

Tsunamis

A tsunami is a large ocean wave resulting from the sudden motion of the ocean floor. Such a motion could be the result of an underwater earthquake, a volcanic eruption, the sudden erosion of the ocean floor, or a large meteorite fall (Figure 4).

Following an underwater earthquake, as a consequence of the raising or lowering of the sea bed, water is pushed up then pulled down. This combination creates a horizontal force that forms the tsunami. Most tsunamis result from earthquakes in a subduction zone, in which the oceanic plate is forced downwards. Huge friction with the overriding plate leads to a build-up of tension and accumulation of energy, whose release results in the overriding plate snapping back into position, triggering a tsunami. For a tsunami to form the magnitude of the earthquake must measure at least 7, otherwise not enough water is displaced.

FACT Tsunamis move rapidly through deep water, slowing as they reach increasingly shallow waters. A tsunami will travel at approximately 765 km/h in 4500m of water but the velocity drops to approximately 65 km/h in 30m of water. As tsunamis approach land, they increase in height.

Characteristics of tsunamis

Tsunamis range in size from just a few centimetres to more than 30 metres. In deep water tsunamis are rarely over 1 metre high and might be unnoticeable to ships, but as they approach a coastline the characteristics of the tsunami will change and they will become up to ten times higher. It is estimated that every year two tsunamis occur that will inflict damage close to their source and every 15 years a destructive, ocean-wide tsunami occurs. Small tsunamis occur daily but are usually non-destructive and often undetectable, as their source is too far away from a coastline for them to have any impact when they reach the shore.

The effects of tsunamis

A number of contributory factors combine to determine the impact of a tsunami on coastal communities and the environment:

- the magnitude of the earthquake responsible for the tsunami
- the distance from the origin of the tsunami to the coastline
- the depth of the ocean off a coastline at risk from an approaching tsunami.

Earthquakes occur daily but their magnitude varies greatly: between 2008 and 2018, 11,000 to 15,000 earthquakes with a magnitude greater than 4 were recorded annually.

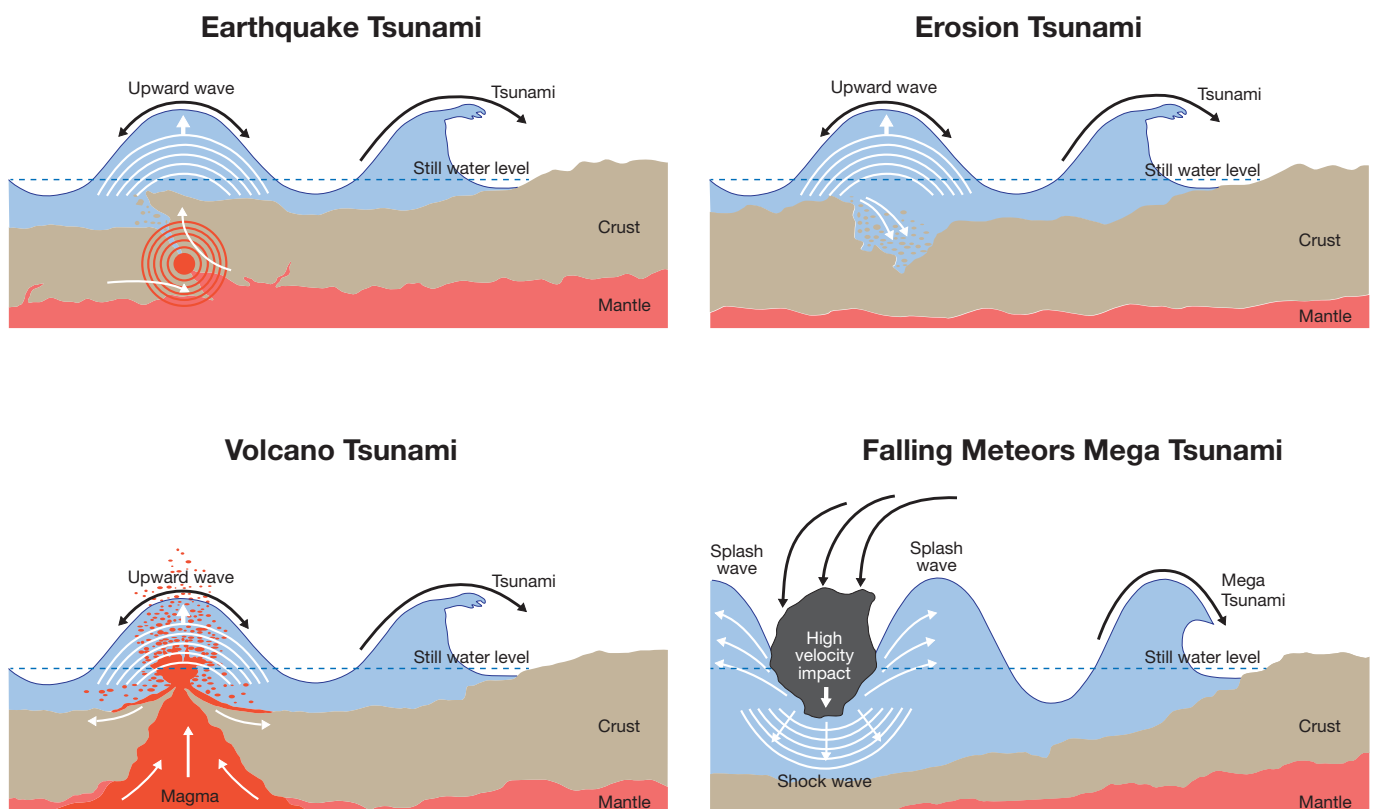


Figure 4: The causes of a tsunami.