

**Magnitude 7.8 - OFF WEST COAST OF THE SOUTH  
ISLAND, N.Z.**

**2009 July 15 09:22:29 UTC**

-- Simulation results and summary --

**Tsunami Engineering Laboratory  
Disaster Control Research Center  
Tohoku University**



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The New Zealand Herald  
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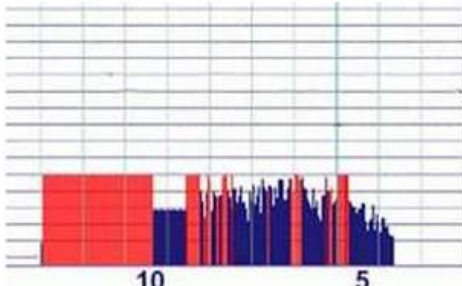
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## South Island quake prompts 'potential tsunami' warning

10:25PM Wednesday Jul 15, 2009  
 By Stuart Dye

*Did you experience the earthquake?*  
[Send us your stories, photos and videos](#)

Civil Defence officials concerned by widely varying measurements of a big quake in Fiordland tonight said they were issuing a "potential tsunami" warning in Southland.



GeoNet's seismic drum readout showed the quake measuring 6.6 on the Richter Scale. Photo / Supplied


**Related links:**  
[→ US Geological Survey's earthquake graph](#)  
[→ Quake info at GeoNet](#)

"We've had big differences in the measurements of the quake, ranging from 6.6 by GNS Science, to 8.2 by a tsunami warning centre in Hawaii - we're issuing a precautionary message," said an emergency management spokesman in Wellington, Vince Cholewa.

People ran from restaurants in Queenstown as buildings shook, and lights and phone lines went down.

It was felt across the South Island.

[http://www.nzherald.co.nz/nz/news/article.cfm?c\\_id=1&objectid=10584718](http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10584718)



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## New Zealand Earthquake Report - Jul 15 2009 at 9:22 pm (NZST)

Magnitude 7.8, Wednesday, July 15 2009 at 9:22 pm (NZST), 100 km north-west of Tuatapere.

