

**A PROTOTYPE OF WEB-APPLICATION FOR TSUNAMI DATABASE ALONG
SOUTHERN COAST OF JAVA ISLAND**

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1. Fault Parameters of Tsunami Sources

Table 1. Fault parameters of the real case used in tsunami simulation (Fuji and Satake, 2006).

Sub Faults	Longitude (°E)	Latitude (°S)	Depth (km)	Strike (degree)	Dip (degree)	Rake (degree)	Length (km)	Width (km)	Slip (m)
1	107.274	9.515	3	280	45	90	50.00	50.00	0.53
2	107.42	9.096	11.7	280	45	90	50.00	50.00	0.15
3	107.705	9.661	3	280	45	90	50.00	50.00	0.51
4	107.851	9.242	11.7	280	45	90	50.00	50.00	0.00
5	108.136	9.807	3	280	45	90	50.00	50.00	1.38
6	108.282	9.388	11.7	280	45	90	50.00	50.00	0.79
7	108.568	9.953	3	280	45	90	50.00	50.00	1.43
8	108.714	9.534	11.7	280	45	90	50.00	50.00	0.00
9	109.000	10.10	3	280	45	90	50.00	50.00	2.47
10	109.146	9.681	11.7	280	45	90	50.00	50.00	2.12

Table 2. Fault parameters used in tsunami simulation for the artificial cases.

Depth (km)	Magnitude (M)	Strike (degree)	Dip (degree)	Rake (degree)	Length (L) (km)	Width (W) (km)	Slip (D) (m)
0	7	285	45	90	50.11872	25.05936	1.58
0	7.5	285	45	90	89.12509	44.56255	2.82
0	8	285	45	90	158.48932	79.24466	5.01
20	7	285	45	90	50.11872	25.05936	1.58
20	7.5	285	45	90	89.12509	44.56255	2.82
20	8	285	45	90	158.48932	79.24466	5.01
40	7	285	45	90	50.11872	25.05936	1.58
40	7.5	285	45	90	89.12509	44.56255	2.82
40	8	285	45	90	158.48932	79.24466	5.01
60	7	285	45	90	50.11872	25.05936	1.58
60	7.5	285	45	90	89.12509	44.56255	2.82
60	8	285	45	90	158.48932	79.24466	5.01

REMARKS :

$$\text{Log } L = 0.5 M - 1.8$$

$$W = L / 2$$

$$\text{Log } D = 0.5 M - 3.3$$

Table 3. Source Points for artificial cases used in tsunami simulation.

Source Point	Longitude (°E)	Latitude (°S)
A	107.5	9
B	108	9
C	108.5	9
D	109	9
E	109.5	9
F	110	9
G	110.5	9
H	111	9
I	107.5	9.5
J	108	9.5
K	108.5	9.5
L	109	9.5
M	109.5	9.5
N	110	9.5
O	110.5	9.5
P	111	9.5
Q	111.5	9.5
R	112	9.5
S	107.5	10
T	108	10
U	108.5	10
V	109	10
W	109.5	10
X	110	10
Y	110.5	10
Z	111	10
AA	111.5	10
BB	112	10

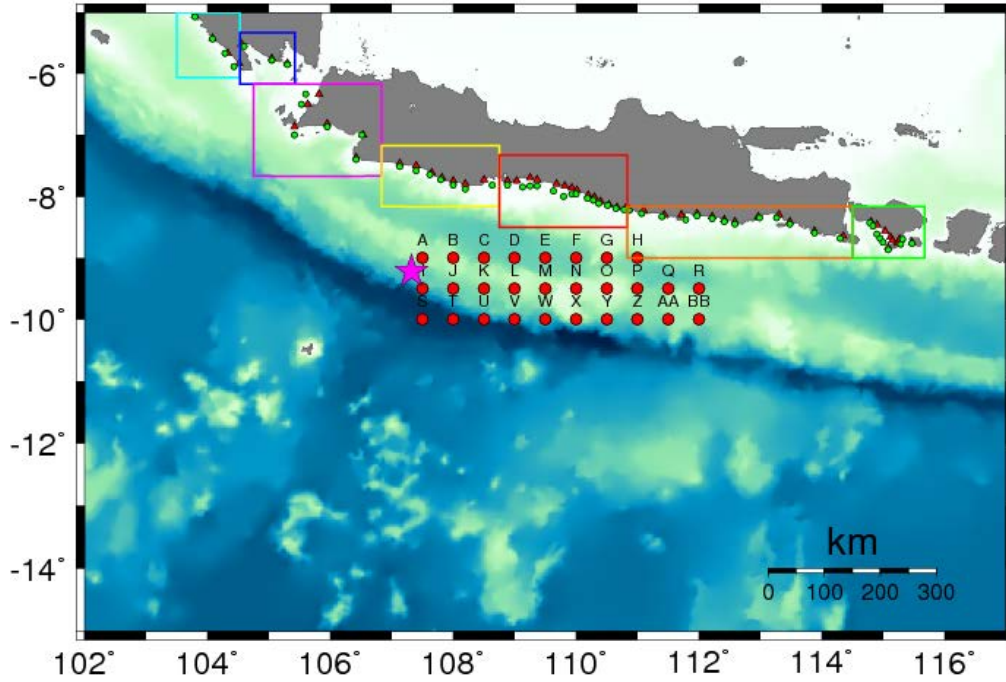


Figure 1. Bathymetry data of study area using GEBCO. Study area in covers region of 5.0°S-15.0°S and 102.0°E-117.0°E. Red dots show the source points (30 points) and green dots show the forecast points (56 points) and red triangles show coastal points (56 points). Purple star shows the epicenter of the July 2006 Java tsunami Earthquake. Each small colored rectangle (light blue, blue, magenta, yellow, red, orange and green) shows the area of magnified map which indicates coastal block area.

