



Australian Government

Geoscience Australia

The Australian Tsunami Warning System Swings into Operation

**Geoscience Australia's role in the
Joint Australian Tsunami Warning Centre (JATWC)**

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Just 15 minutes after the mega-earthquake struck,
tsunami waves began to hit the Sumatran coast

Title: 04122904_57

Subtitle: IndonesiaVideo

Dub Date: 12/29/04 12:40

... and continued to surprise coastal communities across the Indian Ocean

Australian Government Response

May 2005 Budget Statement:

- 1. A \$68.9 million, 4 year program, to provide a comprehensive tsunami warning system for Australia**
- 2. Support international efforts to establish an Indian Ocean Tsunami Warning System and**
- 3. Contribute to the facilitation of tsunami warnings for the South West Pacific**

Three Agencies Responsible

- Geoscience Australia
 - Seismic Monitoring & Earthquake Advice
- Bureau of Meteorology
 - Sea Level Monitoring & Warnings
- Emergency Management Australia
 - Community Awareness & Preparedness

Since 2004...

- Southern Java - 17 July 2006
 - Magnitude 7.7 Earthquake & Tsunami
 - 650+ deaths



Since 2004...

Three hours after the Southern Java earthquake, a tsunami hit the camping grounds at Steep Point, Western Australia, inundating a family at about 7:30pm, moving their 4WD and destroying their campsite.

A **9 metre** run-up was measured by Geoscience Australia.



Since 2004...

- Solomon Islands - 2 April 2007
 - Magnitude 8.1 Earthquake & Tsunami
 - 40+ deaths in the Solomons & an Australian Tsunami Warning was issued for the East Coast



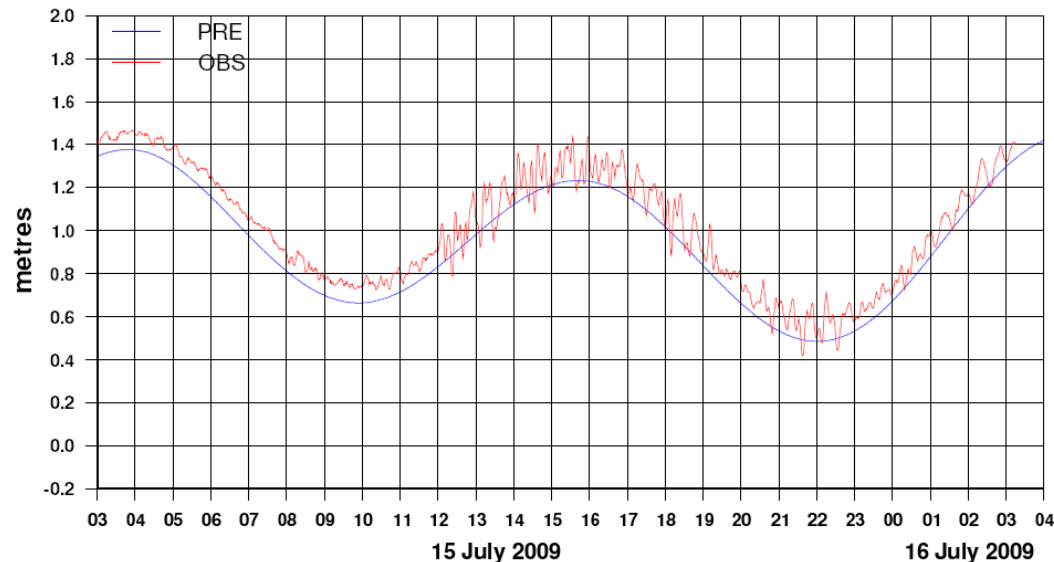
Since 2004...

- South Island, New Zealand - 15 July 2009
 - Magnitude 7.9 Earthquake & Tsunami
 - A tsunami warning was issued for New Zealand, Tasmania, Victoria, NSW & Lord Howe Island

