

**NUMERICAL MODELING ANALYSIS FOR TSUNAMI HAZARD ASSESSMENT IN  
WEST COAST OF SOUTHERN THAILAND**

By Sorot SAWATDIRAKSA (Tsunami Course, 2007)

Thai Meteorological Department, Thailand

**1. Fault Parameters of Tsunami Sources**

Table 1. Tsunami source parameters for scenario earthquakes in and around Andaman Sea.

Parameter	Case 1						Case 2	Case 3	Case 4
Magnitude	9.3						9.0	9.0	7.5
Sub-Fault	1	2	3	4	5	6	-	-	-
Length (km)	200	125	180	145	125	380	575.4	575.4	77.6
Width (km)	150	150	150	150	150	150	144.5	144.5	25.1
Displacement (m)	14	12.6	10	11	7	7	9.55	9.55	3.80
Depth (km)	10	10	10	10	10	10	3	3	35
Strike (°)	323	335	340	340	345	7	25	8	254
Dip (°)	15	15	15	15	15	15	10	10	56
Slip (°)	90	90	90	90	90	90	90	115	-90
Latitude (°N)	3.03	4.48	5.51	7.14	8.47	9.63	11.8	8.60	10.95
Longitude (°E)	94.90	93.82	93.30	92.74	92.28	91.97	91.0	91.64	95.05

note: Latitudes, Longitudes and depth indicate at the left bottom corner of each case.

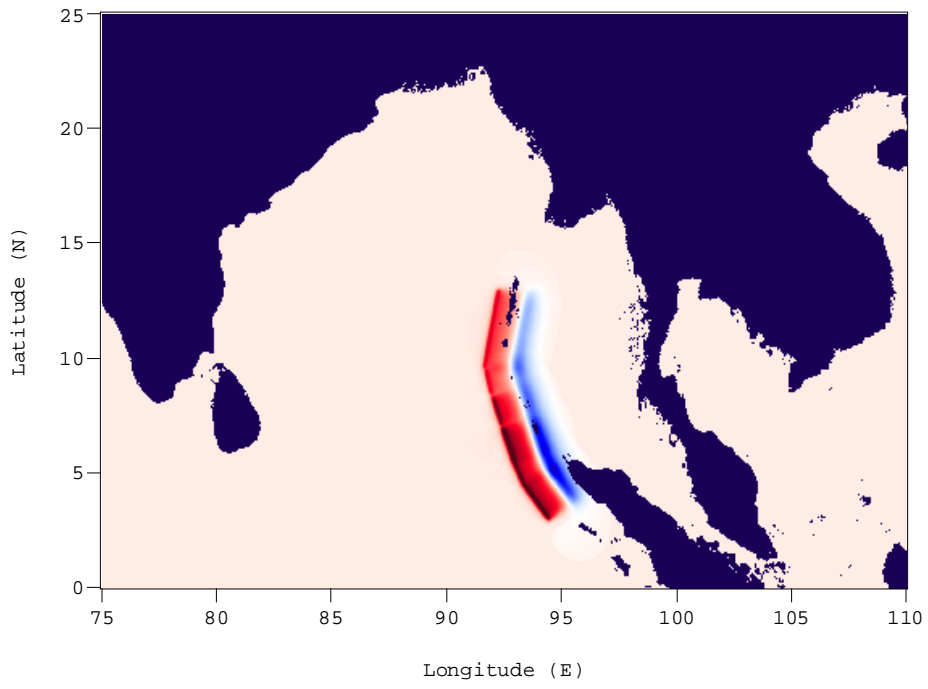


Figure 2. Fault location in Case 1.

