

MEETINGS

Building Critical Zone Research Cyberinfrastructure

Critical Zone Exploration Network Data and Information Systems Workshop; State College, Pennsylvania, 17–18 September 2007

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Biological, physical, and chemical processes transform bedrock and sediments into soil at the Earth's surface. All terrestrial life on Earth is supported in the aptly named "critical zone" (CZ), where air, water, rock materials, and biota interact. The CZ is bounded at the top by the vegetative canopy and at the bottom by the lower limits of groundwater. Processes within this zone regulate the transformation of minerals, solubilize nutrients for biota, buffer toxins, create water pathways, and ultimately sculpt the landscape on which we live. Forty scientists from many disciplines attended a workshop recently at Pennsylvania State University to discuss needs for data and information systems to investigate the CZ.

This workshop grew from an international initiative for scientists interested in the CZ (Critical Zone Exploration Network, or CZEN). The U.S. National Science Foundation (NSF) has recognized the importance of CZ research with support for eight

seed sites within CZEN (www.czen.org) and three proposed critical zone observatories (CZO).

Workshop attendees included representatives of the CZOs recommended for NSF funding, CZEN seed sites, the CZEN steering committee, NSF, cyberinfrastructure specialists, and CZEN students funded by NSF to work abroad. Workshop attendees primarily addressed the question, What measurements should be made at all CZ sites to allow cross-site comparison and better understanding of the CZ? In particular, the group considered measurements to address questions identified in earlier CZEN workshops:

1. How do processes in the critical zone control fluxes of carbon, particulates, and trace gases between land and atmosphere?
2. How do biogeochemical processes at critical zone interfaces govern long-term sustainability of soil and water resources?
3. How do processes in the critical zone that support and nourish ecosystems change over geologic and human time-scales?

4. How do weathering processes affect the establishment of the critical zone, and how is this weathering engine perturbed by global environmental change?

Working groups each considered data needs for one of the science questions assuming a hypothetical site network receiving generous funding. The groups converged on a list of ~50 measurements spanning from chemical to meteorological to hydrological to biological (see list at http://www.agu.org/eos_elec or http://www.czen.org/17Sep07_results). Conducting all measurements at all sites is beyond the capabilities of the NSF CZO and the CZEN seed sites. It remains for the community to prioritize and focus these measurements. Significantly, however, the measurement "wish lists" from the working groups that addressed different science questions showed substantial overlap.

The workshop was promoted by CZEN, a growing network of people, sites, tools, and ideas investigating dynamics of the critical zone. CZEN is developing an ontology for a consistent metadata and cyberinfrastructure system. Further information concerning CZEN and this workshop can be found at www.czen.org.

The full text of this meeting report can be found in the electronic supplement to this *Eos* issue (http://www.agu.org/eos_elec/).

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Attracting, Retaining, and Engaging Early Career Scientists

Young Scientists Event, IUGG XXIV General Assembly; Perugia, Italy, 10 July 2007

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This young scientists event was organized to engage younger scientists with the International Union of Geodesy and Geophysics (IUGG) and to provide a specific forum to express their views at the General Assembly. It comprised a panel discussion chaired by Kate Heal and with three young geosciences panelists (Masaki Hayashi, University of Calgary, Canada; Kalachand Sain, National Geophysical Research Institute, Hyderabad, India; and Simona Stefanescu, National Meteorological Administration, Bucharest). The group, which had identified several topics relevant to young geoscientists, presented their views in open discussion session. Thirty IUGG conference attendees were present.

The first topic discussed was a concern that geoscience research is not attracting and retaining the most talented young people. The panelists and audience identified several causes of this problem, including

limited exposure to geosciences in primary and secondary education, lack of suitable role models, low awareness of the societal relevance of geosciences, and higher salaries in industry. While individual geoscientists should take every opportunity to raise awareness of the value and interest of geosciences, it was suggested that existing conferences should include sessions to support educators and the dissemination of geoscience teaching tools.

With the increasing interdisciplinary nature of much geoscience research, the second topic addressed was how to best prepare young scientists for this. Strong arguments were made for first becoming an expert in one area but developing flexibility and awareness for interdisciplinary group work as auxiliary skills. A good grounding in mathematics was considered important to assist communication between different scientific disciplines, but it is probably also important that mathematics be taught

within an applied context so that its relevance is clear.

The benefits of studying abroad were also noted. Symposia focusing on big topics, such as climate change, that can be addressed only by multiple disciplines could also foster interdisciplinary research.

