunteers (e.g. you, reading this session description) download one or more of these data sets and invert them using any method to obtain the resistivity model/s. In this session we will compare and discuss the results, and review the “answers” for the synthetic data sets. All abstracts submitted to this session will therefore be from those who have completed the homework assignment. All submitted presentations will be made as posters. This Back to Basics session is an opportunity for our community to have an in-depth discussion about the inversion of ERI data – the advances, the challenges, the limitations, and the outstanding questions.

Conveners: Chester Weiss, Virginia Tech, Dept of Geosciences 4044 Derring Hall (0420), Blacksburg, VA 24061 USA, email: cjweiss@vt.edu, and Rosemary Knight, Stanford University, USA, email: rknight@stanford.edu

NS04: Back to Basics: Measurement of Electrical Properties of Rocks and Sediments

The interpretation of electrical and EM geophysical data acquired for hydrogeological and exploration applications relies on an understanding of how bulk electrical properties such as conductivity, induced polarization, dielectric constant, and self-potentials are related to many pore-scale petrophysical properties and physical/ chemical/ biological processes. Laboratory experiments play a crucial role in revealing these relationships and yet the procedures required to make high quality lab measurements that are representative of in-situ conditions and free of experimental artifacts remain a source of lively debate. We welcome contributions on the topic of electrical properties measurement over the full span of frequencies (DC to hundreds of MHz) used in resistivity, IP, SP, EM and GPR methods.

Conveners: Karl E Butler, University of New Brunswick, Department of Geology 2 Bailey Dr., Fredericton, NB E3B 5A3 CAN, Tel: 506-458-7210, Fax: 506-453-5055, email: kbutler@unb.ca, and James Merriam, University of Saskatchewan, Dept. of Geological Sciences 114 Science Place, Saskatoon, SK S7N 5E2 CAN, Tel: (306) 966-5716, Fax: (306) 966-8593, email: jim.merriam@usask.ca

NS05: Urban Geophysics

Unprecedented industrial growth and rapid urbanization are causing a host of problems and challenges to established and emerging human settlements all over the world. Systematic application of various geophysical methods, individually or in combination, can play a vital role in finding solutions to a number of these problems. The session invites contributions on conceptual developments and applications of various geophysical methods dealing with: urban planning and development, metro tunneling and transportation, seismic risk mitigation in populated areas, siting of heavy structures, archeological investigations and preservation of existing monuments, mining hazards and waste disposal, enhancement of potable water supply in problem areas, land slides in mountainous regions, power transmission, etc. Contributions of urban geophysical studies to special problems unlisted here, and those combining the results of airborne, ground, and bore hole surveys will be most welcome.

Conveners: Saurabh Kumar Verma, National Geophysical Research Institute, Uppal Road, Hyderabad, AP 500007 IND, Tel: 91-40-23434601, Fax: 91-40-23434651, email: skvngri@gmail.com, and Shashi Prakash Sharma, Indian Institute of Technology, IIT Campus, Kharagpur, WB 721302 IND, Tel: 91 - 3222 - 283386, email: spsharma@gg.iitkgp.ernet.in

Hydrogeophysics Sessions:

H49: General Hydrogeophysics

Subsurface characterization for hydrological purposes is traditionally based on core analysis and well and tracer test data gathered from a limited number of boreholes. While core-scale data provides detailed 1-D information along the length of boreholes, hydraulic stress data and tracer breakthrough curves generally provide relatively large-scale information concerning average aquifer properties. However, without complementary information, these traditional techniques are often inadequate for characterizing heterogeneous formations at necessary scales. The additional information needed to adequately resolve subsurface heterogeneity can potentially be bridged by high-resolution geophysical techniques. In view of this, we encourage contributions from all domains of hydrogeophysics with emphasis on studies aimed at characterizing (i) hydraulic properties and processes in both saturated and unsaturated formations, (ii) contaminant or tracer migration, (iii) the geomechanical nature of aquifer materials, and (iv) relevant biological and geochemical properties and processes.

Conveners: Tim Johnson, Idaho National Laboratory, Rita Deiana, Università di Padova, Remke L Van Dam, Michigan State University, and Majken Caroline Looms, University of Copenhagen.