PORT KEMBLA, NEW SOUTH WALES - LAST 24 HOURS

LAT 34° 28' 25.5" S LONG 150° 54' 42.7" E

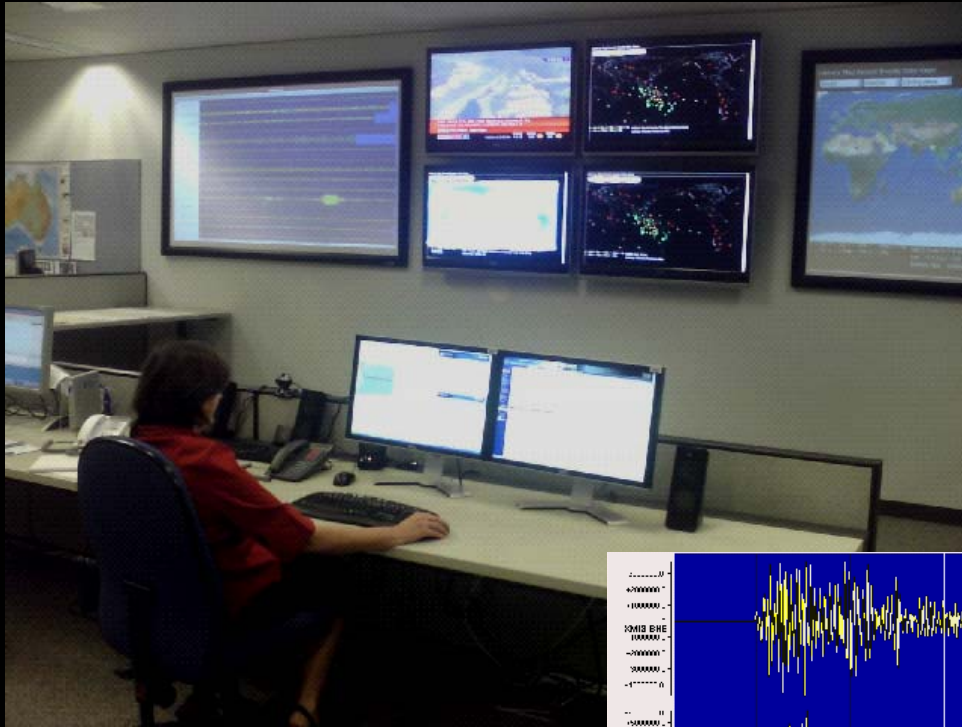
ONE MINUTE OBSERVATIONS & PREDICTIONS TO 03:15 16 JUL 2009 UTC



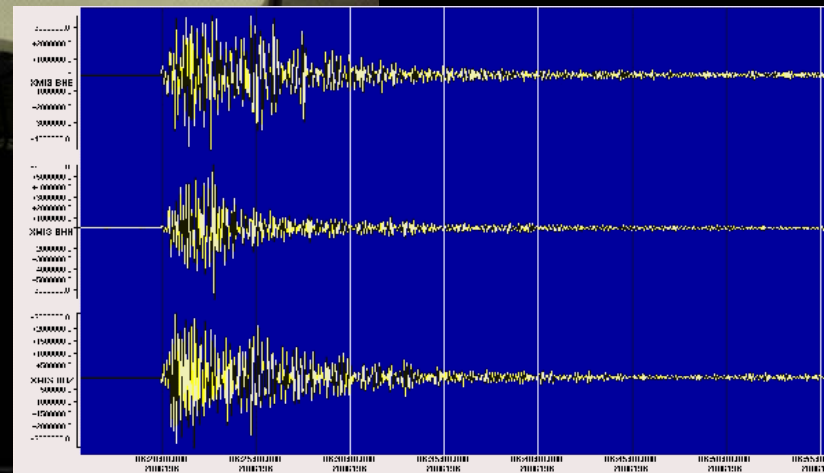
Magnitude Examples

<u>Magnitude</u>	<u>Example</u>
0.5	Hand grenade
1.0	Construction site blast
1.5	WWII conventional bombs
2.0	late WWII conventional bombs
2.5	WWII blockbuster bomb
3.0	Massive Ordnance Air Blast bomb or mine blast
3.5	Chernobyl nuclear disaster, 1986
4.0	Small atomic bomb
5.0	Nagasaki atomic bomb (Hiroshima was half this)
5.5	Newcastle, NSW Quake, 1989
6.5	Tsunamigenic Earthquakes
7.0	Tsar Bomba, largest thermonuclear weapon ever tested
7.5	Landers, CA Quake, 1992
8.0	San Francisco, CA Quake, 1906 (Start of Seismology)
9.0	Anchorage, AK Quake, 1964
9.2	2004 Indian Ocean earthquake
10.0	Estimate for a 20 km rocky meteorite impacting at 25 km/s

