# A Preliminary Analysis, Post 25/10/10 Tsunami Event.

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## Introduction

An earthquake with origin time: 14:42 25 Oct 2010 (UTC) and coordinates: 3.1$^{o}$ South and 100.1 $^{o}$ East was generated in the region of southern Sumatra (Mentawai region), Indonesia. The initial estimated magnitude was of the order of Mw 7.5.

In this preliminary report, the Mentawai event is modelled using the MOST code to determine the run-up and inundation in the region of Rodrigues Island. The model is initialised using the inverse DART measurement to give a better simulation of the event. As a result the model is run using a slip of 3m and applying a source of 100 km in length and 50 km in width.

### Results

The model produced maximum wave height of about 45 cm as depicted in Figure 1. The region that experienced the highest wave height was: the North Coast, North East, East and South East (see arrows in Figure 1).

However, further modelling demonstrated that no significant (compared to 2004 event) inland inundation took place. The East coast (Figure 2) is seen to register the greatest horizontal run-up reaching up to about 70 metres in land. Minor inundations also occurred in other places (see arrows in Figure 2). Figures 3 and 4 illustrate the other region were minor inundation were observed from the model. In terms of vertical run-up or wave height; Port Mathurin showed a maximum wave height of about 40 cm (Figure 2). More or less the same heights were registered for the areas with highest wave height.

The modelling results were compared with the real-time tide gauge reading (see figure 3). It is obvious that the first waves struck Rodrigues coast at high tide (see arrow in figure3). The tide gauge readings compare well with the model results (about 45 cm without tidal effect).

Port Louis tide gauge readings were also analysed. It shows somewhat a lower wave height for the area. No simulation has been done.

### Ground truth

Following communication with the Island representative, Rodrigues did not experienced significant in- land inundation, especially at common flooded areas. However, according to hear say, the east coast experienced some turbulences in the lagoons and caused some damages to small embarkations.

**Conclusion**

The model has confidently simulated the event and demonstrated that turbulences are still persistent from such distant sources. The Mentawai event in Rodrigues was indeed a combined effect of high tide and tsunamigenic waves. Although of a small magnitude, the incoming waves demonstrated it carried enough energy to cause local damage.

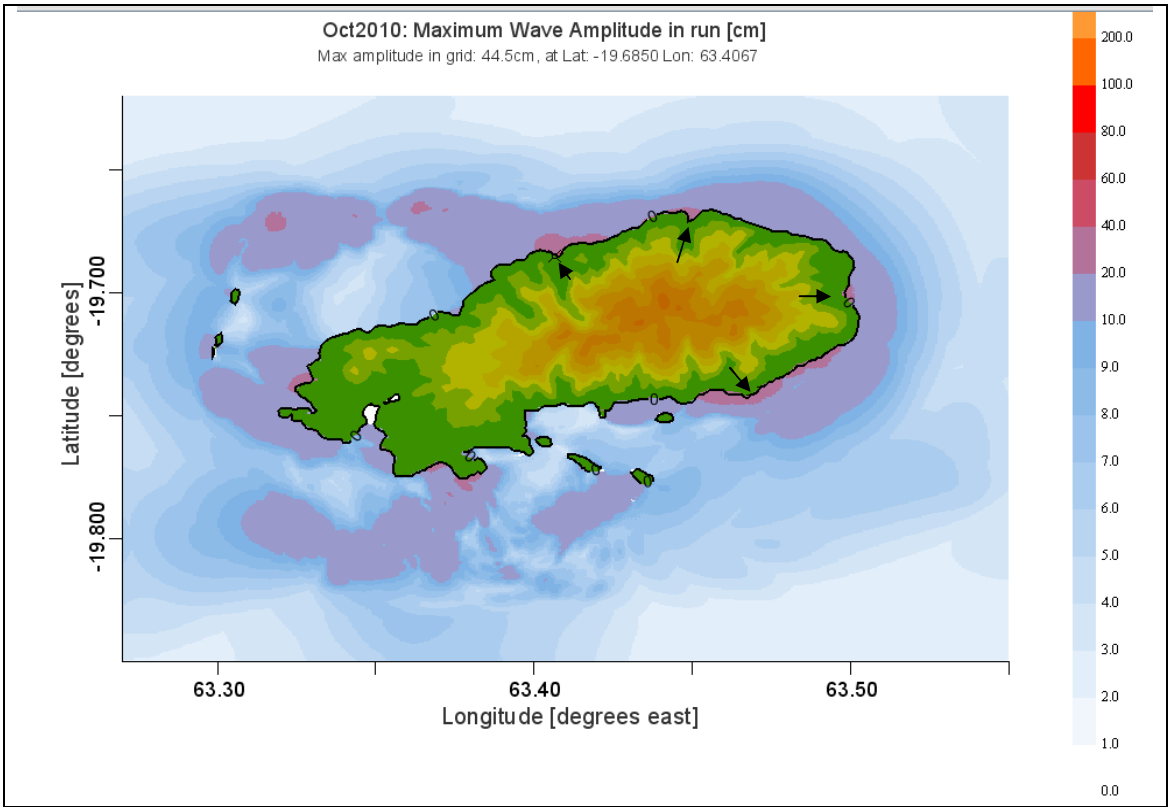


Figure 1: Maximum wave amplitude, Rodrigues Island ( inundated areas marked with arrows)

