

STUDY ON TSUNAMI DATABASE FOR TSUNAMI EARLY WARNING SYSTEM IN BANGLADESH

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1. Fault Parameters of Tsunami Sources

Table 1. Fault parameters for different magnitudes.

Magnitude	Length (Km)	Width (km)	Slip amount (cm)
6.5	22.4	11.2	70.8
7.0	39.8	19.9	125.9
7.5	70.8	35.4	223.9
8.0	125.9	62.9	398.1

Table 2. Depth of fault with different magnitude.

Magnitude (M_w)	Depth of center of fault (km)	Depth of TLC (km)
6.5	0	0.000
6.5	10	5.238
6.5	20	15.238
6.5	30	25.238
7.0	0	0.000
7.0	10	1.531
7.0	20	11.531
7.0	30	21.531
7.5	0	0.000
7.5	10	0.000
7.5	20	4.940
7.5	30	14.940
8.0	0	0.000
8.0	10	0.000
8.0	20	0.000
8.0	30	3.219

Table 3. Location of source points with bathymetry depth.

Source point	Location		Source point	Location	
	Longitude (Degree)	Latitude (Degree)		Longitude (Degree)	Latitude (Degree)
A	92.50	20.50	F	91.50	21.00
B	92.00	20.50	G	91.00	21.50
C	91.50	20.50	H	92.00	20.00
D	91.50	21.50	I	92.50	20.00
E	91.00	21.00	J	92.00	21.00

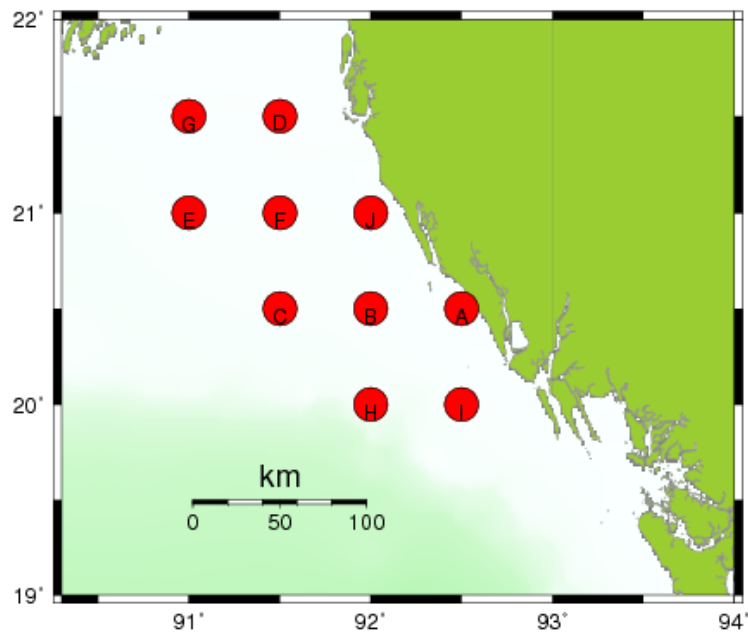


Figure 1. The location of source points.

