NW warning system could avert disasters

By TOM PAULSON
P-1 reporter

The 1,000-mile-long tsunami screamed across the Indian Ocean on Vasily Hitov's computer screen, demonstrating a new tsunami forcesting system under study in Seattle that may soon be used to help prevent disasters like this weekend's immense loss of life in Asia.

This computerized re-creation, done hours after the event is part of a scientific effort here aimed at better protecting coastal communities from these unpredictable sea monsters.

"Our goal is to have results (a isomami prediction) in 15 minutes or less" after an earthquake, said Titro, a mathematician and computer modeler who is working on isomami forecasting among a small, elite group of isomami researchers at the National Oceanic and Atmospheric Administration's Pacific Marine Environmental Laboratory in Seattle at Sand Point.

The Seartle lab pioneered the first real-time early-warning system for tsunamis in the Pacific Ocean and is also a leading player in the ambitious international effort to accurately and rapidly forecast the path of these massive waves that follow a major deep-sea quake.

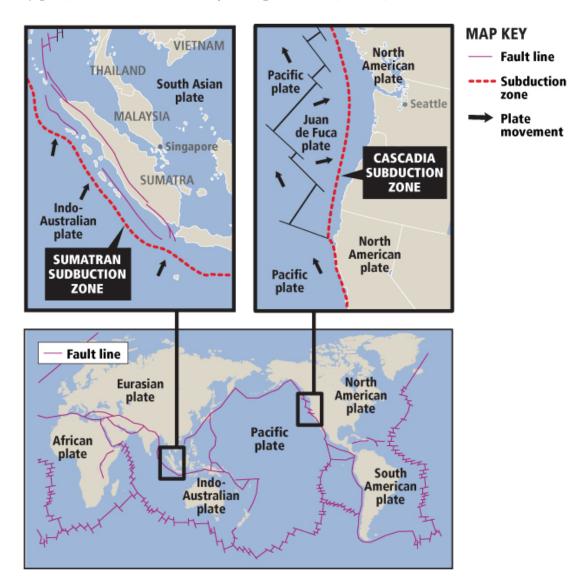
⁸It's more complicated than you might imagine," said Dr. Eddie Bernard, director of the lab and an internationally recognized leader in tsunami research.

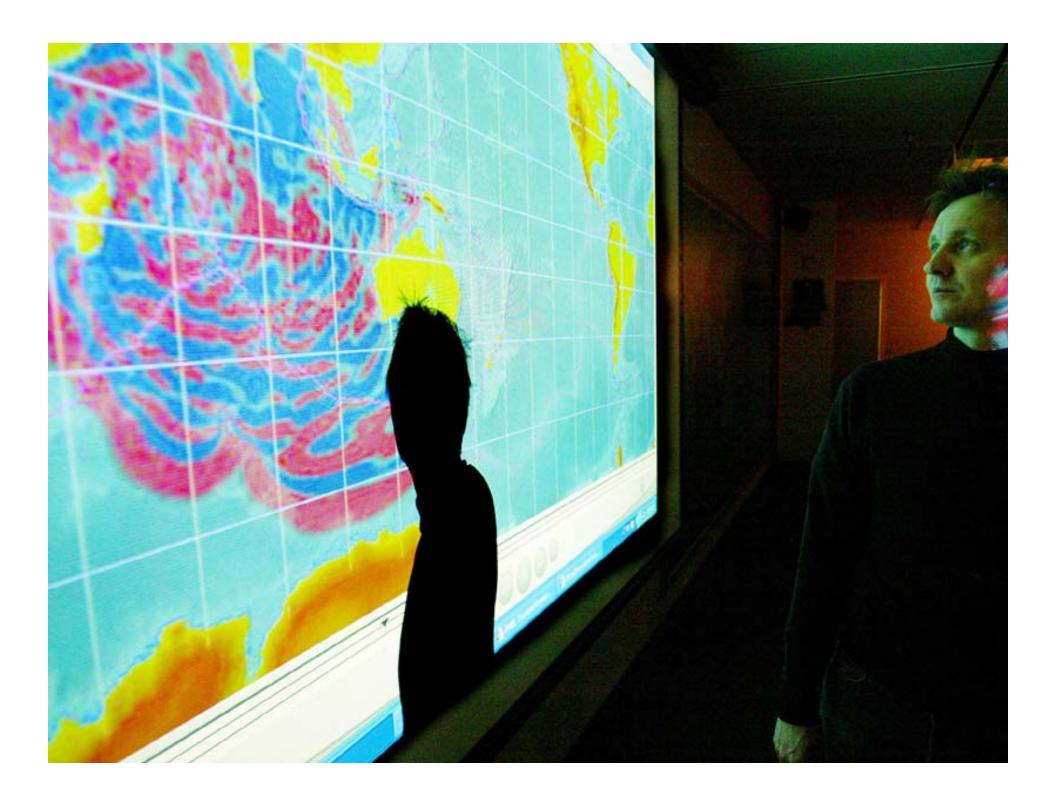
'titov's digital tsurrami forecasting is still experimental, likely to be tested within a year. But had the