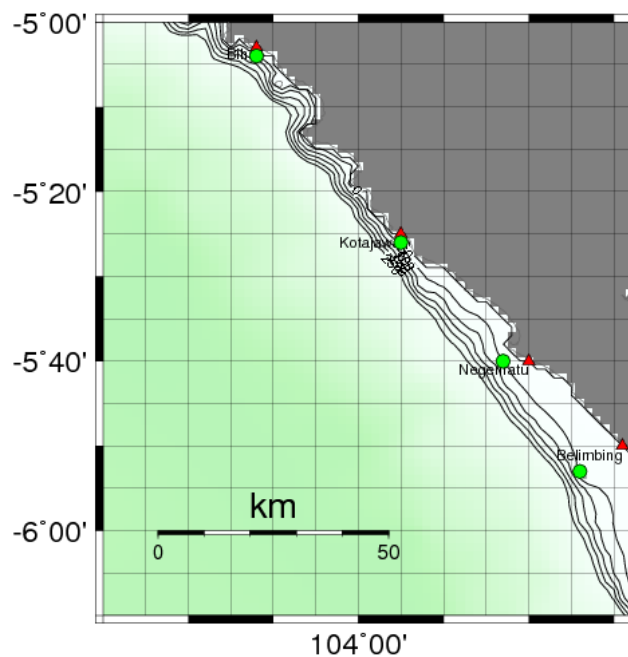


Figure 2. Magnified map of study area for coastal block Lampung 1.

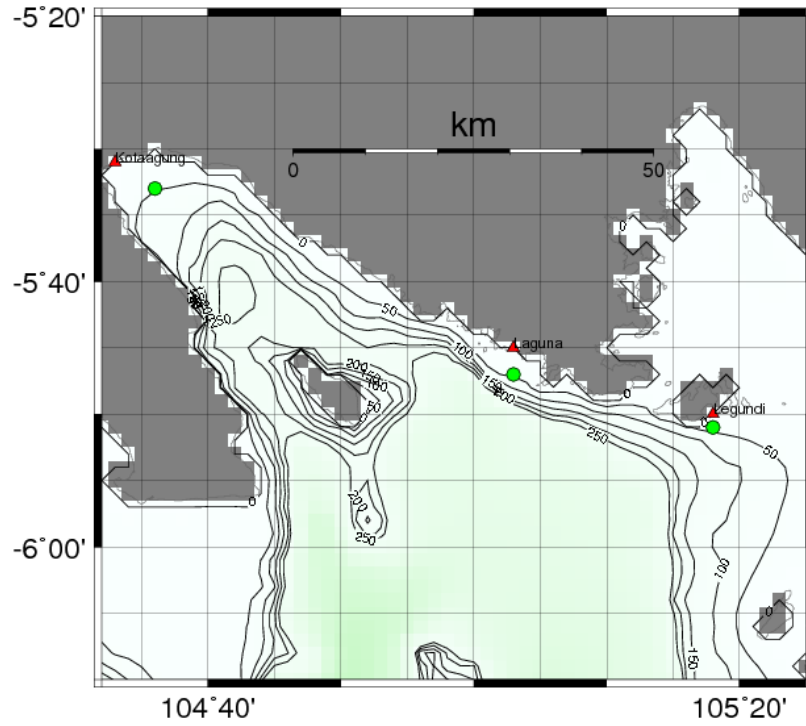


Figure 3. Magnified map of study area for coastal block Lampung 2.

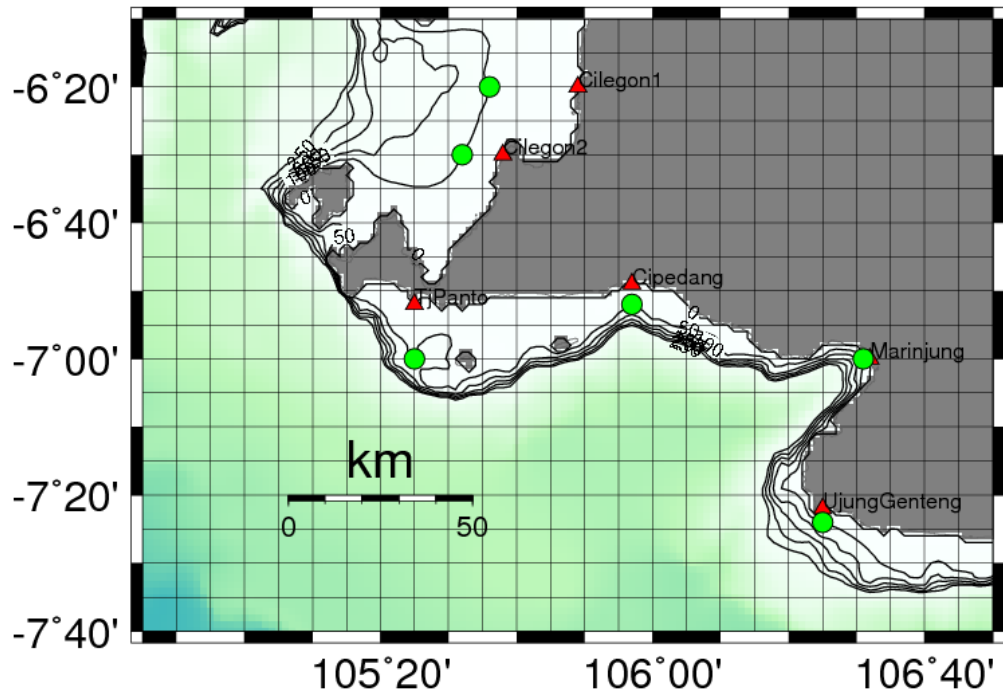


Figure 4. Magnified map of study area for coastal block Jabar 1.