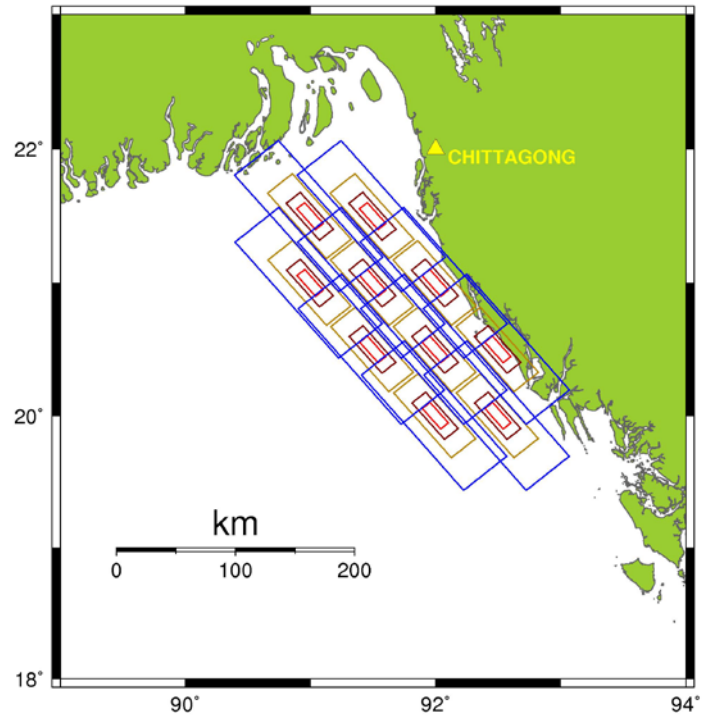


Figure 2. Fault area for each tsunami source. Red color boxes denote fault areas for magnitude 6.5. Maroon color boxes denote fault areas for magnitude 7.0. Dark gold rod color boxes denote fault areas for magnitude 7.5. Blue color boxes denote fault areas for magnitude 8.0.

2. Coastal Points, Forecast Points and Tide Gauge Stations

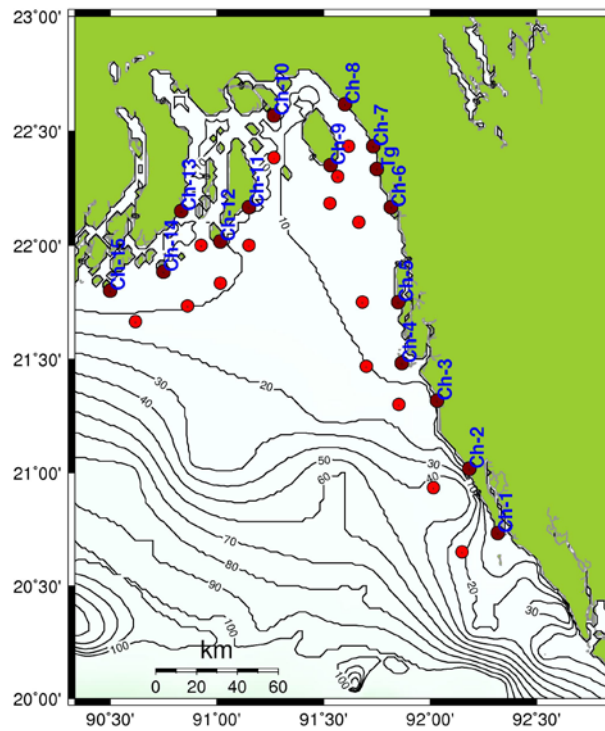


Figure 3a. Bathymetry depth contour map near Bangladesh coast. Red circles indicate forecast points; Maroon circles indicate coastal points.

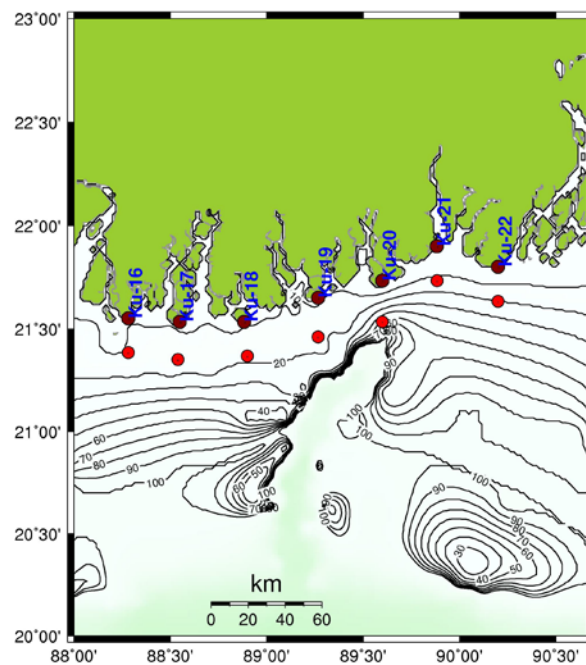


Figure 3b. Bathymetry depth contour map near Bangladesh coast. Red circles indicate forecast points; Maroon circles indicate coastal points.

Table 4. Location of coastal points, forecast points and one tide gauge station with bathymetry depth.