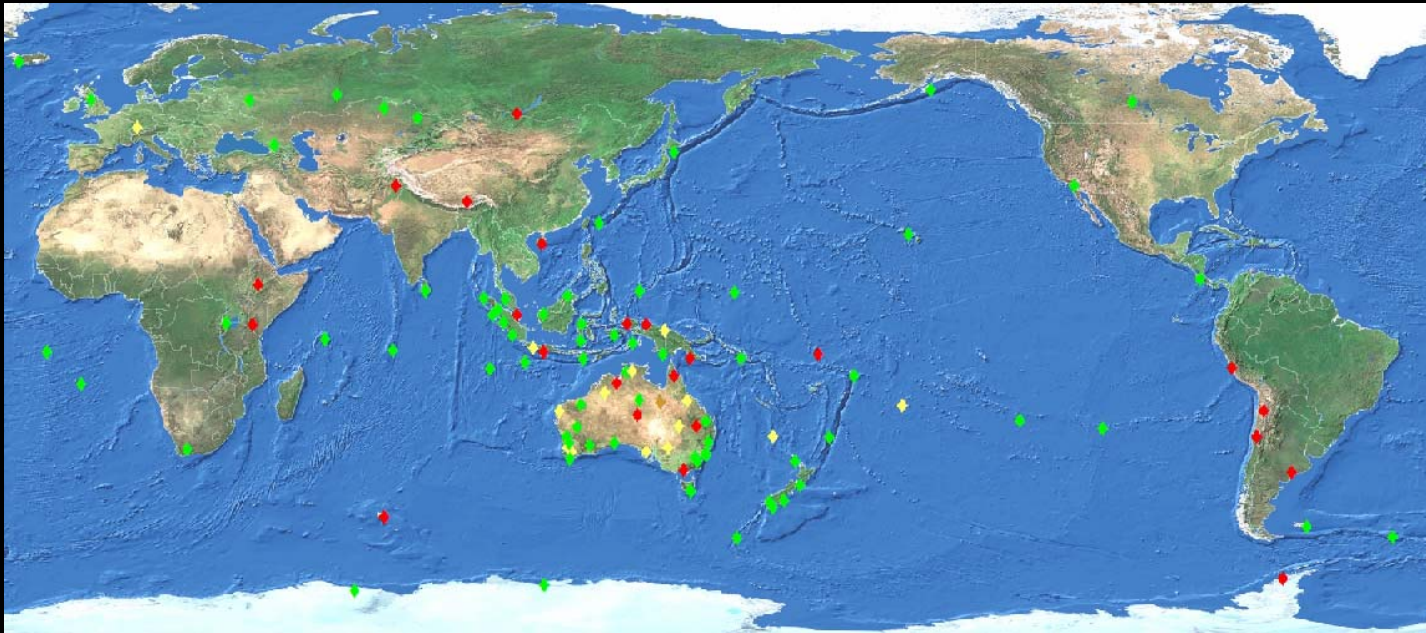
Joint Australian Tsunami Warning Centre



The JATWC is a joint centre with Geoscience Australia looking after the seismic monitoring and the Bureau of Meteorology, the sea level response and public warnings.



