March 3, 2004 (Vol. 04, No. 7)

The Official
Newsletter
of the Oregon Section Association of Engineering Geologists

Serving Professionals in Engineering, Environmental, and Groundwater Geology

MARCH 2004 SECTION MEETING

GUEST: RICK LAHUSEN, USGS, VANCOUVER, WA

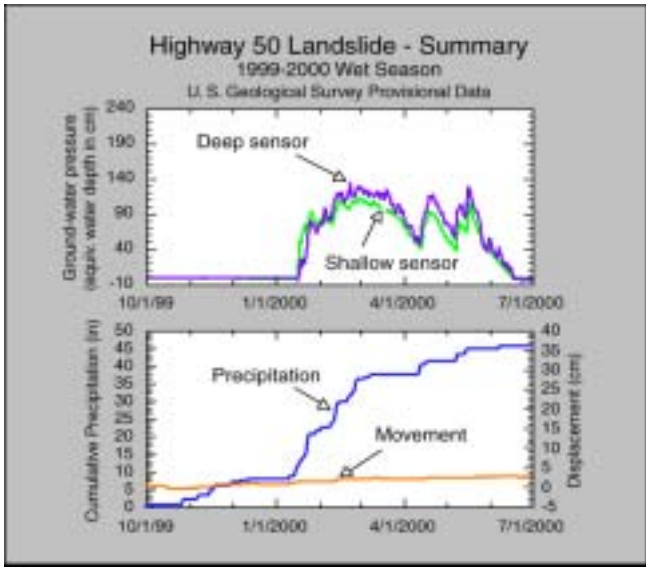
PRESENTATION: REAL-TIME MONITORING OF DEBRIS FLOWS AND LANDSLIDES; TOOLS AND APPLICATIONS

The immediate detection of landslide or debris flow activity provided by real-time systems can be crucial in saving human lives and protecting property. Traditional field observations, even if taken regularly, cannot detect changes at the moment they occur. Moreover, active landslides can be hazardous to work on, and large movements often occur during storms when visibility is poor. The continuous data provided by remote real-time monitoring permits a better understanding of dynamic landslide behavior that, in turn, enables engineers to create more effective designs to mitigate landslides hazards. Technology developed for other markets has produced cost-effective hardware and software tools that can be applied to real-time monitoring systems. Of particular interest are new license-free telemetry systems and non-proprietary real-time data processing software based on OPC foundation standards.

At hazardous sites that are remotely monitored by the USGS, ground movements and hydrologic conditions are measured using a variety of sensors. Ground vibrations caused by mass movements are monitored by buried geophones. Surface deformation is measured with GPS systems, tiltmeters and extensometers. Ground-water conditions are monitored by pore-water-pressure sensors, and on-site rain gauges record precipitation. Data are transmitted up to 100 Km by radios to terrestrial or satellite internet hubs. PC servers provide real-time access to the information via interactive web sites.

HIGHWAY 50 LANDSLIDES

During heavy rains in January 1997, a massive landslide accelerated catastrophically down a Sierra Nevada canyon slope and slid onto a major northern California highway. The Mill Creek slide closed US50 highway for weeks and briefly dammed the American River. In response, the USGS installed a monitoring network on this and



This Month's Meeting is on Tuesday March 16

Old Market Pub
6959 SW Multnomah Blvd
Portland (Garden Home), Oregon

6:00 pm Social
7:00 pm Dinner
8:00 pm Presentation

Pizza and Salad
$13.00 dinner ($6.50 for students)

Call URS at 503-222-7200 by 4 pm Fri. Mar. 12 with your reservation.

There is a $2.00 surcharge for those who do not reserve by the deadline.

Call now!

MESSAGE FROM THE CHAIR

AEG has been actively promoting membership benefits. The AEG is now a participating society in the GeoCare Benefits Insurance Program, with a variety of plans available to members. Insurance offered includes medical, term life, disability, dental, and a variety of supplemental plans. Check out www.geocarebenefits.com for information.

Other benefits to AEG membership include participating in a community of dedicated professionals, education, community outreach, and a good chance to network with like minded geologic professionals. We encourage your participation in the Association of Engineering Geologists. Keep in mind that we have annual officer rotation, and plenty of other opportunities to share in the leadership of AEG. Please contact any of the Oregon Section board members or committee chairs and ask questions or express your interest in becoming more active in your association and your profession.

