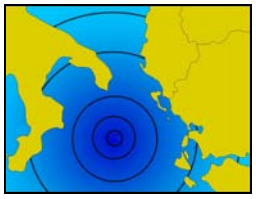

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Project IGCP 495
Quaternary Land-Ocean Interactions:
Driving Mechanisms and Coastal Responses

Project 495

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Modelling of the Bengkulu Minor Tsunami Event, September 12, 2007, West Of Sumatera, Indonesia

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Abstract
Earthquake magnitude of Mw 7.9 – Mw 8.4 was shocking Province of Bengkulu in West Sumatera, Indonesia on September 12, 2007, as reported by BMG-Indonesia, USGS, and GFZ-Potsdam.

This paper is our research documentation which is our modelling results as our quick response to Bengkulu earthquake based on a preliminary estimation of earthquake magnitude (Mw. 8.4) and epicentre (101.00°E, 3.78°S) provided by USGS.

We employ TUNAMI-N1 model to our domain model which has grid resolutions 1,852 meters, for two scenarios (Mw 8.4 and Mw 8.2) along 4 hours simulation with time step 1 second. Bathymetry data with 1 minute-arc resolution is derived from GEBCO. We also used water level data derived from real time tide gauge data at stations Padang (IODE-VLIZ, 2007), Cocos Island (UHSLC, 2007), and DART Buoy No. 23401 (NOAA, 2007) for sea surface wave verification.

Our modelling results show tsunami wave propagate from its source location then mainly hit Bengkulu and its surroundings, also minor part of Padang. Maximum wave height in Bengkulu and surroundings were varying between 0.5 meters and 5.3 meters.

In general, tsunami wave between modelling results and observations data has similar form, but there's slightly lag of arrival time and differences in wave-form. The best fit of our results is at Padang stations, and then nearly fit at Cocos Islands, which both of them is scenario 1 with earthquake Mw. 8.4. at DART buoy station, from both scenarios, tsunami wave from modelling results in DART and Cocos station is earlier than observations data.

If we compare to the preliminary field survey results of Jose Borrero et al (2007), the maximum wave height in Lais is similar (4.2 meters), but slightly overestimates in Muara Maras and, while slightly underestimates in Tais and Pasar Seluma.

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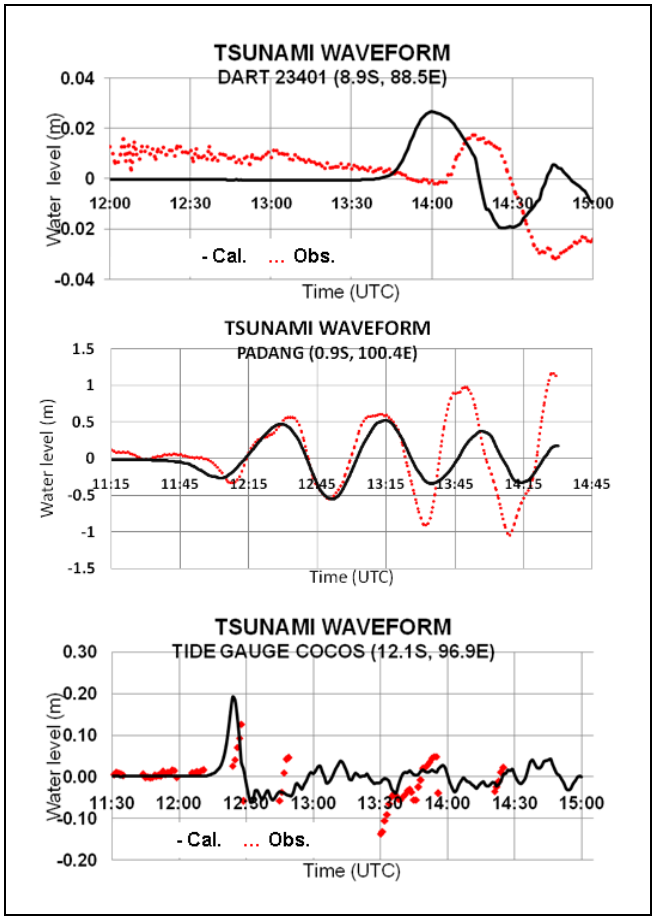

Figure 1. Tsunami modelling results from earthquake Mw 8.4 and its verifications.