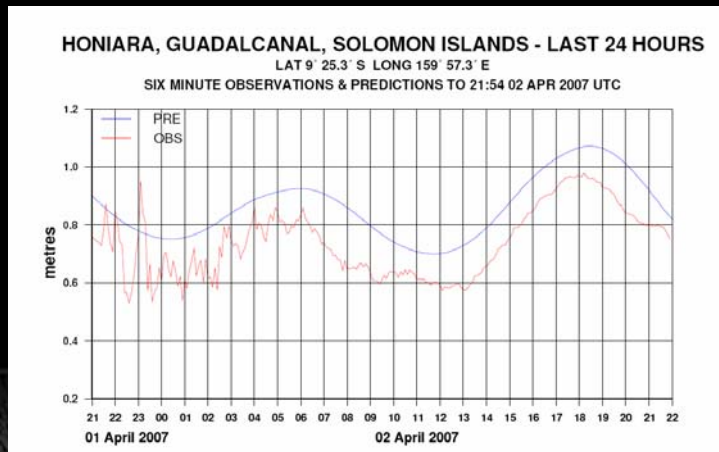
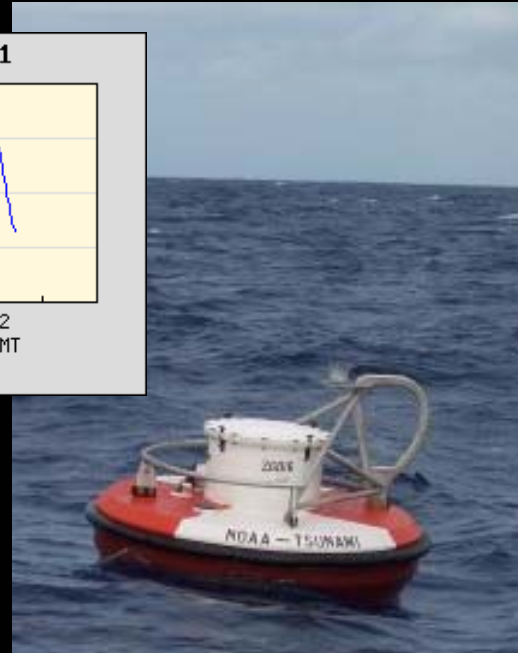
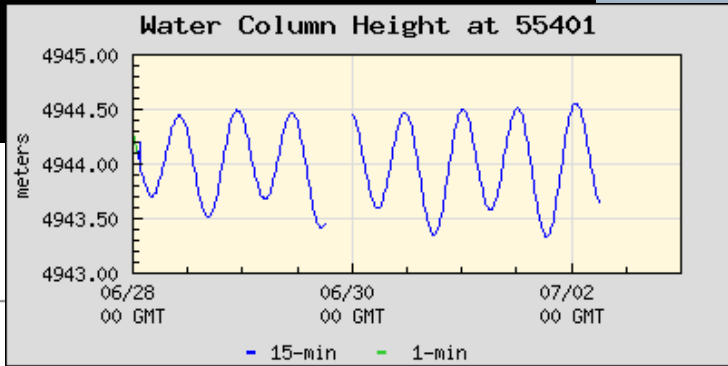
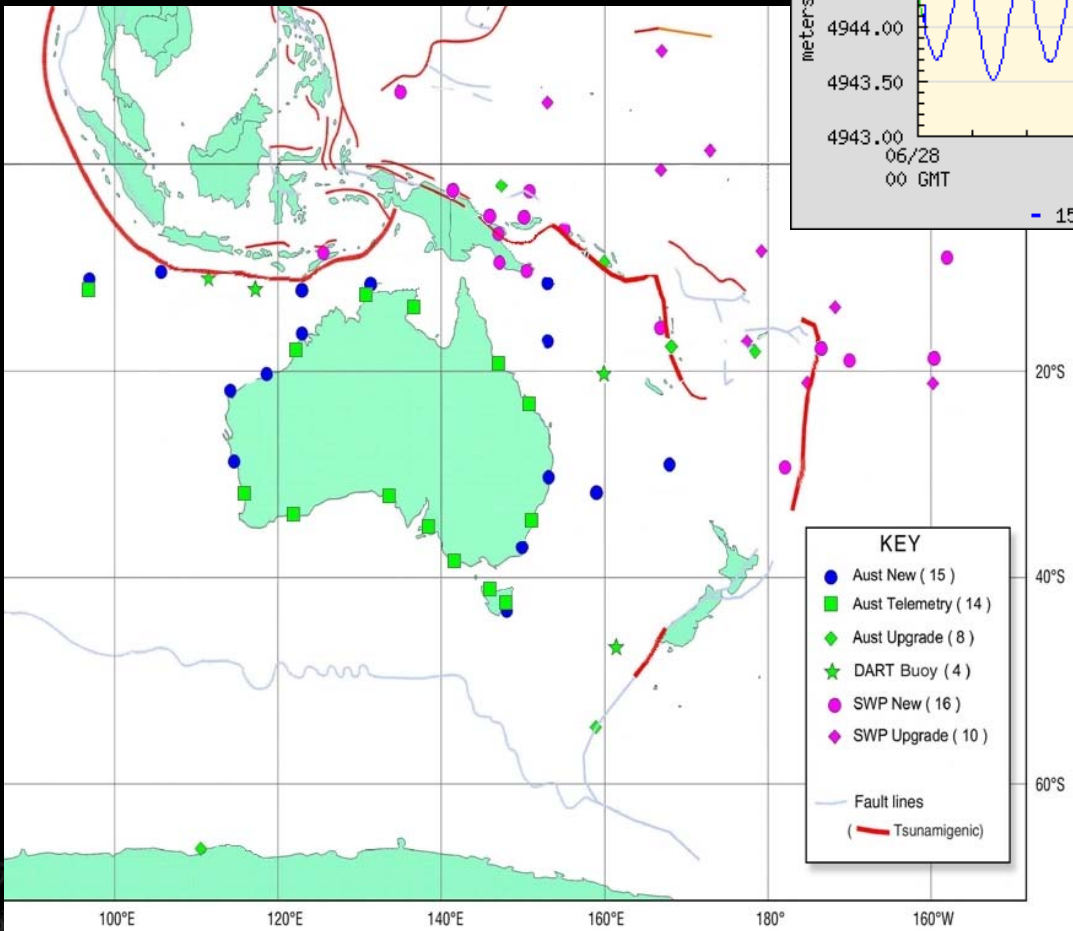
JATWC Seismic Monitoring Systems