H50: Characterization of Soil Moisture Dynamics and Plant-Soil Water Interactions

Soil moisture dynamics play a pivotal role in earth system science. This session aims to characterize the spatio-temporal dynamics of soil moisture and the interactions between soil moisture and plant communities. The emphasis is on linking near-surface geophysical data with key hydrological, soil physical, and ecological processes. Rather than focusing on the wide array of soil moisture sensing techniques, such as ERT, GPR, and TDR, this session will bring together researchers across discipline divides to discuss the measured soil moisture dynamics as both an end-result and a modeling input. We further invite contributions that aim to identify the temporal dynamics of the spatial structure of soil moisture patterns at different scales. Special emphasis is given to the role of vegetation in the space-time relationships of soil moisture. Greater coordination between measurement and modeling methods will provide a viable step towards linking subsurface processes with ecohydrological patterns.

Conveners: Robert Heinse, University of Idaho, Tyson Ochsner, Oklahoma State University, and Nigel Crook, Stanford University.

H51: Innovative Field Methods and New Theoretical Approaches of Hydrogeophysics for Hydraulic Characterization of Aquifers

Hydraulic characterization of aquifers, i.e. determination hydraulic conductivity and storage parameter fields, is vitally important for water resources management and modeling of the fate and transport of contaminants in the subsurface environment. Traditional approaches (pumping tests, slug tests, etc.) for characterizing aquifers can be laborious, expensive, and highly intrusive, while only yielding sparse data sets. Hydrogeophysical methods offer promise to mitigate or even obviate the major limitations of the traditional methods. Presentations are solicited on: innovative methods for hydrogeophysical data acquisition, new theoretical developments, and modeling approaches that address aquifers and the inherent spatial heterogeneity of hydraulic parameters.

Convener: Bwalya Malama, Boise State University, André Revil, Colorado School of Mines, and Kristopher L Kuhlman, Sandia National Lab Carlsbad.

H52: Remote Sensing and Hydrogeophysics Applications for Modeling of Land Surface Hydrological Processes

New measurement and monitoring technologies provide unprecedented opportunities to not only characterize hydrological processes and statevariables in space and time, but also to improve and validate the current state-of-the-art land surface models. Recent studies have demonstrated that the combination of observation techniques such as Electrical Resistivity Tomography [tm1] (ERT), Electric Magnetic Induction (EMI), Ground Penetrating Radar (GPR), near surface seismics, but also air- and space-borne methods from land monitoring remote sensing platforms (TerraSAR-X, RapidEye, ALOS) and soil moisture characterization (AMSR-E, ERS-Scat and SMOS) with land surface models, through initialization, parameterization, and data assimilation, can provide significant improvements to the representation of hydrological processes. In this session, we welcome contributions with an emphasis on the improvement of the water and energy budget within a modeling framework.. They will deal with the development and application of geophysical and remote sensing techniques (be it as input or parameters) that either stand alone or are integrated with hydrological modeling. Contributions are also encouraged that address the quantification of uncertainties in hydrological products due to errors in temporal sampling techniques, sensors and the applied retrieval algorithms; magnitudes which depend on the hydrological variable(s), sensor, and spatio-temporal scale of interest and which play a significant role in the applicability of the obtained observations.

Conveners: Jennifer Jacobs, University of New Hampshire, Adam Ward, Pennsylvania State University, Dongryeol Ryu, The University of Melbourne, and Christoph Rüdiger, The University of Melbourne.

H53: Aquifer Characterization using Direct-Push Methods

Characterization of the mechanical and fluid transport properties of aquifers, i.e. determination of hydraulic conductivity and soil strength, are fundamental parameters in solving geotechnical and geoenvironmental problems ranging from estimation of contaminant migration to the diagnosis of potentially liquefiable soils. Direct-push methods are rapidly deployed and minimally invasive, providing the potential to gain depth-continuous information about soil

properties from either empirical relationships or more refined analytical solutions. As such direct-push methods are emerging as the chosen method to obtain critical soil data. For this session we encourage contributions directed towards solutions developed using direct-push methods for the: (i) hydraulic characterization of aquifers, (ii) characterization of soil strength properties, (iii) analysis of liquefaction susceptibility and other geo-hazards, (iv) characterization of aquifer materials, based on either numerical or experimental methods.