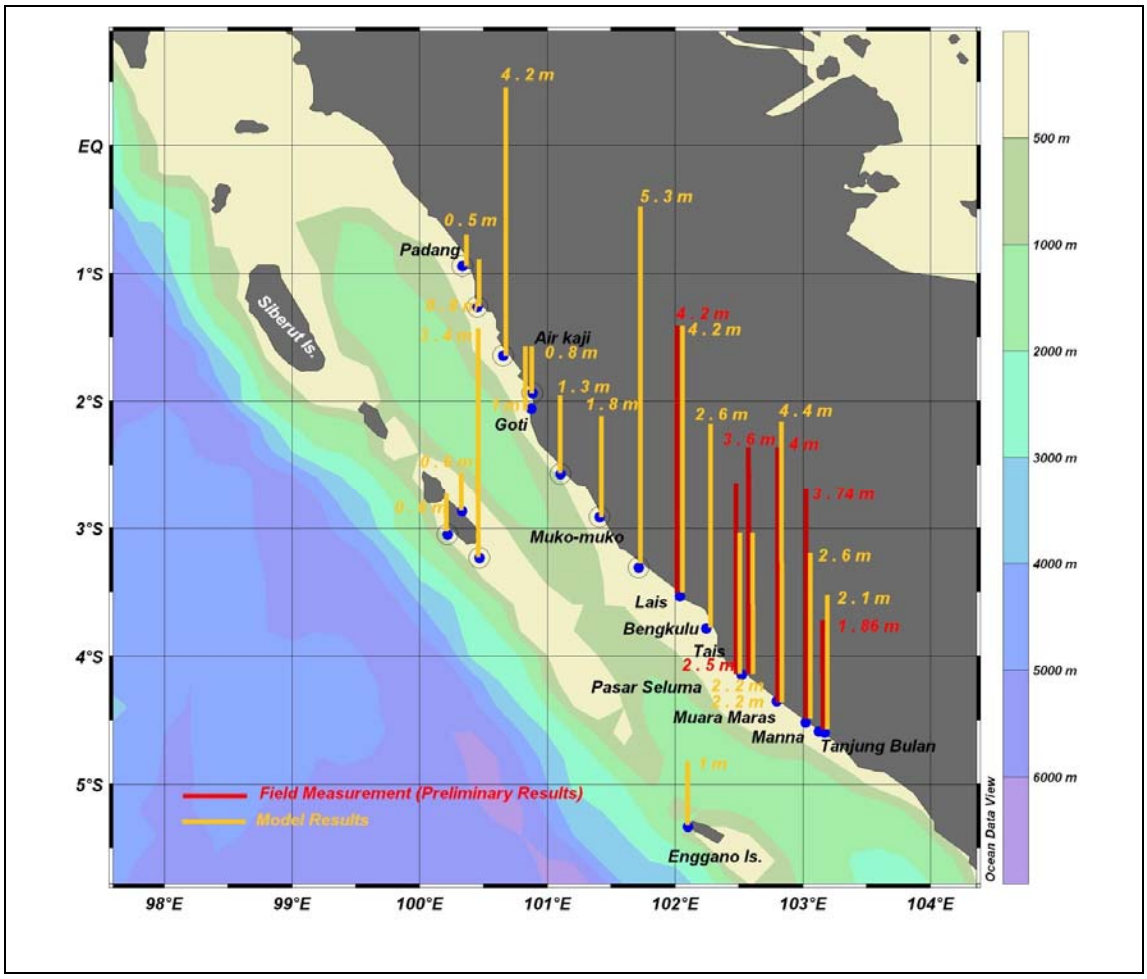

Figure 2. Tsunami maximum wave height modelling results from earthquake Mw 8.4 and its verifications.[a]

[a] This verifications data is provided by Jose Borrero et al (2007).