



American Geophysical Union
Near-Surface Geophysics Focus Group (NSFG)
Newsletter: November 2015

In brief:

1. AGU Updates

- 1.1 NSFG Fall Meeting Business Luncheon
- 1.2 Free Student Tickets for the NSFG Business Luncheon
- 1.3 Student Breakfast at AGU Fall Meeting
- 1.4 SEG Near-Surface Honorary Lecture at AGU Fall Meeting
- 1.5 Near-Surface Sessions at AGU Fall Meeting

2. Journal Information and Special Issue Call for Papers

- 2.1 *Journal of Environmental & Engineering Geophysics* Special Issue: Airborne Geophysics
- 2.2 *The Leading Edge* Special Section: Hydrogeophysics

3. Tech-Transfer Courses and Training

- 3.1 Multichannel Analysis of Surface Waves (MASW) Workshop

4. Upcoming Conferences and Workshops

- 4.1 Meetings Overview

5. Position Announcements

- 5.1 Post Doc Research Associate—Petrophysicist/Geophysicist at Pacific Northwest National Laboratory
- 5.2 John W. Miles Postdoctoral Fellowship in Theoretical and Computational Geophysics
- 5.3 Assistant Professor (Tenure-Track) Position in Geophysics at Louisiana State University
- 5.4 Faculty Position in Geophysics at Stanford University

6. Research Highlight: Geophysics in the Critical Zone, by W. Steven Holbrook

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 NSFG Fall Meeting Business Luncheon

The Near-Surface Geophysics focus group luncheon will take place on Tuesday, 15 December, from 12:30 P.M. to 1:30 P.M. at the Marriott. There are still tickets available, which can be purchased online during [registration](#).

We look forward to seeing everyone in San Francisco!

1.2 Free Student Tickets for the NSFG Business Luncheon

Students—Are you attending AGU Fall Meeting this December and looking for FREE FOOD options? The Near-Surface Geophysics focus group is offering FREE student tickets to the business luncheon on Tuesday, 15 December, at 12:30 P.M.

Interested students should contact Sarah Morton (smorton@kgs.ku.edu) as soon as possible and no later than 29 November. You MUST reply to this email by 29 November 2015 in order to reserve your free ticket. Please encourage any other students you know who are attending the Fall Meeting to contact Sarah about the free lunch; tickets are limited!

In the past, we were able to distribute remaining tickets at the meeting, but that is not the case this year; rather, AGU is requiring that we submit a list of attendees before 30 November. So please encourage your students to contact us soon!

1.3 Student Breakfast at AGU Fall Meeting

Wake up bright and early to enjoy breakfast with AGU section and focus group leaders. All registered students are welcome to attend, but student seating is limited to 400 on a first-come, first-served basis. The student breakfast will be held on 15 December, from 7:00 A.M. to 8:00 A.M. at the San Francisco Marriott Marquis, Salon 7.

<http://fallmeeting.agu.org/2015/event/student-breakfast/>

1.4 SEG Near-Surface Honorary Lecture at AGU Fall Meeting

The 2015 SEG NS Honorary Lecturer, Dr. Hansruedi Maurer, will give an invited presentation based on his SEG lecture "The curse of dimensionality in exploring the subsurface" on Tuesday, 15 December, at 10:20 A.M. in session NS22A, Moscone West 3024. More information about the 2015 SEG NS HL is available at <http://www.seg.org/education/lectures-courses/honorary-lecturers/2015/maurer>.

1.5 Near-Surface Sessions at AGU Fall Meeting

The scientific program for Fall Meeting has been posted online. You can see a listing of near-surface geophysics and other related sessions [here](#), or search through the entire program.

2. Journal Information and Special Issue Call for Papers

2.1 *Journal of Environmental & Engineering Geophysics* Special Issue: Airborne Geophysics

Deadline for manuscript submission: 28 February 2016

Journal of Environmental & Engineering Geophysics (JEEG) announces a call for papers for a special issue on airborne geophysics. This issue is scheduled for publication in March 2017. The special issue co-editors are Antonio Menghini, Aarhus Geophysics, Denmark, and Les Beard, Zonge International, Arizona. Sponsorship of this issue is still open.