Regards,
Warren Krager
AEG Oregon Section Vice Chair

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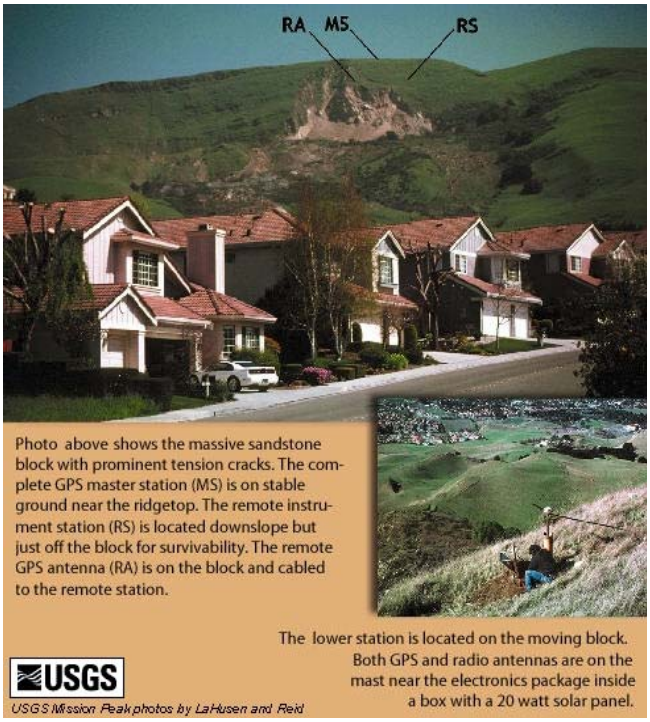
adjacent slides with similar potential. The network included 11 stations and 58 sensors. Under normal conditions, sensors are scanned every second and data transmitted to USGS computers every 10 minutes, but data are transmitted immediately if strong ground vibrations caused by mass movements are detected. Cleveland Corral landslide is one of these slides that moves in response to elevated ground-water pore pressures caused by infiltration from rainfall or melting snow. It typically moves during a wet winter and spring and is dormant during dry times. Continued downslope movement of this slide will likely occur in this and future wet seasons. Currently, both shallow and deep pore-water pressures within the slide are increasing, although pressures are currently insufficient to cause renewed movement. In previous years, up to 18 feet of seasonal movement has occurred. For the 2002-2003 wet season, downslope movement in the central and lower parts of the slide ceased in mid-May 2003. Between mid-April and mid-May of 2003, the slide moved about 1 foot in the central part and about 5 feet in the lower part of the slide.



GPS MONITORING AT MISSION PEAK LANDSLIDE

The Mission Peak Landslide, Fremont, California, has been a test site for a GPS-based earth-deformation monitoring system that is optimally suited for extended monitoring of geologic hazards such as volcanoes and landslides. Design decisions emphasized low-power and low-cost criteria while striving to retain high spatial resolution in near real-time. Each field station consists of an L1 GPS receiver, GPS antenna, USGS controller card, radio transceiver and 12 volt solar power supply. All field stations communicate with and are controlled by a distant base station PC. The base station schedules operation of remote sites in the network and polls each station sequentially to download raw GPS phase and ephemeris data. The base PC operates in a standalone mode to control field stations, download raw data, post-process data to obtain fixed static solutions then create updated plots and serve them via dialup and/or network web services. Alternatively, the base station PC can forward raw data to another site for processing and dissemination. The long-term stability and accuracy of the GPS system is evident by the displacement record that shows seasonal accelerations with a cumulative movement of the massive block of 10 cm since February 2000. Currently the slide is not moving perceptibly.

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PSU AEG STUDENT CHAPTER

The PSU Student Chapter will be having the annual Student Night on April 20, 2004 in the Multicultural Center, Smith Memorial Union (PSU). The night will consist of dinner, drinks, student poster presentations, and enlightened conversation. More information will be available in the coming days (i.e. cost, parking, poster titles, etc.)