Output point	Location		Water depth (m)	Output point	Location		Water depth (m)
Name of coastal point	Longitude (Degree)	Latitude (Degree)		Name of forecast point	Longitude (Degree)	Latitude (Degree)	
Ch-1	92.317	20.733	1.000	BA	92.133	20.650	25.000
Ch-2	92.183	21.017	1.000	BB	92.017	20.933	44.000
Ch-3	92.033	21.317	1.000	BC	91.850	21.300	16.000
Ch-4	91.867	21.483	1.000	BD	91.700	21.467	10.000
Ch-5	91.850	21.750	1.000	BE	91.683	21.750	6.000
Ch-6	91.817	22.167	1.000	BF	91.667	22.100	5.000
Ch-7	91.733	22.433	1.000	BG	91.633	22.267	6.000
Ch-8	91.600	22.617	1.000	BH	91.617	22.433	3.000
Ch-9	91.533	22.350	1.000	BI	91.533	22.183	6.000
Br-10	91.267	22.567	1.000	BJ	91.267	22.383	11.000
Br-11	91.150	22.167	1.000	BK	91.150	22.000	10.000
Br-12	91.017	22.017	1.000	BL	91.017	21.833	8.000
Br-13	90.833	22.150	1.000	BM	90.883	22.000	9.000
Br-14	90.750	21.883	1.000	BN	90.867	21.733	9.000
Br-15	90.500	21.800	1.000	BO	90.617	21.667	13.000
Ku-16	88.283	21.550	1.000	BP	88.283	21.383	12.000
Ku-17	88.550	21.533	1.000	BQ	88.533	21.350	15.000
Ku-18	88.883	21.533	1.000	BR	88.900	21.367	17.000
Ku-19	89.267	21.650	1.000	BS	89.267	21.467	15.000
Ku-20	89.600	21.733	1.000	BT	89.600	21.533	52.000
Ku-21	89.883	21.900	1.000	BU	89.883	21.733	13.000
Ku-22	90.200	21.800	1.000	BV	90.200	21.633	20.000
Tg	91.750	22.333	1.000				

3. Results (Tsunami Height)

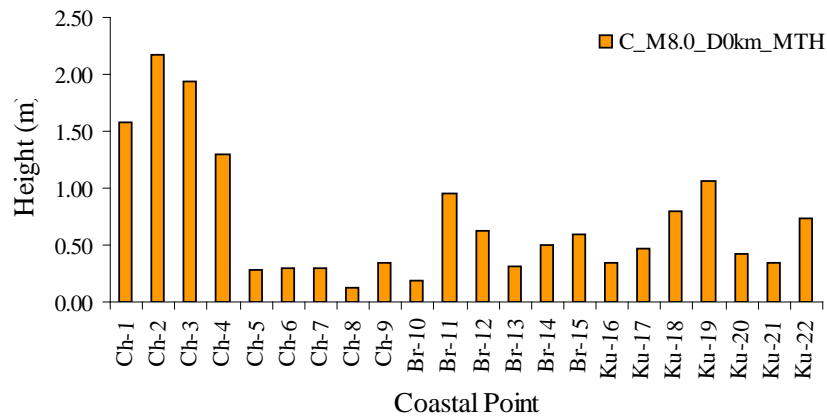


Figure 4. Maximum tsunami heights (MTH) is calculated along the coastal points for the source point C (the location is longitude 91.5°E and latitude 20.5°N) with magnitude 8.0 and depth of 0 km.

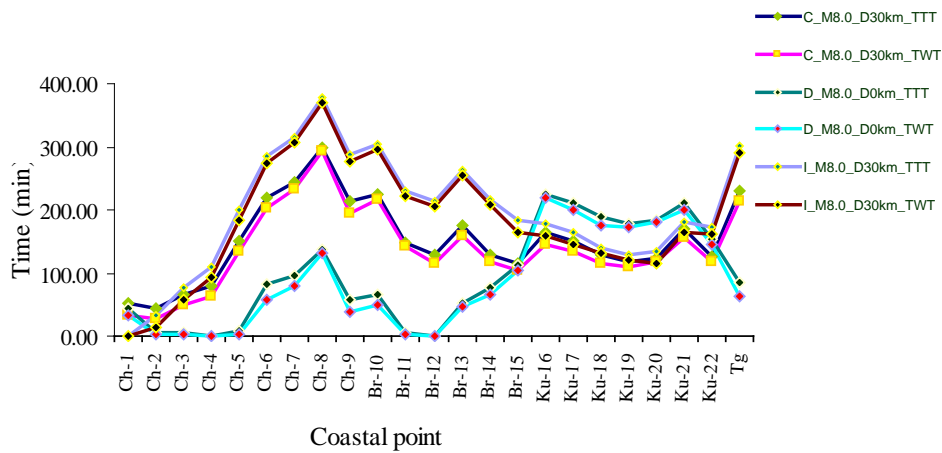


Figure 5. Comparison between tsunami travel times using waveforms and TTT against 22 Coastal points and one tide gauge station for different source points with same magnitude M_w 8.0 and depth (0 and 30 km). (Details attached in Appendix-4).