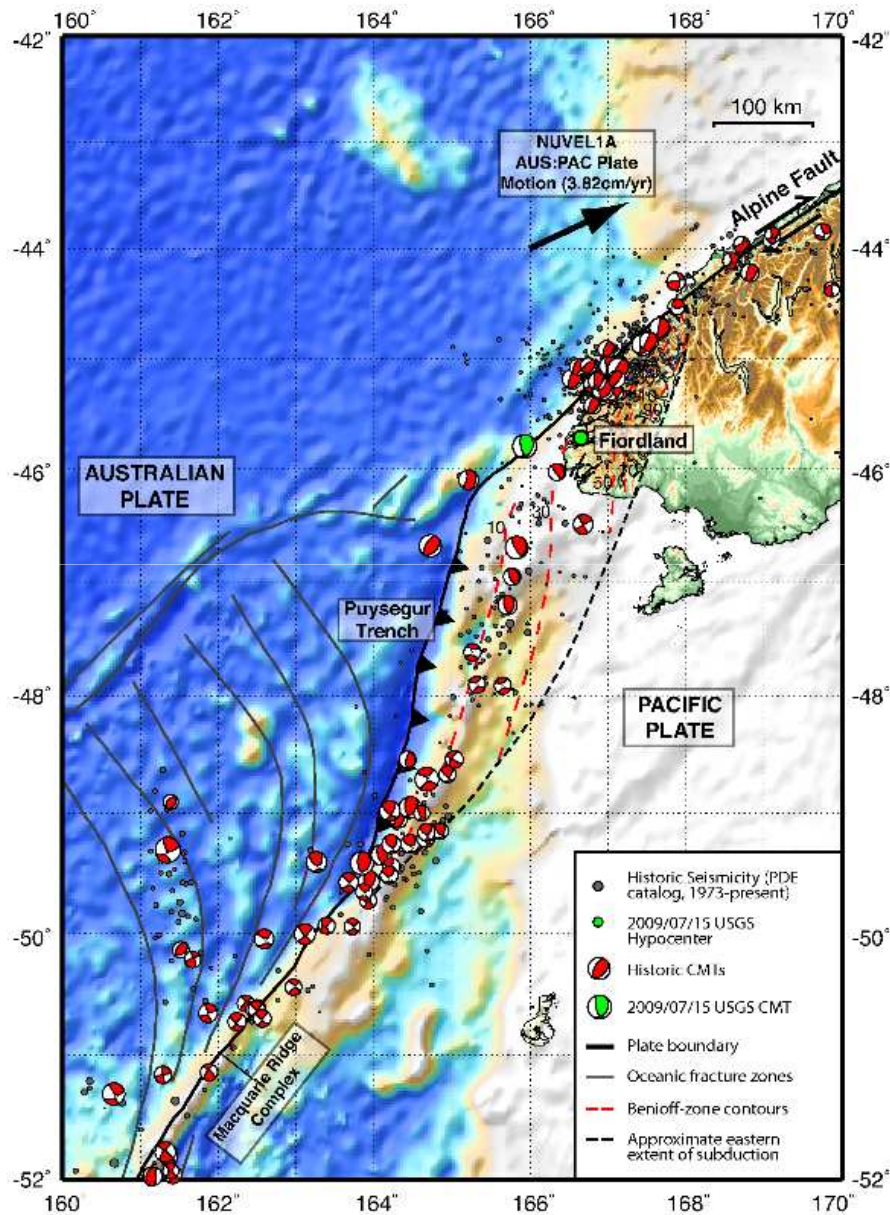
### Quake Details

Information about this earthquake:

Reference Number	3124785/G
Universal Time	July 15 2009 at 9:22
NZ Standard Time	Wednesday, July 15 2009 at 9:22 pm
Latitude, Longitude	45.75°S, 166.58°E
Focal Depth	12 km
Moment magnitude	7.8
Region	Fiordland
Location	<ul style="list-style-type: none"> <li>↕ 100 km north-west of Tuatapere</li> <li>↕ 100 km south-west of Te Anau</li> <li>↕ 160 km north-west of Invercargill</li> <li>↕ 300 km west of Dunedin</li> </ul>

<http://www.geonet.org.nz/earthquake/quakes/3124785g.html>

# Fault parameters and calculation condition



**Location:** 45.81°S, 166.28°E

	Depth (km)	Strike (°)	Dip (°)	Slip (°)
USGS CMT	19.0	27	33	126
Harvard CMT	22.2	26	24	140

Length = 100 km, Width = 50 km, Dislocation = 1.6  
(Empirical formula from Papazachos et al, 2004)

Sources:

USGS CMT:

[http://neic.usgs.gov/neis/eq\\_depot/2009/eq\\_090715\\_jcap/neic\\_jcap\\_cmt.html](http://neic.usgs.gov/neis/eq_depot/2009/eq_090715_jcap/neic_jcap_cmt.html)

Harvard CMT:

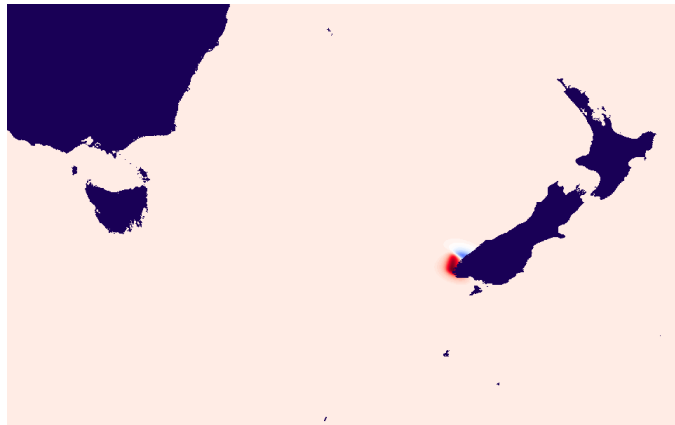
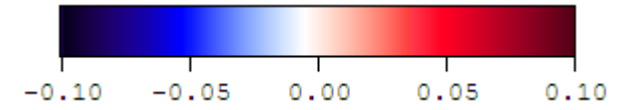
[http://neic.usgs.gov/neis/eq\\_depot/2009/eq\\_090715\\_jcap/neic\\_jcap\\_hrv.html](http://neic.usgs.gov/neis/eq_depot/2009/eq_090715_jcap/neic_jcap_hrv.html)

