American Geophysical Union

Near-Surface Geophysics Focus Group (NSFG)
Newsletter: May 2016

In Brief:

Recent announcements of interest to the near-surface community (conferences, academic positions, graduate student opportunities, etc.) can be found on the AGU Near-Surface Geophysics Focus Group website.

Early career scientists: Check out the NSFG early career website.

Follow NSFG on Facebook and Twitter @NS_AGU!

1. AGU Updates

1.1 Help NSFG Benefit from the AGU Section and Focus Group Incentive Program!

Please consider giving to AGU so that NSFG can take advantage of the 2016 Donor Incentive Program. This tax-deductible gift will not only assist AGU but will support our focus group's initiatives. If only 5% of our members (i.e., about 20 people) give $50 or more in 2016, AGU will provide NSFG with $1000. If 10% of our members give $50 or more, AGU will provide $3000! Given that we are a small focus group, these extra funds would make a real impact on our efforts in support of students and early career scientists. Any donations to AGU qualify, regardless of which program you are supporting! To learn more, please visit the incentive program website or contact AGU's Development Department at development@agu.org or 202-777-7434.

1.2 Student Spotlights and Research Highlights

Interested in being highlighted, or know a student who should be? Please email Sarah Morton for more information about the Student Spotlight. Take a look at this month's Student Spotlight on Andrea Creighton at the end of the newsletter.

We are also seeking research highlights that showcase use of near-surface geophysics in other AGU sections and focus groups. If you are interested in writing a short one-page highlight, please contact Burke Minsley.

2. Journal Information and Special Issue Call for Papers

2.1 *The Leading Edge* Special Section: Hydrogeophysics

Deadline for manuscript submission: 15 May 2016

The Leading Edge (TLE) has announced the call for papers for a special section on hydrogeophysics scheduled for publication in September 2016. The special section will showcase applications of hydrogeophysics to quantitatively assess and monitor subsurface properties and processes. Contributions utilizing borehole, cross-hole, surface, and airborne methods to support the development and calibration of groundwater and contaminant transport models, monitor ecosystems, and sustainably manage groundwater resources are encouraged.

The paper submission deadline is 15 May 2016. Papers should be submitted directly to the guest editors below. Submission guidelines for TLE are available online.

Guest editors: Rosemary Knight and Burke Minsley

Coordinating editor: John Lane

2.2 Special Monograph on Levees and Dams: Advances in Geophysical Monitoring and Characterization

This peer-reviewed volume will inform policy makers, engineers, and Earth scientists about the current and emerging role of geophysics in addressing environmental processes, assessments, and policy directions related to new and existing dams and levees.

Until recently, much of the focus of geophysicists has been confined to characterization and remediation without consideration of the complex relationship between natural processes (e.g., floods) and human activities associated with the design and ongoing dependence on these structures. It is important to enhance communications between geoscientists, engineers, and policy makers to improve the way in which these structures are managed.

Over time, unexpected changes in the physical properties of these man-made structures may or may not compromise their integrity, and such questions require creative (and preferably noninvasive) assessment approaches. Monitoring and remediation of existing structures can be challenging because, often, failures are at a smaller scale and recertification procedures are at a larger scale than envisaged during construction or planning. New, efficient, risk management approaches may benefit greatly from geophysical methods that can address these scaling issues.

We encourage innovative and substantiated geophysics-related ideas. Potential topics include, but are not limited to, placement of geophysical tools within the management policies of levees and dams; small- and mid-sized laboratory experimental approaches; field characterization studies using electromagnetic, seismic, potential field, and integrated methods; inverse modeling; regional overviews as conditioned by climatic zones; statistical analyses and tools for improved management processes such as age strengthening or weakening of structures; and monitoring of important processes such as piping and fluid flow.

We expect the monograph to include 10–20 book chapters, each about 8–20 printed pages in length, containing color and/or black-and-white figures and tables.

Timetable: Submission deadline: 1 October 2016; Reviews and final manuscript: 1 April 2017; Expected publication: October 2017.

For suggestions on manuscript preparation, please see the Springer submission guidelines. Upon submission of manuscript (email) please include the contact information for four potential reviewers.