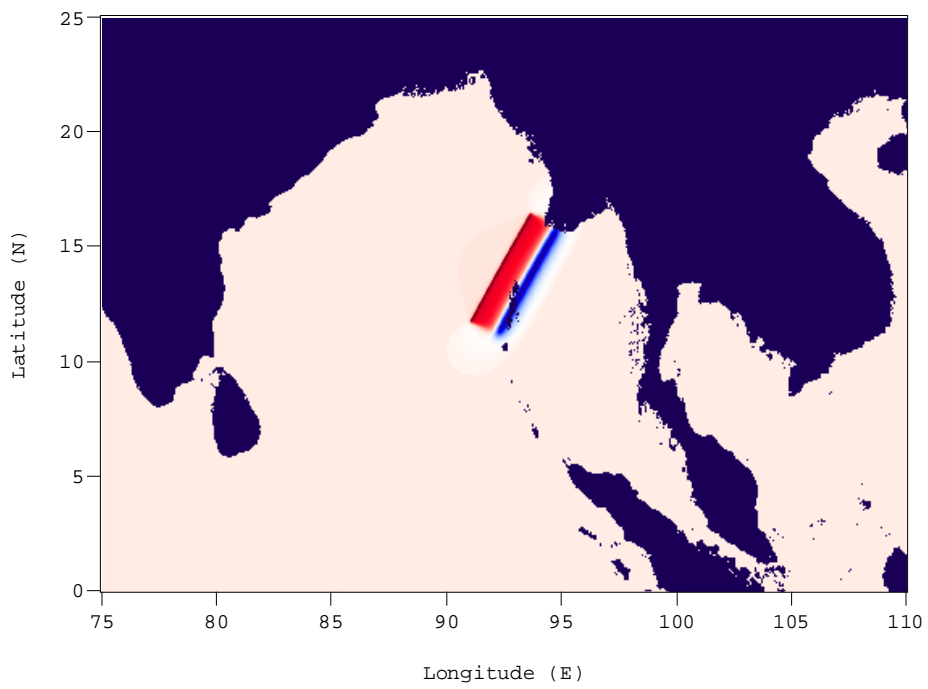


Figure 3. Fault location in Case 2.

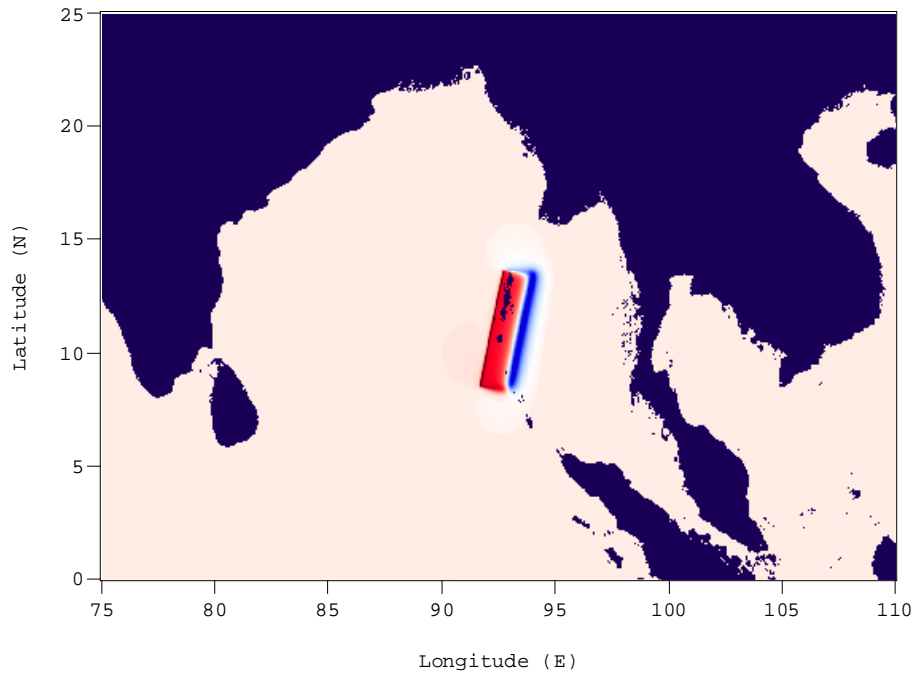


Figure 4. Fault location in Case 3.