Bathymetry: GEBCO 1 minute

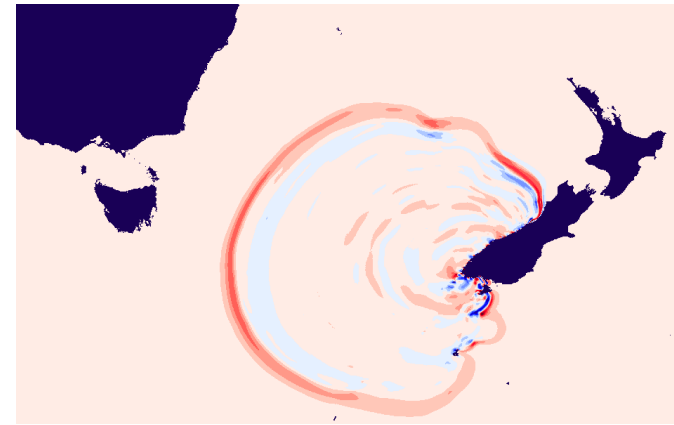
Equation: Linear shallow-water theory in spherical coordinates

Out put time step: 3 seconds

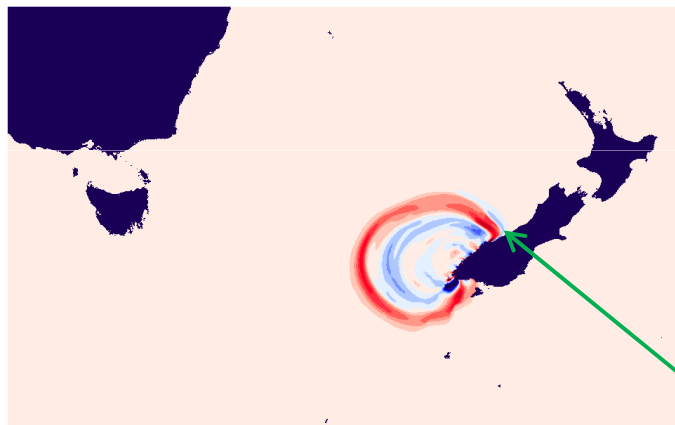
# Tsunami propagation snap shots



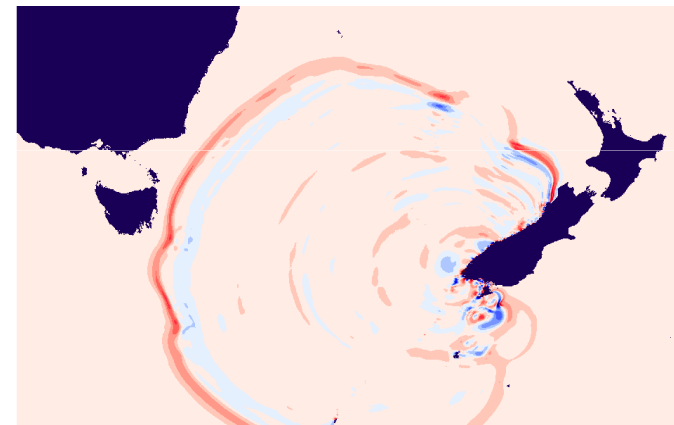
At t = 0 min



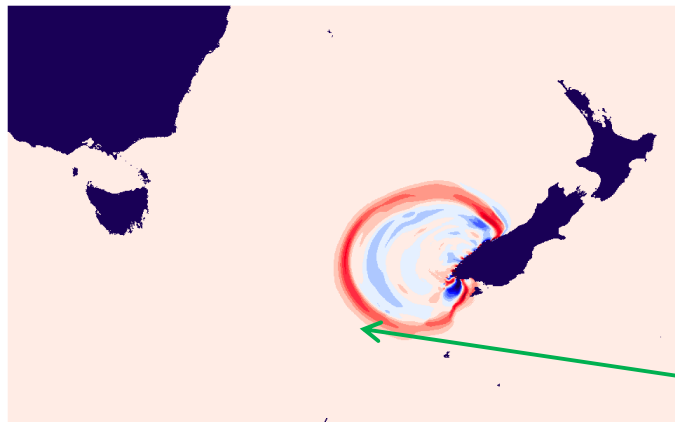
At t = 90 min



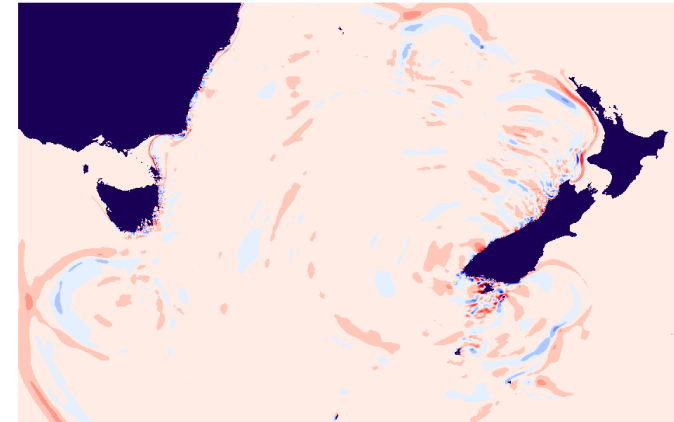
At t = 36 min  
(Jackson Bay)



