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Samoa tsunami caused by geologic features similar to Pacific Northwest

Published on 1 October 2009, 07:03 Last Update: 9 hour(s) ago by [Insciences](#)

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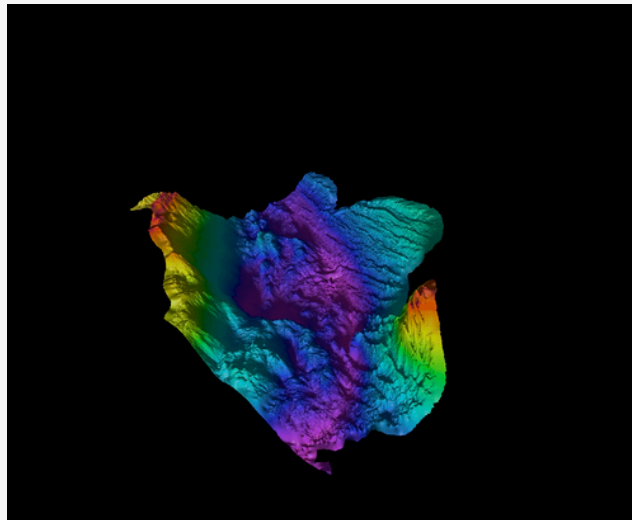
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CORVALLIS, Ore. – The powerful earthquake and deadly tsunami that yesterday struck the Samoan Islands occurred, once again, on a volatile "subduction zone" such as the one that caused the 2004 Indonesian earthquake and another that poses risks to the Pacific Northwest of the United States.

Researchers at Oregon State University who have studied and mapped in detail the subsea terrain near Samoa and Tonga in the South Pacific Ocean say this event – which appears to have killed 100 or more people in the resulting tsunami – happened deep beneath the sea in a complex geological site where two of the Earth's great plates collide.

"To my knowledge, there haven't been many destructive tsunamis in this region in recorded history, but it's not surprising that this happened," said Dawn Wright, a professor of geosciences at OSU who has done extensive bathymetric mapping of this part of the world.

"In this area, the Pacific plate and the Australian plate are colliding, and it's further complicated by a transition from a subduction zone to strike-slip fault such as the San Andreas fault in California," Wright said. "In the process the Pacific plate is also tearing at this transition zone, and such forces make it especially vulnerable to large earthquakes."



Researchers at Oregon State University have done extensive undersea mapping of the seafloor that was the site of the deadly earthquake and tsunami near Samoa. The epicenter in this image is about 20,000 feet of water in the blue region at the lower right corner of this map. (Oregon State University)

The earthquake happened near the Tonga Trench, Wright said, which forms where one of the tectonic plates dives under the other and in the process creates a vast undersea canyon that dwarfs the Grand Canyon in the U.S. – it includes the Horizon Deep, the second deepest spot on the planet, at more than 35,000 feet beneath the sea. In this event, two giant parts of the Earth surged in different directions and violently heaved the ocean water above them, resulting in a tsunami. Some of these high speed waves can reach the speed of a jet airliner and travel across entire oceans – but in this case it appears that Samoa and American Samoa received the brunt of the damage.

"There's a real similarity here to both the subduction zones that caused the Indonesia earthquake and pose risks on the Cascadia Subduction Zone off the Pacific Northwest," Wright said. "Like many places on what's called the 'ring of fire,' these deep, high magnitude earthquakes hold the potential for dangerous tsunamis. That's what we need to be preparing for here in the Pacific Northwest."

Wright noted that engineers at OSU are working at this time with community leaders from Cannon Beach, Ore., to design and build what could become the nation's first tsunami resistant structure, envisioned as a building that people could run to when an earthquake hits and

there may be only a matter of minutes before a deadly tsunami strikes.

The Samoan tsunami occurred only 20 minutes after the earthquake hit, reports indicate, leaving coastal residents very little time to seek safety on higher ground. Successive waves caused significant damage and loss of life.

Shortly after that, in an unrelated geologic event, yet another earthquake struck the Indonesia island of Sumatra and killed many people, not far from where the deadly 2004 earthquake and tsunami occurred.

At OSU, other work is also under way to study subsea terrain, wave behavior and the specific forces of tsunamis, using the world's most sophisticated tsunami wave basin at the Hinsdale Wave Research Laboratory.

About the OSU College of Science: *As one of the largest academic units at OSU, the College of Science has 14 departments and programs, 13 pre-professional programs, and provides the basic science courses essential to the education of every OSU student. Its faculty are international leaders in scientific research.*

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Source: Oregon State University, News and Communications

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