Conveners: Michael Fitzgerald, Georg-August-Universität, Nurhan Ecemis, Izmir Institute of Technology, and Derek Elsworth, Penn State University.

H69: Emerging Applications of Hydrogeophysical Methods for Characterization of Flow and Transport in Subsurface Environments

Strongly perturbed systems with spatiotemporally diverse signals such as those sites undergoing active remediation present both challenge and opportunity for the development and calibration of flow and transport models. Characterization of multiphase processes has traditionally relied upon the interrogation of direct, fluid-phase measurements collected at a limited number of spatial locations. In contrast, geophysical techniques provide spatial averages of the sensor-specific constitutive properties of the medium. Recent advances in geophysical monitoring provide new insights into subsurface flow and transport processes through the combination of traditional borehole methods and non- or minimally invasive geophysical imaging. The goal of this session is to bring together researchers interested in coupling hydrologic and geophysical data, with particular emphasis flow and transport processes occurring in natural or perturbed systems. We invite research that focuses on any aspect of the hydrogeophysical characterization of biological and physicochemical processes at column-, bench-, and field-scales. Processes of particular interest include, but are not limited to, those involving mineral precipitation/dissolution, biofilm and gas evolution, hydraulic property changes, and rate-limited mass transfer.

Conveners: Andrew Ramsburg, Tufts University, Frederick Day-Lewis, USGS, and Yuxin Wu, Lawrence Berkeley National Lab.

Co-Sponsored Special Sessions:

H04: Defining, Measuring and Modeling Hydrological Connectivity Across Scales: Macropores to Landscapes

H40: Shallow and Deep Geothermal Energy

H44: Advances in the Quantitative Characterization of Karstic and Fractured Aquifers

H46: Challenges and Progress in Regional Groundwater Flow, Transport, and Reactive Transport Modeling

C27: Observatories, Tools and Instruments in Polar Regions

IN01: Earth and Space Science Informatics General Contributions

IN11: Challenges in Achieving Earth System Model Interoperability

S05: Observation and Analysis of Natural and Induced Microearthquakes

S12: Monitoring Temporal Changes of Earth's Properties with Seismic Waves

T08: Fault processes in nature and lab: from micro scale to 3-D regional observations and models

T24: Moho, Lithosphere and Upper Mantle Structure Beneath Europe: What Have we Learnt in 100 Years?

V32: Volcanic dynamics: temporal changes of physical properties at volcanoes with and without surficial activity

V36: A Multidisciplinary Look at Volcanism in Continental and Oceanic Plate Interiors

2) AGU NS Focus Group New Logo and Web Page Update (from Louise Pellerin and Rhett Herman)

Check out the new logo and look of our web site at www.agu.org/focus_group/nsg/

3) 2010 Joint Assembly Meeting of the Americas, 08-13 August, Foz do Iguassu, Brazil (from Juan Lorenzo gllore@lsu.edu, JA 2010 NS Program Representative)

Dear Colleagues:

The Near Surface Focus Group (NSFG) is a new and dynamic division of AGU that investigates the complex nature of near-surface geosystems. The Spring Joint Assembly (JA) has always been an exciting meeting for the NSFG.

In 2010 the JA will be the Meeting of the Americas to be held in Foz do Iguassu, 08-13 August 2010, Brazil. Join us in this wonderful opportunity to tap the great diversity of experience of the American continents and develop professional collaboration with neighbors. It is also an excellent opportunity to travel to a beautiful, friendly part of the world and visit the Iguazu National Park and the Iguassu Falls.

In late fall we will begin to accept proposals for sessions, but start thinking about it now. Contact a colleague to organize a session with a north-south counterpoint. Students are encouraged to collaborate and develop a session

Information about the meeting can be found at <http://www.agu.org/meetings/ja10>.

We would also like to include an invitation in Portuguese (thanks to Sergio Fontes) as well as Spanish (thanks to E. Vera and A. Canals).

