

August 2011 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](#)

AGU NS Membership as of August 2011:

Primary affiliation: 740 members; Secondary: 2591 members

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1. Announcement: AGU Council and AGU-SEG collaboration (from Louise Pellerin)

The AGU Council will be meeting this month, and NS FG will be well represented by Vice-Chair George Tsofilias. We look forward to updates related to AGU governance from George in the next newsletter

AGU-SEG collaboration committee meets at regular intervals and is completing Memos of Understanding, and working on jointly-supported workshops and other avenues in which the strengths of AGU and SEG can be brought together. Two upcoming workshops are noted below

As this is summer in the northern hemisphere, many of us have been in the field. I hope you having been having fun and collecting good data.

Cheers,  
Louise Pellerin  
NS FG Chair

HOLD THE DATES:

SEG Hydrogeophysics Summer Research Workshop will be held at Boise State University, Boise ID, 8-11 July 2012. At this stage the organizing committee is discussing session topics. We intend to make this a **\*\*work\*\*shop**, so will

be designing a number of the sessions around "homework" that is done in advance using data sets acquired or contributed for this purpose. We welcome your involvement! If there is a session that you would like to organize, please contact one of us by 1 September 2011. We look forward to seeing you in Boise next summer! [Rosemary Knight](#), [Rob Jacob](#), [Jan van der Kruk](#), and [Lee Liberty](#).

Cryosphere Geophysics: Understanding a changing climate with subsurface imaging with proposed dates and location: 8-10 January 2013 in Boise, Idaho, USA. Workshop objectives are to bring researchers together to exchange concepts and ideas on the application of geophysics to problems in the changing Cryosphere including snow, sea ice, permafrost, and glaciers. Organizers: Steve Arcone, HP Marshall, Hajo Eicken, John Bradford

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## 2. Call for abstracts: AGU Fall Meeting 2011

Visit the [AGU Fall Meeting 2011 Web site](#) for information on deadlines, schedules, guidelines, registration information and more!

The AGU Fall Meeting is the largest worldwide conference in the geophysical sciences, attracting nearly 20,000 Earth and space scientists, educators, students, and policy makers. This meeting showcases current scientific theory focused on discoveries that will benefit humanity and ensure a sustainable future for our planet.

Abstract submission: Closes 4 August 2011 23:59ET/3:59+1 GMT

### 1.2. 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, but are not directly appropriate to any of the other sessions proposed for the focus group.

#### NS02: Cryosphere Geophysics

Conveners: John Bradford, Achim Heilig, and Seth Campbell

Description: The study of the earth's cold regions presents perhaps the most diverse set of geophysical problems of any earth system. We must understand the influence of water in all its phases, and a dynamic system whose geophysical properties can change dramatically on time scales from hours to over centuries. Geophysical methods provide fast, cost-effective, and non-invasive alternatives to conventional manual measurements for subsurface characterization. We invite papers that investigate developments in cold regions subsurface imaging. This may include geophysical hardware development or data acquisition in these harsh and irregular environments, advancements in data processing and analysis, or new developments in characterization of snow, ice, or permafrost properties

#### NS03: Exploiting GPR and Seismic Wavefield Properties for Characterization of the Shallow Subsurface

Conveners: Georgios Tsouflias, and John Bradford

Description: While significant methodological advances have been made in ground-penetrating radar (GPR) and high-resolution seismic subsurface imaging, further understanding is needed in relating wavefield responses to subsurface properties. Consideration of wave polarization and angle of incidence/transmission can lead to improved characterization of fractures in aquifers and reservoirs. Frequency dependent propagation analysis can

be a rich source of information, such as water saturation or clay content. We invite contributions that explore the propagation properties of electromagnetic and elastic waves for characterization of heterogeneous subsurface properties and for monitoring of active processes.

NS04: >From Pore-Scale to Basin-Scale: Geophysical Methods for Groundwater Evaluation and Management  
Conveners: Rosemary Knight, and John Lane

Description: The Development of Geophysical Methods for Groundwater Evaluation and Management In this session we focus on the development of geophysical methods using subsurface, surface, airborne, or satellite sensors to quantify subsurface properties and processes relevant for the effective, sustainable management of groundwater resources. Of specific interest is the development and demonstration of new ways of acquiring, analyzing, interpreting geophysical data. We welcome examples related to all aspects of groundwater management including, but not limited to, development of hydrostratigraphic models, assessment of aquifer properties, evaluation of groundwater quantity and quality, monitoring of natural/managed processes. All approaches are of interest including laboratory and field experiments, theoretical and numerical modeling.

