



Nationwide project lends new details on earthquakes

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By Jeff Martin, USA TODAY



By Incorporated Research Institutions for Seismology

A seismometer is installed on a cement floor in the EarthScope Transportable Array station H28A lower compartment. A lid is placed on the vault before it is sealed and covered with dirt to insulate it from large temperature fluctuations.



An EarthScope field engineer piles dirt on the sealed vault for Transportable Array station I28A near Midland, S.D. The station is powered by solar energy and continuously transmits its data via cellphone.

Incorporated Research Institutions for Seismology

When it comes to studying earthquakes, Oregon State University geology professor Bob Lillie has a simple theory: The more that is known, the better people can prepare and protect themselves.

More knowledge about faults in certain parts of the nation could lead to stricter building codes in those places so structures are less likely to topple, he says.

"If we know about the hazards, then we can put ourselves at less risk," Lillie says.

Lillie is part of a group of scientists involved in USArray, a nationwide research project that allows scientists to study earthquakes in unprecedented ways.

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The project, which involves a traveling network of 400 high-quality, portable seismographs placed in temporary sites, will reach the halfway mark this summer in its goal to measure upheavals beneath the earth's surface from California to Maine, says project director Bob Woodward. This summer, devices are being installed in several states, including South Dakota, Minnesota, Iowa, Missouri and Arkansas, he said. The number, density and systematic placement of the devices give scientists a

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far more detailed picture of [earthquake](#) activity in the USA, he says. Scientists are intrigued about tremors detected in the Pacific Northwest and have installed additional equipment to learn more about them, he says.

The project, which originated on the West Coast in 2004, is moving east so researchers can have a systematic way of studying the entire nation, Woodward says. The instruments, spaced about 40 miles apart, stay in a site for two years before they are moved, Woodward says. The USArray project is scheduled to reach the East Coast by 2013, he says.

USArray's annual budget is about \$13 million per year from the [National Science Foundation](#), he says. It's part of a broader project known as EarthScope, also funded by the foundation. EarthScope's aim is to study the structure and evolution of North America and to learn more about what causes earthquakes and volcanoes.

Before the instruments were installed, "it was kind of like taking a picture with a camera with only a few pixels," Woodward says. "With 400 stations out there, it's like having a much higher resolution camera. So now you can directly see the seismic waves rolling across the country."

The project has covered Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington and Wyoming, he says.

Emily Brodsky, a seismologist who researches earthquakes at the University of California-Santa Cruz, says, "By having that whole bird's eye view, you could start to see these patterns in a way we've never seen before."

By 2011, the seismographs will be in place near the site of some of the most powerful earthquakes in U.S. history — an area known as the New Madrid fault between St. Louis and Memphis, Woodward says.

Almost 200 years ago, in 1811 and 1812, a series of earthquakes centered near the small Missouri town of New Madrid was so powerful that witnesses said the nearby Mississippi River began to flow backwards, says Chuck Langston, director of the Center for [Earthquake](#) Research and Information at the University of Memphis.

"The earthquakes were felt in Boston," Langston says. "There are eyewitness accounts that the river

dammed up, and part of it flowed backwards. It must have been spectacular. Big waves and water moving every which way."

Though California is commonly associated with earthquakes, Woodward says, faults exist across the nation, stretching all the way to the eastern seaboard.

More than \$500 billion in losses could result from a severe earthquake in the Los Angeles area, according to a Jan. 14 Congressional Research Service report to Congress.

"An even higher estimate — approximately \$900 billion — includes damage to the heavily populated central New Jersey-Philadelphia corridor if a 6.5-magnitude earthquake occurred along a fault lying between [New York City](#) and Philadelphia," the report states.

Sizable earthquakes have occurred in this region, says Michel Bruneau, an engineering professor at the University of Buffalo who has done extensive earthquake research. Bruneau points to a study in 2008 that notes a magnitude-5 earthquake damaged buildings in New York City in 1737; and a magnitude-5.5 quake struck the region in 1884, according to the study, reported in the *Bulletin of the Seismological Society of America*. The researchers wrote that stronger earthquakes are possible in the area.

Martin reports for the Argus Leader in Sioux Falls, S.D.

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