SEE ALERT, A6



Sumatra / Cascadia





hunt for hidden clues

Scientists from U.S., around the world scramble into area

BY TOM PAULSON

P-l'reporter

While much of the world is focusing on how to help victims in tsu. nami-ravaged South Asia, scientists are starting to fan out in a search for

Cornell University tsunami scientist Philip Liu is assembling his team in Sri Lanka, Oregon State's Harry Yehix group is in India, a Japanese team has gone to Indonesia and various other scientists from Russia. Korea, Australia and elsewhere are on their way, hoping to unlock tsunami secrets that could lead to mini-

mal destruction the next time around, "Much of the rsunami evidence is ephemeral," said Bretwood Higman, a University of Washington. tsunami researcher who is on Liu's

"I wish we could have gotten in sooner, but this is still an opportunity of a lifetime," said the 28-year-old Higman, whose specialty is in analyzing sediment deposits for a more precise look at tsunami behavior.

This is not just science for science's sake. A better understanding of tsunamis could lead to a variety of practical results in Washington and around the world, including faster. more accurate (sunami warning sys tems and ideas for how better to protect vulnerable coastal areas.

The scientists will do their work amid choos and misery, a situation

SEE SCIENTISTS, A7



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Sri Lanka may hold more answers about tsunamis

BY TOM PAULSON P-I reporter

COLOMBO, Sri Lanka - Along the capital city's main waterfront boulevard. Galle Pace Green, the scientists looked but could find no evidence of the devastating rsunamis that have claimed more than 30,000 lives on this teardrop-shaped island nation.

But just a few miles to the south, in a section of the city known as Mount Lavinia, it was a completely different story. A massive brick wall had been shattered and thrown inland by a wall of water estimated to have been about 15 feet above sea level.

Isunamis are complex, unpredictable. One place,

SEE TSUNAMIS, A7

INSIDE

USS Abraham Lincoln helicopter crashes while onrelief operation in Indonesia

SEE A7



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Abbas easily wins Palestinian election

New leader had backing of U.S., Israel

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U.S. troops kill 8 after convoy is hit by blast

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Sri Lanka may hold more answers about tsunamis