NS05: Hydraulic Fracturing and Fluids in the Shallow Subsurface  
Conveners: James Conder, Wayne Pennington, and Juan Lorenzo

Description: Recent and rapid growth in the availability of passive seismic data sets from hundreds of commercial hydraulic fracturing treatments as well as experiments provides an opportunity to improve the current understanding of initiation and growth of fluid-driven fractures. Source mechanics and moment tensor inversion, as well as simpler spectral content, amplitudes and event duration of hydraulic fracture mechanisms may share parallels with other natural processes such as magmatic dike growth and glacial sliding. We welcome presentations that highlight the similarities in observations, methods and models of these different processes from both all manner of research institutions and industry.

NS06: Low-enthalpy Geothermal Resources: Characterization and Technique Development

Description: Low-enthalpy geothermal resources (LEG) are global, renewable resources that are widely distributed and easily accessible. Optimal development of these resources can enhance energy security by using sustainable and socially acceptable energy extraction processes with lower environmental impact. We are seeking contributions from theoretical and practical advances that quantify and characterise LEG resources at local, regional and national levels, identify suitable technologies for development of various LEG types, evaluate socio-economic factors related to LEG and other contributions that encourage optimum, structured and sustainable development of LEG resources

NS07: Novel Techniques Applied to Near-Surface Geophysical Problems

Conveners: Graham Kent, John Bradford, and Mark Vardy

Description: The Near-Surface (NS) is a difficult and dynamic environment for geophysical surveying; demonstrating sharp discontinuities, small-scale heterogeneity, and complex morphology. The last 5-10 years have seen significant changes in the technology and methods being applied. Multi-disciplinary surveys are the norm, while processing/interpretation workflows are also developing apace, furthering the wealth of information that can be gleaned from these data. In this session we seek to showcase case studies where new/novel techniques have been applied to the NS. We encourage contributions from authors who have applied techniques/workflows from industry and/or taken a multi-disciplinary approach to solving complex NS problems.

NS08: Seismic Characterization of Unconsolidated Sediments

Conveners: Nedra Bonal, Juan Lorenzo, and James Crane

Description: An understanding of the mechanical properties of unconsolidated materials obtained from seismic methods can improve predictions of soil dynamics and groundwater flow behavior. Unconsolidated material properties are sensitive to properties such as water content, matric suction, temperature, texture, biofilm presence, and multiphase pore fluid, among others. Many of these properties may change over a relatively short period of time. Any heterogeneity or anisotropy in such factors can be highly influential on observed seismic responses. We invite presentations which incorporate analytical approaches, including unsaturated soil constitutive models, and/or experimental results that exploit seismic methods

NS09: The Role of Mineral Water Interface in Understanding Geophysical Signals

Conveners: Yuxin Wu, and Andre Revil

Description: Mineral/water interfaces play a critical role in controlling the fate and transport of important chemical species. Properties of this interface, such as its complexation and charge structure, are important drivers of geophysical signals (e.g. IP, SP). Understanding the linkage between interfacial properties and geophysical signals is critical to the development of geophysical methods as monitor tools. Here, we invite studies on mineral water interfacial properties and their linkage to geophysical signals across laboratory and field scales. Particular interests include, but are not limited to, studies of the effects of mineralogy, biofilm, fluid chemistry on interfacial properties and corresponding geophysical signals

### 1.3. Hydrogeophysics sessions

Hydrogeophysics sessions for the [2011 AGU Fall Meeting](#)

Abstract deadline: 4 August 2011

[H87: Geophysics for the Critical Zone](#)

Conveners: Barry Allred, Ulrike Werban, Steffen Zacharias, Peter Dietrich

[H88: Hydrogeophysical Data Fusion for Estimation and Prediction in Hydrologic Systems](#)

Conveners: Stefan Finsterle, James Irving, Michael Cardiff

[H89: Hydrogeophysics: Monitoring and Modeling of Hydrological Processes from Lab to Field Scale](#)

