Reaching Rural Teachers with EarthScope Data Through Online Seismology Training

Lea Gardine*
Tammy Bravo^
John Taber^
Michael E. West*

*Alaska Earthquake Center, University of Alaska Fairbanks-Geophysical Institute

^IRIS Consortium
Wendy Bohon,
Informal Education Specialist at the IRIS Consortium

Robert Butler,
Professor Emeritus, University of Portland

Helena Buurman,
Seismologist at the Alaska Earthquake Center

Michael Hubenthal,
Senior Education Specialist at the IRIS Consortium

Sara Meyer,
ShakeAlert Station Specialist at Pacific Northwest Seismic Network

Special thanks to:

Jenda Johnson,
Earth Sciences Animated

Maïté Agopian,
Outreach Coordinator, EarthScope National Office

Natalie Edgecombe,
Montserrat Volcano Observatory
EarthScope Outreach

Education and Outreach integrated into EarthScope from the beginning

Independent EarthScope National Office with extensive collaboration and close cooperation with the facilities, many other local and national partners

**Primary goals**

1. Create high profile EarthScope identity
2. Promote science literacy through informal education
3. Advance formal education in the classroom
4. Foster use of data, discovery, and technology
5. Establish sense of community ownership
A solid teacher training foundation already exists

1. Joint ESNO/IRIS/UNAVCO teacher workshops
   • usually just 1-1.5 days
   • either stand alone or in conjunction with an EarthScope National Meeting

2. Workshops focusing on reaching teachers of Native American students
   • run by Steve Semken, as part of the EarthScope National Office
   • included IRIS and UNAVCO staff

3. IRIS’s Seismographs in Schools Program
   • NSF funded
   • two day workshops for teachers
   • co-located workshops with deployment region
   • participants received AS-1 educational seismometers
EarthScope’s Transportable Array is beginning its final Alaska install season.

Seismic data from new regions of Alaska is now available, or will be by the end of the 2017 field season.

More remote communities will be able to access local data and help tie in a sense of place for their students.
Alaska is big!

While the majority of the populous lives in areas surrounding Anchorage and Fairbanks, a lot are scattered across the state.

Communities are not connected by a highway system.

Travel within Alaska is expensive and difficult.
There are 53 school districts

Classrooms typically contain wide grade ranges

Teachers are multidisciplinary

Some communities are so small they don’t have formal schools

Home schooling is very popular
A New Approach

Move the workshop online
• allows teachers to participate from home or during class breaks
• creates a more flexible time table
• eliminates the need to schedule around hunting seasons, travel, etc.

Incentivize the participants
• offer professional development credit
• provide scalable resources to cover multiple age ranges with advice on how to use them
• create a cohort of teachers teaching the same material, upon whom to draw inspiration
• offer tuition reimbursement with successful completion
The framework

- Alaska focused
- Pass/Fail
- 15-week time frame
- 1-2 hour target per lesson – required for professional development credit
- offered through Blackboard – online classroom program used by many schools and universities
- video lectures followed by associated hands-on activities
- required group discussion with each lesson
- reflection assignment wherein teachers comment on how the lesson would affect their lesson plan
- both synchronous and asynchronous options
- Provide teachers with box of materials to get started
Building the Course

The syllabus

Three major blocks

1. seismology basics
   • tectonics
   • earthquake basics
   • build your own seismograph
   • seismic wave basics

2. using IRIS’s jAmaSeis software
   • importing data – emphasis on local stations
   • recognizing patterns in seismograms
   • calculating distance/location
   • calculating magnitudes

3. resources
   • Alaska Earthquake Center
   • IRIS’s Online Resources
   • UNAVCO
Successes

Struggles

Wide range of backgrounds

Content was very well received

Participants asked about additional offerings to recommend to colleagues

Participants took the content into their classrooms immediately

Blackboard framework with YouTube videos worked perfectly – no technology issues

Retention

Assignments took more time than estimated

Asynchronous participants limited peer discussions/interactions

Our first time offering an online class

Some clarity of instruction issues - order of assignments

No M≥7 events during semester!

85% Completion 15%

100% Completion 46%
Successes
“I didn't have this in-depth of a lesson in Earthquakes in my college geology classes.”

“The Earthquake Machine activity has been awesome! It really engaged my students and fit the curriculum perfectly.”

“I love the earthquake class. I really need this kind of content support. The lessons are fabulous too. I like going through them and actually do them as a student. I will be able to teach these lessons with more depth and meaning. I just started teaching an Alaska Geology class and will be introducing these lessons with my students soon.”
Second offering Fall 2017!

- Joint UAF, UAA offering
- Pursue 2-credit offering – consistent with work load
- Asynchronous, but with benchmark due dates to keep participant progress together
- Provide clearer direction with assignments – e.g. watch lesson videos before attempting the assignment
- Minor tweaks to lesson assignments
Thank You!

Additional Alaska TA Outreach on Poster 97