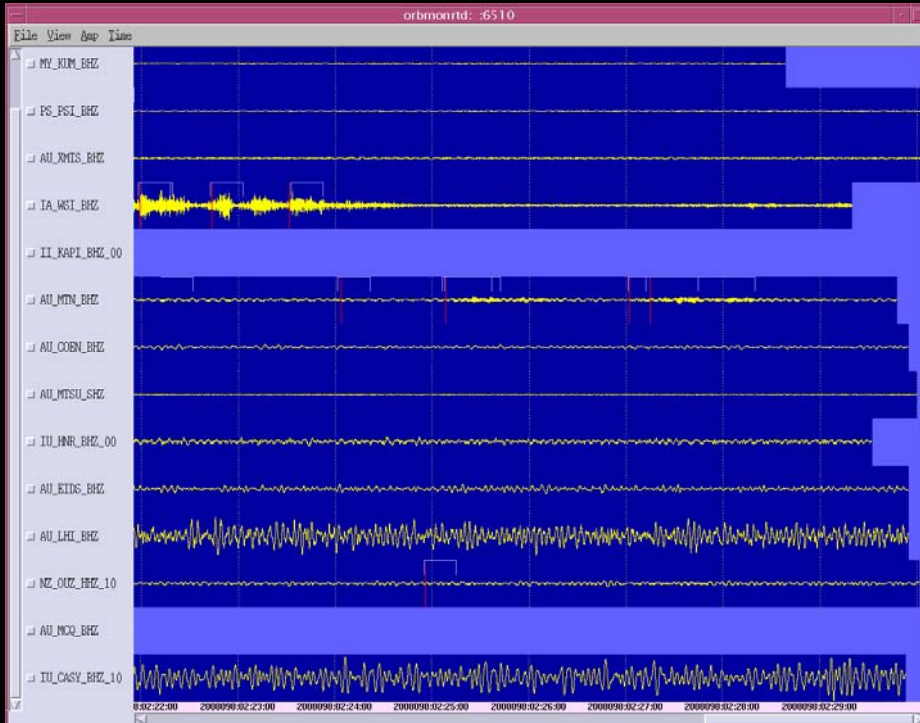
Seismic stations monitored in real-time



JATWC Sea Level Monitoring

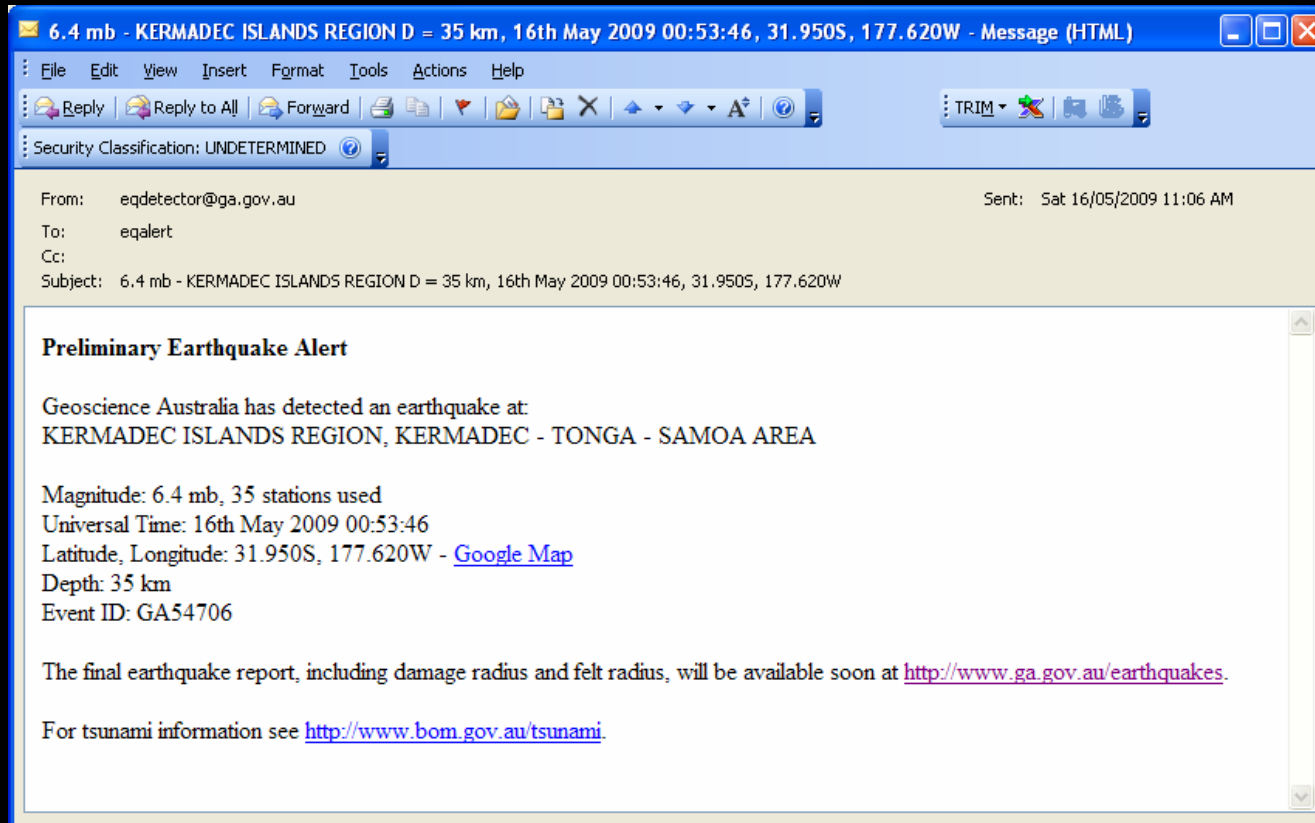


Real-time Seismic Waveform Displays



- Visual display only.
- With experience, the Duty Seismologist can approximate location and magnitude.
- Duty Seismologist waits for earthquake solution before analysis can be made – about 5 to 6 minutes in our region.