Caros colegas :

O Grupo “Near Surface Focus Group - NSFG” é uma nova e dinâmica divisão da AGU dedicada à investigação da natureza complexa dos geosistemas rasos, possivelmente os mais dinâmicos e complexos da Terra e de grande importância para a sociedade. A “Spring Joint Assembly” (JA) tem sido sempre um encontro excitante dos integrantes do NSFG.

Em 2010, a JA organizará o Encontro das Américas, que ocorrerá entre 8 e 13 de agosto em Foz do Iguazu, Paraná – Brasil, nas proximidades das Cataratas do Iguazu, patrimônio natural da humanidade. Junte-se a nós nesta maravilhosa oportunidade de conhecer a grande diversidade de experiência dos continentes americanos e desenvolver colaboração profissional com os vizinhos norte-americanos e sul-americanos, num evento de reconhecida importância internacional.

Brevemente começaremos a aceitar propostas para sessões. É importante então que você comece a pensar sobre isso agora, contatando colegas para organizar uma sessão especial. Estudantes também são extremamente bem-vindos e encorajados a colaborar e propor sessões.

Estimados Colegas:

Pronto les comunicaremos las fechas en que los invitamos a proponer sesiones especiales para dicha reunión. Por lo pronto, les rogamos por favor tomen contacto con sus colegas y piensen en el tema con el cual podrían participar en esta reunión. Demás está decir que los jóvenes estudiantes forman parte integral de nuestro grupo profesional y quedan incluidos dentro de esta invitación.

Quiero hacerles saber de nuestra joven y dinámica asociación, “Near Surface Focus Group” (NSFG) perteneciente al “AGU”-- y cuyos participantes nos dedicamos a la investigación de geosistemas someros, altamente dinámicos y complejos de la Tierra.. Es por ello que estamos convencidos que nuestro grupo abarca uno de los campos de la geociencia con mayor capacidad para contribuir al bienestar de la sociedad en un futuro próximo.

Quiero extender a todos la oportunidad de participar el próximo año en la “Reunión de las Américas” que tendrá lugar en Foç do Iguacu, Brasil, entre los días 8 y 13 de agosto del 2010-- Foç do Iguacu se encuentra muy cerca de las espectaculares Cataratas del Iguazú, consideradas Patrimonio Natural de la Humanidad. Les pido por favor tomen en cuenta esta gran ocasión que se nos presenta, en la que sin dudas podremos mejorar la colaboración científica entre los americanos, mostrando nuestras contribuciones científicas individuales o en grupo, en esta reunión de renombre internacional.

Pronto les comunicaremos las fechas en que podrán proponer sesiones especiales para la reunión así que a partir de ahora sería el momento empezaran a preparar cómo mejor poder participar con nosotros. Por supuesto los jóvenes estudiantes forman parte integral de nuestro grupo profesional y por ello también quedan incluidos dentro de esta invitación.

4) International Workshop on Induced Polarization in Near-Surface Geophysics

On behalf of the Induced Polarization working group of the German Geophysical Society (DGG), we would like to remind you of the International IP workshop taking place in Bonn, Germany between September 30th and October 1st. For more information about the location, abstract submission, fees, etc., please refer to our webpage at: <http://ipworkshop.geo.uni-bonn.de> For further questions, please contact us at: ipworkshop@geo.uni-bonn.de

Sincerely,
Andreas Kemna (spokesman of the DGG IP working group) Adrian Flores-Orozco
(Organizers)

5) Positions

5.1 Faculty, Applied and Environmental Geophysics, University of Lausanne, Switzerland

The Faculty of Earth and Environmental Sciences at the University of Lausanne has an opening for a tenured position at the lecturer level in the field of applied and environmental geophysics. The new faculty member at the Institute of Geophysics will be expected to: (i) teach a variety of geophysics courses to undergraduate- and graduate-level students in earth and environmental

sciences, (ii) develop an externally funded and internationally recognized research program, (iii) supervise undergraduate- and graduate-level students, and (iv) assume administrative duties at various levels within the University.