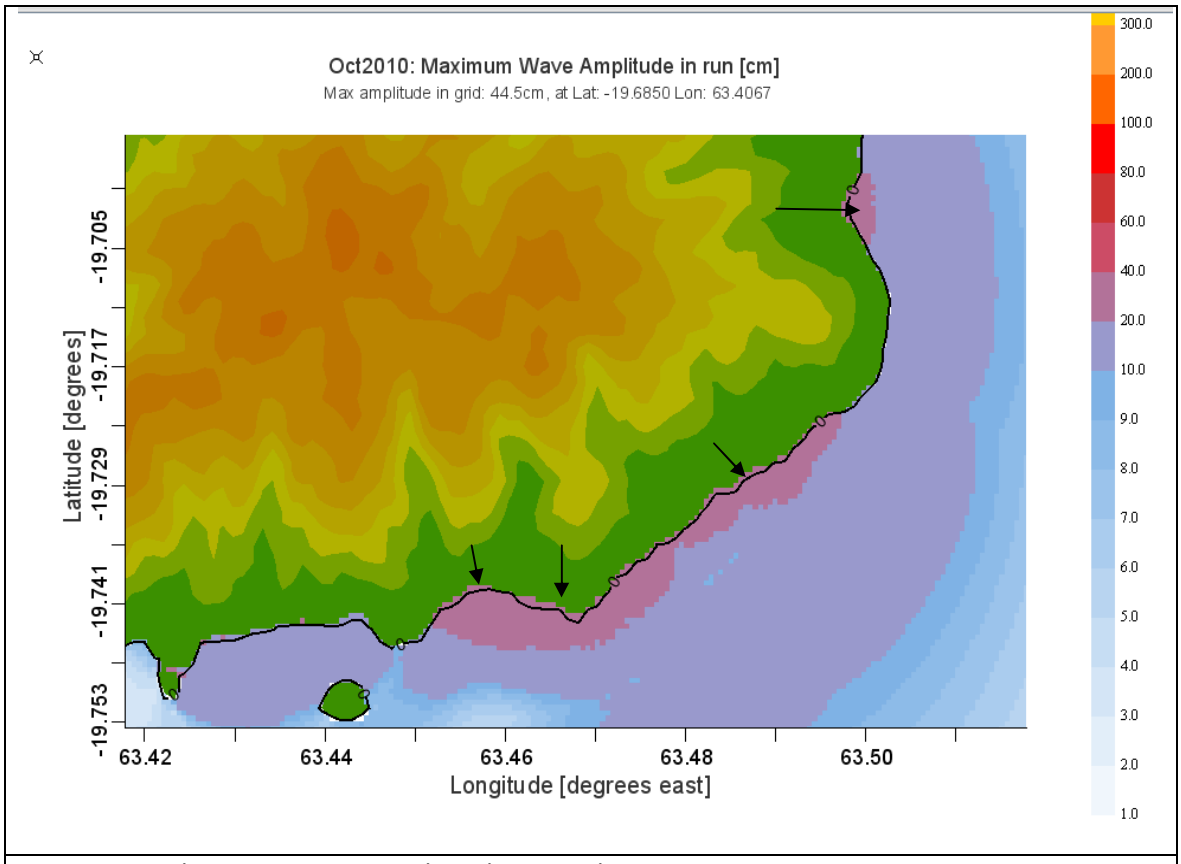


Figure 2: Inundation Extent, East and south East Rodrigues.