Suggested themes are:

- New developments in equipment
- Novel airborne geophysical systems, including unmanned systems
- Data acquisition, modeling, and inversion
- Case histories, including:
 - Hydrogeology, including soil salinity
 - Engineering
 - Ordnance detection
 - Environment
 - Mining
 - Exploration

International contributions are encouraged. The special issue will accommodate six to eight papers, but all accepted papers will be considered for publication in other JEEG issues.

Papers may be submitted through the JEEG submission site, <http://jeeg.allentrack.net>. Indicate in the cover letter that the paper is for consideration in the Airborne Geophysics special issue. The deadline for submissions is 28 February 2016.

Questions may be directed to:

Special Issue Co-Editors: Antonio Menghini, am@aarhusgeo.com, and Les Beard, LPBeard@comcast.net

JEEG Editor: Janet Simms, Janet.E.Simms@usace.army.mil

2.2 *The Leading Edge* Special Section: Hydrogeophysics

Deadline for manuscript submission: 15 May 2016

The Leading Edge (TLE) announces 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. Submissions guidelines for TLE are located at:

<http://www.seg.org/resources/publications/tle/submission-guidelines>

Guest Editors: Rosemary Knight (rknight@stanford.edu), Burke Minsley (bminsley@usgs.gov)

Coordinating Editor: John Lane (jwlane@usgs.gov)

3. Tech-Transfer Courses and Training

3.1 Multichannel Analysis of Surface Waves (MASW) Workshop

Dates: 3–4 December 2015

Registration cost: free

Location: [Kansas Geological Survey](#), Lawrence, Kansas

[Website](#)

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
3rd International Conference on Engineering Geophysics	Al Ain, United Arab Emirates	15–18 November 2015	<i>Closed</i>	<i>Open</i>
3rd International Workshop on Geoelectrical Monitoring (GELMON 2015)	Vienna, Austria	24–26 November 2015	<i>Closed</i>	<i>Open</i>
AGU Fall Meeting	San Francisco, California	14–18 December 2015	<i>Closed</i>	Early registration ends: 12 November 2015
2nd SEG/DGS Workshop: Near-Surface Modeling and Imaging	Manama, Bahrain	6–7 March 2016	<i>Closed</i>	By email for accepted abstracts
SAGEEP 2016	Denver, Colorado	20–24 March 2016	<i>19 November 2015</i>	<i>TBA</i>
EGU General Assembly	Vienna, Austria	17–22 April 2016	<i>13 January 2016</i>	Early registration ends: 17 March 2016

5. Position Announcements

5.1 Post Doc Research Associate—Petrophysicist/Geophysicist at Pacific Northwest National Laboratory

Job Description

The candidate for this position will support interdisciplinary research in the field of electrical and biogeochemical geophysics. A key responsibility will be the conducting of laboratory-scale research in close collaboration with a diverse interdisciplinary team to better understand the electrical geophysical signatures of contaminant behavior in complex subsurface environments.

Minimum Qualifications

Candidates must have received a Ph.D. within the past 5 years from an accredited college or university.

Preferred Qualifications

The incumbent should possess expertise in the theoretical and experimental determination of the interrelationship between geochemical interactions and low-frequency electrical properties of the subsurface, particularly concerning the behavior of those properties in complex contaminated subsurface environments. Applicants with additional expertise on the geochemical impacts of microbial activity in contaminated environments are favored. The candidate should possess good oral and written

communication skills and strong interpersonal skills. The incumbent will be expected to contribute to ideas and methods expanding on existing R&D and to communicate research results through publications, posters, and presentations. The incumbent must also demonstrate initiative, creativity and innovative thinking, and high tolerance for the ambiguity, dynamics, and diversity that are work characteristics of a national laboratory research environment.

Candidates must have received a Ph.D. degree in geophysics or a related field within the past 5 years from an accredited college or university by the time of employment.

Equal Employment Opportunity

Pacific Northwest National Laboratory (PNNL) is an Affirmative Action/Equal Opportunity Employer and supports diversity in the workplace. All employment decisions are made without regard to race, color, religion, sex, national origin, age, disability, veteran status, marital or family status, sexual orientation, gender identity, or genetic information. All staff at PNNL must be able to demonstrate the legal right to work in the United States.

