

## Science understanding

Logical/mathematical Verbal/linguistic

On 26 December 2004, a tsunami hit the islands off the western coast of the Indonesian island of Sumatra. This tsunami killed about 160 000 people, mainly in the city of Banda Aceh. The tsunami was caused by a sudden slip of the tectonic plate boundary between the Indo-Australian Plate and a section of the Eurasian Plate called the Sunda Plate. Between these plates is a deep trench, called the Sunda Trench. You can see this in Figure 10.5.1.

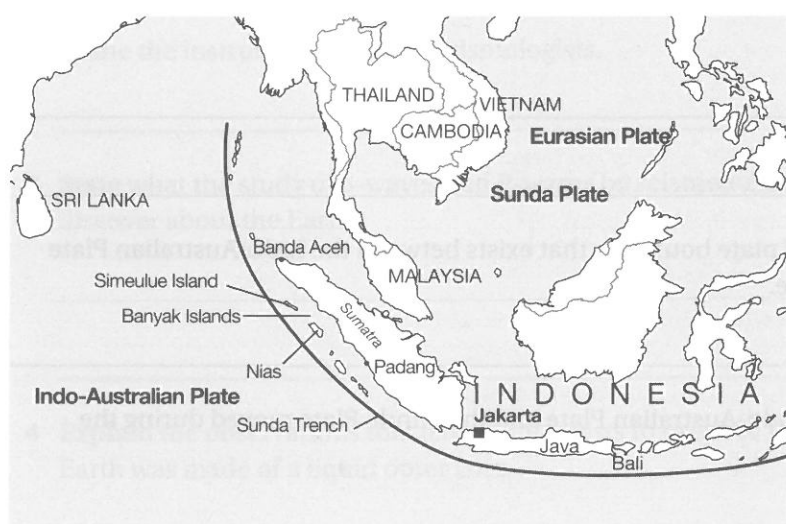
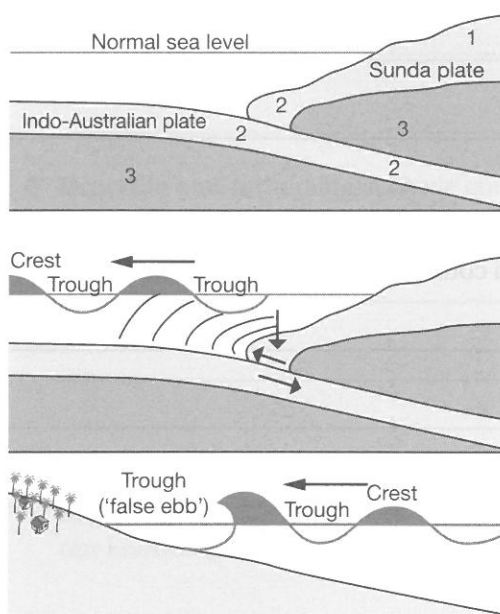


Figure 10.5.1

The Sunda Plate in South-East Asia

As the fault line slipped, it triggered a massive earthquake of magnitude 9.0 on the Richter scale. The epicentre was under the sea near Simeulue Island, and large waves about 37 metres high formed at the surface. The sequence of events is shown in Figure 10.5.2.



1 Before the earthquake

- 1 Continental crust
- 2 Oceanic crust and lithosphere
- 3 Asthenosphere

2 Formation of the tsunami. The Indo-Australian Plate slips down by 20 m and the Sunda Plate is uplifted by 5 m. A tsunami travels outwards initially at 700 km/h in the deep ocean, while a surface wave 37 m high forms.

3 Tsunami waves hitting land. Tsunamis slow down in shallow water. The wave may become much higher, depending on the landscape, and the crests of the waves are closer together. Just before the wave hits the beach, the water level can drop as if the tide has gone out. This is called a false ebb.

Figure 10.5.2

Tsunami formation

**1 Define** a *tsunami*.

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**2 State** the cause of the tsunami of 26 December 2004.

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**3 Define** *epicentre*.

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**4 Identify** the type of plate boundary that exists between the Indo-Australian Plate and the Sunda Plate.

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**5 State** how far the Indo-Australian Plate and the Sunda Plate moved during the earthquake.

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**6 State** the speed of a tsunami in deep water.

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**7 Explain** what effects shallow water has on a tsunami.

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**8 Discuss** some warning signs that a tsunami could be approaching a beach.

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