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- Cuba news
- Haiti news
- Education
- Legislature
- Lottery results
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- Obituaries
- Scripps development
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- Traffic

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- Immigration
- News by e-mail
- News quiz
- Property Records
- Youth section

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- SOUTH FLORIDA NEWS**
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- Palm Beach County
- Miami-Dade County
- Florida
- Nation/World
- Cuba
- Education
- Lottery
- Obituaries
- Scripps development

WEATHER

- Hurricane
- Hurricane weblog
- Web cam

SPORTS

- Miami Dolphins
- Florida Marlins
- Miami Heat
- Florida Panthers
- University of Miami
- High school
- College
- Weblogs/Columns

BUSINESS

- Real estate news

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- Letters
- Chan Lowe cartoons
- SOUTHFLORIDA.COM**
- Entertainment
- Events
- Restaurants
- Movies & TV
- Music & Stage
- Nightlife & Bars
- Florida Getaways
- Celebrity News
- Horoscopes
- Dating/Personals
- Attractions/Outdoors
- Visitor's Guide

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- Lifestyle
- Arts
- Food & Recipes
- Home & Garden
- Travel
- Books

Experts study quake early warning

Seismic waves may indicate the magnitude

By Alicia Chang
The Associated Press
Posted November 10 2005

LOS ANGELES · Scientists have found a way to estimate an earthquake's ultimate strength by analyzing the initial seconds of a rupture, a step that could one day provide early earthquake warning.

Currently, a quake's magnitude, or how much energy is released, is determined after the shaking stops, usually minutes after an event.

But researchers from the University of California, Berkeley, say the measurements of seismic waves soon after a temblor can signal whether it will be a minor or monster temblor.

They say the information could possibly be used in an alert system to give seconds to tens of seconds of advance notice of an impending quake, enough time for schoolchildren to seek safety, power generators to trip off and valves to shut on pipelines.

"We're not talking about a massive amount of time," said Richard Allen, an assistant professor of earth and planetary science, who led the study. "But one can use our approach to come up with a magnitude before people have felt the ground shaking."

Details appear in today's issue of the journal *Nature*.

The study suggests quakes begin in different ways, said Lucy Jones, the scientist in charge of the U.S. Geological Survey in Pasadena, who was not part of the study.

But Jones was skeptical that the information can be used to create an early warning system. The United States is still years away from an alert system because of fears of false alarms and disagreement among scientists about what physical forces cause an earthquake to turn into a big one.

Allen analyzed records of 71 major Pacific Rim quakes in the past decades including 24 events that were greater than magnitude-6.

Using a mathematical model, they were able to estimate a quake's size to within one magnitude unit from as little as four seconds of data of the frequency of the energy in the primary wave. These low-energy waves typically cause a jolt, signaling the occurrence of a quake.

Earlier research conducted by Allen showed that the first few seconds after a quake can be used to estimate quakes smaller than magnitude-6.

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Allen is testing the model in real-time using an intricate network of seismic instruments scattered in Northern California.



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