Conveners: Andrew Hinnell, Vanessa Mitchell, Joerg Rings

[H90: Imaging of Ecological, Hydrological, and Biological Processes Over Multiple Scales](#)

Conveners: Terenton Franz, Dush Jayawickreme, Ty P.A. Ferré

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3. Call for abstracts: Fall AGU 2011: B34: Geophysical Signatures of Biological Processes (from [Estella Atekwana](#))

[B34: Geophysical Signatures of Biological Processes](#)

Description: Novel geophysical monitoring techniques are increasingly being explored for non-invasively imaging biological processes in situ. We welcome studies on the geophysical signatures resulting from both microbial and plant-related processes. Specific examples include, but are not limited to, geophysical signatures resulting from, (1) microbial breakdown of hydrocarbons (e.g. due to contaminant releases into the environment such as the BP Gulf Oil Spill), (2) biomineralization processes, (3) microbial production of gasses in the subsurface, and (4) and water

(and carbon) exchange via plants and trees.

For further information, visit the [AGU Fall Meeting Web site](#).

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4. Call for abstracts: Second International Workshop on Induced Polarization in Near-Surface Geophysics, Colorado School of Mines, CO, USA (André Revil)

Dear Colleagues,

please find some information regarding the Second International Workshop in Induced polarization organized this year at the Colorado School of Mines. Don't hesitate to share this information with your colleagues.

Thank you

André Revil

For registration and abstract submission, visit the [Colorado School of Mines Web site](#).

Dates: Monday, 31 October to Wednesday, 2 November 2011 (3 full days)

Location: The Green center, Golden CO at the Colorado School of Mines, CO, USA

Number of attendees: limited to 100 participants

Deadline for registration: 14 September 2011

Information:

Second International Workshop on Induced Polarization in Near-Surface Geophysics Colorado School of Mines, CO, USA.

Organizing committee: [André Revil](#); [Andreas Kemna](#), [Lee Slater](#); [Andrew Binley](#); [Ernst Niederleithinger](#); [Konstantin Titov](#); [Kenneth Hurst Williams](#)

Induced polarization (IP) or complex resistivity is a non-intrusive geophysical method used to image the subsurface. Although historically developed to detect ore bodies, the IP method has more recently emerged as an exciting technology in the emerging field of hydrogeophysics and biogeophysics. In particular, literature over the last decade has conclusively demonstrated the unique potential of the IP method as a geophysical imaging tool for characterization hydraulic properties and monitoring of biogeochemical transformations in the subsurface. These recent developments have been in part driven by considerable improvements in instrumentation, macroscopic modeling and tomography techniques and the understanding of the microscopic origin of IP at the pore scale levels. However, there is still a gap in our fundamental understanding of IP mechanisms and a unified theory is still missing. Consequently, the full potential of the IP method as a non-invasively subsurface imaging tool has not been exploited. One fundamental problem is that various polarization mechanisms exist and may overlap in the frequency range of laboratory and field measurements.

We propose that advancement in the IP technique requires that geophysicists gain a better understanding of the considerable amount of work that has been done in disciplines other than geophysics on electrochemical polarization mechanisms. Such work is not well integrated into the geophysical literature. Yet low-frequency induced polarization is commonly known under other names in other disciplines including "AC impedance spectroscopy" or "low-frequency dielectric spectroscopy" in electrochemistry, material sciences, biology, and colloidal chemistry. In order to bridge these different disciplines, we believe that an international workshop is needed with keynote speakers working in different and complementary domains including electrochemistry,

colloidal chemistry, and cell biology to favor cross-fertilization between disciplines.

This workshop will be the continuation of a previous workshop entitled [‘International Workshop on Induced Polarization in Near-Surface Geophysics’](#), held in Bonn, Germany, on 30 September/1 October 2009. The aim of that workshop was to present recent developments and applications of the method for near-surface hydrogeological and environmental investigations. The second workshop will specifically focus on improving our understanding of the mechanisms generating IP signals in the Earth.

