

LIVING ON THE EDGE: LINKING MIDDLE SCHOOL EDUCATIONAL SEISMOLOGY PROGRAMS TO PACIFIC NORTHWEST ACTIVE CONTINENTAL MARGIN EARTHQUAKE HAZARDS

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Plate tectonics, earthquakes, volcanoes, and other topics aligned with the National Science Education Standards are included in grade 6–8 Earth and environmental science classes. Middle school Earth science teachers, however, rarely have the geological background required to connect plate tectonics with regional geology and earthquake hazards. IRIS, SpiNet, and other seismology-education developers have shown that teacher resources are most effective when classroom activities are connected with regional earthquake hazards. For the Pacific Northwest, we created professional development programs that emphasize active-continental-margin geology to help teachers and their students connect global plate tectonics with regional earthquakes. Middle school teachers and students find Cascadia tsunami geology a particularly engaging topic to use as a launch point for studying active-continental-margin geology, geologic hazards, and EarthScope science. Drawing on “The Orphan Tsunami of 1700”, we developed classroom activities that invite students to approach Cascadia tsunami geology as a “Crime Scene Investigation”. The activities teach students how geoscientists decipher pre-historic geologic events using the geologic record thereby gaining greater understanding of plate tectonic processes, such as the earthquake cycle. Analysis of Plate Boundary Observatory data leads students to understand that the Juan de Fuca–North America plate boundary is “locked and loading” as it stores elastic energy to be released in the next great Cascadia earthquake. To raise awareness of earthquakes, we established Seismometers in Middle Schools programs in public schools in Portland and southwest Washington. Our most effective program included a three-day resident Earth-science teacher professional development workshop featuring: (1) instruction in plate tectonics, fundamentals of seismology, and regional geology; (2) teachers working in teams to learn AS-1 seismometer assembly, operation, and seismogram analysis; and (3) field study of Cascadia coastal tsunami geology led by Brian Atwater (USGS Seattle). Even with extensive training, follow-up classroom visits were necessary to help teachers get their seismometers operating properly at their schools. Earthquake notices that provide plate tectonic context and example AS-1 seismograms for locally recorded earthquakes have proved effective in maintaining middle school teachers and students interest in earthquakes and seismology.

POSTER 115

A SOFTWARE SYSTEM FOR REAL-TIME SHARING OF SEISMIC DATA IN EDUCATIONAL ENVIRONMENTS

Ben Coleman (Moravian College), Joseph Gerencher (Moravian College)

The purpose of this project is to facilitate real-time sharing of seismic data between educational institutions at all levels. Most existing software requires changes to the underlying network configuration, and therefore the cooperation of the institution's computer administrators. Our system works within the bounds of typical computing policies to allow data to be shared in real-time over the Internet. This is particularly well-suited for educational applications.

At the data collection point, the software allows owners of AS-1 seismometers to share their data with others without affecting their local usage. The software reads data off the device and then sends it out across the Internet. At the same time, this data is made available for other programs by placing it on a separate communications port (COM). Thus, data collectors willing to share their data can continue to use their preferred software.

Users interested in viewing streams of data from remote sites use a second piece of small software that performs similar operations. Once the data source is specified, the software reads data off the Internet and then makes it available on a COM port. As with the data collector, the user can view the data with any seismic software, and the program will believe the data is coming from a local device. Thus, this software can be utilized in conjunction with a standard program such as AmaSeis by individuals who do not own a seismometer.

POSTER 118

MUSIC AND CREATIVITY IN 100 LEVEL EARTH SCIENCE CLASSES

Edward Garnero (Arizona State University)

Many seismological concepts are best appreciated by students with strong quantitative background. For example, the time history of ground shaking rich in diverse frequency information as being due to (often complex) source processes originating large distances away, or alternatively, the huge amounts of time involved in circulation within Earth's interior responsible for plate tectonics, commonly confuse freshmen students. The use of music in analogies and examples draws upon a much more common student experience, one that is often rich in physical parallels to seismology. Additionally, bringing music into the classroom in the form of actual song emphasizes creativity and fun, which students respond favorably to. Students write extra credit raps, songs, and poems about geological and seismological concepts, which serves to strengthen student interest and involvement. I have taught a 230 student introductory course eight times. Two of the eight times have been without music in the classroom; of these two offerings, students were less engaged in general, and expressed less interest in course content. In this presentation, I will summarize some of my approaches of bringing music into the classroom.

