

Science in the News

Tsunamis - Killer Waves



A tsunami is a series of ocean waves that sends surges of water, sometimes reaching heights of over 100 feet (30.5 meters), onto land. These walls of water can cause widespread destruction when they crash ashore.

These awe-inspiring waves are typically caused by large, undersea earthquakes at tectonic plate boundaries. When the ocean floor at a plate boundary rises or falls suddenly it displaces the water above it and launches the rolling waves that will become a tsunami.

Most tsunamis, about 80 percent, happen within the Pacific Ocean's "Ring of Fire," a geologically active area where tectonic shifts make volcanoes and earthquakes common.

Tsunamis may also be caused by underwater landslides or volcanic eruptions. They may even be launched, as they frequently were in Earth's ancient past, by the impact of a large meteorite plunging into an ocean.

Tsunamis race across the sea at up to 500 miles (805 kilometers) an hour—about as fast as a jet airplane. At that pace they can cross the entire expanse of the Pacific Ocean in less than a day. And their long wavelengths mean they lose very little energy along the way.

In deep ocean, tsunami waves may appear only a foot or so high. But as they approach shoreline and enter shallower water they slow down and begin to grow in energy and height. The tops of the waves move faster than their bottoms do, which causes them to rise precipitously.

A tsunami's trough, the low point beneath the wave's crest, often reaches shore first. When it does, it produces a vacuum effect that sucks coastal water seaward and exposes harbor and sea floors. This retreating of sea water is an important warning sign of a tsunami, because the wave's crest and its enormous volume of water typically hit shore five minutes or so later. Recognizing this phenomenon can save lives.

A tsunami is usually composed of a series of waves, called a wave train, so its destructive force may be compounded as successive waves reach shore. People experiencing a tsunami should remember that the danger may not have passed with the first wave and should await official word that it is safe to return to vulnerable locations.

Some tsunamis do not appear on shore as massive breaking waves but instead resemble a quickly surging tide that inundates coastal areas.

The best defense against any tsunami is early warning that allows people to seek higher ground. The Pacific Tsunami Warning System, a coalition of 26 nations headquartered in Hawaii, maintains a web of seismic equipment and water level gauges to identify tsunamis at sea. Similar systems are proposed to protect coastal areas worldwide.

After reading the article, answer the following questions on a separate piece of paper DCN style.

- 1) What is a Tsunami?
- 2) List 3 things that can cause tsunami to form?
- 3) Where do most tsunami's occur?
- 4) How fast do tsunami's move in deep ocean?
- 5) Define trough.
- 6) What is one sign of a tsunami?
- 7) What is a wave train?
- 8) Describe the role of the Pacific Tsunami Warning System.
- 9) What is the best defense against a tsunami?