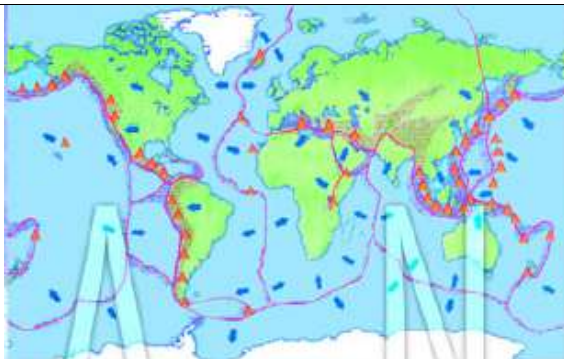


MECHANISM AND GENERATION OF TSUNAMI

The pieces of puzzle

Earth's crust is gigantic puzzle made up of dozen and so pieces. The map shows the shape and location of these pieces, and the direction in which they move. Most earthquakes, volcanoes and some time tsunami also occur where plates collide.

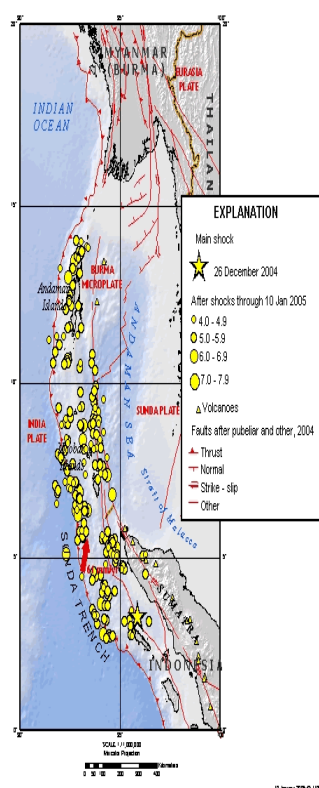
- Plate boundaries
- Direction of plate movement
- Volcanoes
- Earthquake zones



The recent Sumatra and Andaman Earthquake and there after devastating Tsunami in Indian Ocean is the result of such movement. The devastating Earthquake of 26 December 2004 occurred as thrust faulting on the interface of India plate and Burma micro plate and this is because movement of India and Australia plate towards north and northeast with respect of interior of Eurasia plate with velocity about 60 mm/y in the earthquake region.

SUMATRA EARTHQUAKE: MECHANISM AND GENERATION OF TSUNAMI IN SOUTH-EAST ASIA

M9.0 Sumatra - Andaman Islands Earthquake of 26 December 2004



The devastating mega thrust quake of December 26th 2004 occurred on the interface of the India and the Burma micro plates and was caused by the release of stresses that developed as the India plate subduct beneath the overriding Burma plate. The India plate begins its descent into the trench at the Sunda trench lies in the west of the earthquake epicenter. The trench is the surface expression of the plate interface between the Australia and India plates, situated to the south west of the trench, and the Burma and the Sunda plates, situated to the north-east.

Since 1900, earthquake similarly sized or larger than 26 December earthquake.

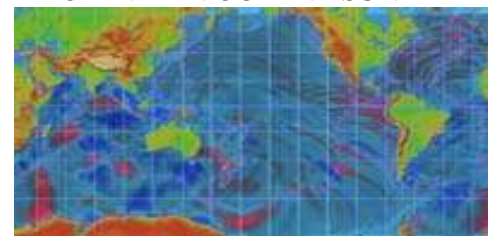
- 1952 quake - 9.0 Kamchatka
- 1957 Andread - 9.1 Island Alaska
- 1960 Chile - 9.5
- 1964 Prince - 9.2 William sound (Alaska)

Note : - All of these earthquake like 26 December earthquake, where mega thrust event, occurring where one tectonic plate subduct beneath another. All produced destructive Tsunami, although deaths and damage from the 26 December Tsunami have far exceeded those cause by Tsunamis associated with the earlier earthquake.

