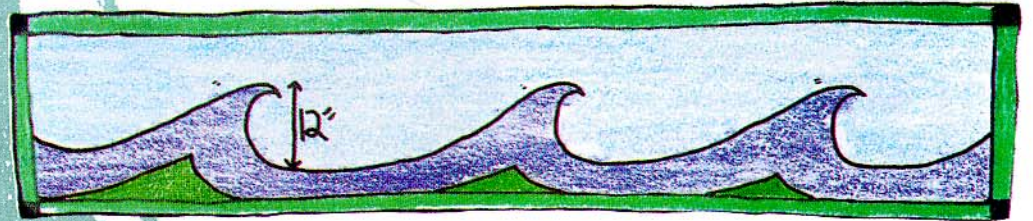


# TSUNAMI WARNING!

A tsunami is a series of waves generated by large, violent oceanic earthquakes caused by rapid movements of the sea floor.



## WHAT CAUSES TSUNAMIS?

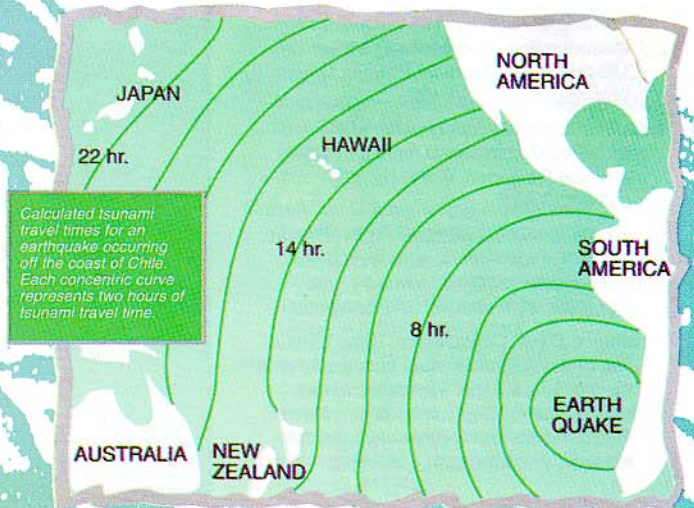
Tsunamis, also called seismic sea waves (or incorrectly tidal waves), are generally caused by earthquakes. The earthquakes that generate tsunamis might occur far away from where you live or very close to where you live. Not all earthquakes generate tsunamis. To generate tsunamis, earthquakes must occur underneath or near the ocean, be large, and create vertical movements in the sea floor. All coastal regions of the world can experience tsunamis, but in the Pacific Ocean there is a much more frequent occurrence of large destructive tsunamis because of the many large earthquakes along the margins of the Pacific Ocean.

### Fire and Water

About two-thirds of the earth is covered by the waters of four oceans. The Pacific Ocean is the world's largest, covering more than one-third of the total surface area of our planet. The Pacific Ocean is surrounded by a series of mountain chains, deep ocean trenches, and island arcs, sometimes called a "ring of fire." The great size of the Pacific Ocean and the large earthquakes associated with the "ring of fire" combine to produce deadly tsunamis.

In less than a day, these tsunamis can travel from one side of the Pacific to the other. However, people living near areas

where large earthquakes occur may find that the tsunami will reach their shores within minutes of the earthquake. For these reasons, the tsunami threat to many areas such as Hawaii, Japan, or the U.S. west coast, can be immediate. Tsunamis from nearby earthquakes take only a few minutes to reach coastal areas. Less urgent are tsunamis from distant earthquakes taking 3 to 22 hours to reach coastal areas.



## Tsunamis on the Move

In the deep ocean, destructive tsunamis can be small—often only a few feet or less in height—and cannot be seen nor can they be felt by ships. But, as the tsunami reaches shallower coastal waters, its height can increase rapidly. Sometimes, coastal waters are drawn into the ocean just before the tsunami strikes. When this occurs, more shoreline may be exposed than even at the lowest tide. This major withdrawal of the sea should be taken as a warning that the tsunami will follow. No one would want to try to outrun a fast-moving 30 foot high wall of water that could smash the shore, people, and houses with great impact.