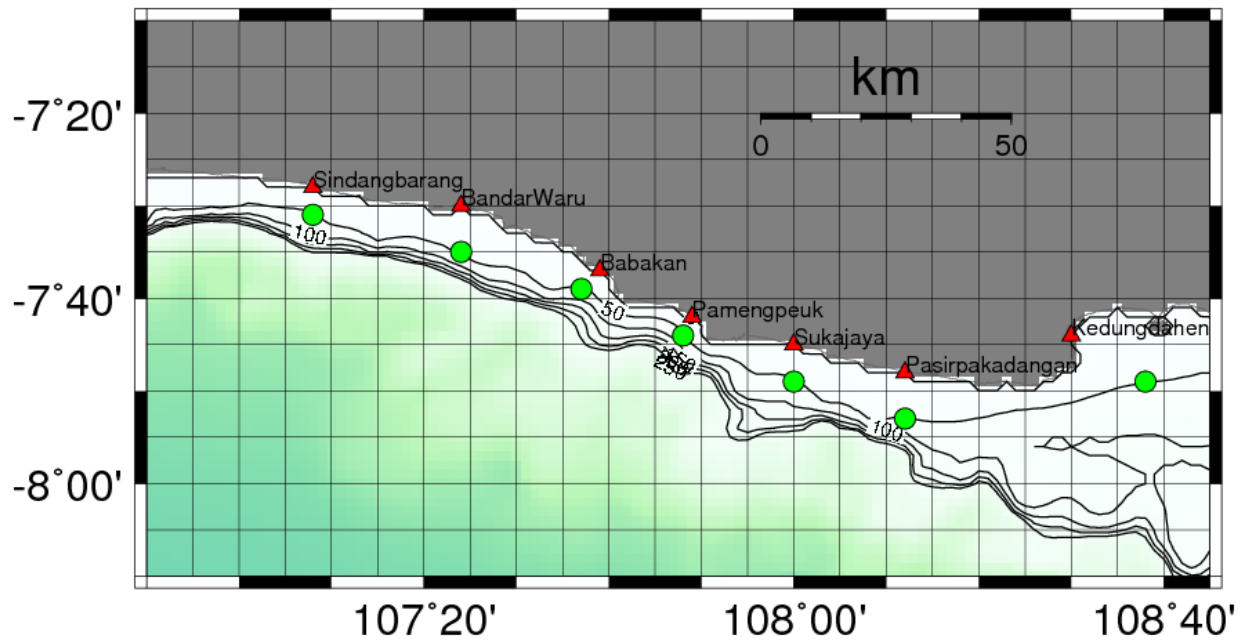


Figure 5. Magnified map of study area for coastal block Jabar 2.

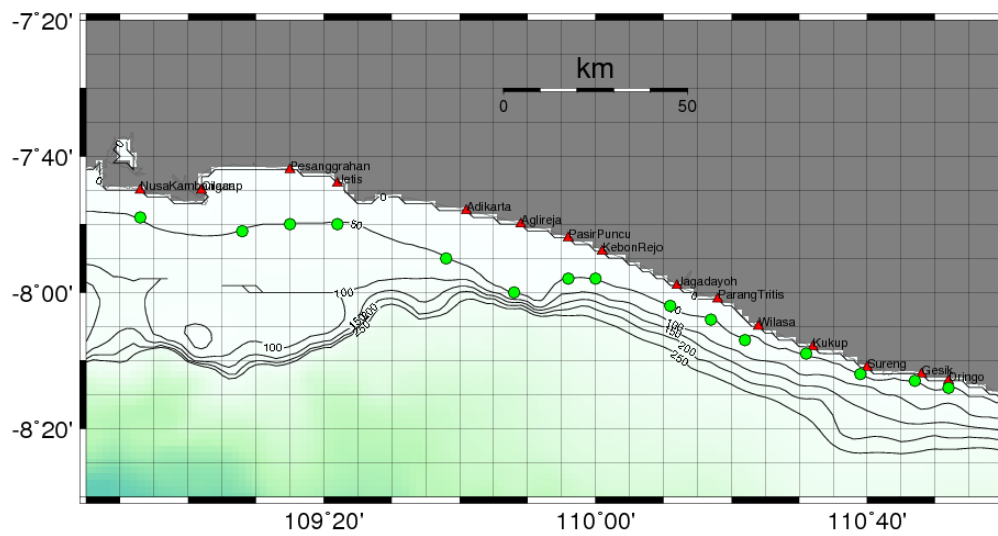


Figure 6. Magnified map of study area for coastal block Jateng.