Juan M. Lorenzo and William E. Doll, Editors

For all correspondence, please email gllore@lsu.edu, Subject: DAL

3. Tech-Transfer Courses and Training

3.1   Multichannel Analysis of Surface Waves (MASW) Workshop

Dates: 18−19 May 2016; 14−15 July 2016
Registration cost: free
Location: Kansas Geological Survey, Lawrence, Kans.
Website

SurfSeis 5 will be released shortly (we are expecting within a week or so). What's new? Passive data and single-record processing is now available with the high-resolution linear radon transform (HRLRT). Also available are varying topography, Scholte wave inversion, and more.

This free 2-day MASW workshop will provide an opportunity for geoprofessionals, geoscientists, and graduate students to gain knowledge about data acquisition, analysis, and interpretation of the seismic Rayleigh surface waves. The learning process will be facilitated by the use of SurfSeis software. The workshop is designed to address the current approaches for analyzing seismic data from both active and passive sources to obtain shear wave velocity (V_s) estimates for the near surface.

On day 1, a theoretical overview of the MASW method (active and passive) will be presented, participants will be familiarized with the SurfSeis software package, and field data acquisition from both active and passive sources is scheduled to take place (weather permitting).

Day 2 will continue with the theoretical MASW overview covering surface wave inversion, multimode interpretation and inversion, inversion sensitivity, use of a priori information, the quality of inversion results, and the latest advancements for dispersion curve imaging, such as the high-resolution linear radon transform, challenging dispersion curve patterns, and more. Seismic data acquired on day 1 will be analyzed. Participants are encouraged to bring samples of their own data for discussion, as time permits.

Attendees are expected to bring their own laptops.

4. Upcoming Conferences and Workshops

4.1   Meetings Overview

Meeting (click to go to website)	Location	Meeting Dates	Submission	Registration
Japan Geoscience Union Meeting 2016	Chiba, Japan	22–26 May 2016	*Closed*	Early registration ends: 10 May 2016
4th International Workshop on Induced Polarization	Aarhus, Denmark	6–8 June 2016	*Closed*	Registration ends: 20 May 2016
Asia Oceania Geosciences Society 13th Annual Meeting	Beijing, China	31 July to 5 August 2016	*Closed*	Early registration ends: 18 May 2016
ASEG 25th International Geophysical Conference and Exhibition	Adelaide, Australia	21–24 August 2016	*Closed*	Early registration ends: 6 May 2016
35th International Geological Congress (IGC)	Cape Town, South Africa	27 August to 4 September 2016	*Closed*	Early Registration ends: 31 May 2016
EAGE Near Surface Geoscience 2016	Barcelona, Spain	4–8 September 2016	*Closed*	Early registration ends: 15 July 2016
Geological Society of America Annual Meeting	Denver, Colorado	25–28 September 2016	12 July 2016	Early registration ends: 22 August 2016
Society of Exploration Geophysicists Annual Meeting	Dallas, Texas	16–21 October 2016	*Closed*	Registration opens May 2016

5. Position Announcements

5.1   Two Ph.D. Positions in Exploration Geophysics at Luleå University of Technology, Sweden

Geophysical vectoring of mineralized systems in northern Norrbotten

Ref: 1003-2016

Project description

Recent three-dimensional (3-D) inversion of magnetotelluric (MT) data from northern Scandinavia indicates a very pronounced NW–SE trending electrical conductivity anomaly in the Kiruna area, northern Sweden. The anomaly, hereafter referred as the Kiruna conductivity anomaly, is located in the lower crust. The character of the Kiruna anomaly is unusual when viewed in a global perspective but has interesting similarities to some other electrical conductivity models of tectonic boundaries with the Archaean and the Proterozoic. The cause of the Kiruna electromagnetic anomaly is not known, and the purpose of the proposed project is to place and understand this anomaly in a plate tectonic context and its implications for mineralizations in the area. The project aim is to investigate if this deep anomaly is genetically related to the known mineralization within the upper crust of the Kiruna area, i.e. the Luossavaara-Kiirunavaara (Kiruna), Svappavara, Mertainen, and Malmberget apatite iron ores; the Aitik porphyry copper ore; and the Nautanen iron oxide copper gold (IOCG) mineralizations, which all are adjacent to the electromagnetic anomaly. The project is expected to contribute to a better understanding of a possible link genetically between these mineralizations. These geophysical investigations will run parallel and in close collaboration with a Ph.D. study in geological 3-D and 4-D modeling of the subsurface. On the basis of the combined results, geological and geophysical 3-D and 4-D models will be constructed for visualizing the subsurface crustal architecture. The project involves interpretation of various kinds of geophysical data. MT data are used for the regional investigations, and magnetic, gravity, electromagnetic and gamma ray spectrometry data are used for the study of the upper crustal structures and mineralization.