The final discussion topic was proposed by IUGG president Uri Shamir and addressed what IUGG and young scientists can do for each other. Initially this appeared to be a call to involve younger researchers to ensure the ongoing operation of IUGG, but passionate comments from Shamir made it clear that the issue is far broader. Many of the senior scientists present clearly cared very strongly about fostering the careers of younger scientists for the good of the individual and the geoscience community, although this is perhaps not realized by younger geoscientists. An important first step for IUGG (and other geo-organizations) to increase interaction with young scientists is more engagement from younger researchers themselves. However, judging from the low turnout of younger scientists at this meeting (only 20% of the audience), this is a challenge in itself.

The event concluded by identifying actions to increase the engagement of younger

researchers within IUGG. Relabeling “young” scientists as “early career” scientists and encouraging them to be conveners with more experienced colleagues might increase interaction. Particular attention should be paid to engaging with early career researchers from less economically developed coun-

tries, for example, by providing access to travel grants and campaigning for free access to information and Internet resources.

Finally, activities that are perceived as directly useful to early career researchers, such as professional career development and mentoring from senior scientists, could

be included at existing scientific conferences.

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M E E T I N G A N N O U N C E M E N T S

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■ 7–9 January 2008 **International Workshop on Snow, Ice, Glacier and Avalanches**, Mumbai, India. Sponsors: Indian Institute of Technology (IIT) Bombay; UNESCO. (G. Venkatraman, Principal Research Scientist, CSRE, IIT Bombay, Powai, Mumbai, India 400076; Tel.: +91-22-2576-7686; Fax: +91-22-2572-3480; E-mail: gv@iitb.ac.in; Web site: <http://www.csre.iitb.ac.in/csreworkshop/index.html>)

Workshop objectives include studying snowpack characteristics (such as wetness, density, grain size, and snow water equivalent); identifying first-year, second-year, and multiyear ice; and discussing polar cryosphere characteristics and their relation to climate change. Topics include snow cover mapping, polar cryosphere, and avalanche warning and prevention.

■ 23–29 January 2008 **Polar Gateways 2008**, Barrow, Alaska, USA. Sponsors: National Aeronautics and Space Administration (NASA); Barrow Arctic Science Consortium (BASC); U.S. National Science Foundation. (J. Cooper, NASA Goddard Space Flight Center, Greenbelt, Md., USA; Tel.: +1-301-286-1193; E-mail: John.F.Cooper@nasa.gov; Web site: <http://www.space.fmi.fi/ipyid63/PolarGateways2008.pdf>)

The Barrow program consists of “on-the-ice” orientation to local Arctic land and sea environments, invited presentations, group discussions on key science challenges, science system (e.g., ice core sampling, robotics) testing, native cultural orientation, and science outreach in association with the Barrow township and North Slope Borough communities. Globally linked aspects of the conference also are planned. The workshop will explore questions including, What is understood from Earth, heliophysics, and planetary science perspectives about the dramatic changes occurring in the Earth-Sun-heliopause system as driven by the changing polar and connected heliophysical space environments? What critical insights could be gained from space exploration that might increase our understanding of optimal future directions for continuing survival and prosperity on Earth? About 50 scientists are expected to attend.

■ 28–31 January 2008 **Fire in the Southwest: Integrating Fire Into Management of Changing Ecosystems**, Tucson, Arizona, USA. Sponsors: Association for Fire Ecology; Geological Society of America; U.S. National Park Service; others. (D. Nelson, P.O. Box 9140, Boulder, CO 80301, USA; Tel.: +1-303-357-1014; Fax: +1-303-357-1074; E-mail: dnelson@geosociety.org; Web site: <http://www.humboldt.edu/swfire/index.html>)

This conference will provide a forum on the ecology and management of fire-adapted and fire-affected ecosystems in the southwestern United States and northern Mexico. Topics include fire and ecological restoration; fire and wildlife; fire, insects, and pathology; and social issues and fire management implications. A ses-

sion on Burned Area Emergency Response will examine the effectiveness of postfire emergency stabilization and rehabilitation treatments.

■ 4–6 March 2008 **GeoHealth I: Building Bridges Across the Geological and Health Sciences**, Reston, Virginia, USA. Sponsors: Geological Society of America; U.S. Geological Survey; American Industrial Hygiene Association. (D. Nelson, P.O. Box 9140, Boulder, CO 80301, USA; Tel.: +1-303-357-1014; Fax: +1-303-357-1074; E-mail: dnelson@geosociety.org; Web site: <http://www.geosociety.org/meetings/08geohealthI/>)

The meeting objective is to improve communication between the geological and health sciences, which will also facilitate communication with policy and decision makers on complex human environmental health problems. Geoscientists and health scientists will share perspectives on airborne, soilborne, and drinking water contaminants and pathogens through a series of invited lectures, case studies, and breakout sessions.

