Scientists Say They Can Predict Earthquake Intensity

By Jessica Berman
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Even though no one can predict when or exactly where an earthquake will strike, scientists say they believe they may have come up with a way to determine how strong it will be. Seismologists say such advance warnings could give communities enough time to prepare for devastating earthquakes.

Recovery effort in Balakot, Pakistan

Seismologists at the University of California at Berkeley think they've come up with a way to determine how strong an earthquake will be based on its earliest rumblings.

Richard Allen and colleagues have spent the past five years studying data from 71 around the world earthquakes, and found that it would have been possible to estimate their magnitude within the first few seconds of rumbling.

Professor Allen says seismologists measure the first wave of energy, called the "P wave," that travels across the fault line. Fault lines are places where the earth is ruptured and shifts. Professor Allen says the P wave is the fastest in a series of earthquake waves and it doesn't do much damage. "And so what we're doing is we're looking at the P wave and we're using that P wave to tell us about the final magnitude of the earthquake. And we do that by measuring the frequency content. If it's a low rumble, that tells us it's going to be a large magnitude event. If it's a high-pitched squeal, then we know it's going to be a small magnitude event," he said.

In the study, published in the journal Nature, Richard Allen's team showed it can predict within one magnitude the intensity of an earthquake based on the frequency of the P wave.

Depending on where they are along the fault line, Professor Allen says people could be warned four seconds or more ahead of time of a large magnitude earthquake. "Obviously, you can get under a
desk and reduce the chances that you'll be injured during an earthquake," he said.

There are early warning systems in Japan, Taiwan, Turkey and Mexico that warn of earthquakes moments before they begin. These slow and stop trains to protect riders, and activate systems within buildings to withstand the shock of an earthquake.

But they cannot predict the magnitude of an earthquake, according to Boston University seismologist Rachel Abercrombie. "They're still pretty unpredictable. There're still a lot of uncertainties," he said.

For example, Ms. Abercrombie says sometimes an underground fault can cause another fault line slip. "It moves a bit of fault, and the next bit of fault says 'Hey, now you've kicked me and I'm going to move. And I'm going to move.' But there's no way you can tell from the beginning which pieces of fault were sitting there ready to go," he said.

Mr. Allen says he and his colleagues are now setting out to implement their findings.

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