Directorate: Energy & Environment

Job Category: Post-Graduates and Post-Docs

Group: Hydrology

Opening Date: 19 October 2015

Closing Date: 18 November 2015

<http://pnnl.jobs/richland-wa/post-doc-research-associate-petrophysicistgeophysicist/F1734177FC274BD3B2697DE999CA03AD/job/>

5.2 John W. Miles Postdoctoral Fellowship in Theoretical and Computational Geophysics

The Institute of Geophysics and Planetary Physics (IGPP) at Scripps Institution of Oceanography has an opening for the John W. Miles Postdoctoral Fellowship in Theoretical and Computational Geophysics in 2016. Funding from the Green Foundation for Earth Sciences is available to fully support a postdoctoral position in the broad areas of computational and theoretical geophysics. Applicants are encouraged to contact potential mentors at IGPP prior to the application deadline. The position is available for 1 year for applicants less than 5 years from a Ph.D. degree, and is renewable for a second year subject to satisfactory performance and availability of funds. Salary starts at \$60,000/year plus benefits and depends on experience.

Applications including a statement of research interests (1–2 pages), dissertation abstract (1 page), curriculum vitae with publications, and contact information for two recommendation letter writers should be submitted online at <http://igpp.ucsd.edu/greenfoundation/application>.

Review of applications will begin on 12 November 2015. Please address questions to Donna Blackman, Green Foundation Secretary, dblackman@ucsd.edu.

University of California, San Diego, is an Equal Employment Opportunity (EEO) employer and welcomes all qualified applicants. Applicants will receive fair and impartial consideration without regard to race, sex, color, religion, national origin, age, disability, veteran status, genetic data, or other legally protected status.

5.3 Assistant Professor (Tenure-Track) Position in Geophysics at Louisiana State University

The Department of Geology and Geophysics at Louisiana State University (LSU) seeks an outstanding individual with expertise in the broad area of geophysics. The specific geophysical research area is open to all subdisciplines of geophysics. However, the individual should be able to work on problems that either build on existing strengths in the department or advance science in fields that complement these strengths.

This tenure-track position at the Assistant Professor level is intended to complement our existing research strengths, including Coastal Resilience and Near-Surface Processes, Evolution of Sedimentary Basins, Earth Materials and Processes, Planetary Science, Tectonometamorphism, Climate and Tectonics, and Polar Studies. Research in this subdiscipline may also build strength in the LSU campus-wide research focus areas of "Coastal Sustainability and Environment" (CS&E), "Conventional and Renewable Energy" (C&RE), "Core Computing/High Performance Computing" (CC/HPC), and "Materials Science and Engineering" (MS&E). Nominations or inquiries should be directed to Geophysics Search Committee, at 225-578-3353 or geology@lsu.edu.

LSU is designated a Carnegie Research I University and is one of a handful of distinguished universities to enjoy Land, Sea, and Space Grant status. The Department of Geology and Geophysics currently consists of 17 tenure-track faculty members having a wide range of geoscience expertise covering field, experimental, analytical, and theoretical components. We offer degrees in geology at the B.S., M.S., and Ph.D. levels. The department has a strong record of success in research and graduate training, synergistic interactions with other academic units at LSU, federal and industry-funded research and teaching programs, and a large and active alumni base. (See <http://geology.lsu.edu> for more information.) Opportunities for a broad range of research interactions are available within the department and throughout the university. The university actively promotes interdisciplinary research clusters, including coastal sustainability and environment, conventional and renewable energy, core computing/high performance computing, and materials science and engineering. (See <http://research.lsu.edu> for more information.)

Required Qualifications: Ph.D. in geology, geophysics, or other relevant disciplines. The successful candidate will be in the process of developing an internationally recognized scientific reputation, and will be expected to maintain a high-level, externally funded research program, mentor and support graduate students, publish in highly ranked journals, and provide leadership both on campus and beyond. A.B.D. candidates will be considered as long as the degree is conferred by the effective date of the appointment.

Special Requirements: Willingness and ability to travel internationally or domestically.

Applications are to be submitted online. The application package should contain an application letter, a CV, a teaching statement, a research statement, and the names and contact information of at least three persons who can provide letters of reference.