Seis-alert (automatic solution)



XML sent to BoM JATWC &
email alerts to GA staff and AGD

ORBEVENTS

GA_DBEVENTS

File View Filters

Calc Mwp
 Run Mwp
 Follow Events
 Zoom In
 Zoom Out

Current UTC Time: 19th Feb 2008 03:03:41

NOTIFY
 ALERT

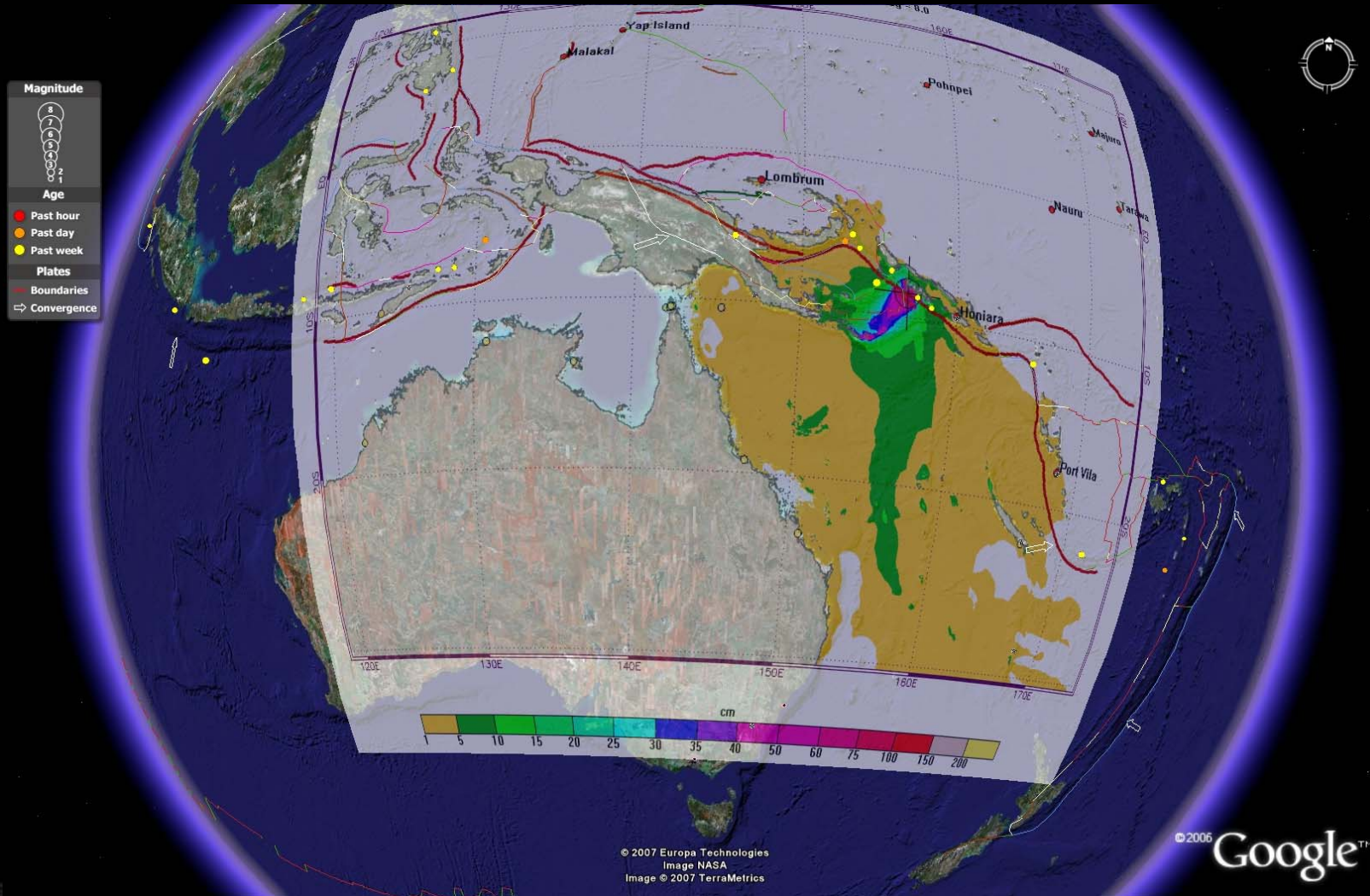
Events						
Evid	Orid	Time	MB	NASS	AUTH	
39517	39521	23:57:22	4.85	28	reg_sean	
39515	39516	17:17:14	4.43	10	reg_sea	
39510	39512	14:00:28	4.63	14	reg_swpr	
39497	39506	09:54:34	5.60	46	reg_swpr	
39497	39509	09:54:33	5.83	22		
39497	39508	09:54:05	5.80	27		
39497	39507	09:54:33	5.58	43		
39497	39506	09:54:34	5.60	46		
39497	39505	09:54:34	5.59	45		
39497	39504	09:54:28	5.62	43		
39497	39503	09:54:28	5.63	40		
39497	39502	09:54:28	5.60	35		
39497	39501	09:54:28	5.54	29		
39497	39500	09:54:28	5.30	24		
39497	39499	09:54:28	5.38	21		
39497	39498	09:54:28	5.30	17		
39497	39497	09:54:28	5.45	14		
39492	39495	09:37:21	4.95	15	reg_sean	
39491	39491	04:48:35	3.75	5	OZ_SW	

Type	Action	AUTH
03	ATWSAlarm Creation	rt
03	ATWSAlarm Ring Phones	rt
03	ATWSAlarm Sent Emails	rt
03	ATWSAlarm Sent Email	rt
04	ATWSAlarm XML Message to 134 178 63	rt