■ 9–13 March 2008 **TMS 2008: Linking Science and Technology for Global Solutions**, New Orleans, Louisiana, USA. Sponsor: The Minerals, Metals & Materials Society (TMS). (Conference Manager, TMS Meeting Services, 184 Thorn Hill Road, Warrendale, PA 15086, USA; Tel.: +1-724-776-9000 ext. 243; Fax: +1-724-776-3770; E-mail: mtg-serv@tms.org; Web site: <http://www.tms.org/Meetings/Annual-08/AnnMtg08Home.html>)

This interdisciplinary meeting presents programming in four topical areas: light metals; extraction, processing, structure, and properties; emerging materials; and materials and society. The meeting consists of plenary sessions, lectures, continuing education short courses, and an exhibition.

■ 7–8 April 2008 **British Ecological Society (BES) 2008 Annual Symposium: Ecology of Industrial Pollution: Remediation, Restoration and Preservation**, Birmingham, United Kingdom. Sponsors: BES; School of Geography, Earth and Environmental Sciences. (L. Batty, University of Birmingham; E-mail: l.c.batty@bham.ac.uk; Web site: <http://www.britishecologicalsociety.org/articles/meetings/current/2008annualsymp/>)

This symposium will bring together researchers, environmental agencies, policy developers, and others to provide a forum for developing an integrated approach to managing industrially polluted areas. Sessions will focus on monitoring and assessment, ecological impacts, ecology and remediation, and biodiversity and legal issues. Abstract deadline is 28 February 2008.

■ 12–13 May 2008 **The 2008 Little Alaska Weather Symposium (LAWS '08)**, Fairbanks, Alaska, USA. Sponsors: NOAA National Weather Service; Geophysical Institute of the University of Alaska Fairbanks; International Arctic Research Center; others. (N. Molders, Geophysical Insti-

tute, University of Alaska Fairbanks, 903 Koyukuk Drive, Fairbanks, Alaska, USA; E-mail: nicole.molders@gi.alaska.edu; Web site: <http://weather.arsc.edu/Events/LAWS08/>)

The symposium will provide a forum on operational and research information related to weather in Alaska. Primary topics include operational forecasting and observational sources in Alaska, polar aspects of weather, and reanalysis and data assimilation. Abstract deadline is 4 March 2008.

■ 18–23 May 2008 **213th Electrochemical Society (ECS) Meeting**, Phoenix, Arizona, USA. Sponsors: ECS; Jusing Engineering Co. (P. Urso, ECS, Meetings and Program Coordinator, Tel.: +1-609-737-1902; Fax: +1-609-737-2743; E-mail: paul.urso@electrochem.org; Web site: <http://www.electrochem.org/meetings/biannual/213/213.htm>)

Topics include fuel cells and energy conversion; biomedical applications and organic electrochemistry; electrochemical synthesis and engineering; and fullerenes, nanotubes, and carbon nanostructures. The program consists of short courses, symposia, and technical exhibits.

■ 28–30 May 2008 **65th Annual Meeting of the Eastern Snow Conference (ESC)**, Fairlee, Vermont, USA. Sponsor: Eastern Snow Conference. (S. Fassnacht, Watershed Science Program, Colorado State University, Fort Collins, CO 80523-1472, USA; Tel.: +1-970-491-5454; Fax: +1-970-491-6754; E-mail: srf@cnr.colostate.edu; Web site: http://www.easternsnow.org/annual_meeting.html)

The scientific program includes sessions on theoretical, experimental, and operational studies of snow, ice, and winter hydrology. This year's theme is “Applied Uses in Snow and Ice Hydrology.” There is a special poster session, “Instrumentation: Tools and Toys, Modeling and Hardware.” Abstract deadline is 28 February 2008.

■ 16–20 June 2008 **SGEM (Surveying Geology Ecology Management) Eighth Scientific Conference: Modern Management of Mine Producing, Geology and Environmental Protection**, Albena, Bulgaria. Sponsors: Ministry of Environment and Water; University of Mining and Geology; Beykent University; others. (V. Nikolova, 14, Kliment Ohridsky Boulevard, Sofia, Bulgaria 1797; Tel.: +359-2-975-3982; Fax: +359-2-817-2477; E-mail: sgem@sgem.org; Web site: <http://www.sgem.org>)

This interdisciplinary conference will bring together experts in fields including geology and mine surveying; extraction and treatment of mineral resources; geodesy; geoinformatics; oil and gas exploration; and reclamation and environmental protection. Abstract deadline is 1 April 2008.

■ 26–29 June 2008 **36th Conference on Broadcast Meteorology**, Denver, Colorado, USA. Sponsor: American Meteorological Society (M. Alger, E-mail: malger@ktv.com; Web site: <http://www.ametsoc.org/meet/fainst/200836broadcast.html>)

The conference will offer broadcast meteorologists an opportunity to broaden their meteorological knowledge, especially with respect to regional challenges in forecasting, including tropical, severe weather, lake effect, mountain, and winter weather. Abstract deadline is 28 January 2008.