Applicants for this position should articulate in their application letter how they will help LSU attain its goals as stated in Flagship 2020:

Discovery: Expand discovery through transformative research and creative activities addressing contemporary and enduring issues that shape the way we live in the world

Learning: Enhance a faculty-led and student-centered learning environment that develops engaged citizens and enlightened leaders

Diversity: Strengthen the intellectual environment by broadening the cultural diversity of the LSU community

Engagement: Promote engagement of faculty, staff and students in the transformation of communities

Offer of employment is contingent upon verification of an individual's eligibility for employment in the United States. All offers of employment, oral and written, are contingent on the university's verification of credentials and other information required by federal law, state law, and LSU policies/procedures, and will include the completion of a criminal history check. The review process will begin 8 January 2016. Apply online and view a more detailed ad at <https://lsusystemcareers.lsu.edu>, Position #030923.

LSU IS COMMITTED TO DIVERSITY AND IS AN EQUAL OPPORTUNITY/EQUAL ACCESS EMPLOYER.

Quick link at ad URL: <https://lsusystemcareers.lsu.edu/applicants/Central?quickFind=59923>

5.4 Faculty Position in Geophysics at Stanford University

We invite applications for a tenure-track faculty position in the [Department of Geophysics](#) in any broadly defined field of observational, experimental, computational, or theoretical geophysics. Current departmental interests include, but are not limited to, energy, water, geodynamics, and natural hazards, as well as new and emerging areas. The appointment will likely be at the junior level (assistant or untenured associate professor). The successful candidate will have demonstrated skills in one or more of the following: quantitative observations and data analysis, data processing, computational modeling, or geophysical imaging, at any scale. Priority will be given to the overall originality and promise of the candidate's work over any specific area of specialization.

The successful candidate will be expected to develop a world-class independent program of research and have a strong commitment to both graduate and undergraduate teaching. A doctorate is required at the time of appointment.

How to Apply

Applications should include a cover letter, curriculum vitae, statement of research and teaching interests, three recent publications, and the names and email addresses of three individuals from whom the search committee can request letters of reference. Please [apply online](#). Review of applications will commence 1 December 2015. The position will remain open until filled. Questions related to your submission may be directed to csaplar@stanford.edu.

Contact

Csilla M. Csaplár
(650) 498-6877
csaplar@stanford.edu

Stanford University has a strong institutional commitment to the principle of diversity. In that spirit, we particularly encourage applications from women, members of ethnic minorities, and individuals with disabilities.

6. Research Highlight: Geophysics in the Critical Zone, by W. Steven Holbrook

The Critical Zone (CZ) is Earth's breathing skin—the thin layer from treetop to bedrock that dictates the transformation of rock into soil and holds life-supporting water and nutrients. The U.S. National Science Foundation (NSF) has established 10 Critical Zone Observatories (CZO), focused sites where a diverse array of Earth scientists collaborate to understand biogeochemical cycling, geological processes, and hydrology in Earth's near-surface environment. These sites often host substantial installations of environmental and soil monitoring equipment, such as eddy flux towers, sap flux measurements, soil moisture and temperature probes, and geochemical samplers. However, with a few exceptions, the use of geophysics in these sites has been minimal.

Near-surface geophysical methods have a key role to play in elucidating CZ processes, especially those that operate in the deep CZ (tens of meters depth). At those depths, direct observation is possible only with drilling, which is expensive and invasive. Geophysical measurements, however, are capable of characterizing physical properties over the entire depth range of the CZ, and over spatial scales that can cover entire watersheds or landscapes. This enables geophysical measurements, especially when combined with drilling and sampling, to address fundamental questions such as: How thick is the CZ? How does CZ thickness vary across landscapes, and what controls that variation? What processes are responsible for initiating bedrock weathering at depth? How do CZ processes create and maintain subsurface porosity, which provides water storage potential for ecosystem use?

Over the past 2 years, geophysicists from the Wyoming Center for Environmental Hydrology and Geophysics (WyCEHG) have been exploring these questions at various sites across the country, including 6 of the 10 CZOs (see map). Funding for this work has come primarily from a Research Infrastructure Improvement grant from the NSF Experimental Program to Stimulate Competitive Research (EPSCoR). WyCEHG's approach is to acquire multimethod, multiscale geophysical data to characterize CZ properties from the borehole scale to the landscape scale. Typical data acquired include seismic refraction, electrical resistivity, magnetic, electromagnetic interference, and ground penetrating radar (GPR) data. Where appropriate, other methods, such as surface NMR, borehole logging, and time-domain electromagnetics (TEM), are also employed.