At t = 120 min



At t = 42 min  
(Dart Tasmania)



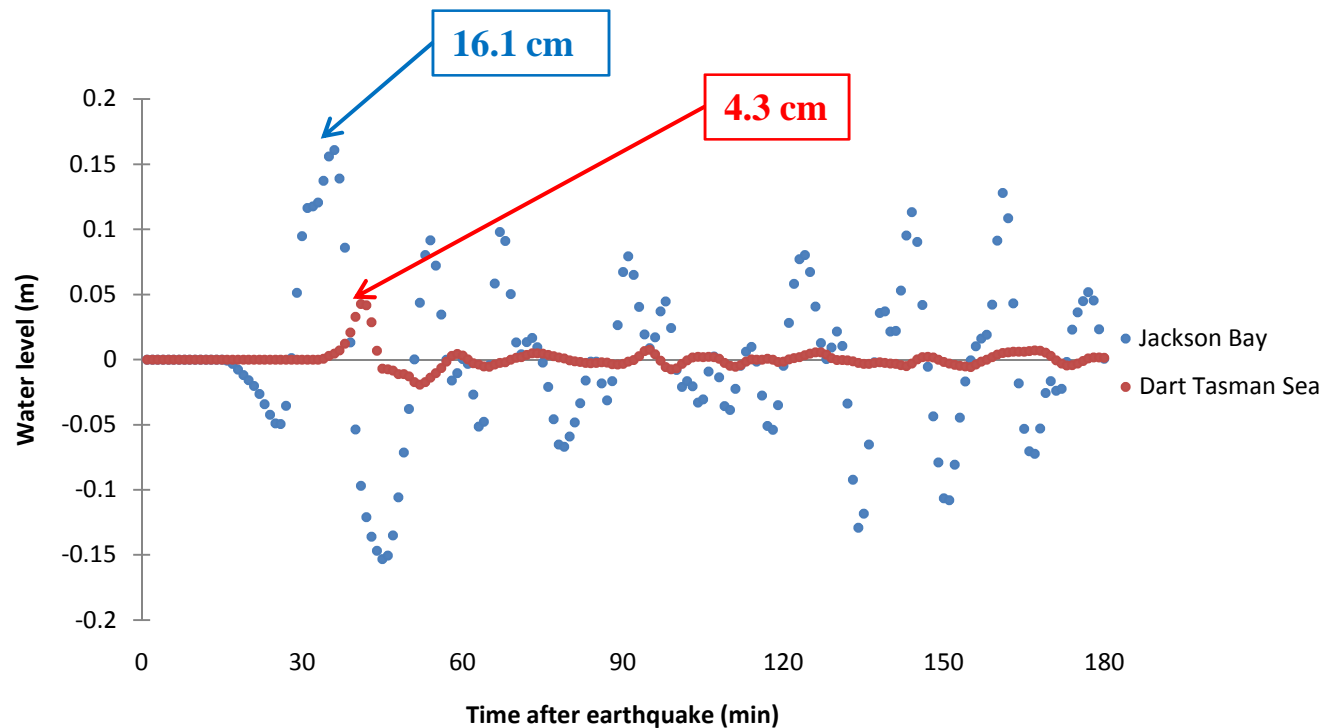
At t = 180 min

# Tsunami waveform observation

- ❖ Tsunami was observed at 2 locations and reported as **17 cm** at tide gauge station (Jackson Bay, NZ) and **5 cm** at Dart Tasman Sea, NZ
- ❖ Calculation results show **16.1 cm** at Jackson Bay tide gauge station and **4.3 cm** at Dart Tasman Sea.

GAUGE LOCATION	LAT	Lon	TIME	AMPL	PER
Jackson Bay, NZ	43.97S	168.62E	10:18Z	0.17M	10min
DART Tasman Sea, NZ	-46.92S	160.56E	09:53Z	0.05M	8min

Source: <http://www.prh.noaa.gov/ptwc/messages/hawaii/2009/hawaii.2009.07.15.105227.txt>



# Maximum wave height

Simulated maximum wave height

- ❖ At South Island, NZ : 1.50 m
- ❖ At Tasmania, AUS: 0.32 m
- ❖ At SE. coastline, AUS: 0.24 m