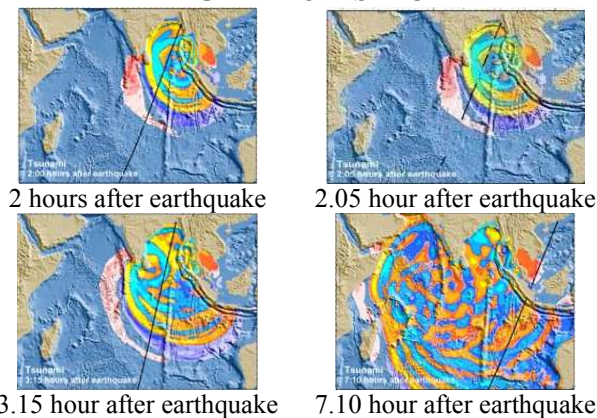
In the event that you do find yourself near the coast when an earthquake hits, be aware of the following guidelines:

- ✓ Move to higher ground immediately.
- ✓ A tsunami may be coming within minutes
- ✓ Go on foot.
- ✓ If there is no high ground, move inland away from the coastline.
- ✓ Stay away from the coast.
- ✓ Later waves are often higher than the first
- ✓ Waves may continue to arrive for hours
- ✓ Listen to your radio for the "all clear" signal

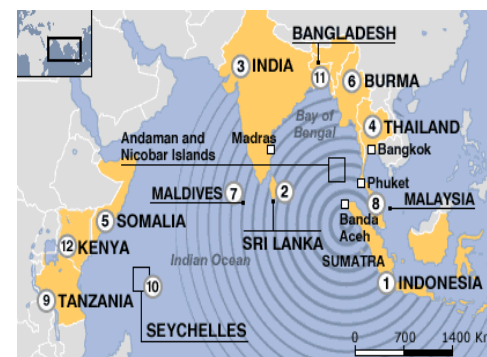
WORLD WIDE REACH OF INDIAN OCEAN TSUNAMI



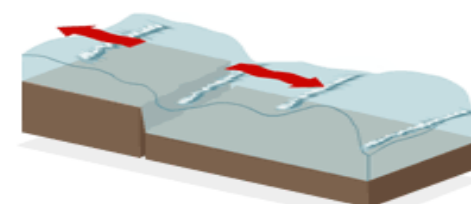
MEASUREMENT OF TSUNAMI HEIGHT FROM SPACE



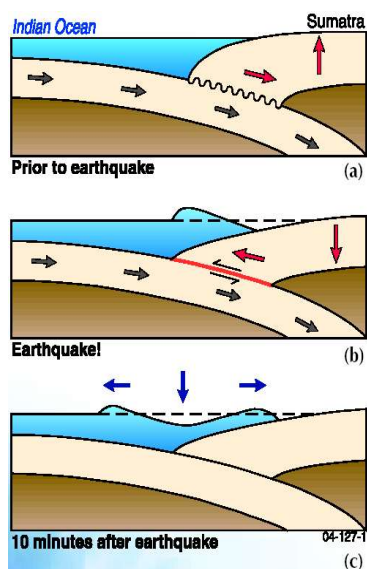
The height goes down over time as the wave spreads over ocean and the energy is expended over the shore. At 2 hours after the quake, it was 60 cm (about 2 feet) high. By 3 hour 15 minute after the quake, that drops to around 40 cm (about 16 inches) high. By 8.50 hour after the quake, the wave spread over most of the Indian ocean and was quite small in most areas-5 to 10 cm (2 to 4 inches).



The map depicts location of epicenter and spreading of Tsunami



Subduction zone earthquakes are the most common source of destructive Tsunamis. They generated when (a) the lower subducting plate drags against the upper plate, causing flexure; (b) stress on the plate boundary causes the upper plate to rebound to its initial, un-flexed position, displacing the sea surface; (c) the displaced sea surface propagates outwards as a Tsunami.



The red arrows in (a) and (b) indicate the direction in which the upper plate is deformed due to drag and release of lower the plate.