Early results from these efforts have just been published in a paper that appeared in *Science* on 30 October 2015 [St. Clair et al., 2015]. WyCEHG researchers collaborated with colleagues from Massachusetts Institute of Technology, University of California, Los Angeles, Duke University, Johns Hopkins University, Colorado School of Mines, and the University of Hawaii to explore the “shape” of the CZ beneath topography at three sites cored by crystalline bedrock. Two end-member shapes were revealed, depending on the regional state of stress in the crust. Where regional compressive stresses are low (e.g., Boulder Creek CZO), regolith forms a layer of relatively constant thickness beneath topography. Where regional compressive stresses are high, in contrast (e.g., Calhoun CZO), regolith takes on a mirror-image relation to topography, so that the CZ is thick beneath ridges but thin beneath valleys. In both cases, the patterns were also predicted by 3-D models of the state of stress in the crust. This suggests that stress mediates the opening of fractures at the base of the CZ, thus providing pathways for meteoric water to access fresh bedrock and begin the cascade of biogeochemical processes that together define the CZ.

These results provide a new conceptual model for understanding an important control on CZ structure: The state of stress in Earth's crust may set an important boundary condition on the initiation of weathering processes at depth. However, this work has only “scratched the surface” of CZ processes, and much remains to be done. In particular, major questions remain about the relationships of these regolith patterns to geochemical weathering, watershed-scale groundwater pathways, and the long-term evolution of landscapes.

Link to news articles on the *Science* paper:

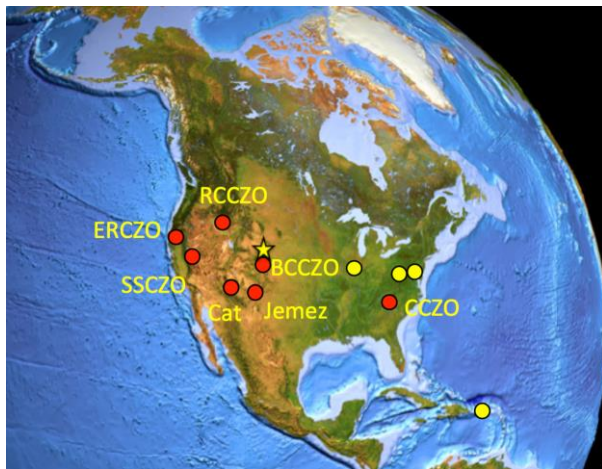
<http://news.mit.edu/2015/bedrock-weathering-based-on-topography-1029>

<http://www.uwyo.edu/uw/news/2015/10/uw-researchers-advance-understanding-of-mountain-watersheds.html>

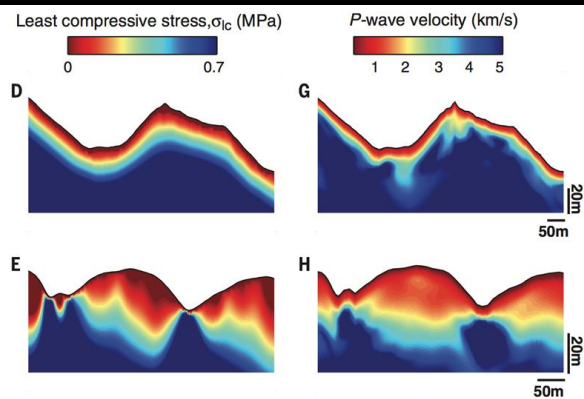
<http://newsroom.ucla.edu/releases/technique-for-analyzing-bedrock-could-help-builders-planners-identify-safe-building-zones>

Reference

St. Clair, J., S. Moon, W. S. Holbrook, J. T. Perron, C. S. Riebe, S. Martel, B. Carr, C. Harman, K. Singha, and D. Richter (2015), Geophysical imaging reveals topographic stress control of bedrock weathering, *Science*, 350(6260), 534–538.



Map showing locations of national CZO sites (circles). Red circles are CZOs where WyCEHG (star) has collected geophysical data.



Results of geophysical imaging (right) and stress modeling (left) from the Boulder Creek CZO (top) and Calhoun CZO (bottom). Weak compressive stress at Boulder Creek creates surface-parallel regolith, while strong compressive stress at Calhoun creates a CZ that mirrors topography [St. Clair *et al.*, 2015].



The University of Wyoming summer geophysics field team in eastern Oregon.



University of Wyoming grad students Brady Flinchum and Jordan Leone collect GPR data on fractured bedrock at the Southern Sierra CZO, California.

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!