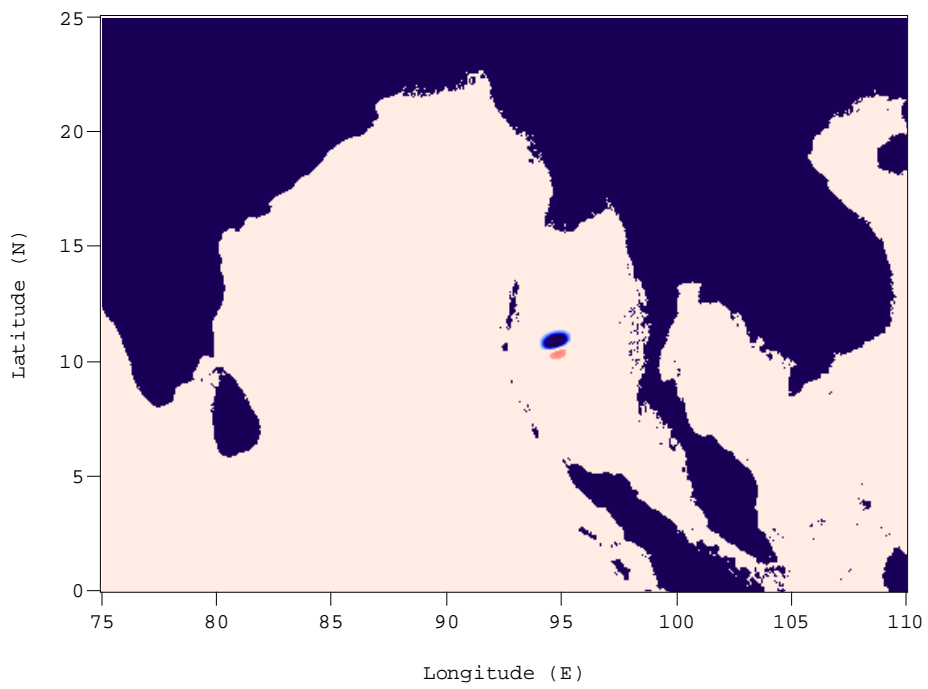


Figure 5. Fault location in Case 4.

## 2. Tide Gauge Stations

Table 2. Locations of tide gauge stations along southern Thailand west coast.

Province		Station	Location		Depth (m)	Owner
			Latitude (°N)	Longitude (°E)		
DART buoys		by23401	8.91	88.54	3509 <sup>1</sup>	Thailand
DART buoys		by53401	0.05	91.90	4529 <sup>1</sup>	Indonesia
Phangnga	Ko stok	tmd006	9.47	97.91	4.61 <sup>2</sup>	TMD <sup>5</sup>
Phangnga	Ko miang	tmd007	8.57	97.64	6.49 <sup>2</sup>	TMD
Phuket	Ko rachanoi	tmd008	7.49	98.32	1.87 <sup>2</sup>	TMD
Satun	Ko palai	tmd009	6.50	99.18	8.11 <sup>2</sup>	TMD
Ranong	Ko konnatee	md001	9.95	98.60	1 <sup>1</sup>	MD <sup>6</sup>
Phangnga	Kuraburi	md002	9.23	98.38	2.11 <sup>2</sup>	MD
Phuket	Ao Po	md003	8.06	98.44	0.41 <sup>2</sup>	MD
Krabi	Muang Krabi	md004	8.04	98.91	1.53 <sup>2</sup>	MD
Trang	Kantang	md005	7.31	99.41	0.98 <sup>2</sup>	MD
Satun	Tammalang	md006	6.53	100.07	1 <sup>1</sup>	MD
Phuket	Taphanoi	ny001	7.82	98.42	2.99 <sup>2</sup>	HDRTN <sup>7</sup>
Satun	Tarutao	ny002	6.70	99.63	14.08 <sup>2</sup>	HDRTN
Ranong	Ko song	tg102	10.0	98.60	1 <sup>1</sup>	assumed
	Ko phyam	tg103	9.72	98.38	0.66 <sup>2</sup>	assumed
	Amphoe kapoe	tg104	9.63	98.50	0.14 <sup>2</sup>	assumed
	Ko surin north	tg105	9.45	97.92	0.44 <sup>2</sup>	assumed
	Ko surin south	tg106	9.38	97.85	1.02 <sup>2</sup>	assumed
Phangnga	Ko pra tong	tg202	9.08	98.25	0.06 <sup>2</sup>	assumed
	Ko kho khao	tg203	8.95	98.25	1.23 <sup>2</sup>	assumed
	Khao lak	tg204	8.63	98.23	1.29 <sup>2</sup>	assumed
	Ban thap lamu	tg205	8.58	98.25	0.16 <sup>2</sup>	assumed
	Thay muang	tg206	8.38	98.25	1.34 <sup>2</sup>	assumed
	Ban tha nun	tg207	8.22	98.28	13.03 <sup>2</sup>	assumed
	Ko yao noi	tg208	8.13	98.58	2.62 <sup>2</sup>	assumed
	Ko yao yai	tg209	8.02	98.58	1.74 <sup>2</sup>	assumed
	Ko similan	tg210	8.65	97.65	51.79 <sup>2</sup>	assumed
Phuket	Maikhao beach	tg302	8.17	98.28	0.57 <sup>3</sup>	assumed
	Naiyang beach	tg303	8.10	98.30	2.57 <sup>3</sup>	assumed
	Bang tao beach	tg304	8.00	98.28	0.08 <sup>4</sup>	assumed