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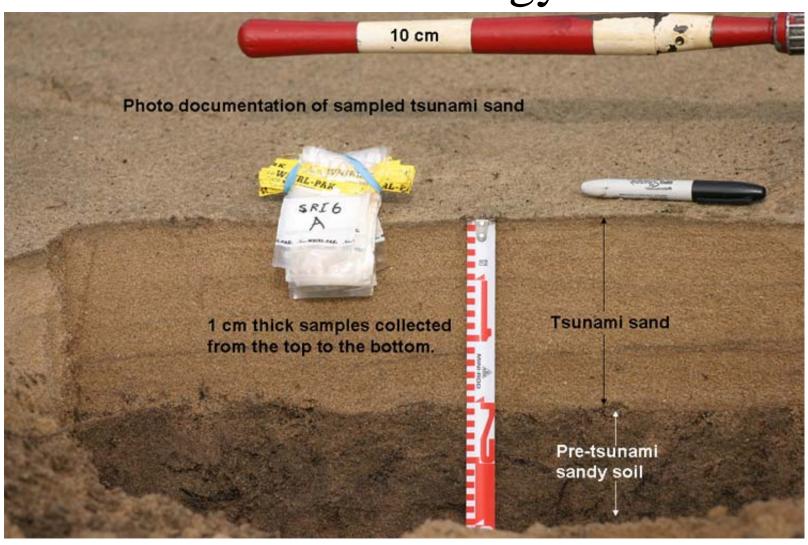
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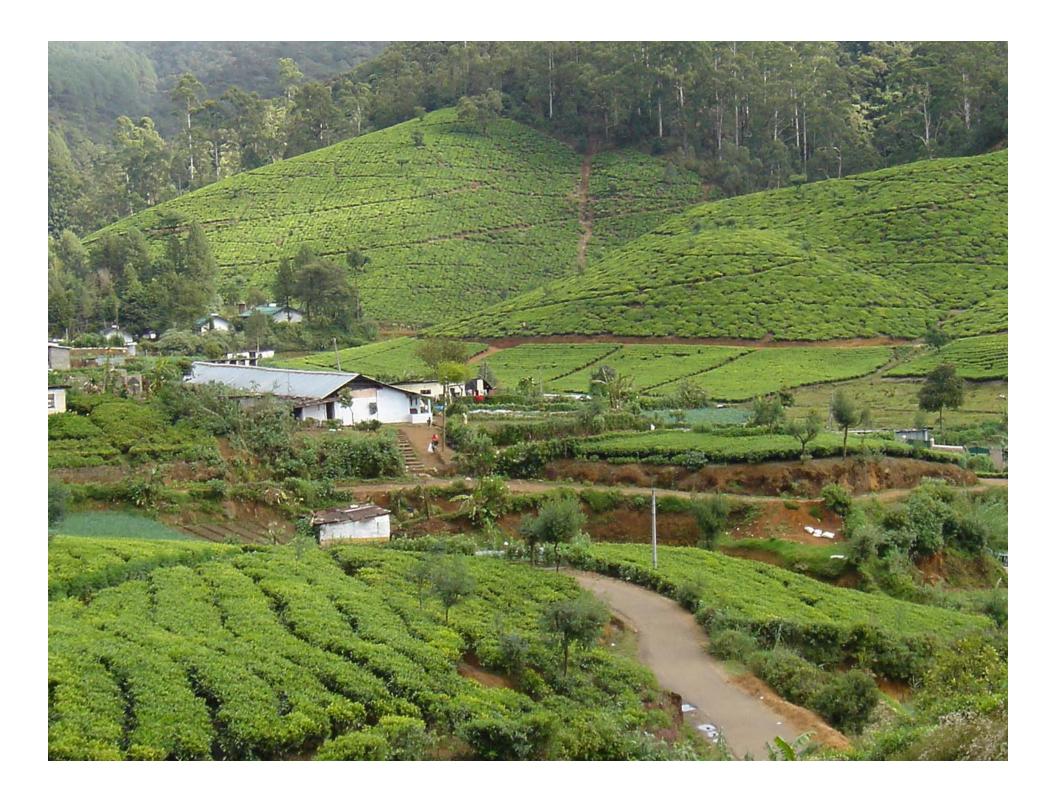


Tsunami Geology ...













Tsunami experts examine waves' debris

Sri Lanka warns of land mines, kidnappers

> BY TOM PAULSON F-1 reporter

TRINCOMALEE, Sri Lankz Reface they could get chave to the business of with they came here from around the world – to try to unlock the mysteries of transmis- a group of activities first gay permission and advice from the Sri Lankan minister of defense on how to avoid land mines and kidnappings.