JAMASEIS: A CROSS-PLATFORM VERSION OF AMASEIS

Martin Janicek (Moravian College), Joseph Gerencher (Moravian College)

Based on Amaseis, the well-known and widely-used program written by Alan Jones, jAmaseis is a client to acquire and display seismic data. This new application is written in Java, which allows the program to be used on Windows, Apple, or UNIX systems. The underlying design provides modularity so additional functionality can be easily added. jAmaseis works with an AS-1 seismometer, but support for other devices is possible. Currently, jAmaseis works with an AS-1 seismometer to show the incoming signal on the helicorder screen and to save/load historical data. Additional functionality being developed includes all the other features of the current Amaseis program. Future development will incorporate support for additional devices and features that will expand its pedagogical capabilities. For example, we are considering support for multiple streams of data and the possibility of software-computed triangulation.

POSTER 117

EARTHSCOPE WORKSHOPS FOR INTERPRETIVE PROFESSIONALS IN PARKS AND MUSEUMS

Robert Lillie (EarthScope National Office, Oregon State University), Charlotte Goddard (EarthScope National Office, Oregon State University), Jochen Braunmiller (EarthScope National Office, Oregon State University), Anne Trehu (EarthScope National Office, Oregon State University)

The EarthScope National Office (ESNO) recently sponsored an inaugural workshop for interpretive professionals in the Pacific Northwest. Participating organizations included the National Park Service; U. S. Forest Service; state parks of Oregon, Washington, and California; state geological surveys of Washington and Oregon; the Pacific Geoscience Center of the Geological Survey of Canada; Oregon Paleo Lands Institute; Hatfield Marine Science Center; Oregon Shakes; Olympic Park Institute; Mt. St. Helens Institute; and Orting High School. The 3-day workshop combined presentations by EarthScope scientists with interpretive methods to convey the story of the ongoing deformation of the edge of the North American continent. Participants learned how to use EarthScope data and science results, and developed and presented interpretive programs on the evolving landscape and earthquake, tsunami, and volcanic hazards of the Cascadia Subduction Zone.

Two challenges facing the EarthScope community include providing the public with access to timely EarthScope science and presenting complex data and related principles in language and formats accessible to varied audiences. The workshop showed how incorporating EarthScope data and scientific results into interpretive programs and exhibits can enhance the “sense of place” represented by the dynamic landscape of the Pacific Northwest.

The ESNO is working with IRIS and UNAVCO to develop Cascadia Subduction Zone modules for the “Active Earth” kiosk. Funds are available to supply 2-to-4 participating sites with their own kiosk. Workshop participants are submitting proposals outlining how their visitor center or museum would use the kiosk to complement their organization’s interpretive programs.

More EarthScope interpretive workshops are being planned over the next three years to focus on the Sierra Nevada, San Andreas Fault, Yellowstone Hotspot, Basin and Range Province, and Colorado Plateau. There are also plans to build on the momentum of the EarthScope Cascadia Workshop by organizing workshops to focus on more detailed content and interpretive strategies for the staffs at specific parks and museums, and to train EarthScope scientists on interpretive methods to engage various audiences.