	Kamala beach	tg305	7.95	98.28	0.03 <sup>4</sup>	assumed
	Patong beach	tg306	7.90	98.28	0.02 <sup>4</sup>	assumed
	Karon beach	tg307	7.83	98.28	0.81 <sup>4</sup>	assumed
	Kata beach	tg308	7.82	98.30	0.24 <sup>3</sup>	assumed
	Naihan beach	tg309	7.77	98.30	0.24 <sup>3</sup>	assumed
	Ao rawai	tg310	7.75	98.33	4.12 <sup>2</sup>	assumed
	Ao chalong	tg311	7.82	98.37	0.19 <sup>2</sup>	assumed
	Ao tha rua	tg312	7.95	98.40	0.02 <sup>2</sup>	assumed
	Ko racha yai	tg313	7.62	98.37	2.52 <sup>2</sup>	assumed
Krabi	Ao nang	tg402	8.03	98.82	0.20 <sup>2</sup>	assumed
	Ao krabi	tg403	8.02	98.92	0.30 <sup>2</sup>	assumed
	Ko phiphi	tg404	7.75	98.77	4.80 <sup>2</sup>	assumed
	Ko lanta yai	tg405	7.60	99.03	4.89 <sup>2</sup>	assumed
Trang	Ao sikao	tg502	7.53	99.30	0.72 <sup>2</sup>	assumed
	Ko kradan	tg503	7.32	99.25	4.55 <sup>2</sup>	assumed
	Ko chao mai	tg504	7.30	99.38	0.21 <sup>2</sup>	assumed
	Pak nam kantang	tg505	7.33	99.50	0.07 <sup>2</sup>	assumed
	Ko sukon	tg506	7.08	99.57	0.31 <sup>2</sup>	assumed
Satun	Thung wa	tg603	7.12	99.73	0.26 <sup>2</sup>	assumed
	Ban pak la ngu	tg604	6.82	99.78	0.59 <sup>2</sup>	assumed
	Pak nam satun	tg605	6.55	100.8	1 <sup>1</sup>	assumed
	Ko rawi	tg606	6.57	99.18	5.16 <sup>2</sup>	assumed
	Koa dang	tg607	6.53	99.28	3.79 <sup>2</sup>	assumed

Note 1: depth from region R1

2: depth from region R2

3: depth from region R3

4: depth from region R4

5: TMD (Thai Meteorological Department)

6: MD (Marine Department of Thailand)

7: HDRTN (Hydrographic Department Royal Thai Navy)

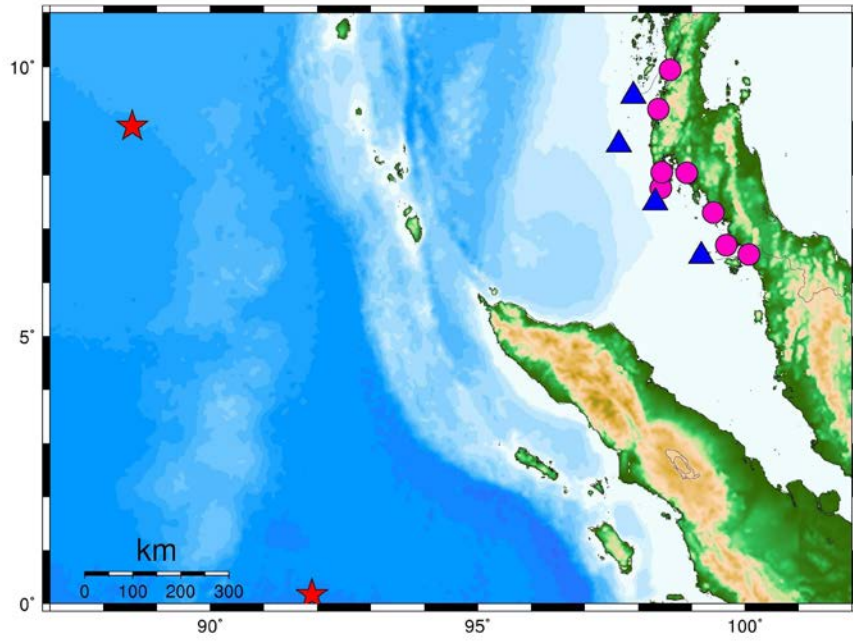


Figure 6. Locations of DART buoys (red star) and existing tide gauge stations (pink circles). Blue triangle indicates position of planned installation tide gauge stations by the Thai Meteorological Department.

