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Study questions New Madrid threat

Two scientists say recent study suggests a big earthquake in the mid-U.S. is unlikely, but others interpret the data far differently.

BY BRANDON STUMBO | BALTIMORE | April 22, 2009

Scientists have spent long hours and many years attempting to predict the next big earthquake in the New Madrid Seismic Zone, but a study published in the March edition of the journal *Science* suggests that all the hype may be for nothing.

The new findings might give disaster responders in Illinois, Indiana, Missouri, Arkansas, Kentucky, Tennessee and Mississippi reason to reconsider earthquake response policy, the researchers say.

The eight states have drawn in geologists and geophysicists from all over the world since a series of earthquakes rocked the region in 1811 and 1812. However, according to studies headed by Eric Calais, professor of geophysics at Purdue University, and Seth Stein, William Deering professor of Earth and Planetary Sciences at Northwestern University, there doesn't seem to be enough stress accumulating at the New Madrid Fault line to produce an earthquake of any significant magnitude.

"Before now, all we could really say is that there have been big earthquakes in this region in the past, maybe there will be another big one," Stein said. "And that's not necessarily true."

Utilizing data acquired over an eight year period from GPS antennas mounted in strategic locations throughout the earthquake zone, research teams from both Purdue and Northwestern found that the fault system was moving about 0.2 millimeters, the width of a fishing wire, per year. Calais said that sizeable earthquakes could only be expected when there was at least 2 millimeters of movement or more.

"There must be enough movement to accumulate strain for a big earthquake to take place and that just isn't happening here," Calais said.

Some scientists who also conduct extensive geological research in the fault zone agree with the Calais and Stein data, but have come to vastly different conclusions.

"The measurements are excellent," Arm Elnashai, director of the Mid-American Earthquake(MAE) Center, said. "It is the interpretation of the measurements that is the problem."

Elnashai and his colleagues develop catastrophic event planning scenarios and possible engineering solutions for each state in the New Madrid region. The Federal Emergency Management Agency (FEMA) funds this research in the hope that it will lead to more effective earthquake response efforts.

Elnashai argued that the readings might suggest that the tension between the two tectonic plates at the fault line is so great they are no longer able to move. If this is the case, a large earthquake is likely. He also stated that surface readings do not necessarily demonstrate what is happening at tectonic plate depth.

"The soil in the region is very soft and may not be reacting the same as the rock deep underneath," he said.

Oliver Boyd, research geophysicist for the U.S. Geological Survey (USGS), and Martitia Tuttle, paleoseismologist for the USGS, agreed with Elnashai.

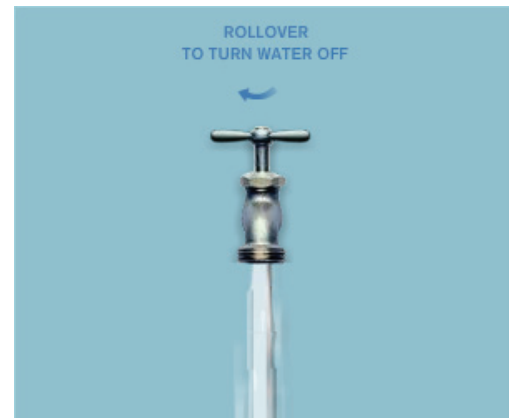
"The data they've [Calais, Stein] collected just doesn't indicate that stress isn't building up for a big earthquake," Boyd said. "I don't think GPS systems will give us the kind of information we need."

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"I fear that the earthquake hazard is much broader than the New Madrid"

—Eric Calais, Purdue University

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Tuttle was not convinced by the findings either.

"There is broad consensus that the New Madrid does possess a potential hazard," she said.

Tuttle criticized the study as having too narrow a scope. From her point of view, the eight years of data collection is far too short of time to make any conclusions. The region has a long record of seismic activity -- thousands of years -- and Tuttle, along with other scientists, feel that a decade's worth of readings isn't strong enough to ignore this fact.

The Calais and Stein study also suggests that, since stress does not appear to be accumulating at the New Madrid region, it is probably transferring to other fault lines.

"I fear that the earthquake hazard is much broader than the New Madrid," Calais said. "We don't know at this point where it [the pressure] is going."

Many scientists agree with this possibility, given that there have been long periods of inactiveness at the New Madrid and the pressure must be dispersing to somewhere, but there is much disagreement on what should be done in reference to earthquake preparedness and response.

Both Calais and Stein stated that funding and research needs to take a broader approach than simply focusing on the New Madrid.

"They are probably wasting billions of dollars on something that is almost certainly not that big of a problem," Stein said.

While most scientists agree that broader research is needed to fully understand tectonic systems in the Midwest, some are skeptical of reducing the focus on the New Madrid. Many feel that the evidence for a large earthquake is still strong enough to warrant continued funding.

"What if they [Calais, Stein] are wrong and FEMA pulls the plug?" Elnashai said.

Even Calais is wary of the consequences the misinterpretation of data could have.

"It is hard to make a case for another big one, but we must be very careful because we don't know completely how the Earth works," he said.

Most scientists agree that there are still plenty of unknowns concerning the New Madrid. As such, many feel the region should still be their main focus.

"You hope that it won't be that bad, but we still need to prepare," Tuttle said.

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