



# AS-1 Seismograph Workshop

September 18<sup>th</sup> – 20<sup>th</sup>, 2009

Trinity University – San Antonio, Texas

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**Objective(s):** Teachers will be able to

- Set-up, calibrate, operate and troubleshoot their AS-1 seismograph.
- Use data collected from their AS-1 seismograph as an integral part of their seismology/plate tectonics instruction.
- Participate as part of a larger community of educational seismograph users.

## September 18th, 2009

8:00 – 8:15	Welcome & IRIS Overview and Review of Agenda	<i>Michael Hubenthal, IRIS</i>
8:15 – 8:45	Introduction Activity	<i>Michael Hubenthal, IRIS</i>
8:45 – 9:15	Seismographs in Schools Vision <u>Outcome:</u> To provide teachers with a vision and examples for using the AS-1 and its data in their classrooms, and guidance for creating an implementation plan throughout the workshop	<i>Tammy Bravo, IRIS</i>
9:15 – 10:15	Earthquake Machine <u>Outcome:</u> To increase participants understanding of the elastic rebound theory through the use of a mechanical model	<i>Michael Hubenthal, IRIS</i>
10:15 – 10:30	Morning Break	
10:30 – 11:15	Seismic Waves Basics <u>Outcome:</u> To increase participants understanding of Earthquake waves and their propagation.	<i>Larry Braille, Purdue U.</i>
11:15 – 12:00	Build Your Own Seismograph <u>Outcome:</u> Teachers will be able to explain how each part of a seismograph contributes to the recording of seismic waves and conduct the activity with their students.	<i>Michael Hubenthal, IRIS</i>
12:00 – 1:00	Lunch	
1:00 – 2:00	Zero-order seismology <u>Outcome:</u> Teachers will register their stations, learn to navigate AmaSeis, find files in the AmaSeis file structure, extract and analyze earthquakes, save and upload data	<i>Tammy Bravo, IRIS</i>
2:00 – 3:00	Recognizing Patterns In Seismograms <u>Outcome:</u> Teachers will be able to distinguish earthquakes from seismic noise and will be able to recognize features within seismograms.	<i>Larry Braille, Purdue U.</i>

3:00 – 3:15	Afternoon Break	
3:15 – 3:45	Using AS-1 data to locate earthquakes <u>Outcome:</u> Teachers will be able to apply the S minus P method to locate Earthquakes from AS-1 data. Including; recognition of P and S arrivals, use of the AmaSeis travel time tool to determine the S minus P time, epicenter location on a globe, use of the USGS catalog to identify earthquakes	<i>Tammy Bravo, IRIS</i>
3:45 – 4:15	Structured Practice Locating Earthquakes	<i>Tammy Bravo, IRIS</i>
4:15 – 4:30	Review Practice Events	<i>Tammy Bravo, IRIS</i>
4:30 – 5:00	Small Breakouts	
5:00	Gots and Needs	

**September 19th, 2009**

8:00 – 8:30	Review of Gots and Needs	
8:30 – 9:15	USArray	<i>Jay Pulliam, Baylor U.</i>
9:15 – 10:15	Where did "OUR" waves come from? <u>Outcome:</u> Teachers will be introduced to the SeismicWaves program and will be able to import .sac files from the AS-1 into SeismicWaves and connect the recording to Earth structure.	<i>Larry Braile, Purdue U.</i>
10:15 – 10:30	Morning Break	

**Group A**

10:30 – 12:00	Setting-up, Troubleshooting & Calibrating Your AS-1 <u>Outcome:</u> Teachers will be confident that their system is set up and working correctly, correct problems that might arise and will know how to perform a simple calibration of their system and to adjust the damping of their system accordingly	<i>Tammy Bravo, IRIS</i>
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**Group B**

10:30 – 12:00	Web Tools, Applications, Software <u>Outcome:</u> Teachers will be able to access and use a variety of web-based tools (IEB, REV, NEIC) to support the seismology instruction in their classrooms.	<i>Michael Hubenthal, IRIS Glenn Kroeger, Trinity U.</i>
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12:00 – 1:00	Lunch	
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**Group B**

1:00 – 2:30	Setting-up, Troubleshooting & Calibrating Your AS-1 <u>Outcome:</u> Teachers will be confident that their system is set up and working correctly, correct problems that might arise and will know how to perform a simple calibration of their system and to adjust the damping of their system accordingly	<i>Tammy Bravo, IRIS</i>
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**Group A**

1:00 – 2:30	Web Tools, Applications, Software <u>Outcome:</u> Teachers will be able to access and use a variety of web-based tools (IEB, REV, NEIC) to support the seismology instruction in their classrooms.	<i>Michael Hubenthal, IRIS Glenn Kroeger, Trinity U.</i>
2:30 – 2:45	Afternoon Break	
2:45 – 3:45	Calculate the Magnitude of An Event w/ AS-1 Data <u>Outcome:</u> Teachers will be able to determine the magnitude of an event using AS-1 data and differentiate between magnitude estimates (mb, MS, mbLg). Including how to measure amplitude and period of seismic phases used in magnitude determination, how to use the Magnitude. Calculator and how to find magnitude data in online catalogs.	<i>Larry Braille, Purdue U.</i>
3:45 – 4:15	Structured Practice Calculating Magnitudes	<i>Larry Braille, Purdue U.</i>
4:15 – 4:30	Review Practice Events	<i>Larry Braille, Purdue U.</i>
4:30 – 5:00	Small Breakouts	
5:00	Gots and Needs	

**September 20th, 2009**

8:00 – 8:15	Review of Gots and Needs	
8:15 – 9:15	Exploring Earth Structure with Occam's Razor <u>Outcome:</u> Teachers will be able to explain and demonstrate how the internal structure of Earth (concentric layers of different density and composition) is inferred through the analysis of seismic data.	<i>Michael Hubenthal, IRIS</i>
9:15 – 10:15	TBD	
10:15 – 10:30	Morning Break	
10:30 – 11:00	TBD	
11:00 – 11:30	Q&A/Wrap-up/Distribute Materials	
11:30 – 12:00	Evaluation	
12:15	First van departs for Airport	