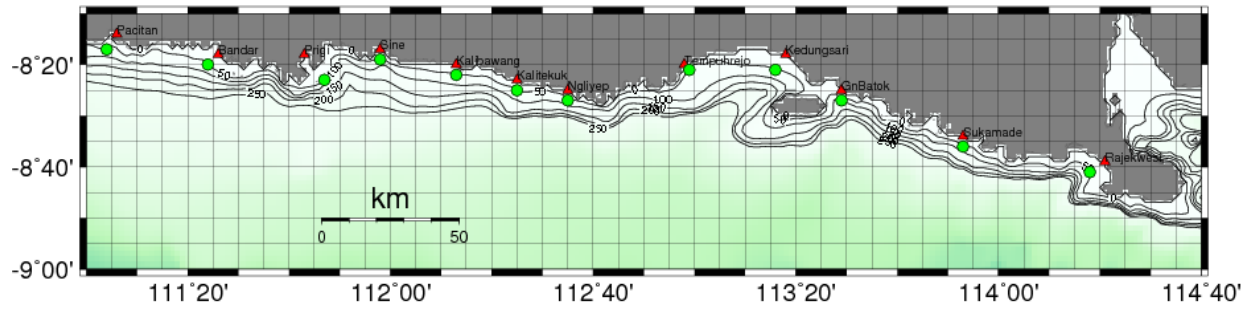


Figure 7. Magnified map of study area for coastal block Jatim

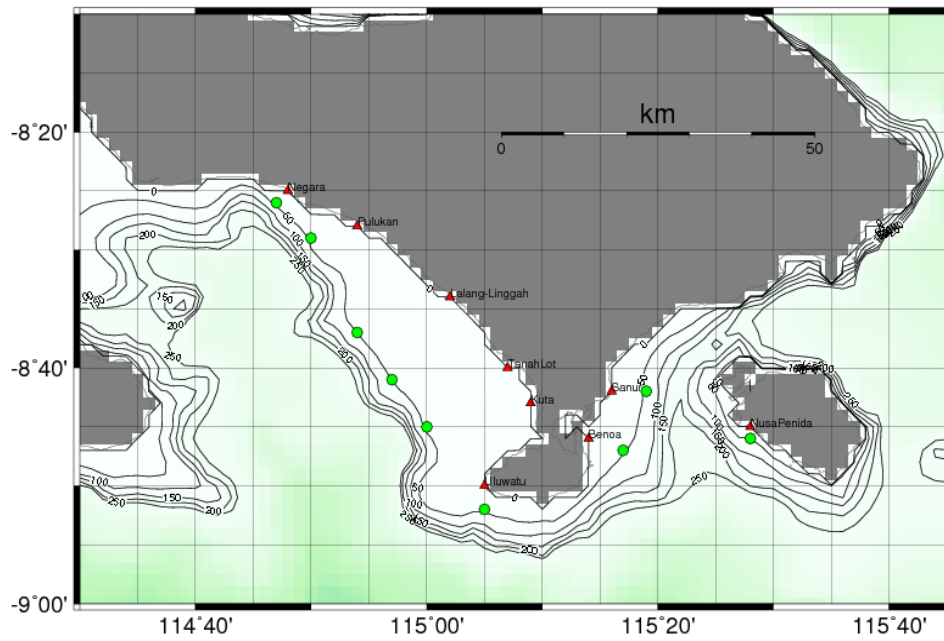


Figure 8. Magnified map of study area for coastal block Bali.

2. Forecast and Coastal Points

Table 4. Forecast point with different sea depths.

TARGET POINT	Forecast Point 1			Forecast Point 2			Forecast Point 3		
	Depth (m)	Lon (deg:min:sec)	Lat (deg:min:sec)	Depth (m)	Lon (deg:min:sec)	Lat (deg:min:sec)	Depth (m)	Lon (deg:min:sec)	Lat (deg:min:sec)
Cilegon1	47	105:36:00	-06:20:00	30	105:44:00	-06:20:00	19	105:46:00	-06:20:00
Sindangbarang	52	107:08:00	-07:31:00	34	107:08:00	-07:30:00	16	107:08:00	-07:29:00
BandarWaru	41	107:24:00	-07:35:00	30	107:24:00	-07:34:00	20	107:24:00	-07:32:00
Sukajaya	54	108:00:00	-07:49:00	31	108:00:00	-07:47:00	18	108:00:00	-07:46:00
Kedungdahen	48	108:38:00	-07:49:00	28	108:36:00	-07:47:00	20	108:35:00	-07:46:00
Cilacap	52	109:08:00	-07:51:00	29	109:07:00	-07:48:00	20	109:06:00	-07:47:00
Pesanggrahan	51	109:15:00	-07:50:00	32	109:15:00	-07:47:00	18	109:15:00	-07:45:00
Adikarta	51	109:38:00	-07:55:00	29	109:38:00	-07:52:00	19	109:39:00	-07:51:00
Jagadayoh	48	110:11:00	-08:02:00	31	110:11:00	-08:01:00	17	110:11:00	-08:00:00
Bandar	53	111:24:00	-08:20:00	-	-	-	13	111:25:00	-08:19:00
Kalibawang	54	112:13:00	-08:22:00	-	-	-	24	112:13:00	-08:21:00
Kalitekuk	55	112:25:00	-08:25:00	-	-	-	26	112:25:00	-08:24:00
Kedungsari	54	113:16:00	-08:21:00	-	-	-	18	113:16:00	-08:19:00
RajekIsi	51	114:18:00	-08:41:00	30	114:20:00	-08:40:00	-	-	-
TanahLot	48	114:57:00	-08:41:00	-	-	-	20	114:59:00	-08:41:00
Uluwatu	41	115:05:00	-08:52:00	-	-	-	17	115:05:00	-08:51:00
Sanur	57	115:19:00	-08:42:00	-	-	-	16	115:17:00	-08:42:00

Table 5. List of coastal point and forecast point.

