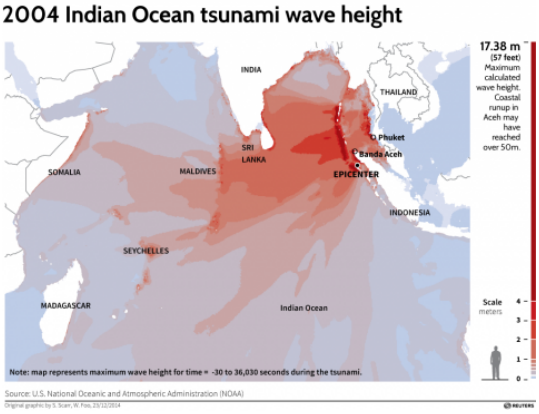
Tsunami Wave Height - 2004 Indian Ocean Disaster



The word “tsunami” comes from the Japanese language: *Tsu* means “harbor” and *nami* means “wave.” A tsunami, thus, is a wave, or a succession of waves—often massive—striking harbor and/or coastal areas.

Earthquakes are a common cause of tsunamis, but not all earthquakes cause these massive waves (and ... not all tsunamis are caused by earthquakes). Earthquake-caused tsunamis can occur when:

- The epicenter of the earthquake occurred in the sea floor.
- The quake measures around 6.5 magnitude.
- The earthquake was a shallow event, occurring at a maximum depth of about 33 km.
- The quake region is relatively large.

In the deep ocean, a tsunami wave can travel as fast as a jetliner but may not even be noticed (or felt) by passing ships. The same wave behaves very differently, however, when it reaches the shoreline. NOAA (the U.S. National Oceanic and Atmospheric Administration) tells us why this is so:

> *... in very deep water, a tsunami will travel at high speeds and travel great transoceanic distances with limited energy loss. For example, when the ocean is 20,000 feet (6100 m) deep, unnoticed tsunami travel about 550 miles per hour (890 km/hr), the speed of a jet airplane. And they can move from one side of the Pacific Ocean to the other side in less than one day.*
>
> *As a tsunami leaves the deep water of the open sea and propagates into the more shallow waters near the coast, it undergoes a transformation. Since the speed of the tsunami is related to the water depth, as the depth of the water decreases, the speed of the tsunami diminishes. The change of total energy of the tsunami remains constant. Therefore, the speed of the tsunami decreases as it enters shallower water, and the height of the wave grows.*
>
> *Because of this “shoaling” effect, a tsunami that was imperceptible in deep water may grow to be several feet or more in height.*

A massive, deadly and highly destructive tsunami occurred on December 26, 2004 following an earthquake in the Indian Ocean, off the shore of Banda Aceh, Indonesia. Although the maximum-calculated wave height, for this tsunami, was 17.38 meters (57 feet), NOAA has stated that “coastal runup in Aceh may have reached over 50 meters.”

This graphic image helps us to put those heights into perspective.

The 2004 disaster was not the first catastrophe, caused by a tsunami, which occurred in this general area of the Indian Ocean. In 1883, the volcano Krakatau (Krakatoa) erupted, causing the loudest-ever recorded sound and producing a tsunami with a height of nearly 41 meters.

Click on the image for a full-page view.

Credits:

See Alignments to State and Common Core standards for this story online at:
http://www.awesomestories.com/asset/AcademicAlignment/Tsunami-Wave-Height-2004-Indian-Ocean-Disaster

See Learning Tasks for this story online at:
http://www.awesomestories.com/asset/AcademicActivities/Tsunami-Wave-Height-2004-Indian-Ocean-Disaster