POSTER 120

THE CENTRAL PLAINS EARTHSCOPE PARTNERSHIP

Tina Niemi (University of Missouri–Kansas City), Steve Gao (Missouri University of Science and Technology), Ross Black (University of Kansas)

The Central Plains EarthScope Partnership (CPEP) is a coalition of universities, schools, state geological surveys, and state and federal agencies organized to promote earth science research and education in the four states of Kansas, Nebraska, Iowa, and Missouri by utilizing the NSF-funded EarthScope facility. The CPEP goals are to 1) Coordinate conversion of 1/10 of the USArray stations into permanent stations for long-term monitoring, research, and education through private, state, and federal ownership, 2) Partner with the USArray Facility to select sites for the transportable array, 3) Educate and enhance the public awareness and knowledge of EarthScope, earthquakes, and earth structure in the Central Plain states through development of programs and materials, and 4) Promote EarthScope-related outreach activities in the Central Plains states. Our objective is to maximize both the number of people positively impacted by the project and duration of that impact. We seek to coordinate the utilization of EarthScope data in our region and to strengthen earth science education by providing region-specific learning modules for public display and for public distribution. As the USArray and the EarthScope facility moves from the active tectonic zone of the western US into regions with lower seismicity, we see CPEP as a template for how other regions can effectively organize. We see the organization of regional groups like CPEP as a model for how Midwest and Eastern US regions can provide a ‘lasting legacy’ for the EarthScope Facility.

POSTER 119

CASCADIA ACTIVE EARTH DISPLAY: A FREE COMPUTER-BASED MUSEUM DISPLAY ON CASCADIA TECTONICS

Kelly Reeves (IRIS), Jochen Braunmiller (EarthScope National Office), Susan Eriksson (UNAVCO), Charlotte Goddard (EarthScope National Office), Jenda Johnson (IRIS), Helmut Mayer (UNAVCO), Celia Schiffman (UNAVCO), John Taber (IRIS), Russ Welti (IRIS)

IRIS, UNAVCO and the EarthScope National Office are collaborating to create new content on Pacific Northwest tectonics for the Active Earth Display. The Active Earth Display is a computer-based, interactive museum display originally developed by IRIS to convey real-time earth science information and content to visitors at small museums, visitor centers, schools and libraries. Both the existing version of the Active Earth Display and this special package focused on Cascadia are freely available. The pages are delivered through an internet browser that, when set to kiosk-mode, fills the whole screen. IRIS provides users a free Active Earth Display account, and users need to provide a computer, a monitor (preferably a touch-screen), and a kiosk, if desired.

The new package focused on Cascadia is rich in Flash interactives and animations designed to engage the public with plate tectonics, earthquakes, volcanoes and tsunamis and the ways that researchers understand and monitor these tectonic processes. The IRIS/UNAVCO/EarthScope team will be working with professional museum designers to create the final product.

POSTER 114

THE CSUN-SAN FERNANDO VALLEY, CALIFORNIA AS-1 SEISMOGRAPH PROJECT

Gerry Simila (California State University Northridge), Dayanthie Weeraratne (California State University Northridge)

Following the 1994 Northridge earthquake, the Los Angeles Physics Teachers Alliance Group (LAPTAG) began recording aftershock data using the Geosense PS-1 (now the Kinometrics Earthscope) PC-based seismograph. Data were utilized by students from the schools in lesson plans and mini-research projects. Over the past 14 years, a small network of geology and physical science teachers are now using the AS-1 seismograph to record local and teleseismic earthquakes. This project is also coordinating with the Los Angeles Unified School District (LAUSD) high school teachers involved in the 9th grade, American Geological Institute's EARTHCOMM curriculum, and the new 11th grade Earth Science course. The seismograph data are being incorporated with the course materials that are emphasizing the California Science Content Standards (CSCS). In addition, CSUN's California Science Project (CSP) and Improving Teacher Quality Project (ITQ) conduct in-service teacher (6-12) earthquake workshops. We have also participated in the NSF-funded System-wide Change for All Learners and Educators (SCALE) project with the University of Wisconsin-Madison and LAUSD for 6th grade plate tectonics workshops. In January 2007, IRIS conducted their seismology –teacher workshop at CSUN. The network schools and seismograms from earthquakes in southern California region (2003 San Simeon, 2004 Parkfield) and worldwide events (e.g. Alaska 2002; Sumatra 2004, 2005) are presented.

POSTER 116