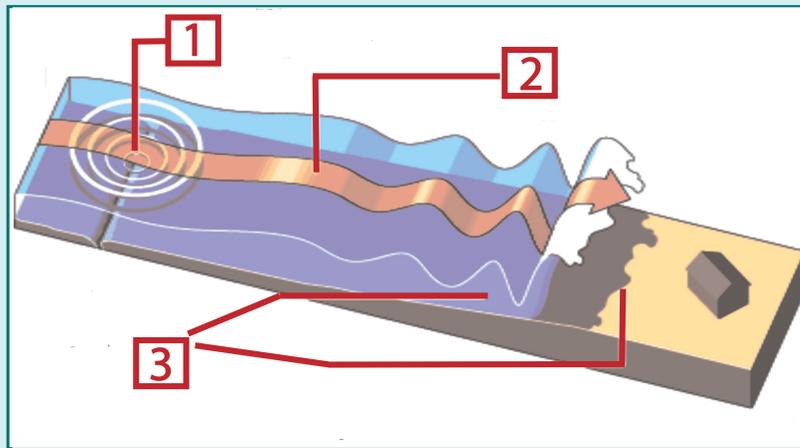


WHAT IS A TSUNAMI?



<http://www.aeic.alaska.edu/tsunami>

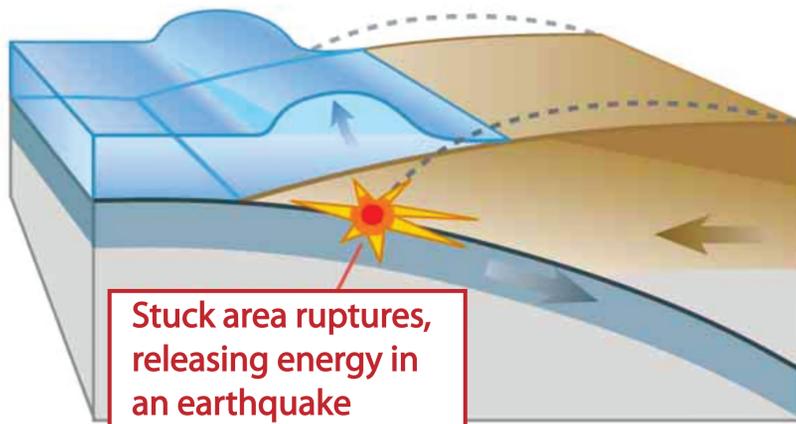
- A **series of waves** brought on by a large-scale **underwater disturbance** that vertically displaces ocean water;
- Originates from the **Japanese** word "tsu-nami" (harbor wave);
- Propagate across **great distances** retaining their wave energy and **destructive force**;
- Tsunami is **NOT** a tidal wave!



1 Generation of Tsunami Waves

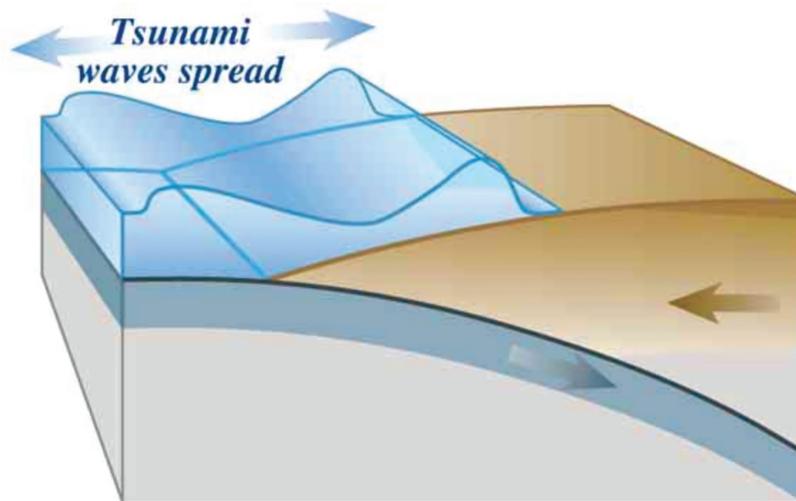
A tsunami is generated when a sudden displacement of a large volume of water occurs. Typically, the undersea disturbance is the result of an earthquake, a volcanic eruption, or an undersea landslide.

