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

2009 July 15 09:22:29 UTC

-- Simulation results and summary --



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Local news & Information



South Island quake prompts 'potential tsunami' warning

http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10584718



· Report: Quake downed power and phone lines

Next Article in World »

July 15, 2009 -- Updated 1318 GMT (2118 HKT)

http://edition.cnn.com/2009/WORLD/asiapcf/07/15/new.zealand.earthquake/index.html?iref=24hours

Fault parameters and calculation condition



Length = 125 km, Width = 60 km, Dislocation = 1.6 (Empirical formula from Papazachos et al, 2004)

Case 1	Lat. (°)	Lon. (°)	Depth (km)	Strike (°)	Dip (°)	Slip (°)
USGS CMT	-45.80	165.93	19.0	27	33	126
Harvard CMT	-45.81	166.28	22.2	26	24	140

Case 2

Sources:

USGS CMT:

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

Bathymetry: GEBCO 30 sec

Equation: Linear shallow-water theory in spherical coordinates Out put time step: 2 seconds

 $http://earthquake.usgs.gov/eqcenter/eqinthenews/2009/us2009jcap/NZ_basemap.png$

Tsunami propagation snapshots





Water level station

Station name	Lat.	Long.	Arrival time	Time at peak	Amplitude (m)	Period (min)
Jackson Bay, NZ	-43.96	168.62	0956	1155	0.47	18-28
Charleston, NZ	-41.91	171.43	1104	1117	0.25	13-15
Dog Island, NZ	-46.65	168.41	1106	1207	0.12	4-6,12-17
Spring Bay, AU	-42.5	147.9	1145	1220	0.06	10
Port Kembla, AU	-34.5	150.9	1200	1323	0.14	12
DART 55015	-46.9	160.6	0950	0953	0.05	8



Modeled waveforms and recorded amplitude

300 (min)



Maximum wave height



Summary

- The 7.8 M_w at the SW. of New Zealand generated small tsunami that struck local areas and also to Australia. Preliminary observation shows that the amplitude at Jackson Bay and DART 55015 was 0.17 and 0.05 m respectively.
- Fault parameter from USGS resulted higher uplift than Harvard CMT(0.571 > 0.469 m) causing higher in over all tsunami wave height at water level stations.
- Model results were validated with the arrival time and time to peak for each stations. Results were found to be satisfied for both arrival time at wave height at peak time except that in Jackson Bay station. The reason for this would be the effect of shallow region and very detailed bathymetry data may need for this location.
- Tsunami wave arrives local area within 30 min and reach Tasmania and other parts of Australia after 2 hrs.
- ✤ Modeled maximum wave height at South Island is 2.85 m, 0.84 at Tasmania and 0.77 at SE. Australian coastine.