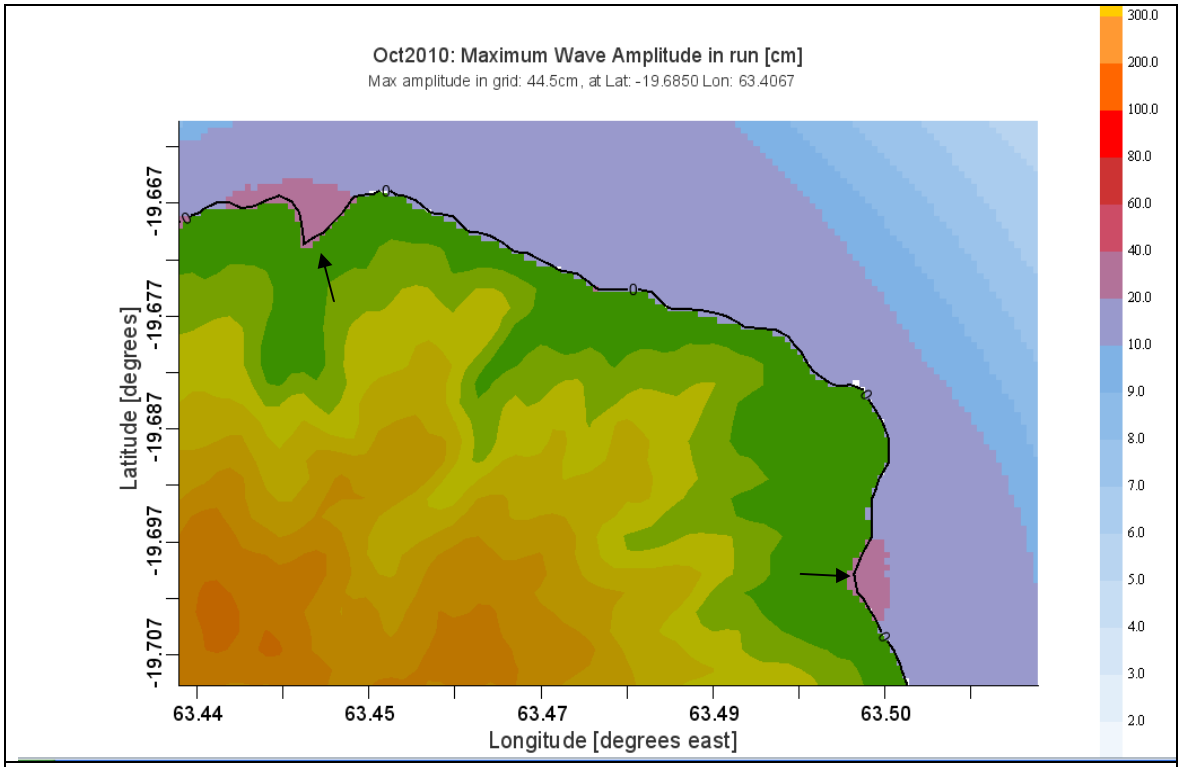


Figure 3: Inundation Extent, North East and East Rodrigues.

