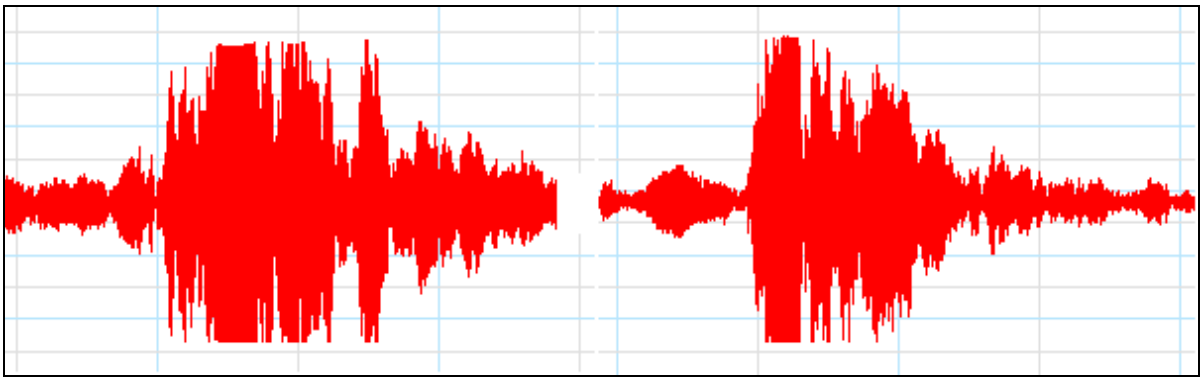
A Data Logging Seismograph

Australia has few large earthquakes, but we are surrounded by very unstable regions, where large earthquakes are common.



PNG 10.30 pm, April 11, 2005
Magnitude 6.5

Noumea 3.10 am, April 12, 2005
Magnitude 6.8

This seismograph is capable of detecting Magnitude 7 and sometimes Magnitude 6 earthquakes around the edges of our continental plate. These two quakes were recorded less than five hours apart on a seismograph like this one, attached to a school datalogger. This is a horizontal seismograph so it detects the horizontal parts of the different earthquake waves. P waves, travel at up to 8km /second and move nearly straight through the earth and arrive first, S waves arrive next. Raleigh and Love waves only travel at 2 – 5km/second and curve around the surface of the earth so they arrive last. This means that if an earthquake occurs in Indonesia, the P waves will arrive in Sydney about 10 minutes later, but the Love waves won't arrive for another 10 minutes and depending on the paths they take around the curve of the earth, they will keep arriving for up to an hour. The seismograph is most sensitive to Love Waves, which have the largest horizontal movement and cause the most damage. P waves are usually detected by vertical seismographs.

Our Geological plate, called the Australian-Indian Plate, is moving north at about 7 cm each year. We broke away from Gondwana (the name given to the southern continents including Antarctica, South America, Africa and Australia when they were joined together) about 45 million years ago. Half way between Australia and Antarctica is a mid-ocean ridge is where the seafloor is spreading. From New Zealand to New Guinea the eastern edge of our plate is colliding with the Pacific Plate. Near Indonesia, the northern edge of our plate is sliding under the Asian Plate.

An earthquake occurs when parts of the plates move along a fault line. A few centimetre movement along a fault only a hundred metres long will produce a Magnitude 2 or 3 earthquake. The Magnitude 9.1 "Tsunami earthquake" on December 26, 2005 had up to 10 metres of movement along a fault line, 1000km long. Vertical movement of the seafloor caused the tsunami wave.

As the earthquake waves move out from the epicentre of the earthquake they make the ground shake, and buildings sway. Because of the heavy weight on the seismograph bar it stays still while the building moves.

Dave Dobeson, the holder of the 2005 University of Sydney Science Teacher Fellowship.
http://science.uniserve.edu.au/school/Seismograph/menu.html