No	COASTAL BLOCK	POINT OF OBSERVATION	COASTAL POINT			FORECAST POINT		
			LONG (°E)	LAT (°S)	Depth (m)	LONG (°E)	LAT (°S)	Depth (m)
1	Lampung 1	Biha	103:48:00	5:03:00	1	103:48:00	5:04:00	68
2	Lampung 1	Kotajawa	104:05:00	5:25:00	1	104:05:00	5:26:00	33
3	Lampung 1	Negeriratu	104:20:00	5:40:00	1	104:17:00	5:40:00	51
4	Lampung 1	Belimbing	104:31:00	5:50:00	1	104:26:00	5:53:00	19
5	Lampung 2	Kotaagung	104:33:00	5:31:00	1	104:36:00	5:33:00	47
6	Lampung 2	Laguna	105:03:00	5:45:00	1	105:03:00	5:47:00	40
7	Lampung 2	Legundi	105:18:00	5:50:00	1	105:18:00	5:51:00	33
8	Jabar 1	Cilegon1	105:49:00	6:20:00	1	105:36:00	6:20:00	47
9	Jabar 1	Cilegon2	105:38:00	6:30:00	1	105:32:00	6:30:00	51
10	Jabar 1	TjPanto	105:25:00	6:52:00	4	105:25:00	7:00:00	49
11	Jabar 1	Cipedang	105:57:00	6:49:00	1	105:57:00	6:52:00	40
12	Jabar 1	Marinjung	106:32:00	7:00:00	2	106:31:00	7:00:00	40
13	Jabar 1	UjungGenteng	106:25:00	7:22:00	1	106:25:00	7:24:00	50
14	Jabar 2	Sindangbarang	107:08:00	7:28:00	1	107:08:00	7:31:00	52
15	Jabar 2	BandarWaru	107:24:00	7:30:00	1	107:24:00	7:35:00	41
16	Jabar 2	Babakan	107:39:00	7:37:00	1	107:37:00	7:39:00	53
17	Jabar 2	Pamengpeuk	107:49:00	7:42:00	1	107:48:00	7:44:00	58
18	Jabar 2	Sukajaya	108:00:00	7:45:00	1	108:00:00	7:49:00	54
19	Jabar 2	Pasirpakadangan	108:12:00	7:48:00	1	108:12:00	7:53:00	53
20	Jabar 2	Kedungdahen	108:30:00	7:44:00	1	108:38:00	7:49:00	48
21	Jateng	Cilacap	109:02:00	7:45:00	2	109:08:00	7:51:00	52
22	Jateng	Pesanggrahan	109:15:00	7:42:00	1	109:15:00	7:50:00	51
23	Jateng	NusaKambangan	108:53:00	7:45:00	1	108:53:00	7:49:00	46
24	Jateng	Jetis	109:22:00	7:44:00	1	109:22:00	7:50:00	52
25	Jateng	Adikarta	109:41:00	7:48:00	1	109:38:00	7:55:00	51
26	Jateng	Aglireja	109:49:00	7:50:00	1	109:48:00	8:00:00	43
27	Jateng	PasirPuncu	109:56:00	7:52:00	1	109:56:00	7:58:00	51
28	Jateng	Jagadayoh	110:12:00	7:59:00	1	110:11:00	8:02:00	48

Table 6. List of coastal point and forecast point.

No	COASTAL BLOCK	POINT OF OBSERVATION	COASTAL POINT			FORECAST POINT		
			LONG (°E)	LAT (°S)	Depth (m)	LONG (°E)	LAT (°S)	Depth (m)
29	Jateng	KebonRejo	110:01:00	7:54:00	1	110:00:00	7:58:00	48
30	Jateng	ParangTritis	110:18:00	8:01:00	1	110:17:00	8:04:00	52
31	Jateng	Kukup	110:32:00	8:08:00	1	110:31:00	8:09:00	43
32	Jateng	Wilasa	110:24:00	8:05:00	1	110:22:00	8:07:00	60
33	Jateng	Sureng	110:40:00	8:11:00	1	110:39:00	8:12:00	46
34	Jateng	Gesik	110:48:00	8:12:00	1	110:47:00	8:13:00	46
35	Jateng	Dringo	110:52:00	8:13:00	1	110:52:00	8:14:00	44
36	Jatim	Pacitan	111:06:00	8:14:00	1	111:04:00	8:17:00	60
37	Jatim	Bandar	111:26:00	8:18:00	1	111:24:00	8:20:00	53
38	Jatim	Prigi	111:43:00	8:18:00	1	111:47:00	8:23:00	80
39	Jatim	Sine	111:58:00	8:17:00	1	111:58:00	8:19:00	59
40	Jatim	Kalibawang	112:13:00	8:20:00	1	112:13:00	8:22:00	54
41	Jatim	Kalitekuk	112:25:00	8:23:00	1	112:25:00	8:25:00	55
42	Jatim	Ngliyep	112:35:00	8:25:00	1	112:35:00	8:27:00	67
43	Jatim	Tempuhrejo	112:58:00	8:20:00	1	112:59:00	8:21:00	54
44	Jatim	Kedungsari	113:18:00	8:18:00	1	113:16:00	8:21:00	54
45	Jatim	GnBatok	113:29:00	8:25:00	1	113:29:00	8:27:00	96
46	Jatim	Sukamade	113:53:00	8:34:00	1	113:53:00	8:36:00	63
47	Jatim	Rajekwesi	114:21:00	8:39:00	1	114:18:00	8:41:00	51
48	Bali	Negara	114:48:00	8:25:00	1	114:47:00	8:26:00	31
49	Bali	Pulukan	114:54:00	8:28:00	1	114:50:00	8:29:00	39
50	Bali	Lalang-Linggah	115:02:00	8:34:00	3	114:54:00	8:37:00	49
51	Bali	TanahLot	115:07:00	8:40:00	1	114:57:00	8:41:00	48
52	Bali	Kuta	115:09:00	8:43:00	2	115:00:00	8:45:00	34
53	Bali	Uluwatu	115:05:00	8:50:00	1	115:05:00	8:52:00	41
54	Bali	Benoa	115:14:00	8:46:00	3	115:17:00	8:47:00	45
55	Bali	Sanur	115:16:00	8:42:00	3	115:19:00	8:42:00	57
56	Bali	NusaPenida	115:28:00	8:45:00	1	115:28:00	8:46:00	50