Exploration for critical raw materials

Ref: 999-2016

Project description

Within the project ARN (alternative mineral raw materials in northern Sweden) three Ph.D. students will be employed, one in exploration geophysics, one in ore geology, and one in applied geochemistry. The Ph.D. students will work with the same ore deposits but from different perspectives. The ARN project aims at developing new technologies and innovations related to exploration of minerals that by the European Union are listed as critical raw materials, in particular graphite and platinum-gold, and to develop methodologies for simulation of environmental effects from mining of these raw materials. We hereby seek a Ph.D. student in exploration geophysics, with focus on improved and innovative exploration methods. The project will work closely together with the parallel Ph.D. project in ore geology. The intention is to integrate ore geological interpretations with geophysical measurements from different ore deposits in a way that will benefit both Ph.D. projects.

6. Student Spotlight: Andrea Creighton, University of Wyoming

As a motivated undergraduate at Clemson University, Andrea Creighton knew from the beginning she wanted to pursue glaciology, and her early career aspirations did not go unnoticed. She was quickly offered the opportunity to take part on a Department of Defense–sponsored project that utilized ground penetrating radar (GPR) for detecting buried unexploded ordnances. This internship introduced Andrea to the near-surface geophysical community, and using the skills she acquired in electrical methods, she created her own project that focused on understanding topographic effects on infiltration in bioretention systems.

Through this work, Andrea became encouraged to learn more about near-surface methods and was soon accepted into the Summer of Applied Geophysical Experience program (SAGE). This experience transformed her preexisting interests into a passion for geophysics and inspired her to become a SAGE teaching assistant the following year; 2016 will mark her fourth year in this educational program, where her close involvement with younger students has contributed greatly to her future career as a cryosphere geophysicist in academia and research.

Andrea is now a second-year doctoral student in hydrogeophysics at the University of Wyoming. Her dissertation research is focused on using surface nuclear magnetic resonance (NMR) for investigating permafrost environments. More specifically, she is interested in sediment structure and soil properties related to thermokarst lake evolution. A thermokarst environment exhibits surficial depressions or other karst-like subsidence features due to thawing of massive ground ice in a permafrost terrain. Her 2015 AGU Fall Meeting poster, C11C-0787, highlighted a blocky inversion scheme using data from outside Fairbanks, Alaska, that showed talik, or year-round unfrozen ground, depth resolution decreasing as the thickness of the water column increases. With predetermined constraints obtained from forward modeling, she has been able to accurately determine water content and resolve talik depth for shallow thermokarst lakes. The next step in her work is to use NMR and other near-surface geophysical techniques such as GPR to understand the geomorphic processes involved in the thermokarst lake environment.

In the interest of helping others combined with her work in hydrologically changing environments, Andrea has recently started volunteering with the Albany County Sheriff's Search and Rescue in Laramie, Wyo. She is currently training to become certified in high-angle rescue, which uses technical rope techniques to save those who have been injured on 60° or greater inclines, as well as swiftwater rescue, which focuses on moving-water rescue missions.

If you would like to learn more about her work in cryosphere geophysics, the SAGE program, or Search and Rescue in Wyoming, please contact Andrea.

To contribute material to the NSFG newsletter, send an email to [Burke Minsley.](#)

Deadline: Material must be received five full business days before the first of the month.

Guidelines for submissions: All members are welcome to submit content of interest to the near-surface community. Please keep messages brief and provide contact information and (if available) a Web address for additional information.

Get your message out to NSFG members faster.

You no longer need to wait until the end of the month to share an important or time-sensitive contribution to the newsletter. Appropriate contributions to the newsletter will also be shared ASAP via Twitter. Please note that only NSFG members who follow @NS_AGU will receive Twitter announcements, so make sure that you sign up!