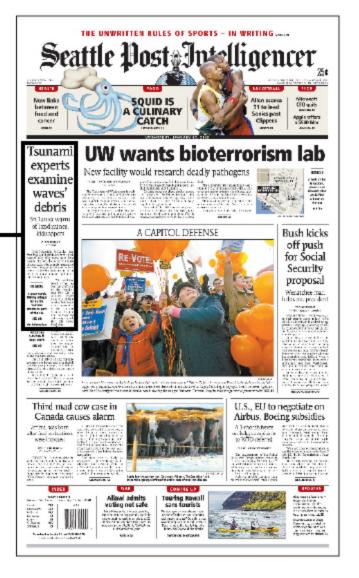
INSIDE

A once-scenic fishing village hit by the tsunami wants no part

of the sea

An Indonesian man sucked out to sea survives 15 days a drift "He said the beach is fine; has ton't go too far in to the whols," and Phil Liu, a sunners expert from Cornell University, briding a team speacored by the Narional Science Foundation as they set but to rapidly collect this shorthard that.

Along the hard hit coast, where thousands were killed, the scientists exam





'Tsunami made the water . . . poison'

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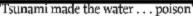
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Studying the killer wave for clues that can save lives

BY TOM PAULSON

P-I reporter

BATTICALOA, Sri Lanks — Grammed inno a humid army harracks for the night, a small group of American scientists — exhausted, dirty and excited — pulled out their laptops and launched, into a vertied duel on "fundular lones."

The tsunant survey team had been driving like mad, through territories held by the separatist Tamil Tigers and around the landmine warning signs, trying to mescare and document evidence of this liller wave on the east coast of Sri Lanka.

Finding no hotels available here after the destruction, they found shelter (through a Sri Lankan associate) among the soldiers.

The phenomenon they were delacing in which a single wave type known as a "bore" splits into

SEE WAVE, A6











Secrets of tsunamis not easily revealed

BY TOM PAULSON P-7 reporter

COLOMBO, Sri Lanka – Before an audience hungry for answers, a group of American Isunami scientists spoke of some tantalizing find ings, but said they remain far away from understanding and explaining the massive Dec. 26 tsunamis that have killed more than 160,000 in Southern Asia.

"We still don't have all the data we need." cautioned Phil Liu, a tsunami expert from Cornell University and leader of the scientific team sponsored by the National Science Foundation.

The scientists presented their

findings over the weekend to Sri-Lanka's minister of science and about 100 engineers, academics and other dismitaries after a hectic week of observation and analysis amidchaps and misery.

One location on the other side of the planet with a similar risk profile kept coming up in the discussion the Pacific Northwest.

Costas Synolakis, a University of Southern California tsunami researcher who led studies on the southern coast of Sri Lanka last week, cited the network of deepocean tsunami detectors designed and built in Seattle at the Pacific Ma-

SEE TSUNAMIS, A9



Foll says most Americans optimistic

Hopes fade for crewman of crab boat

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King's dream lives in Seattle youths' volunteer spirit

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Secrets of tsunamis not easily revealed

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Poll says most Americans optimistic on 2nd term, but Iraq is top concern

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PRAYERS FOR DISASTER VICTIMS



Toll passes 162,000; U.S. easing back relief

Russians protest cuts



Tsunami expert

BY TOM PAULSON P-I reporter

COLOMBO, Sri Lanka - All the tsunami detectives over here keep referring to a guy in Seattle named Brian Atwater.

Most Pacific Northwest residents likely have heard that a massive mag nitude 9 earthquake, much like the Sumatran quake on Dec. 26. spawned a killer tsunami off the Washington and Oregon coast more rhan 300 years ago.

What might not be as well known is why we know this, and how recently it was that we didn't and were at risk of a similar deadly surprise.

take's paper in 1996 that they all finally shut up about it," Acwater, a U.S. Geological Survey geologist and "paleoseismologist" at the University of Washington, said in an interview about his work in Seattle.

The normally mild-mannered Atwater still gets irked thinking about what he had to go through to get his ideas accepted.

