AWESOME stories

CAUSE of INDIAN OCEAN TSUNAMI

Earthquake-caused tsunamis are not a recent phenomenon. This image of a copper engraving, from 1755, depicts the impact of an earthquake and tsunami on the city of Lisbon. The "great quake" occurred on November 1, 1755. Thucydides, the ancient Greek historian, describes receding sea water which returns in massive waves, inundating coastal areas. He attributes the cause of such waves to earthquakes. Original engraving maintained at the Museu da Cidade, Lisbon. Image online, courtesy Wikimedia Commons.

When we think about earthquakes which occur underground, we envision falling buildings, buckling freeways and observable fault lines (like the San Andreas).

When we think about earthquakes which occur undersea, we worry about tons of displaced water racing toward shorelines (both near and far).

That racing seawater is called a Tsunami. It can develop when an under-ocean earthquake vertically jolts the seabed, transferring energy from below the ocean (caused by the quake) to the surface (producing a tsunami).

Think of it like this. If you were underwater, and you suddenly and forcefully thrust your fist upwards, you would displace the water on all sides of your moving fist. That is a simplified analogy, on a significantly smaller scale, of what happens when a tsunami is born.

When a thrust earthquake occurs underwater, the upward movement of the seabed - sometimes by many meters - displaces hundreds of cubic kilometers of water. That water has to go someplace, once it's been disturbed in such a dramatic fashion.

Just like ripples forming around a stone, which someone has thrown into the water, large waves begin to move away from the earthquake's center. The difference between stone-throw ripples and earthquake-caused waves, however, is profound. The ripples quickly die-out, but tsunami waves keep moving.

In deep water, a tsunami moves incredibly fast. In shallow water, as the tsunami approaches coastal areas, the waves slow down but grow taller.

Sometimes the trough of a tsunami wave reaches the shoreline before its crest arrives. When a leading-depression wave occurs, seawater suddenly draws-back from the shore, exposing hundreds of meters of seabed.

People unfamiliar with tsunamis can misunderstand why fish are suddenly flapping around on a drying seabed. Drawn to the shore, to investigate, they put themselves in harm's way since the crest of the wave will soon arrive.

Tsunamis often have several waves which overwhelm the shoreline. They arrive in intervals, sometimes five to ninety minutes apart. Even this phenomenon confuses people who think that if they have survived the first wave, they have survived the tsunami.

On the 27th of December, 2004 - the day after the officially named "Great Sumatra-Andaman Earthquake" - the waves of the resulting tsunami were still reaching shorelines thousands of miles from the quake's epicenter. About 29 hours after its birth, the tsunami reached both American coasts.

Much closer to the epicenter, the island of Phuket - with its hard-working local families, lovely beaches and

vacationing tourists - was seriously at-risk for a tsunami strike.

See Alignments to State and Common Core standards for this story online at:
http://www.awesomestories.com/asset/AcademicAlignment/CAUSE-of-INDIAN-OCEAN-TSUNAMI-The-Impossible

See Learning Tasks for this story online at:
http://www.awesomestories.com/asset/AcademicActivities/CAUSE-of-INDIAN-OCEAN-TSUNAMI-The-Impossible

Questions 2 Ponder

When Is Acting on Curiosity Ill-Advised?

Drawn to observe the shore when water somehow pulls back from the coastline, leaving fish flapping around, is the worst thing we can do. A tsunami is likely on the way.

On the 26th of December, 2004, curious people put themselves in danger when they tried to understand why the waves along the Thai shore, for example, had pulled back from the normal water's edge.

Since no one had any warning about a potential tsunami, following a massive underwater earthquake, no one realized the unusual phenomenon they were observing was the trough of a tsunami wave.

It would not be long before the wave's crest arrived. When it did, a wall of water swept away everything in its path - including houses, cars, buildings and people.

When a curious event happens - like the water along a shoreline pulling back far from the normal water's edge - how likely is it that people will not investigate "what's up?" Explain your answer.

Can you think of other events were acting on our curiosity is ill-advised? What are they?

Media Stream

Tsunami - Wave Draw-Back at Phuket, Thailand
Photo of Kata Noi Beach - taken on December 26, 2004 - by PHG, online courtesy Wikimedia Commons.

View this asset at:
http://www.awesomestories.com/asset/view/Tsunami-Wave-Draw-Back-at-Phuket-Thailand

Tsunami Damage - Pa Tong, Phuket Island
Photo of Pa Tong, Phuket Island, Thailand - following the December 26, 2004 tsunami - by Milei.vencel, online courtesy Wikimedia Commons.

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http://www.awesomestories.com/asset/view/Tsunami-Damage-Pa-Tong-Phuket-Island

Tsunami Strike - Indian Ocean
Image of December 26, 2004 tsunami wave, online courtesy Wikimedia Commons.
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San Andreas Fault - How It Impacts California

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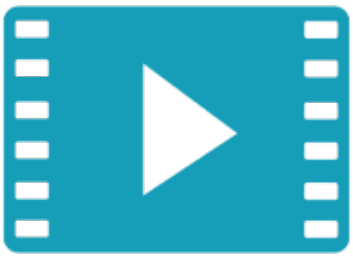

How Earthquakes Cause Tsunamis - Animation

Video animation by NOAA. Clip online, courtesy NOAA.
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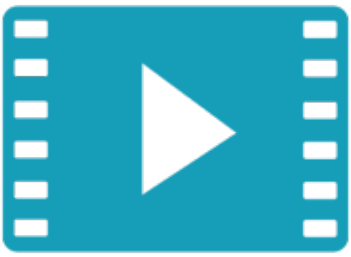

Tsunami - What is It?

Video produced by UNESCO / IOC-NOAA International Tsunami Information Center, NOAA / Pacific Marine Environmental Laboratory, SeismicReady Consulting, Inc., US Geological Survey, University of Hawaii. Online, courtesy NOAAPMEL.
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