3. Results (Tsunami Height)

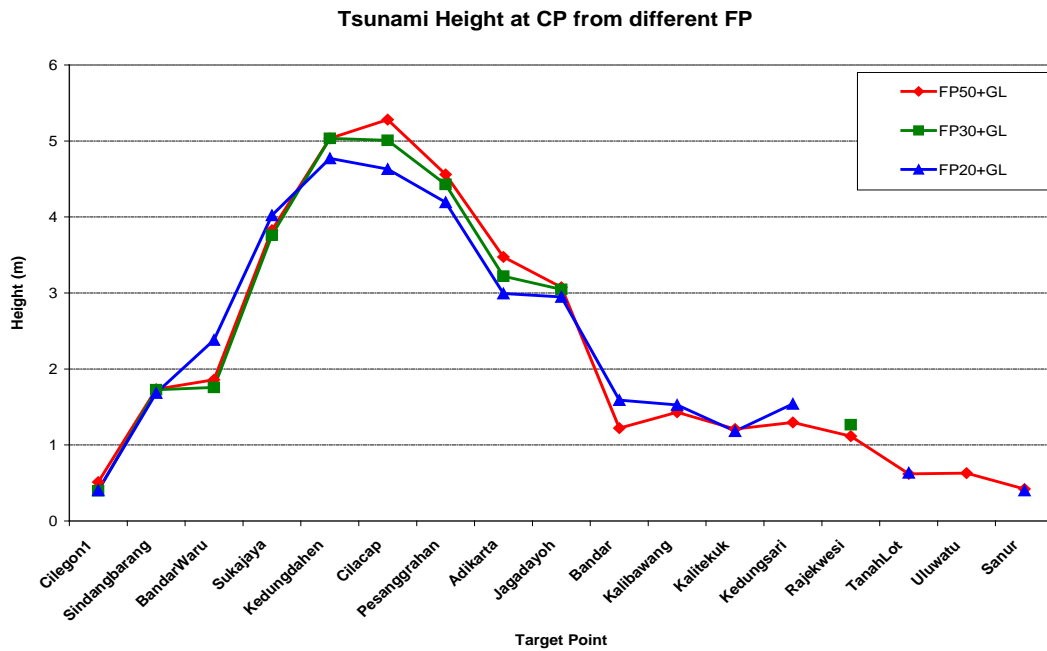


Figure 9. Comparison of tsunami heights at coastal points obtained by applying Green's law to the heights at the forecast point with different depths in case of source point C with depth 0 km and magnitude 8.0.

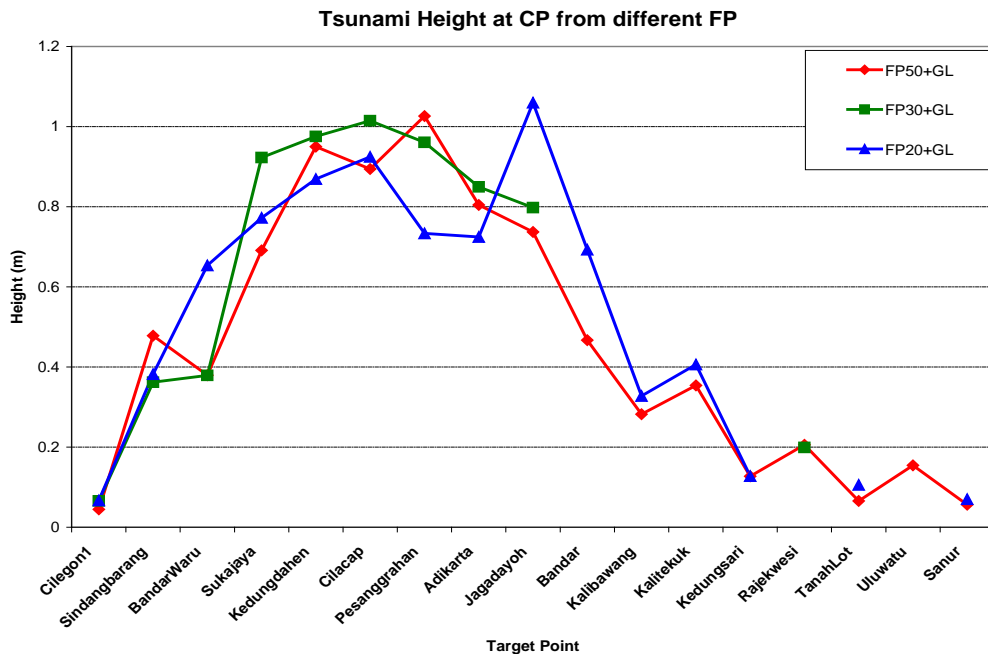


Figure 10. Comparison of tsunami heights at coastal points obtained by applying Green's law to the heights at the forecast point with different depths in the real case of the 2006 Pangandaran tsunami (M_w 7.7).