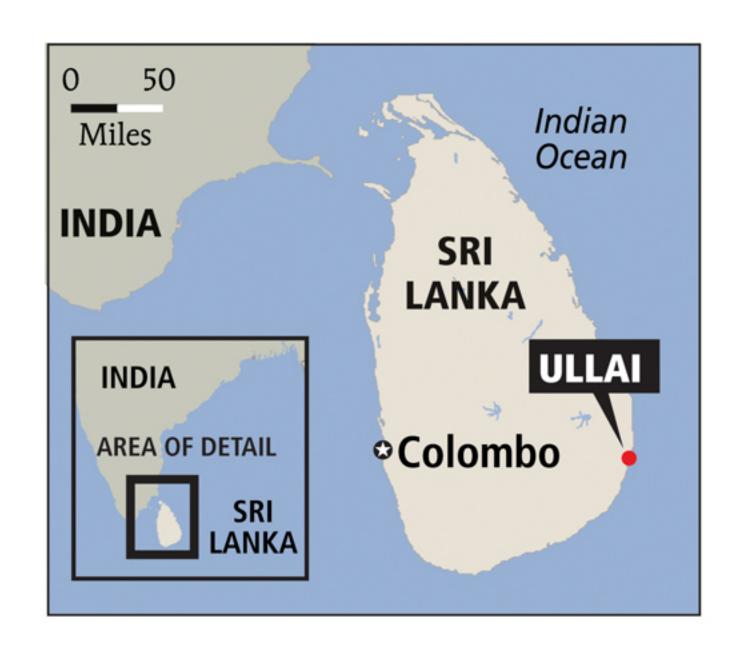
"They" were the quake and tsunami experts who in the 1990s said that Atwater was just flat wrong about the risk from the Cascadia Subduction Zone.

It wasn't just a sleeping fault, most people said; it was dead.

Tsunamis? That's just a Japanese "It really wasn't until Kenji Sa- word. Everyone knew the Northwest

had tough case to prove Tsunami expert had tough case to prove TSUNAMIS: Undersea canyons implicated the second of the s TSUNAMIS: Undersea canyons implicated RELIEP: Wolfowitz hopes U.S. aid will mean describes with incomesia will mean closer ties with incomes a Note of the control of the c











A scientist toils as survivors

BY TOM PAULSON P-lineporter

ULLAI, Sri Lanka - Just over the hill from where Starin Fernando was taking sand samples and measuring how far the tsunami ran up on land was a fresh mass. grave with about 250 bodies.

"We were lucky to escape," said Naush-

ad Ahmad, 42, who had owned a small beach hotel that was obliterated by the waves. 'We knew it was not a normal

Fernando, a Sri Lankan geologist, came to this tiny fishing and tourist village. on the east coast of Sri Lanka, where a team of American tsunanti experts had left off. Here in Arugam Bay, where about 700

M'S SIGN AARON SELE TO ONE-YEAR DEAL

Seattle Post Intelligencer





Viaduct funding 'impossible'

"It is the first time to freely choose. . . . It's like a dream"

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In Sri Lanka, scientists feel post-tsunami wrath

BY TOM PAULSON P-1 reporter

COLOMBO, Sri Lanka - In the aftermath of the tsunami that killed about 40,000 people in Sri Lanka, acientists here are defending themselves against allegations of homicidal incompetence or outright neglect for not sounding a warning.

"We had technical problems, and perhaps lack of competence, but claims that we could have acted to save anyone are based on a basic misunderstanding," said Chandra Jayasena, a geologist at the University of Peradiniva. Sri Lanka's Jargest university located hours inland. and high up in the lush, green hill country.

"It's absurd," said E.G.R. Dharmaratne, chairman of the country's Geological Survey and Mines Bureau. "How could we have informed our people when the world's tsu-

SEE SRI LANKA, A7

INSIDE

Indonesia, rebels agree to cease-fire talks

SEE A7

Senator's bill would provide better alert system for Pacific U.S.

SEE B1





He tucked America in with a laugh and a grin

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Lessons Learned?

