## 2004 Indian Ocean Earthquake and Tsunami



The 2004 Indian Ocean earthquake and tsunami (also known as the Boxing Day Tsunami) occurred on 26 December, with an epicentre off the west coast of northern Sumatra, Indonesia. It was an undersea megathrust earthquake that registered a magnitude of 9.2 Mw (not the Richter scale), reaching a Mercalli intensity up to IX in certain areas. The earthquake was caused by a rupture along the fault between the Burma Plate and the Indian Plate. Its epicentre was between Simeulue and mainland Sumatra. The earthquake was the third largest ever recorded and had the longest duration of faulting ever observed; between eight and ten minutes. It remotely triggered earthquakes as far away as Alaska. The event is known by the scientific community as the Sumatra–Andaman earthquake.



More than 150,000 are known to be dead, almost 100,000 in Indonesia alone, with an additional 30,000 in Sri Lanka and the damage undoubtedly runs into billions of dollars. The number of dead in this tragedy ranks the Banda Aceh earthquake and associated tsunamis as the seventh largest recorded in human history. Certainly the almost unprecedented visual coverage provided by the world's media has etched the scale of human suffering and grief on everyone's minds.

The Banda Aceh earthquake was **big**. It ranked as the 3rd largest earthquake in the last century, stronger than the 9.0 Mw Kamchatka earthquake of November 1952. Larger earthquakes include the 9.2 Mw Prince William Sound (Good Friday) earthquake on March 23, 1964 and the 9.5 Mw colossus near Valdivia in Chile on May 22, 1960. However, the loss of life was significantly less in each of the other earthquakes. The Chilean earthquake, the largest ever instrumentally recorded, had about 2,800 deaths with less than 250 attributed to the tsunamis that swept across the Pacific to Japan and the Philippines.

These tsunami "tidal waves" raced toward Banda Aceh and other small coastal communities. The oscillatory motions within the waves travel at high speed - at about 800km per hour - although if you were at sea you probably would not notice the wave passing under you. However, when the waves reached land the water slowed and piled up. At least five huge waves, estimated at 12m in height crashed into Banda Aceh. The devastation from the earthquake (locally estimated at Magnitude 8) and the associated tsunami waves was terrifying and complete as the water surged several kilometers inland. Many people undoubtedly died because they simply did not realize what was happening.



Village on the coast of Sumatra

Banda Aceh where a man warned, "Smong! Smong!"

Tell your students that if they are on the seashore and the water suddenly starts to move rapidly offshore, don't wander down to see flapping fish and pick up shells, just head for the highest point that you can find furthest from the coast, because a tsunami wave is likely to follow. This is exactly what one ten-year old British girl told her mother. She had just finished a school class on earthquakes and tsunamis before going on vacation in Thailand. She communicated this to her mother who alerted Thai staff at their resort and 100 people ran to safety before the waves swept in. Another survivor in Banda Aceh realized that the earthquake would likely be followed by a tsunami. He gathered his wife and two children, put them all on his motor cycle and headed inland until he ran out of gas. They all survived, watching the waves crashing across Banda Aceh from a hillside outside the town. In both cases some basic geological knowledge allowed the survivors a sufficient time interval that they were able to escape. Most people thought it was a crazy man running by yelling, "Smong! Smong!". He was from the Simeulue Islands where children are raised with the story of a 1907 earthquake and tsunami disaster. All the children learn to "Run! Run!" after an earthquake strikes. That man survived.