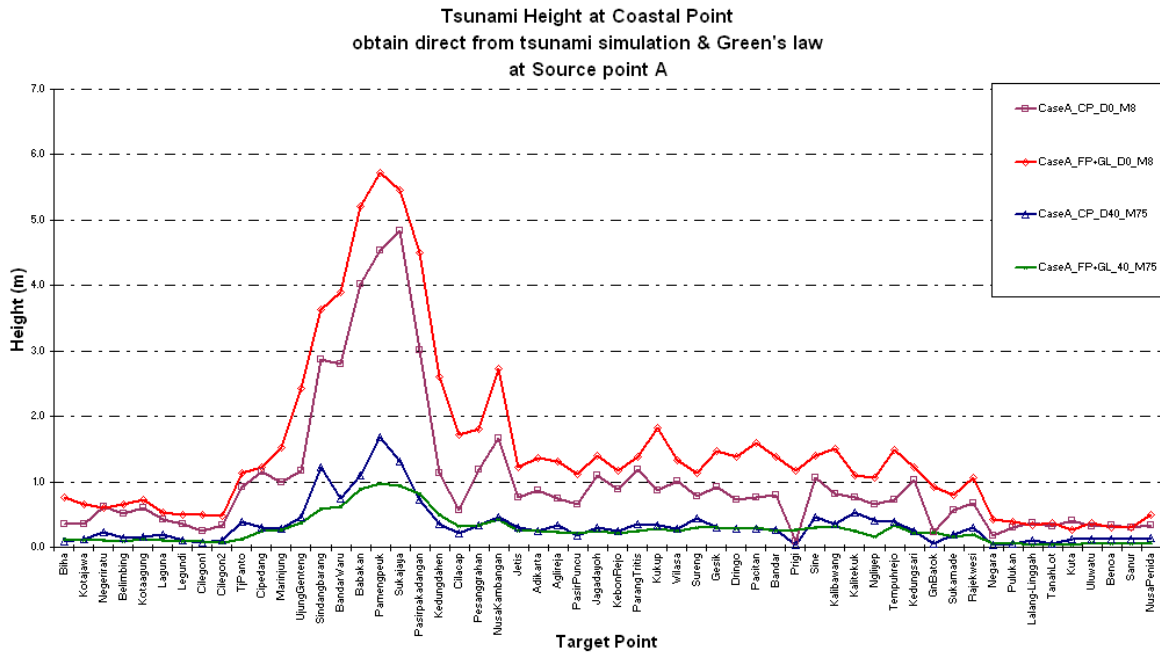


Figure 11. Comparison of tsunami heights obtained directly from simulation and by applying Green's law to heights at FPs for source point A with the same depth and magnitude.

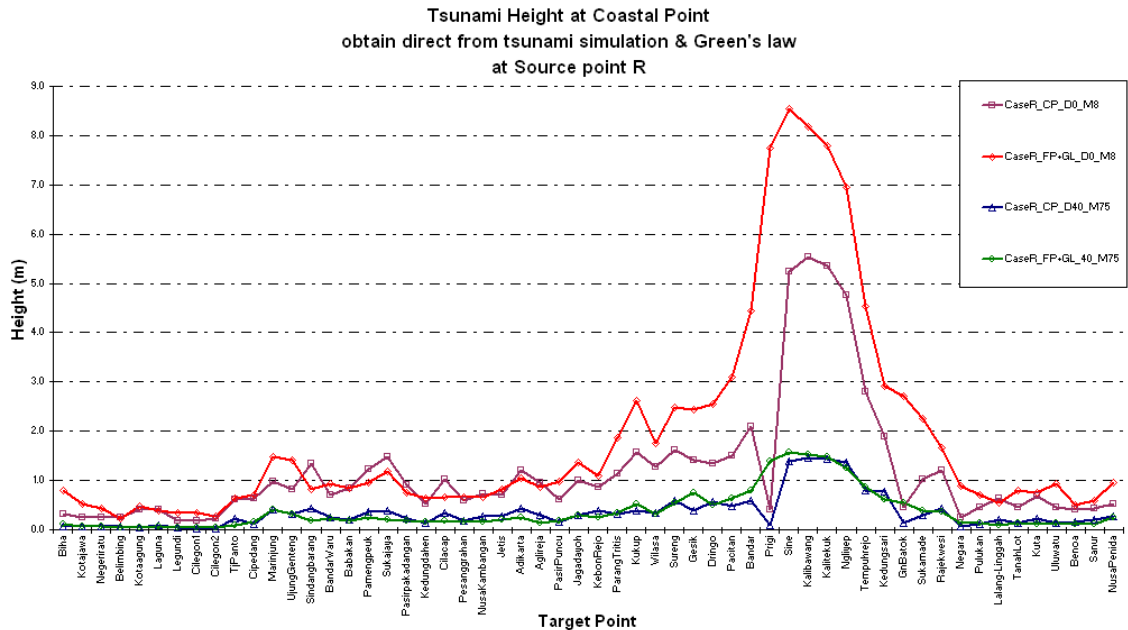


Figure 12. Comparison of tsunami heights obtained directly from simulation and by applying Green's law to heights at FPs for source point R with the same depth and magnitude.

Tsunami Height at Coastal Point
 obtain by applying Green's law at different source points

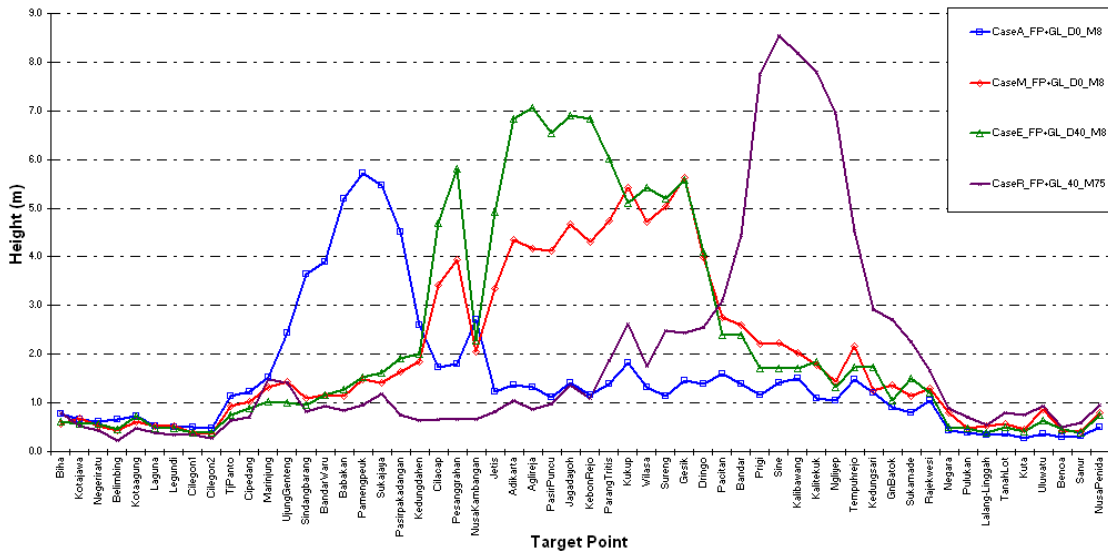


Figure 13. Comparison of tsunami heights obtained by using Green's law for different source points with the same depth and magnitude.

