



## EIACP, PUDUCHERRY

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# World Tsunami Day

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Tsunamis are rare events but can be extremely deadly. In the past 100 years, 58 of them have claimed more than 260,000 lives, or an average of 4,600 per disaster, surpassing any other natural hazard. The highest number of deaths in that period was in the Indian Ocean tsunami of December 2004. It caused an estimated 227,000 fatalities in 14 countries, with Indonesia, Sri Lanka, India and Thailand hardest-hit.

Just three weeks after that the international community came together in Kobe, in Japan's Hyogo region. Governments adopted the 10-year Hyogo Framework for Action, the first comprehensive global agreement on disaster risk reduction.

They also created the Indian Ocean Tsunami Warning and Mitigation System, which boasts scores of seismographic and sea-level monitoring stations and disseminates alerts to national tsunami information centres.

Rapid urbanization and growing tourism in tsunami-prone regions are putting ever-more people in harm's way. That makes the reduction of risk a key factor if the world is to achieve substantial reductions in disaster mortality – a primary goal of the Sendai Framework for Disaster Risk Reduction 2015-2030, the 15-year international agreement adopted in March 2015 to succeed the Hyogo Framework.

## What are tsunamis?

The word "tsunami" comprises the Japanese words "tsu" (meaning harbour) and "nami" (meaning wave). A tsunami is a series of enormous waves created by an underwater disturbance usually associated with earthquakes occurring below or near the ocean.

Volcanic eruptions, submarine landslides, and coastal rock falls can also generate a tsunami, as can a large asteroid impacting the ocean. They originate from a vertical movement of the sea floor with the consequent displacement of water mass.

Tsunami waves often look like walls of water and can attack the shoreline and be dangerous for hours, with waves coming every 5 to 60 minutes.

The first wave may not be the largest, and often it is the 2nd, 3rd, 4th or even later waves that are the biggest. After one wave inundates, or floods inland, it recedes seaward often as far as a person can see, so the seafloor is exposed. The next wave then rushes ashore within minutes and carries with it many floating debris that were destroyed by previous waves.

## **What are the causes of tsunamis?**

### *Earthquakes*

It can be generated by movements along fault zones associated with plate boundaries.

Most strong earthquakes occur in subduction zones where an ocean plate slides under a continental plate or another younger ocean plate.

All earthquakes do not cause tsunamis. There are four conditions necessary for an earthquake to cause a tsunami:

1. The earthquake must occur beneath the ocean or cause material to slide into the ocean.
2. The earthquake must be strong, at least magnitude 6.5 on the Richter Scale
3. The earthquake must rupture the Earth's surface and it must occur at shallow depth – less than 70km below the surface of the Earth.
4. The earthquake must cause vertical movement of the sea floor (up to several metres).

### *Landslides*

A landslide which occurs along the coast can force large amounts of water into the sea, disturbing the water and generate a tsunami. Underwater landslides can also result in tsunamis when the material loosened by the landslide moves violently, pushing the water in front of it.

### *Volcanic eruptions*

Although relatively infrequent, violent volcanic eruptions also represent impulsive disturbances, which can displace a great volume of water and generate extremely destructive tsunami waves in the immediate source area.

One of the largest and most destructive tsunamis ever recorded was generated in August 26, 1883 after the explosion and collapse of the volcano of Krakatoa (Krakatau), in Indonesia. This explosion generated waves that reached 135 feet, destroyed coastal towns and villages along the Sunda Strait in both the islands of Java and Sumatra, killing 36,417 people.

### *Extraterrestrial collisions*

Tsunamis caused by extraterrestrial collision (i.e. asteroids, meteors) are an extremely rare occurrence. Although no meteor/asteroid-induced tsunamis have been recorded in recent history, scientists realize that if these celestial bodies should strike the ocean, a large volume of water would undoubtedly be displaced to cause a tsunami.