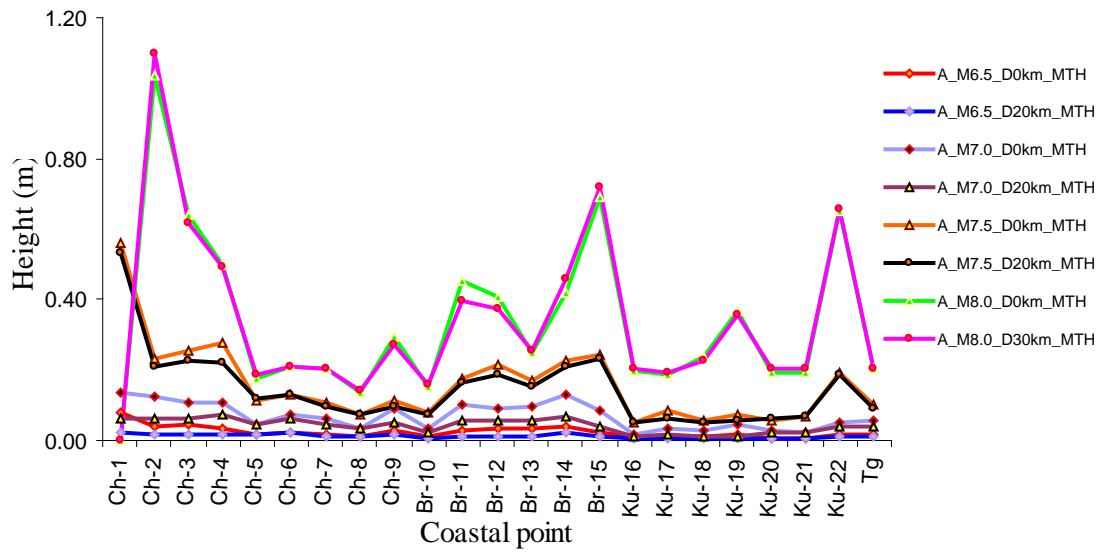


Figure 6. Tsunami heights against the coastal points for different magnitudes and depths with same source. The location of source point A is 92.5°E and 20.5°N. The trend line of tsunami height decreases as magnitude gets lower. (Details attached in Appendix-5).

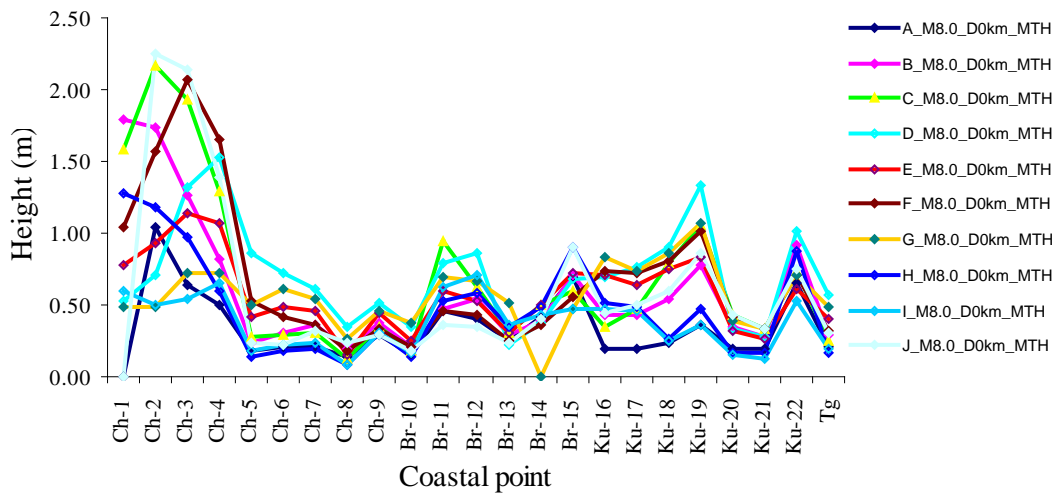


Figure 7. Tsunami heights against the coastal points for different source points with same magnitude and depth. (Details attached in Appendix-6).