Earthquake starts tsunami



Stuck area ruptures, releasing energy in an earthquake

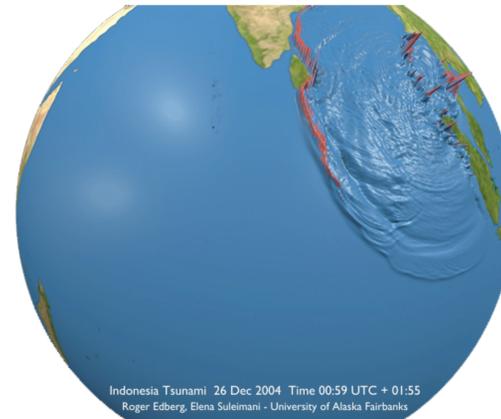
When an earthquake occurs along a subduction zone, the leading edge of the overriding plate breaks free and springs forward, raising the sea floor and the water.



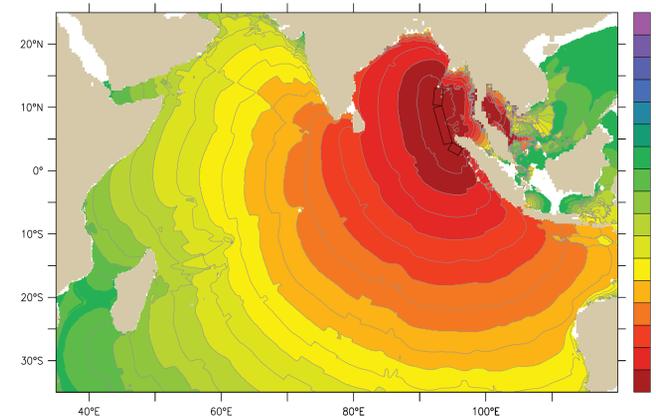
Part of the tsunami travels toward the nearby land with very long wavelengths (hundreds of miles) in deep water and growing in height as the water depth decreases.

2 Deep Ocean Tsunami Propagation

- In deep ocean, tsunami propagate with speeds that can exceed 700 kilometers per hour (450 miles per hour);
- Tsunamis are not dangerous in deep water: a single wave is about a meter high, and its length can extend for hundreds of kilometers, making a sea surface slope so gentle that the wave passes unnoticed.



Snapshot of the December 26, 2004 tsunami propagating across the Indian Ocean. This tsunami was generated by the Mw 9.0 megathrust submarine earthquake off the west coast of Northern Sumatra. The tsunami waves killed more people than any other tsunami in the recorded history.



The December 26, 2004 tsunami travel time contours. Each color represents one hour of tsunami propagation time. It took the wave 2 hours to reach Sri Lanka and the coast of Bay of Bengal, and about 7 to 9 hours to propagate to the east coast of Africa.

What can I do to protect myself from a tsunami?

- ✓ Develop a family disaster plan. Everyone needs to know what to do on their own to protect themselves from an earthquake.
- ✓ Be familiar with local Emergency Management earthquake and tsunami plans. Know where to go to survive a tsunami.
- ✓ Be prepared to survive on your own for a minimum of seven days.
- ✓ Prepare a disaster supply kit for your home, automobile and work.
- ✓ Take a first aid course and learn survival skills. **Knowledge is your greatest defense against potential disaster.**

Remember:

1. Never go to the coast to watch a tsunami! Tsunamis move faster than a person can run.
2. Do not return to shore after the first wave. Wait for the "All Clear" signal before you return.
3. If you see an unexpected rise or fall in the coastal water, a tsunami may be approaching. Move inland or uphill quickly.



Tsunami emergency sign in downtown Seward, Alaska.

3 Tsunami Run-up on a Shore

- As the tsunami waves enters shallow waters, it slows down, and the wave amplitude grows;
- A tsunami may run ashore as a breaking wave, a wall of water or a tide-like flood;
- A receding sea sometimes precedes a tsunami;
- Horizontal inundation can penetrate hundreds of meters (or even a few kilometers) inland.



Comparative imagery overview of northern shore of Banda Aceh, Sumatra, Indonesia area, pre- (top photo) and post-tsunami (bottom photo). Image source: Space Imaging, CRISP - Singapore.

References:

Killer Waves- <http://library.thinkquest.org>
 Pacific Tsunami Museum- <http://tsunami.org>
 USGS- <http://pubs.usgs.gov/circ/c1187/>
 AEIC- <http://www.aeic.alaska.edu/tsunami>
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