- What does the Indian Ocean tsunami tell us about Cascadia?
- Are we ready for the same thing

'Tsunami on its way, gonna happen any day'

Preparedness, resignation at coastal summit

BY TOM PAULSON

P-I reporter

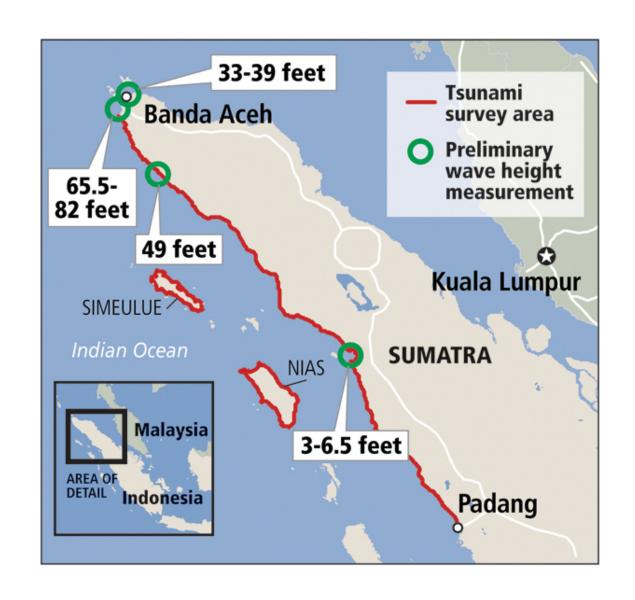
LONG BEACH – Not ready. That may best describe the basic consensus after a daylong "Coastal Tsunami Summit" in this community recognized as one of the most prepared in the nation for the kind of killer waves that rolled across the Indian Ocean Dec. 26.

Stephanie Fritts, director of emergency management for Pacific County, has been trying for years to convince residents here that they can – and should – plan to survive a tsunami. The Indian Ocean tragedy, she said, has gotten everyone's attention and also drawn attention to how much more needs to be done.

"There are things we can do to improve our chances," she said, even though Long Beach is among only about a dozen communities nationwide (along with Ocean Shores and the Quinault Indian Reservation) to

SEE TSUNAMI, A11





80-foot waves blasted Indonesia, scientists now say

BYTOM PAULSON P-E reporter

Scientists studying the Indian Ocean rsu-nami have distovered startling syidence that the killer waves, at least for one coastal area in northern Indonesia, were much larger than cartier believed.

The new findings, of keen interest worldwide to researchers seeking insights into the mechanics of this disaster, also trandate into a disturbing suggestion that the experts have significantly underestimated the magnitude of the trunami threat in the Pacific Northwest and perhaps to coastal communities around the Pacific Ocean.

"It's just staggering," said Andrew Moore, a scientist at Kent State University who was ou a research team, led by Yoshinobu Tsuji of the

University of Tokyo, that recently returned from studying the wave's trail of destruction on the west coast of Sumatra.

Moore, Tsuji and their colleagues found preliminary evidence the tsunami's height along an extensive section of shoreline south of the city of Banda Aceh averaged about 80 feet above sea level, with "run-ups" on inland slopes often reaching well over 100 feet. They estimated the wave's average velocity on shore at 45 feet per second.

"It's mind-boggling to think about," said vasily ritov, a mathematician and isunami computer modeler at the Pocific Marine Environmental Laboratory in Seattle. The lab. operated by the National Oceanic and Atmospheric Administration, is bust to some of the

SEE WAVES, AG



This has serious implications for all of the West Crost' Supersizing our tsunami threat



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Rice makes peace push

Tsunami scare exposes glitches in warning system

The coastal communities of Washington never get the automated emergency radio tsunami alert issued by the National Weather Service.

BY TON PAULSON Polyoperior

It was the seventh inning and the Mariners were up by two over the Phillies when California tsamanti selendat Harvey Kebey, sixting with a group of colleagues, overheard the words: "Quake . . . isunami warning . . . Emneka."

The Humboldt University professor quickly borrowed a cell phone from a colkargue to call his geologist wife at their home six miles array from Bureka, Calif. 20 miles

from proffshore earthquake that, un fuesday evention, was inhibitly estimated as magni-nucle 2.4 and considered espable of generating a dangerous tsurami.

"We hadn't had a tsunami warning on the California coast for many years, *said Kekey, who reached his wife and talked briefly before the line went dead. They were able to that long enough for him to confirm she was OK and to ascertain that, because of the location of the earthquake, a significant trunami

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Tsunami scare exposes glitches in warning system

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