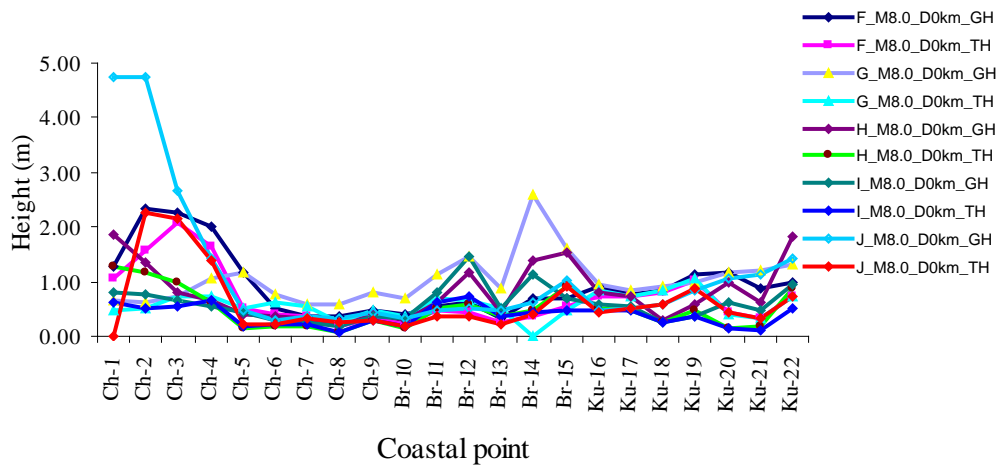


Figure 8. Tsunami heights with Green's Law and Maximum Tsunami Heights at coastal points for different source points with same magnitude and depth. (Details attached in Appendix-9).

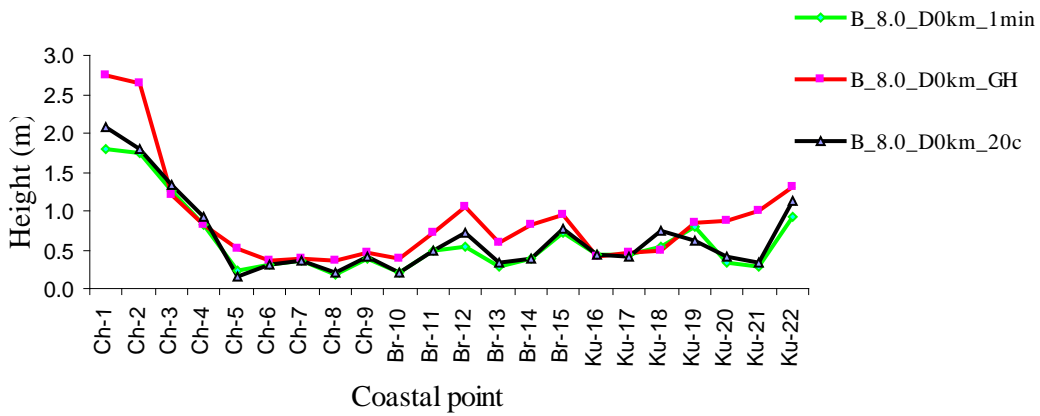


Figure 9. Comparison of tsunami heights for twenty arc second grid interval, tsunami heights for one arc minute grid interval and tsunami heights with Green's Law against the coastal points. The source point B is located at 92.0° E and 20.5° N. The red curve denotes tsunami heights against coastal points for Green's law; the black curve denotes tsunami heights against coastal points for twenty arc second grid interval of bathymetry; the green curve denotes tsunami heights against coastal points for one arc minute grid interval of bathymetry.

4. Conditions for Computation

Table 5. Region for computation and data used for simulation.

Area	85.0° E - 95.0° E / 15.0° N - 23.0 ° N
Bathymetry data	1 arc-minute GEBCO / 20 arc-second GEBCO
Δt	3.0 s / 2.0 s