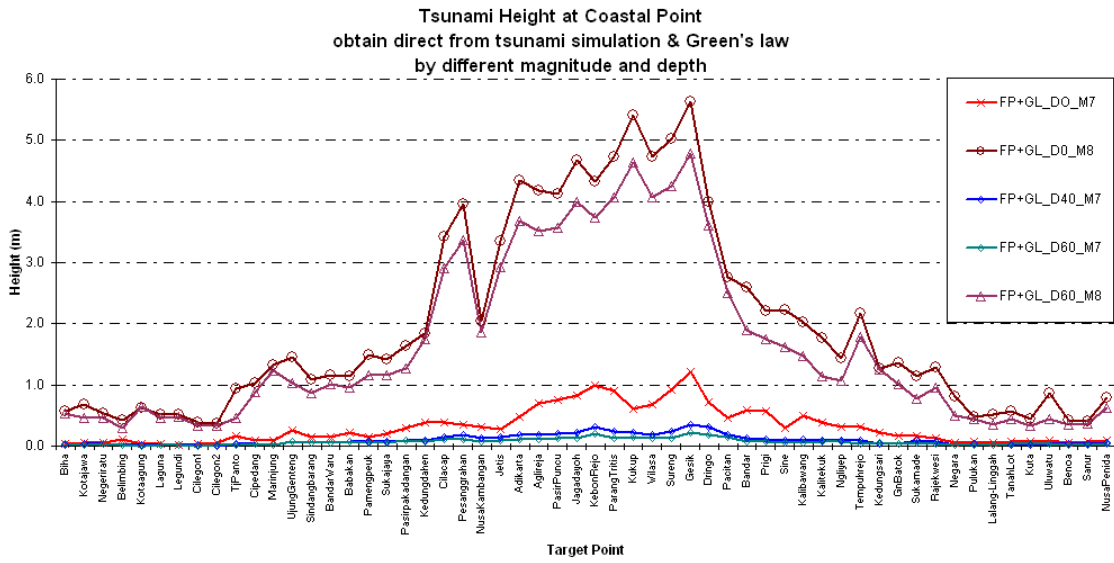


Figure 14. Comparison of tsunami heights obtained by using Green's law for the source point M (108.5°E, 10.0°S) with various depth and magnitude.

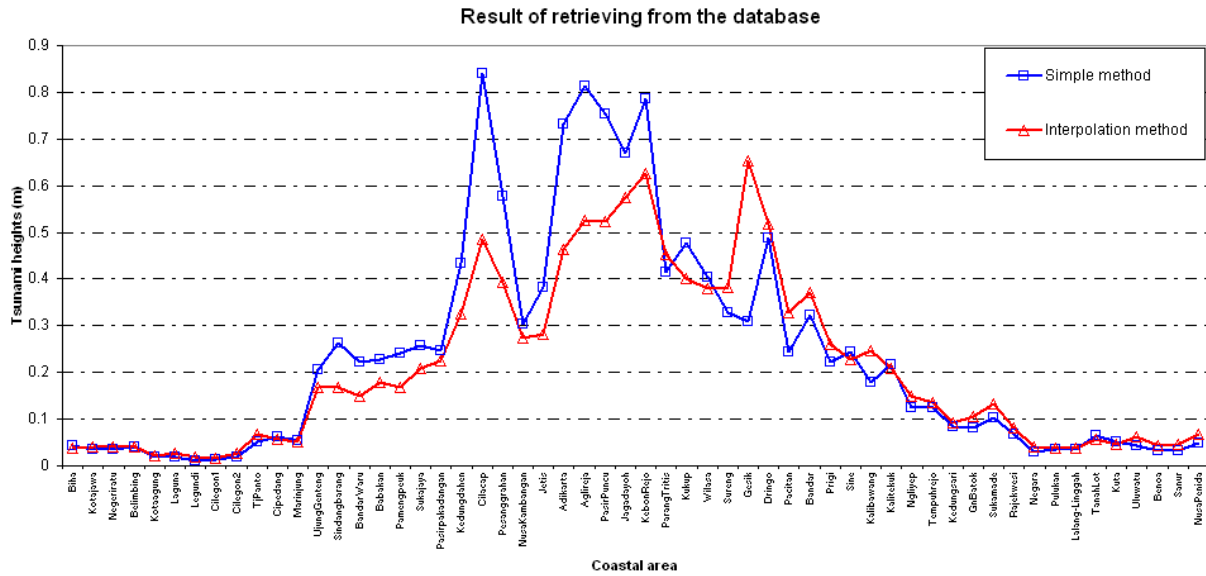


Figure 15. Comparison of tsunami heights for real earthquake (epicenter :109.2°E and 9.8°S, depth 30 km and magnitude 7.25) from retrieving database by simple and interpolation method.

4. Conditions for Computation

Table 7. Region for computation and data used for simulation.

Area	102.0° E-117.0° E / 5.0° S- 15.0 °S
Bathymetry data	1 arc-minute GEBCO
Δt	0.5s