2004 Officers
Soren Clark: President
Josh Mathisen: Vice-President
Susan Wacaster: Secretary
Aaron Fox: Brownbag and Field Trip Wrangler
Scott Burns: Faculty Advisor and Lead Wine Taster

Website
http://web.pdx.edu/~clarksk/aeg.html

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DEBRIS FLOW DETECTION

A USGS developed system, known as the Acoustic Flow Monitor (AFM), senses and analyzes ground vibrations with a compact, solar-powered unit that is installed near specific channels. It uses an inexpensive geophone and an on- site microprocessor to continuously analyze vibration signals and detect debris flows and floods on the basis of frequency, amplitude, and continuous duration of the vibration signal. A two-way radio system communicates between each sensing unit and a PC base station. The geophone can sense ground vibrations with frequencies ranging from 10 Hz to 300 Hz. Most debris flows cause the ground to vibrate at a peak frequency of 30 Hz to 80 Hz, whereas watery floods cause ground vibrations with a peak frequency of more than 100 Hz.

NORTH CASCADES HIGHWAY ROCK FALL

A massive rockslide occurred above the North Cascades Highway near Newhalem on Nov. 9, 2003. The slide cut off access to the town of Diablo and has the potential to impact the Skagit River. The USGS provided a real-time monitoring network consisting of 3 stations including geophones, tiltmeters, extensometers, a rain gauge and software optimized for monitoring rock noise. Novel use of a consumer-level satellite internet hub enables real-time access to the data from this remote site.

RICK'S BIO

Rick attended UC Davis as an undergraduate then pursued graduate work at Humboldt State University where he focused on hillslope hydrology, landslides, and debris flows. In addition, he is a self-taught techno-geek who enjoys applying instrumentation to resolve challenging questions of geohazards. He has been with the USGS Cascades Volcano Observatory since 1985. He has worked on debris flow research projects and numerous hazard responses in the US as well as around the Pacific Rim and Europe.

AEG OR CALENDAR

Apr. 20: PSU Student Night

May. 18: George Priest/Charlie Hammond, Johnson Creek Landslide

OTHER CALENDAR

Mar. 18: WA AEG Sec. Meeting in Seattle, Bob Burk and Norm Norish presentation on "2003-04 N. Cascades Hwy Rock Avalanche", RSVP via email to michelle_harkins@urscorp.com or phone at 206-438-2015 by 4:00 pm on Monday March 15.

Apr. 3: ASCE Seattle Geotech Group Annual Spring Seminar, Advances in Ground Improvement, see www.seattleasce.org or call Doug Lindquist at 206-324-9530 for registration.

OREGON SECTION AEG NEWSLETTER is published monthly from September through May. Subscriptions are for members of AEG affiliated with the Oregon Section or other Sections, and other interested people who have requested and paid a local subscription fee of $10.00. Email subscriptions are free.

News items are invited and should be sent to: Charlie Hammond, OR Section AEG Newsletter Editor, Cornforth Consultants, 10250 SW Greenburg Road, Portland, OR 97223, email: or.aeg.news @cornforthconsultants.com, phone (503) 452-1100. Electronic media is preferred. Deadline for submittal is Friday three weeks before each meeting.

Please notify Charlie if you have a change to your email or mailing address.

THANKS FOR SUPPORTING OREGON AEG!

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NEWS ITEMS

Shlemon Conference Earth Fissures April 1 - 3, 2004: Hosted by the Engineering Geology Foundation and the Association of Engineering Geologists, the first annual Shlemon Conference in El Paso, Texas, will evaluate the present state of knowledge of earth fissures. For more information, contact either Bill Haneberg, bill@haneberg.com, 206-871-9359 or Jeff Keaton, jeff.keaton@amec.com, 714-779-2591 ext. 308. Please visit the conference web site for more information: www.haneberg.com/fissure.

Membership Information: If your membership information has changed, please take the time to update through the AEG Website or by contacting our Chief Staff Executive Becky Roland at (303) 757-2926 x307

"Seeking Old AEG Annual Directories": If anybody has any pre-1997 AEG annual directories, please email George Freitag, History Chair at gfreitag@gri.com. George is compiling our sections history. His mailing address is: GRI Inc., 9725 SW Beaverton-Hillsdale Hwy, Beaverton, OR 97005

Receive Your Newsletter by E-Mail: PLEASE TAKE THE TIME TO SWITCH TO THE E-MAIL NEWSLETTER. This saves the Section money and simplifies the editor's job. Please send your e-mail address to or.aeg.news@cornforthconsultants.com

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