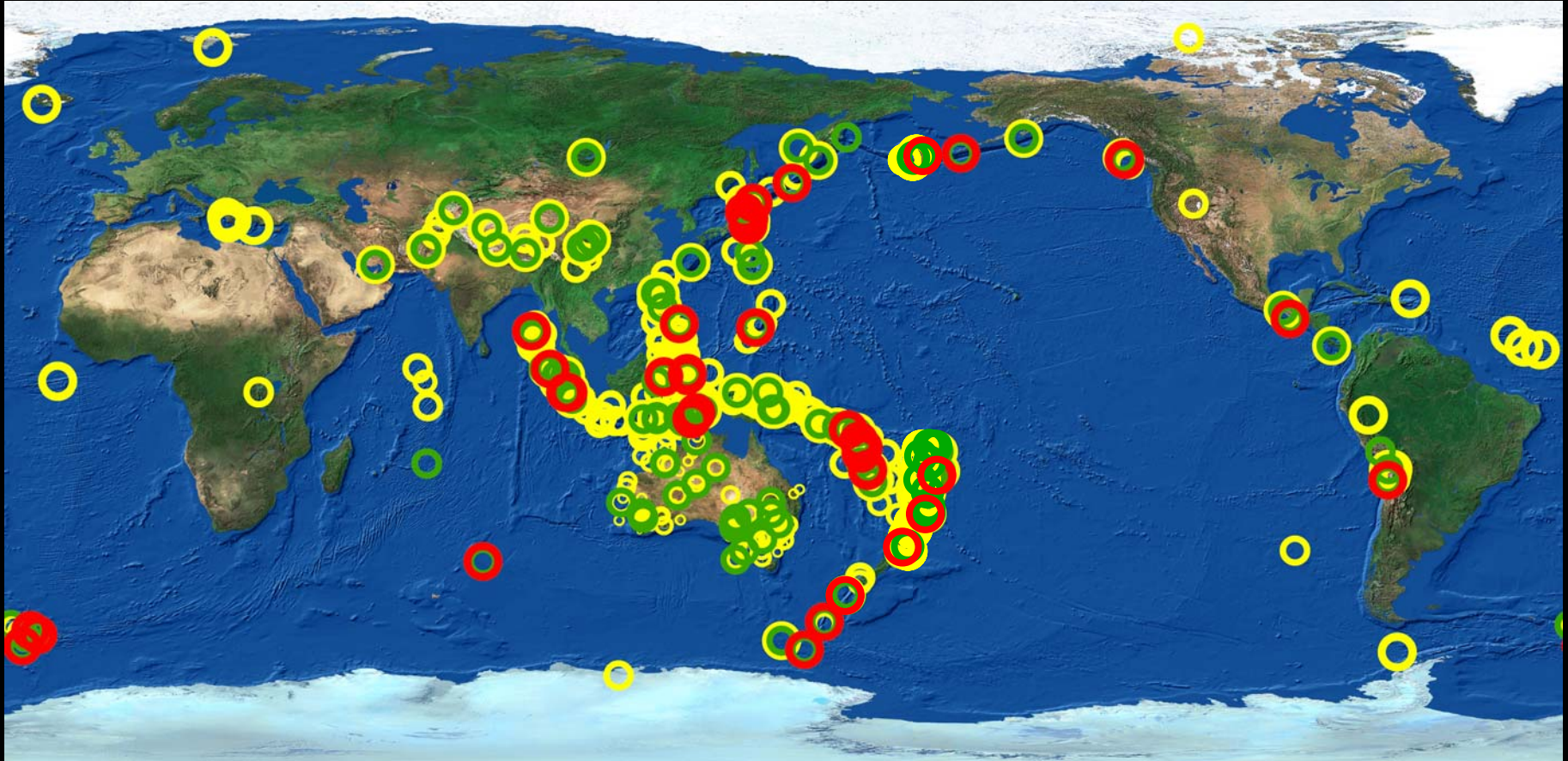
DATE	TIME	Latitude	Longitude	Depth	Stations	mb	ms	Time Since Event:
18/02/2008	09:54:34	-21.84	170.00	200.00	46	5.60	4.16	17:41 hours