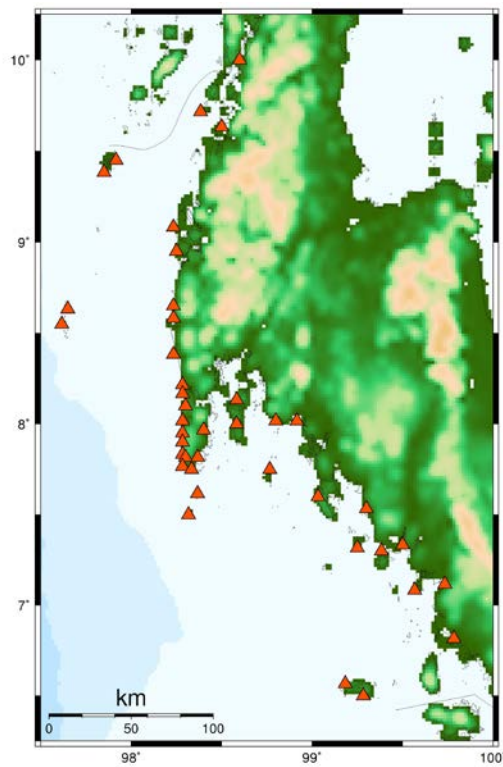


Figure 7. Locations of virtual tide gauge stations as outpost along southern Thailand west coast.

### 3. Results (Tsunami Height)

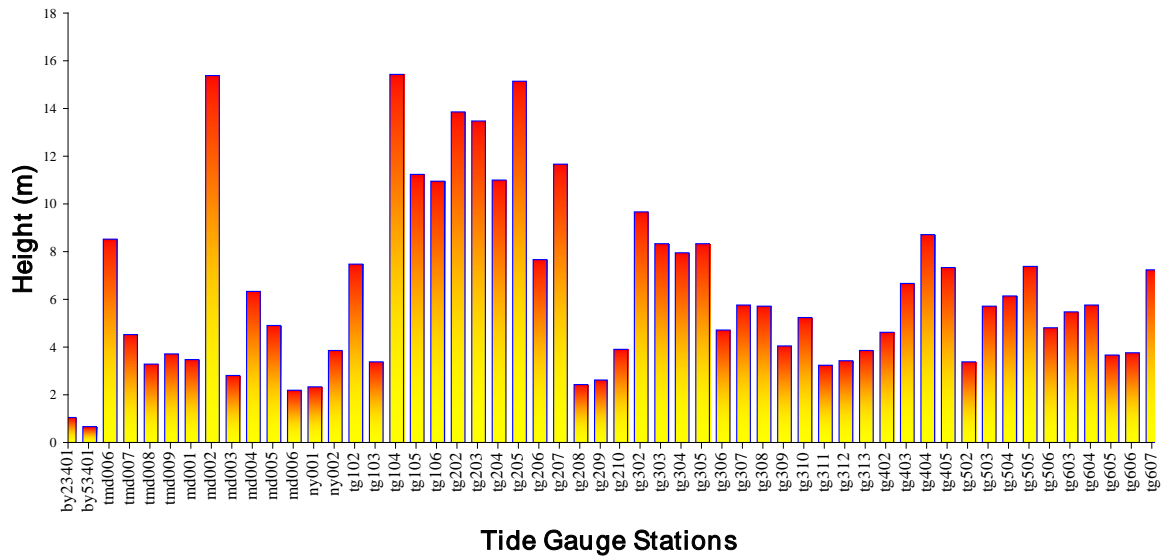


Figure 8. Maximum wave height in Case 1 after 12 hours.