Applications covering any domain of applied and environmental geophysics that will reinforce and/or complement current research activities are welcome. We are particularly interested in candidates with an academic track record of internationally recognized and independent research in one or more of the following domains: petrophysics, computational geophysics, or biogeophysics. An adequate command of French for teaching and administrative purposes is expected at the latest two years after the beginning of the appointment. This is an exceptional opportunity for a highly motivated and dynamic scientist with a dedication to excellence in both research and teaching to actively participate in the development of a rapidly evolving institute and faculty. Our institute is very well equipped and scenically located on the shores of Lake Geneva, a region of outstanding natural beauty offering a vibrant cosmopolitan atmosphere and an exceptionally high quality of life.

To apply please send your CV, list of publications, reprints of the three to five most pertinent publications, and a summary of your research plans together with the names and addresses of three referees to Professor Lukas Baumgartner, Dean of the Faculty of Earth and Environmental Sciences, Amphipôle Building, University of Lausanne, CH-1015 Lausanne, Switzerland, doyen.gse@unil.ch. Deadline for the receipt of applications is September 15, 2009.

The position is available from January 1, 2010, or at some later date to agree upon. For further information please visit <http://www.unil.ch/gse> or contact Prof. Lukas Baumgartner (doyen.gse@unil.ch) or Prof. Klaus Holliger (klaus.holliger@unil.ch). The University of Lausanne wishes to promote the access of women to academic careers and hence strongly encourages applications from qualified female candidates.

5.2 Post-Doctoral, Hydrogeophysics, Dept. of Geophysics, Stanford University

We are currently in Year 3 of a 4-year project funded by, and conducted in collaboration with, Schlumberger Water Services. The focus of the project is the integration of geophysical data in the decision-making framework for water resource management in regions threatened by seawater intrusion. Specific topics of interest include the development of improved methods for 1) assigning support and uncertainty to various forms of hydrologic and geophysical data, 2) forward modeling of geophysical data, and 3) weighting and integration of geophysical data with other forms of data. We are working in collaboration with the Pajaro Valley Water Management Agency, using available data from this geographic area (near Watsonville on the California coast), but our approach is intended to yield results that are transferable to other locations. As part of this project, geophysical data will be acquired that can be incorporated into the groundwater model of the Pajaro Valley basin. The ideal candidate will have a Ph.D. in Earth Sciences or Engineering, with knowledge of applied geophysical methods and a strong background in computational methods. The position is now available, and is a two-year position, subject to continued funding. Please send a detailed c.v., and the names and email addresses of three people willing to provide letters of reference, to Rosemary Knight by email: rknight@stanford.edu. Applications will be accepted until the position is filled and announced on the following website: <http://gemcenter.stanford.edu/>

5.3 Two Post-Doctoral positions at Colorado School of Mines

5.3.1 Induced polarization (time and frequency domains, development of the theory, field/lab and inversion of IP datasets) for contaminant plume investigations and permeability tomography.

For further details see <http://www.epa.gov/oamrtpnc/q0900194/index.htm>

The potential candidates can contact André Revil at arevil@mines.edu and Dale Werkema at werkema.d@epa.gov. The work will be performed at the Colorado School of Mines under the supervision of André Revil (dept of Geophysics, <http://www.andre-revil.com>) and co-supervision of Burke Minsley (USGS, bminsley@usgs.gov) and Dale Werkema (EPA). The candidate is expected to have excellent skills in numerical modeling.

Starting date: As soon as possible.

5.3.2 A postdoc to strengthen the connection between TOUGHREACT (developed at Berkeley to model transport phenomena in porous media) and geoelectrical methods (time-lapse induced polarization, self-potential and resistivity). Development of forward modeling and stochastic inverse modeling. The work will be performed at the Colorado School of Mines under the supervision of André Revil (dept of Geophysics, <http://www.andre-revil.com>). The candidate is also expected to spend some time at Berkeley National Laboratory. The candidate is expected to have excellent skills in numerical modeling.

Starting date: As soon as possible.

To contribute material to the NS-letter send an e-mail to:
George Tsoflias tsoflias@ku.edu

DEADLINE: Material must be received 2 full business days prior to the first of each month.

GUIDELINES FOR SUBMISSIONS: All members are welcome to submit content of interest to the NS community. Please keep messages brief and provide contact information and (if available) a web address for additional information. AGU requests formatting of e-mail messages to be as simple as possible (no bold characters (use ALL CAPS instead), no color font, or other special formatting of text and paragraphs). E-mail attachments cannot be distributed.