

On this day in history: 2004 Boxing Day tsunami

In 2004 the Boxing Day tsunami took hundreds of thousands of lives. Today, Australia spearheads a warning system for the Indian Ocean.

By Natsumi Penberthy • December 18, 2014



The 2004 Indian Ocean tsunami is thought to have resulted in the deaths of 230,000 people. Image credit: AAP/AP

BOXING DAY – 26 December – marks ten years since the most devastating tsunami in recent history. It was on this day in 2004 that an earthquake under the Indian Ocean generated a series of tsunamis that is thought to have killed up to 230,000 people.

Governments have worked hard since at developing better tsunami detection and evacuation plans for the Indian Ocean. But, tsunamis are still highly unpredictable beasts.

The source of the 2004 tsunami was a huge earthquake, measuring 9.1 on the Richter scale, its epicentre in the Indian Ocean 250km south-east of the Indonesian city of Banda Aceh. Waves generated by its force were reported to be up to 15m high.

These massive surges of water swept away buildings and people, especially on the coastlines of Indonesia, Sri Lanka, India and Thailand; but the effects were felt as far away as Somalia on the east coast of Africa, 4500km west of the epicentre.

Australia, which is bordered to its west by the Indian Ocean, had a lucky escape. The western coastline was 'sideswiped' avoiding the direct energy of the tsunami.

The disaster resulted in much soul searching as it became apparent that huge death toll was exacerbated by a lack of planning for Indian Ocean tsunamis by governments.

No plan for Indian Ocean tsunamis in 2004

On the day seismic signals picked up by stations in Australia were the first to trigger an alert at the Pacific Tsunami Warning Centre in Hawaii. (An international tsunami warning system has existed in the Pacific, where quakes are more common, since the 1940s.)

When it was realised how significant the quake was, however, the response was haphazard. “Back in 2004 we didn’t know where to send the warning in the Indian Ocean, we didn’t have national contacts”, says Dr Richard Bailey, head of Tsunami Warning and Ocean Services with Australia’s Bureau of Meteorology.

Tsunami waves travel at speeds of up to 800km/h depending on the depth of the water. In 2004 it took anywhere from fifteen minutes to seven hours (for Somalia) for the fatal waves to reach the various coastlines.

Hampered by a lack of a plan for the Indian Ocean, governments and relevant organisations were alerted, but many were fatally slow to react.

The northern regions of the Indonesian island of Sumatra were hit very quickly, while Sri Lanka and the east coast of India and Thailand were affected two hours later. However, in many places, no evacuation measures were taken.

Australian Indian Ocean tsunami warning system

In 2004, Geoscience Australia, the government body responsible for earthquake and tsunami detection, was only monitoring roughly 30 seismic detectors on the Australian continent and one on Antarctica. There were also 26 tide gauges, but these were designed to measure sea level rise due to climate change.

Following 2004, the Australian Government pumped \$68 million in to a warning system for the Indian Ocean, which is a major component of a multi-national Indian Ocean tsunami warning system. Of the 28 countries that ring the Indian Ocean, now Australia, Indonesia and India are responsible for spearheading tsunami warnings in the area.

Today Geoscience Australia’s capacity has built up to where they now monitor over 300 seismic stations across the globe, as well as 44 coastal sea-level tide gauges and six deep-ocean buoys.

This operates 24 hours-a-day and a tsunami warning coming out the joint tsunami centre takes about 15 minutes.

“Australia is fortunate because we are a few hours distant from the closest sources of fatalities,” says Professor Phil Cummins, a natural hazards expert at the Australian National University and Geoscience Australia.

Closest, are possible earthquakes generated south of New Zealand, which could mean a tsunami would hit Hobart and Sydney within two hours. With our current warning system, those cities would have an hour and 45 minutes to evacuate relevant areas.

With the right plan in place, this would be critical time. Ninety-nine per cent of fatalities due to tsunamis in the Pacific – where there has been a long-standing warning system –

come from close to the epicentre, while those who are warned in time survived. In contrast, in 2004, 50 per cent of the people killed were not near the epicentre.

Why was the tsunami in 2004 such a surprise?

One of the reasons the 2004 tsunami had such an impact was that the scientific community were caught unawares, says Phil. It wasn't widely known that tsunamis of that size could occur in the area that it did. Scientists are now much more aware that tsunami events can be spaced thousands of years apart he says.

In addition, says Geoscience Australia's Daniel Jaksa: "We cannot predict earthquakes and it's not likely that we ever will". But in Australia we now have near real-time coverage of tsunami events says Daniel, who helped to develop the Indian Ocean tsunami warning system.

"The biggest challenge for us is the fact that these events are so rare," he says. "The challenge now is to maintain vigilance, maintain the effort to keep the systems alive in real-time, which is...very expensive."

Scientists warn that even in the presence of the best warning systems, it's very difficult to completely avoid fatalities at the epicentre as there is sometimes as little as 10 minutes to detect an event and evacuate.

"We can be ready for tsunamis, but we can never promise to be safe. We need to be ready and vigilant," says Richard Bailey.