

lecture 11 (Dec 11)

Tsunami

Sources

Chapter 5 - Tsunami

Tsunami

tsunami is Japanese for “harbor wave” because they don’t cause
caused by sudden offset of seafloor by earthquake faulting or undersea landslide
very long wavelength: tens to hundreds of miles crest-to-crest
travel hundreds of miles per hour in open ocean (deep water)
low broad waves in open ocean, no danger to ships at sea
in shallow water they slow and get much, much higher
if trough comes first, water drops by a large amount for a while, luring people out onto
exposed seafloor
crest surges ashore (not a single curling/breaking wave) washing through low coastal
areas, washing away anything it can, then eventually ebbs and pulls much debris
back out
next crest may surge ashore as long as an hour after the first
often catches people off guard who thought tsunami was over
the first crest is not always the largest

Indian Ocean Earthquake and Tsunami, December 26, 2004

caused by magnitude 9 subduction zone earthquake (3rd largest recorded)
tsunami killed nearly 250,000 throughout Indian Ocean basin, especially in Sri Lanka
and Thailand

Monitoring and Mitigation

wave breaker structures
lines of trees
warehouses or other building parallel to the shore
raised and strengthened buildings
limiting building in low-lying areas
public education, warning signs, and evacuation routes
tsunami warning systems
buoys and seafloor pressure sensors at sea connected by satellite link
government tsunami warning office, public warning system
available in parts of the Pacific Ocean basin but not Indian or Atlantic yet

Volcanoes & Tsunamis

the island of Hawaii has had massive slumps of the flanks of its volcanoes in the past (prehistoric times) producing massive tsunamis in the Pacific Ocean
one side is presently somewhat unstable and was observed to be slipping seaward during a period of heavy rains

a volcano in the Canary Islands off the coast of Africa is fractured in such a way that some believe that a large part of it could some day slide off into the Atlantic producing a massive tsunami that would cause major disaster in Europe and North America

the eruption of Krakatao in 1883 caused tsunamis that washed away villages well above 100 feet above sea level on the coasts of the Sunda Straits in Indonesia