

# TSUNAMI

A **TSUNAMI** is a series of giant sea waves commonly generated by under-the-sea earthquakes and whose heights could be greater than 5 meters. It is erroneously called tidal waves and sometimes mistakenly associated with storm surges. Tsunamis can occur when the earthquake is shallow-seated and strong enough to displace parts of the seabed and disturb the mass of water over it.

## SOME NATURAL SIGNS OF AN APPROACHING LOCAL TSUNAMI



A felt earthquake.



Unusual sea level change: sudden sea water retreat or rise.

Rumbling sound of approaching waves

## TSUNAMI PREPAREDNESS AND SAFETY



Do not stay in low-lying coastal areas after a strong earthquake. Move to higher grounds immediately.

Never go down the beach to watch for a tsunami. When you can see the wave, you are too close to escape it.



During the retreat of sea level, interesting sights are often revealed. Fishes may be stranded on dry land thereby attracting people to collect them. Also, sandbars and coral flats may be exposed. These scenes tempt people to flock to the shoreline thereby increasing the number of people at risk.

Stay out of danger areas until an "all clear" is issued by competent authority. A tsunami is not a single wave but a series of waves.

## HOW TSUNAMI IS GENERATED

A



A. Tsunamis are commonly generated in subduction zones under the ocean where two plates collide, with one plate (A) moving down under the other (B).

B

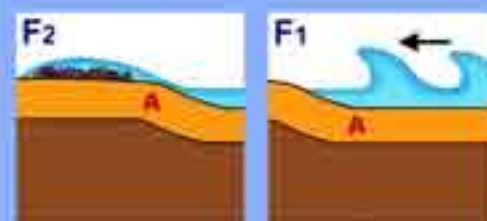


B. When plates get stuck, the overriding plate (B) gets distorted.

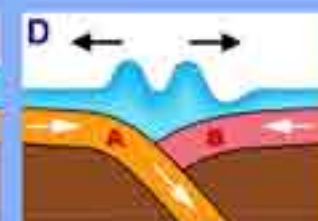
C



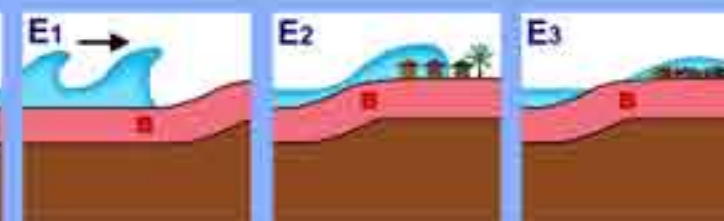
C. Stuck area ruptures triggering an earthquake and pushing up the ocean floor and sea water above. This starts the tsunami which moves in opposite directions.



F1 - F2. On the side of the downgoing plate A, the sea water surges up and the huge waves hit the opposite coast suddenly. For this case, there will be no drop in sea surface at the coasts. What can be observed is the sudden rise of water.



D. There are two possible behaviors of the surface that may be observed.



E1 - E3. On the side where the ocean floor rose (plate B), considerable volume of water is pushed up. This causes the shifting of sea water. As a result, sea water is momentarily pulled back away from the shore (E1) causing the water to drop along the coast, which then rushes back as tall wall of seawater that hits the coastal areas.



Damaged residential area at Malabang, South Cotabato due to tsunami surges in Mataling River brought by the 1976 Moro Gulf Earthquake.



A jeepney in South Cotabato smashed by tsunami produced by the 1976 Moro Gulf Earthquake.



A nipa hut destroyed by tsunami during the 1994 Mindoro Earthquake.



Indian Ocean Tsunami, Phuket, Thailand, 26 December 2004.

The coastal areas in the Philippines especially those facing the Pacific Ocean, South China Sea, Sulu Sea and Celebes Sea can be affected by tsunamis that may be generated by local earthquakes.

On 17 August 1976, a M7.9 earthquake in Moro Gulf produced tsunamis which devastated the southwest coast of Mindanao and left more than 3,000 people dead, with at least 1,000 people missing. More than 8,000 people were injured and approximately 12,000 families were rendered homeless by more than 5-meter high waves.

The 15 November 1994 Mindoro Earthquake also generated tsunamis that left 78 casualties.

These tsunamis occurred within a very short time, with a first wave reaching the shoreline nearest the epicenter, 2 to 5 minutes after the main earthquake. These tsunamis were both **locally generated**. There **will not be enough time for warning** in case of locally generated tsunamis.

Tsunamis may also be generated from distant locations, such as those coming from other countries bordering the Pacific Ocean like Chile, Alaska in the USA and Japan (**far field tsunamis**). The tsunami of 2 May 1960 that was generated by a strong earthquake from Chile killed 61 in Hilo, Hawaii while 20 people were reportedly killed in the Philippines. Travel times for tsunamis generated in distant locations are longer (1 to 24 hours) and will generally give enough time for warning from the Pacific Tsunami Warning Center (PTWC) and Northwest Pacific Tsunami Advisory Center (NWPTAC).



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