

The Australian Tsunami Warning System

The Australian Tsunami Warning System (ATWS) is a national effort between the Australian Bureau of Meteorology, Geoscience Australia and Emergency Management Australia to provide a comprehensive tsunami warning system capable of delivering timely and effective tsunami warnings to the Australian population by 2009. The project also supports international efforts to establish an Indian Ocean tsunami warning system, and contributes to the facilitation of tsunami warnings for the South West Pacific.

'Tsunami' is a Japanese word, which translates as 'harbour wave', now used internationally to refer to a series of waves travelling across the ocean with extremely long wavelengths (up to hundreds of kilometres between wave crests in the deep ocean). Tsunami are usually the result of a sudden rise or fall of a section of the earth's crust under or near the ocean. A seismic disturbance can displace the water column, creating a rise or fall in the level of the ocean above. This rise or fall in sea level is the initial impulse generating a tsunami wave.

On 26 December 2004 the fourth largest earthquake to be recorded since 1900, with a Moment magnitude (Mw) of 9.2, occurred off the west coast of Northern Sumatra in Indonesia. It led to one of the largest losses of life from a natural phenomenon to be recorded in

modern times. A tsunami generated from the displacement of the sea floor of up to 10 m over a length of 1200 km, hit the coastline of 11 countries in and around the Indian Ocean, killing over 280,000 people.

Australia's vulnerability to tsunami

Australia is surrounded to the northwest, northeast and east by some 8,000 km of active tectonic plate boundary capable of generating tsunami, which could reach our coastline within two to four hours. One-third of all earthquakes worldwide occur along these boundaries. The impact of a tsunami hitting vulnerable low-lying areas of the Australian coast could be significant.

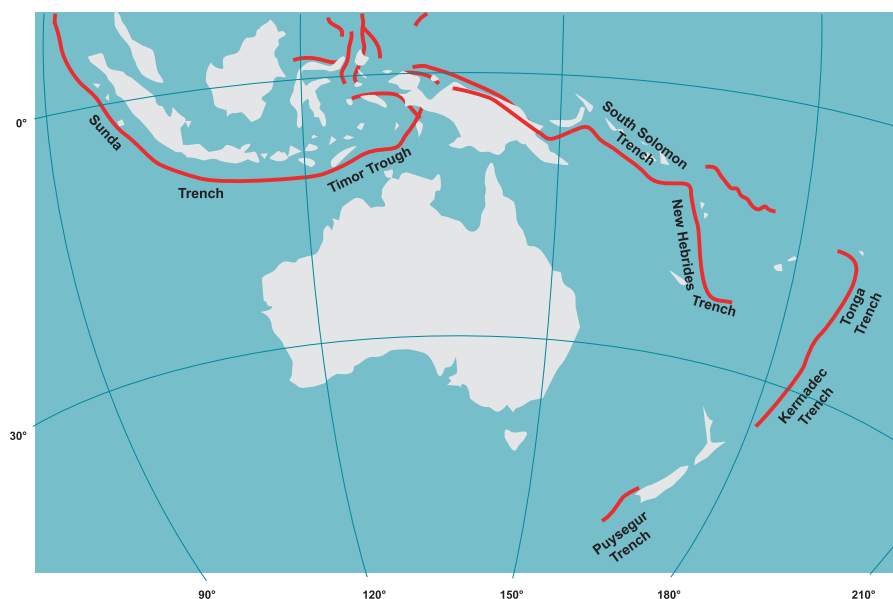
As a direct result of the tsunami generated off the coast of Indonesia on 26 December 2004, the Australian Government identified the need to be able to warn the Australian population of such

phenomena, with the aim of minimising the loss of life and economic impact to its population. At that time an informal Australian Tsunami Alert System (ATAS) was operated jointly by the Australian Bureau of Meteorology, Geoscience Australia and Emergency Management Australia. The ATAS system has limited capabilities in tsunami monitoring and warning.

Enhancing Australia's capabilities

The Australian Government has committed \$68.9M over four years to establish an Australian Tsunami Warning System by 2009. This will include:

- Establishment of an Australian Tsunami Warning Centre (AusTWC) with 24/7 monitoring and analysis capacity for Australia;
- The upgrade and expansion of sea-level and seismic monitoring networks around Australia and in the Indian and South West Pacific Oceans;



Subduction zone plate boundaries (shown in red) around Australia that have the potential to generate a tsunami that may impact on Australia's coast (source: Geoscience Australia).



Australian Government

**Bureau of Meteorology
Geoscience Australia**

Emergency Management Australia

- Implementation of national education and training programmes about tsunami;
- Assistance to the intergovernmental Oceanographic Commission (IOC) in developing the existing Pacific Tsunami Warning & Mitigation System (PTWS) and establishing an Indian Ocean Tsunami Warning & Mitigation System (IOTWS); and
- Technical assistance to help build the capacity of scientists, technicians, and emergency managers in the South West Pacific and Indian Oceans.



Deep Ocean Tsunami Detection Buoys will form part of the Bureau’s enhanced sea-level monitoring network.

How will the new system work?

Geoscience Australia will operate an enhanced network of seismic stations nationally and have access to data from international monitoring networks. It will advise the Bureau of Meteorology and Emergency Management Australia

of the size, location and characteristics of a seismic event, which has the potential to generate a tsunami.

Based on this seismic information from Geoscience Australia, as well as advisories from the Pacific

Tsunami Warning Centre (PTWC) in Hawaii and from neighbouring countries with tsunami detection capacity, the Bureau will run a tsunami model to generate a first estimate of the tsunami size, arrival time and potential impact locations. The Bureau will verify the existence of a tsunami using information from an enhanced sea-level monitoring network.

The Bureau will then promulgate advice and warnings on any possible tsunami threat to State emergency management services and the Public through its National Office in the first instance, and subsequently through its network of Regional Offices once a tsunami is verified. Emergency management agencies will then use this information to estimate coastal inundation using pregenerated inundation models prepared by Geoscience Australia.

Emergency Management Australia will liaise with the operations centres of affected State and Territory emergency management organisations and coordinate Federal assistance as required.

Emergency Management Australia also has responsibility for improving public awareness and preparedness for tsunami in Australia.

