IRIS EDUCATION AND OUTREACH PROGRAM

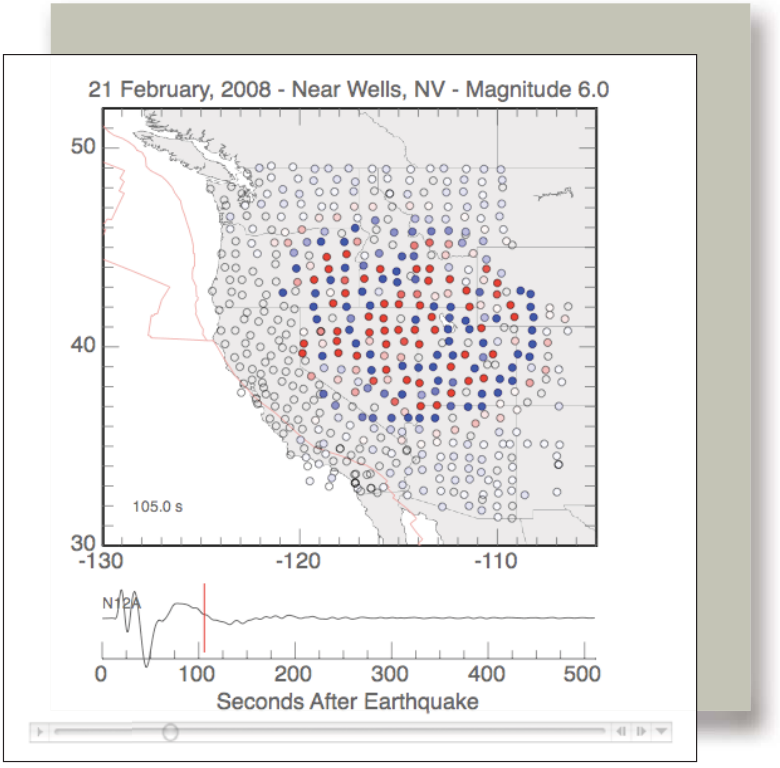
New Online Earthquake Wave Visualizations for Your Classroom

Do your students have trouble understanding the concept of seismic waves traveling outward from an earthquake? Now you can show innovative visualizations of seismic waves sweeping across 400 seismometers currently deployed in the western US. The animations use real data from selected earthquakes to visualize how seismic waves travel away from an earthquake. Because the seismometers are packed into a grid with unprecedented density, displaying the recorded wave amplitudes at each seismometer through time clearly shows how wave fronts propagating through the Earth behave. New animations are added as large earthquakes occur.

Earthquake near Wells, Nevada
February 21, 2008
Magnitude 6.0

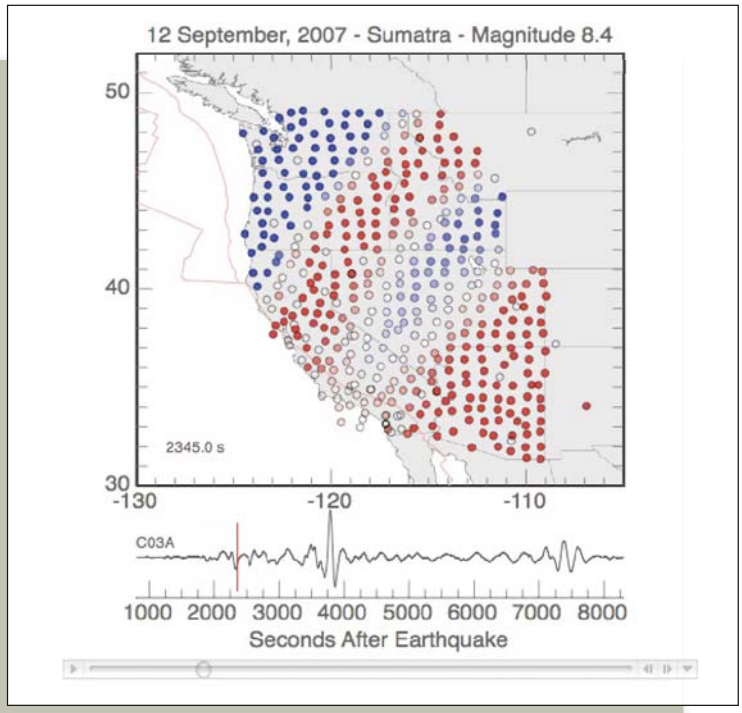
This earthquake occurred right in the center of the seismometers currently deployed in the western US as part of the EarthScope project. The visualization clearly shows seismic waves radiating outward from the epicenter like ripples spreading outward from a pebble dropped in a pond.

Visualizations from other earthquakes are also currently available.



Visualizations by Charles Ammon, Penn State University

Find the visualizations online at:
http://eqseis.geosc.psu.edu/~cammon/QA/



Earthquake off the coast of southern Sumatra
September 12, 2007
Magnitude 8.4

This visualization clearly show vertical ground displacement sweeping through the array. Using this visualization along with Alan Jones' Seismic Waves program (http://www.iris.edu/edu/software.htm) will give students a much better understanding of how seismic waves travel through the Earth. Students may be surprised to see that earthquakes on the other side of the Earth can be so clearly recorded.

What the Visualizations Show

Each circle represents a seismometer, and the color of each circle represents the signal amplitude of the wave. The color changes as waves of differing amplitude cross the circle – blue represents downward ground motion and red represents upward ground motion. Darker colors indicate stronger ground motion.

Press play and you will see the progressive passage of wave after wave across the array along the great circle direction from the earthquake. Underneath the map, a bar moves across a representative seismogram as you watch the vertical ground displacement cross the whole array. First P waves, then S waves and finally surface waves traverse the array. Part way through each visualization of distant earthquakes you will start to see the waves moving backwards across the array, i.e. traveling towards instead of away from the earthquake. These waves are the surface waves traveling around the surface of the Earth in the opposite direction of the surface waves that first reached the array.

For more advanced students, the three component motion animations (the link is listed under Additional Animations) visualize the three dimensional motion of P, S, and surface waves, showing that the particle motion for P waves is in the direction of wave propagation while for S waves and some surface waves the particle motion is perpendicular to the wave propagation.

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NSF earthscope PROJECT