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5. Reminder (UPDATED): SEG 2011 Annual Meeting in San Antonio, TX, 18-23 September (from James Irving)

SEG 2011 Annual Meeting in San Antonio, TX, 18-23 September

The SEG Annual Meeting is approaching rapidly and the technical program is in the process of being finalized and published. Approximately 50 near-surface abstracts were submitted this year, which has allowed us to build a great NS program consisting of three oral sessions ("Hydrogeophysics", "Surface Waves", and "Environmental and Geotechnical Applications"), and one poster session for general NS contributions. In addition, the NS program will be complemented by a post-convention workshop entitled "Geophysics Applied to Geohazards and Public Safety". Further information about the sessions and the post-convention workshop will be provided on the NSGS Web site.

The NSGS will be holding its annual reception during SEG on Tuesday, September 20 at the Iron Cactus Mexican Grill (200 River Walk, Suite 100, San Antonio, Texas) in the Agave Room starting at 7 pm. There is no charge for SEG-NS Section members. Non-members can join on the spot and students are particularly welcome. Student membership is free! In addition, all members are welcome to share their ideas at the NSGS business meeting to be held right before the reception at the convention center (location and time to be announced).

For questions or suggestions please do not hesitate to email James Irving, Klaus Holliger, or Jan van der Kruk.

We are looking forward seeing you in San Antonio!

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6. Announcement: AGU Exploration Station - invitation to participate at FM 2011

Exploration Station is coming! Save the date – Sunday, 4 December 2011 – 1:00-5:00 p.m.

We are getting ready for another great Exploration Station in San Francisco on 4 December as part of the annual American Geophysical Union Fall Meeting. This is a request to consider becoming a part of this illustrious event and to save the date.

What is Exploration Station?

Exploration Station is a program of activities organized by the various AGU sections and focus groups. Many AGU section and focus group members work for organizations with well-developed education and public outreach programs. Exploration Station is an opportunity for these organizations to bring their exhibits and hands-on activities to the meeting and interact with the public in San Francisco.

This event is four hours long, free, and open to the public. Participants make their way through an average of 15-20 exhibits offering a variety of easy, family friendly, hands-on activities and an opportunity to interact one-on-one with scientists, engineers, and education specialists. Exploration Station was established to take advantage of the large number of scientists and education specialists that gather in San Francisco to attend the AGU meetings. Past events have been very successful at engaging young people and their families; last year's event attracted over 200 attendees.

As an exhibitor, you would be expected to be at the event for the full four hours plus set-up and take-down time. You would also be expected to create a fun, dynamic, and interactive learning experience for between 100-500 members of the public of all ages. For more information, please see the attached FAQ document.

Please let us know by 6 September if you would be interested in participating by emailing [Bethany Adamec](#), Education and Public Outreach Coordinator or [Pranoti Asher](#), Education and Public Outreach Manager, and you will be among the first to receive updates for the event.

Thank you for your interest in Earth and space science education and we look forward to your participation in this annual tradition at the AGU meeting! Please feel free to forward this note to your colleagues who might be interested in participating in Exploration Station.

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7. Announcement: 5th International Conference on Environmental and Engineering Geophysics; China, June 15 -18, 2012

Dear Colleagues,

It is our great pleasure to announce that the "5th International Conference on Environmental and Engineering Geophysics" (ICEEG2012) will be held on the campus of The Central South University, Changsha, China, 15-18 June 2012. Please mark your calendar and submit your abstract. The ICEEG2012 will be unique for all attendees to share your current research results and experiences in near-surface geophysics. For further information, visit the [ICEEG 2012 Web site](#).

Welcome to Changsha!

Jianghai Xia  
Executive Chair/ICEEG2012

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8. Announcement: 14<sup>th</sup> International Conference on Ground Penetrating Radar (GPR2012); China, 4-8 June 2012

The 14<sup>th</sup> International Conference on Ground Penetrating Radar (GPR2012) will be held on 4-8 June 2012. Tongji University in Shanghai, China is the host institution (General Chair: Prof. [Xie Xiongyao](#)).

The goal of GPR2012 is to provide an international forum for scientists, engineers, and all kinds of GPR end users to discuss and exchange the advancement of GPR technology (advanced modeling, processing, inversion, and novel

GPR systems and antennas) and its applications in hydrogeophysics, geophysical exploration and mining, archaeology and geology, civil and geotechnical engineering, concrete, pavement and material characterization, etc.