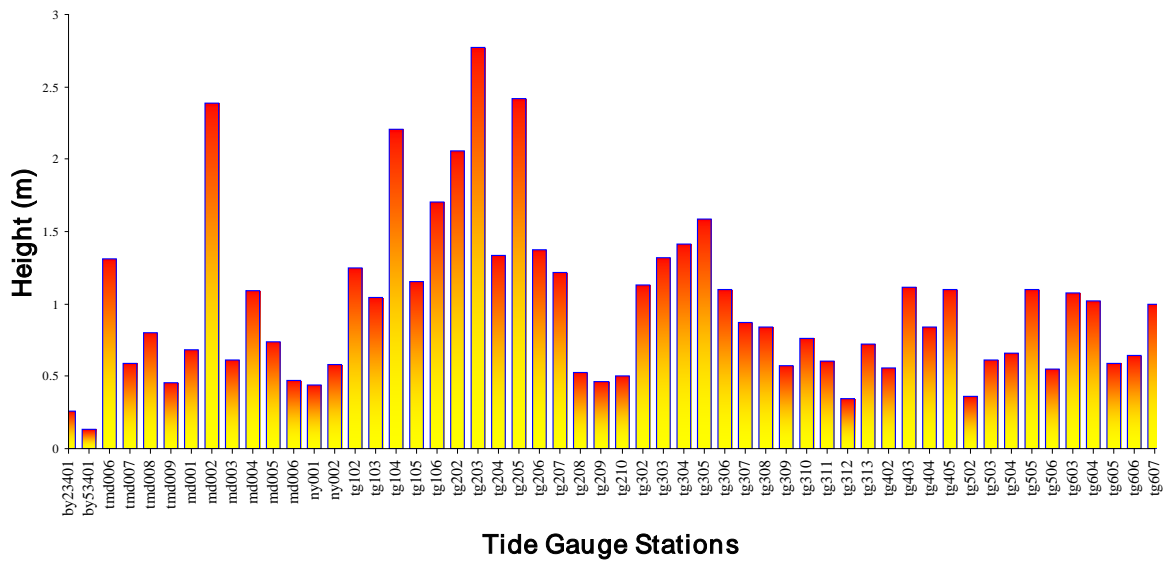


Figure 9. Maximum wave height in Case 2 after 12 hours.

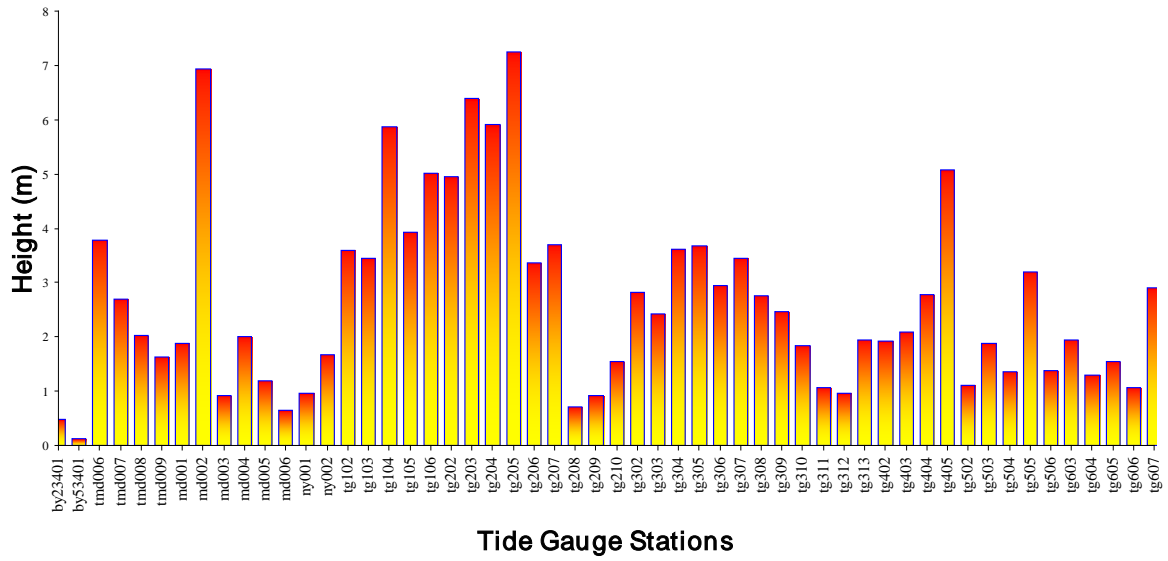


Figure 10. Maximum wave height in Case 3 after 12 hours.