Map Tool

Tsunami Propagation Models

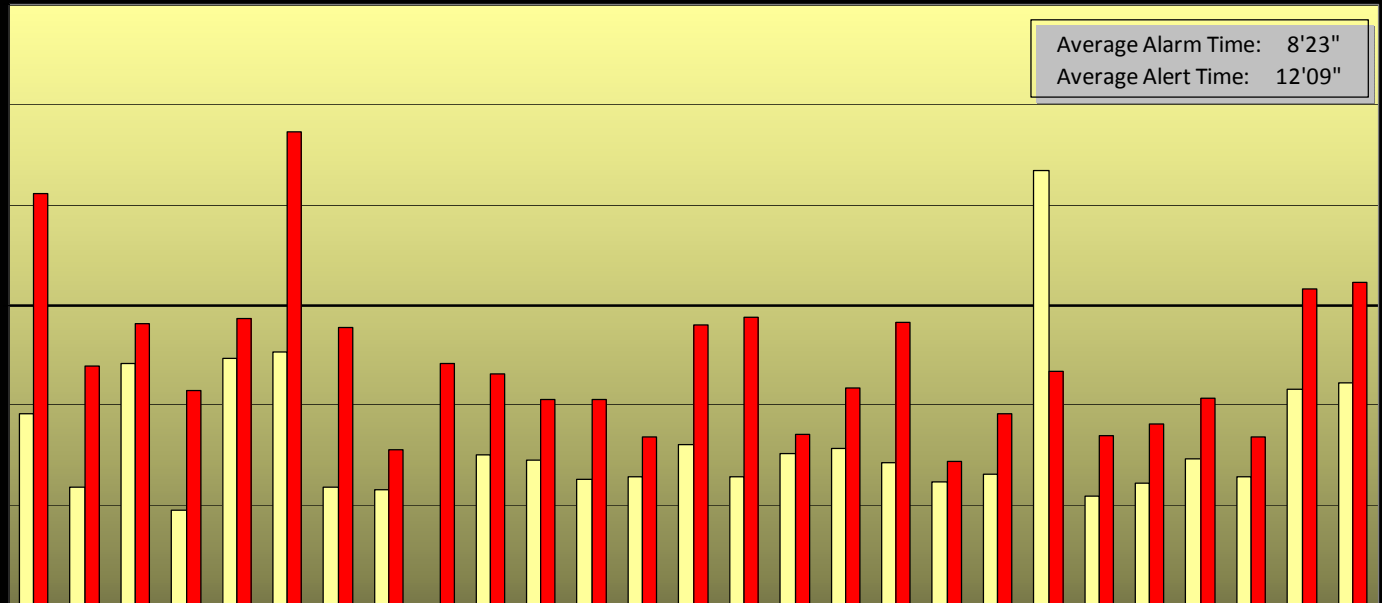


Earthquakes assessed by GA in the last year ...



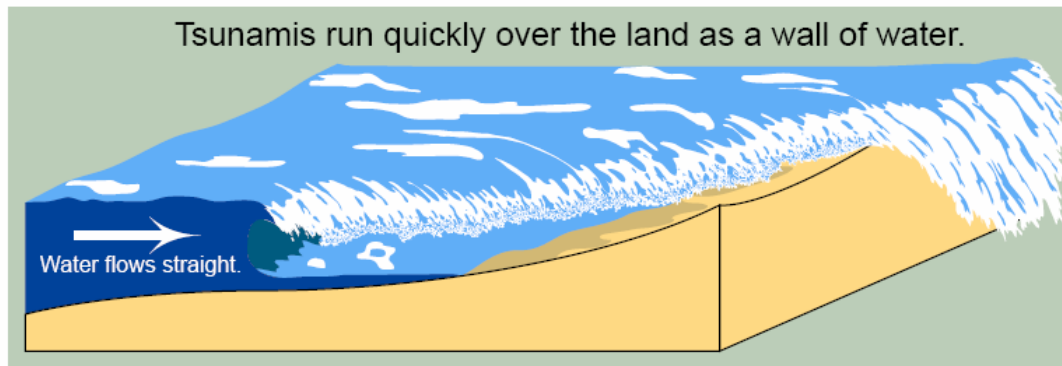
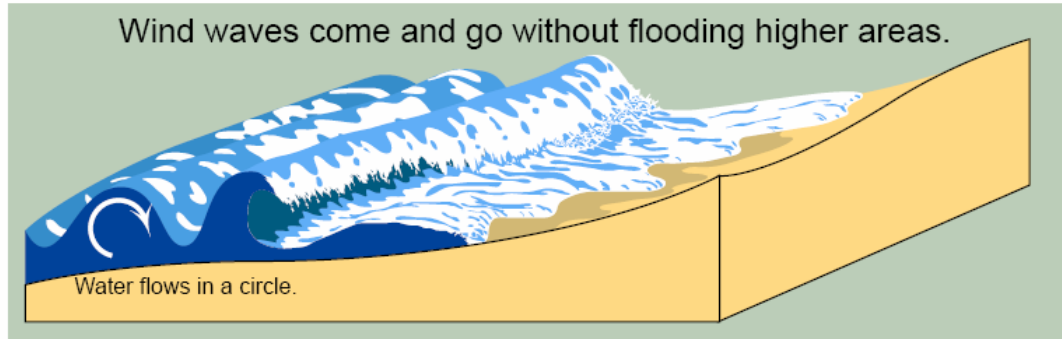
- 787 earthquakes were detected and screened
- 122 earthquakes threatened Australian interests of which
- 40 earthquakes were potentially tsunamigenic

Some Comparisons



Thank You for Listening

Tsunamis are often no taller than normal wind waves, but they are much more dangerous.



Even a tsunami that looks small can be dangerous!

Any time you feel a large earthquake, or see a disturbance in the ocean that might be a tsunami, head to high ground or inland.