### How Fast?

In the deep ocean, over 20,000 feet in depth, the unnoticed tsunami can travel at the speed of a commercial jet plane, nearly 600 miles per hour. It can move from one side of the Pacific Ocean to the other in less than a day. This rapid speed makes it important to be aware of the tsunami as soon as it is generated.

### TSUNAMI FACTS

- Tsunamis that strike coastal locations in the Pacific Ocean Basin are almost always caused by earthquakes.
- Some tsunamis can be very large. In coastal areas they can be more than 50 feet high and can move inland several hundred feet.
- All low-lying coastal areas can be struck by tsunamis.
- A tsunami is a series of waves. Often the first wave is not the largest. The danger from a tsunami can last for several hours after the arrival of the first wave.
- Tsunamis can move faster than a person can run.
- Sometimes a tsunami causes the water near the shore to recede, exposing the ocean floor.
- The force of some tsunamis is enormous. Large rocks weighing several tons, boats, and other debris can be moved hundreds of feet by tsunami wave activity. Homes and other buildings are often destroyed.
- Tsunamis can occur at any time, day or night.
- Tsunamis can travel up rivers and streams that lead to the ocean.

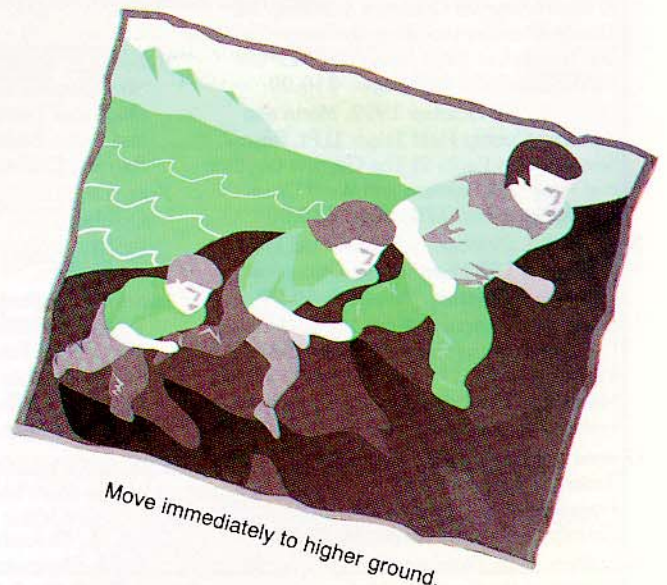
This information was taken from *Tsunami Warning Supplement for Teachers and Students* prepared in cooperation with: UNESCO/Intergovernmental Oceanographic Commission; International Tsunami Information Center; Hydrographic and Oceanographic Office, Chile; National Weather Service, Pacific Region; University of Hawaii, School of Ocean & Earth Science & Technology; State of Hawaii, Department of Education; and the State of Hawaii, Civil Defense and County Civil Defense.

### WHAT YOU SHOULD DO

- Be aware of tsunami facts. This knowledge could save your life. Share this knowledge with relatives and friends.
- If you are in school and hear there is a tsunami warning, follow the advice of your teachers and other school personnel.
- If you are home and hear there is a tsunami warning, make sure everyone else in your home is aware of the warning. Everyone should evacuate if it is in a tsunami evacuation zone. If you are home alone, ask a friend or neighbor to help you. Move in an orderly, calm, and safe manner to the evacuation site or to any safe place outside your evacuation zone.
- If you are at the beach or near the ocean and you feel the earth shake, move immediately to higher ground. Do not wait for a tsunami warning to be announced. Stay away from rivers and streams that lead to the ocean, and stay away from the beach and ocean if there is a tsunami. A regional tsunami from a local earthquake could strike some areas before a tsunami warning could be announced.

For more information on tsunamis, contact:

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Illustrations by Joe Hunt Graphics.