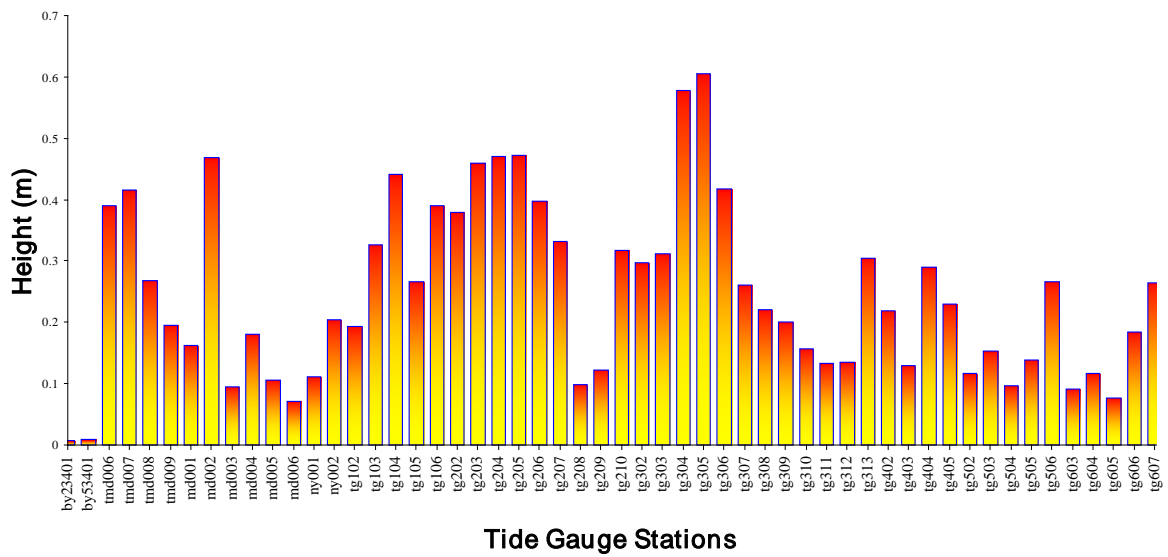


Figure 11. Maximum wave height in Case 4 after 12 hours.



#### 4. Conditions for Computation

Table 3. Region for computation and data used for simulation.

Region	R1	R2
Area	75° E - 110° E / 0° N - 25° N	96°29'00" E - 99°55'15" E / 5°59'00" N - 9°45'15"N
Bathymetry data	1 arc-minute GEBCO	15 arc-second
$\Delta t$	1.5s	?記載なし

Region	R3	R4
Area	97°59'55" E - 98°20'00" E / 7°45'25" N - 8°12'39" N	98°05'28" E - 98°19'00" E / 7°50'58" N - 8°00'00" N
Bathymetry data	5 arc-second	1.67 arc-second
$\Delta t$	3.0s	

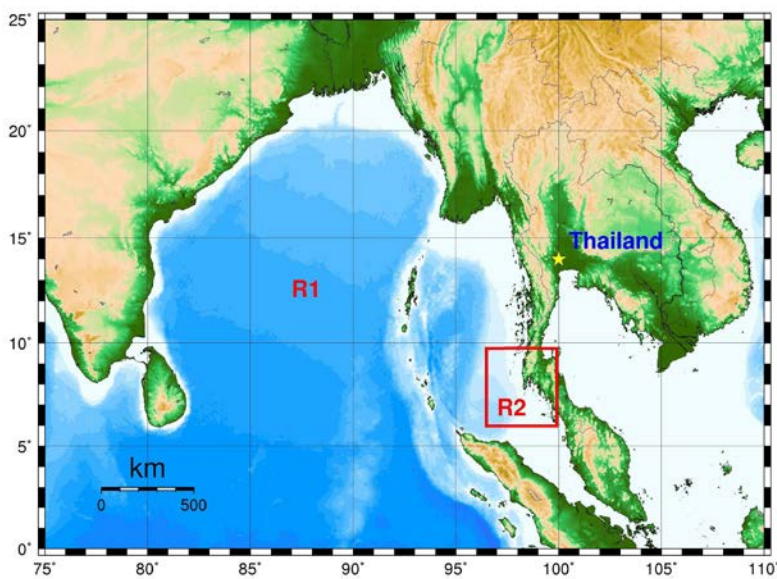


Figure 12. Computation area for numerical model region R1.