For more information, please visit the [GPR 2012 Web site](#).

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## 9. Open positions:

### 9.1. Assistant Professor in Geophysics at the University of Copenhagen

A position as assistant professor is available at the Department of Geography and Geology, University of Copenhagen, starting 1 September 2011 or soon thereafter. The assistant professor will be closely associated with a newly established chalk research centre supported by Maersk Oil with the ultimate goal to improve reservoir models of North Sea chalk based on integrated sedimentological, geophysical, and geological investigations. The assistant professor will apply ground-penetrating radar (GPR) techniques (including time-lapse cross-hole and surface reflection methods) and borehole measurements (including logging and petrophysical data collection on core material) to investigate fine-scale layering and fluid/gas flow characteristics of the chalk, integrate the fine-scale geophysical investigations with geological data, and develop and apply methods for upscaling the fine-scale rock characteristics to reservoir-scale models. The upscaling part of the project will include seismic waveform modeling of the constructed models and comparison with commercial reflection seismic data from the North Sea. Two PhD projects focused on the fine-scale geophysical investigations and the upscaling part, respectively, will also be announced as part of the research project. The assistant professor is expected to take part in the supervision of these PhD projects. Furthermore, the successful candidate will take part in teaching in DGG courses with a focus on reservoir characterization and mapping, and the petroleum geology of the North Sea.

The successful candidate should hold a PhD degree in geophysics or similar and have worked as a postdoctoral researcher for 2 to 5 years. Strong skills in numerical modelling of seismic and/or GPR wavefields are considered essential. The candidate should also have the ability to integrate geophysical, geotechnical and geological data, possess analytical skills, and have a proven publication record with contributions to the geophysical literature.

The position is open from 1 September 2011 or as soon as possible thereafter. Information on the Department is linked at [www.science.ku.dk/institutter](http://www.science.ku.dk/institutter), and enquiries about the position can be made to Professor [Lars Stemmerik](#), Head of Department, tel. +45 35324168.

For further information visit the [University of Copenhagen's job listing](#).

### 9.2. Post Doctoral Position and PhD position in Biogeophysics: Geoelectrical Signatures of Microbial Biofilms

Advances in near-surface geophysics have established a link with geoelectrical responses and enzymatic activity and bacterial growth. However, a fundamental mechanistic understanding of the processes and sources resulting in the measured electrical response remains uncertain. This particularly includes the polarization enhancement observed during microbial activity. This project seeks to increase current knowledge by investigating the role of biofilms and its components in generating the geoelectrical responses of subsurface sediments.

This project will be directed by Prof. Estella Atekwana at Oklahoma State University, School of Geology. The objectives include: (i) evaluating the contribution of biofilm components to geoelectrical signatures using field relevant organisms, (ii) determining the contribution of nanoparticulate biogenic minerals in biofilms to geoelectrical signatures, (iii) determining if the geoelectrical signatures can be used to quantify the rates of biofilm formation and biogenic mineral accumulation in subsurface media, (iv) developing a fundamental understanding of potential underlying polarization mechanisms at low frequencies (<40 kHz) resulting from the presence of microbial cells and biofilms, and (v) evaluating the use of reactive transport models to predict the geophysical response associated with the development of biofilms in field conditions. Clogging of porous media by microorganisms using electrical geophysical techniques will also be investigated.

It is expected that these investigations will develop standardized geophysical methods as tools to accurately assess microbial metabolic activity at DOE contaminated sites.

The preferred candidate will have a PhD in Geophysics or relevant field (e.g., environmental engineering, biophysics) with experience related to biofilms, bioclogging, biogeophysics. We seek to hire a highly motivated, enthusiastic; individual who is capable of working and thinking independently. A PhD position on Biogeophysics is also available.

Candidates should submit a full CV, including the contact information of three referees, to: Prof. [Estella Atekwana](#), Oklahoma State University, School of Geology, 105 NRC, Stillwater, Oklahoma, 74078. Phone: (405) 744-6358.

Oklahoma State University is an equal opportunity/affirmative action employer. Minorities, women, veterans, and persons with disabilities are strongly encouraged to apply. We anticipate a start date in September 2011.

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To contribute material to the NS-letter send an e-mail to:

[Xavier Comas](#)

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.