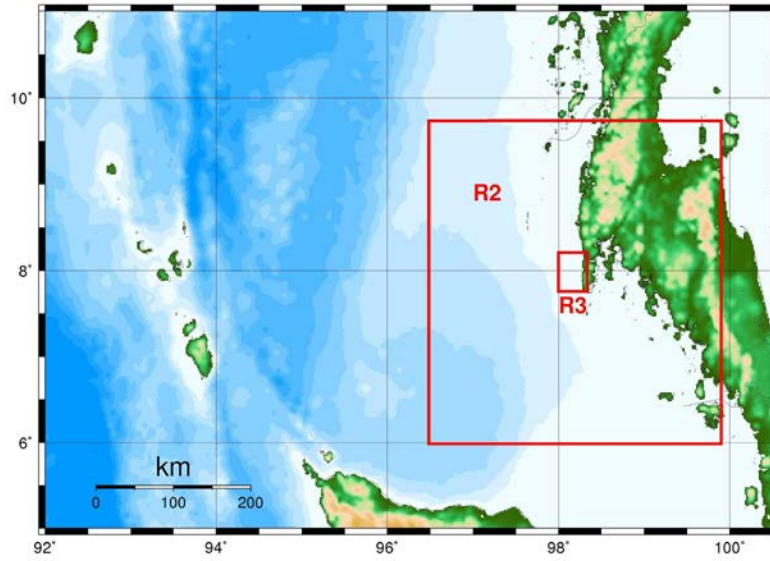


Figure 13. Computation area for numerical model region R2.

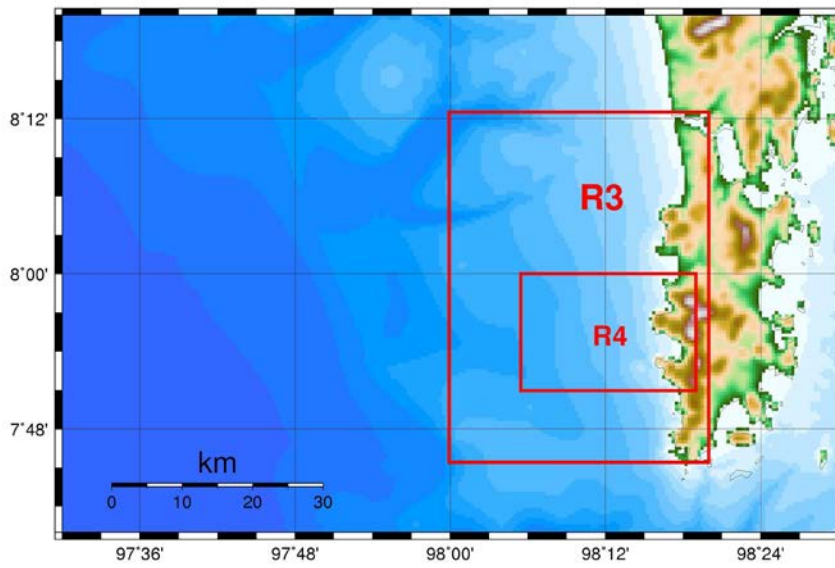


Figure 14. Computation area for numerical model region R3.

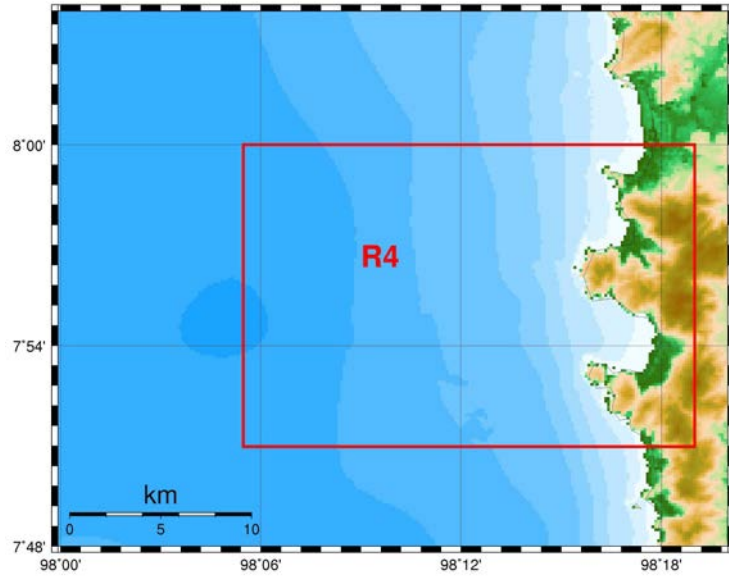


Figure 15. Computation area for numerical model region R4.