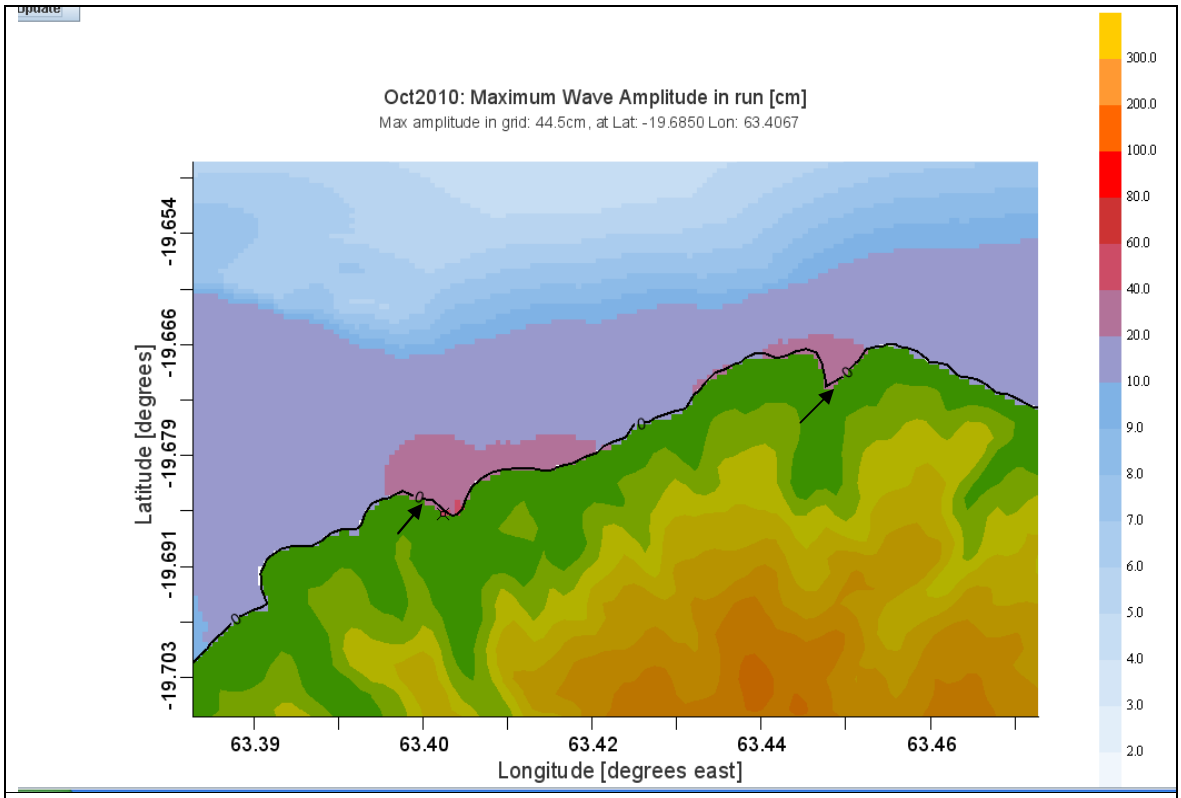


Figure 4: Inundation Extent, North Rodrigues.

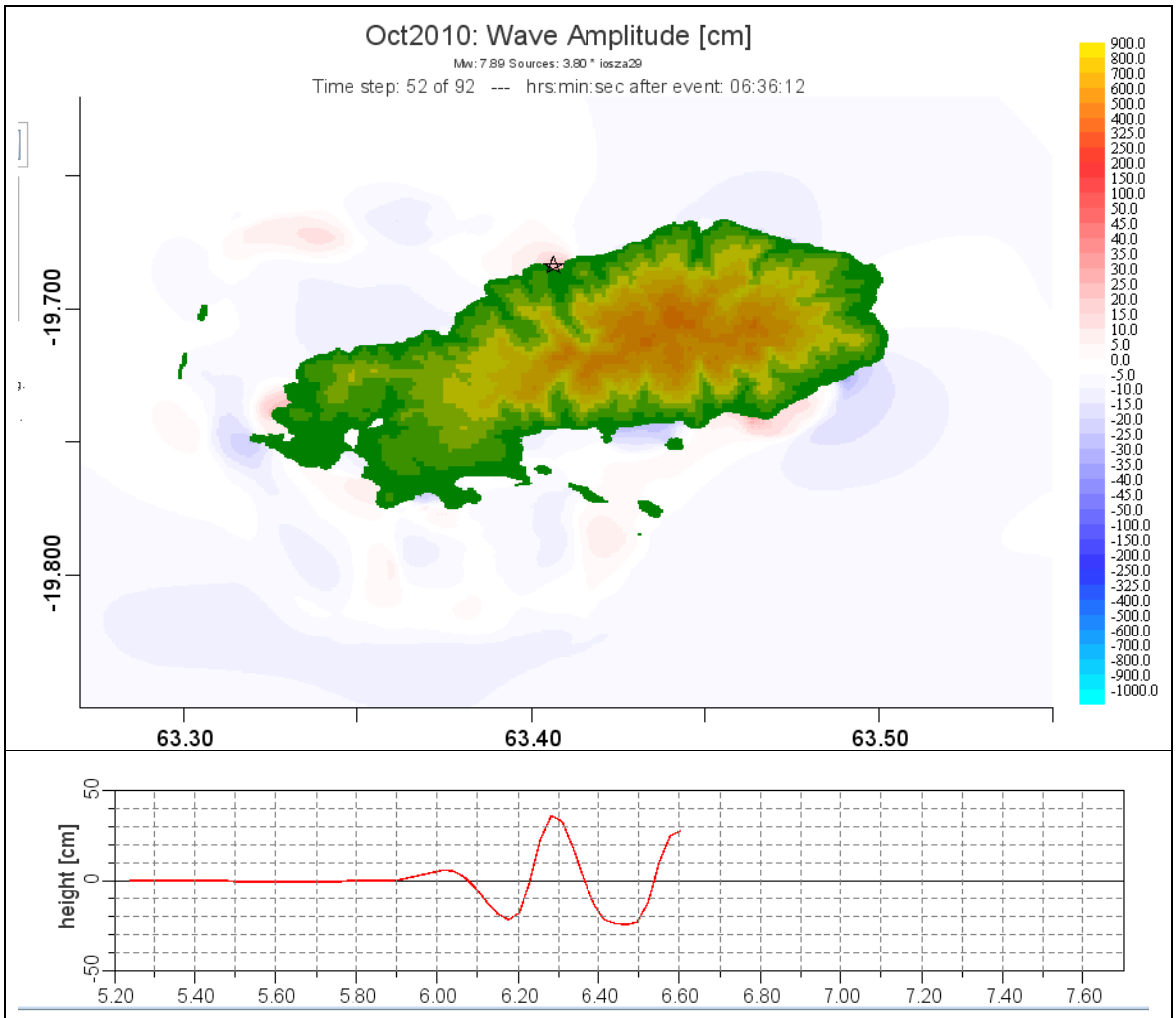


Figure 5: Wave height at Port Mathurin, Mantawai Event

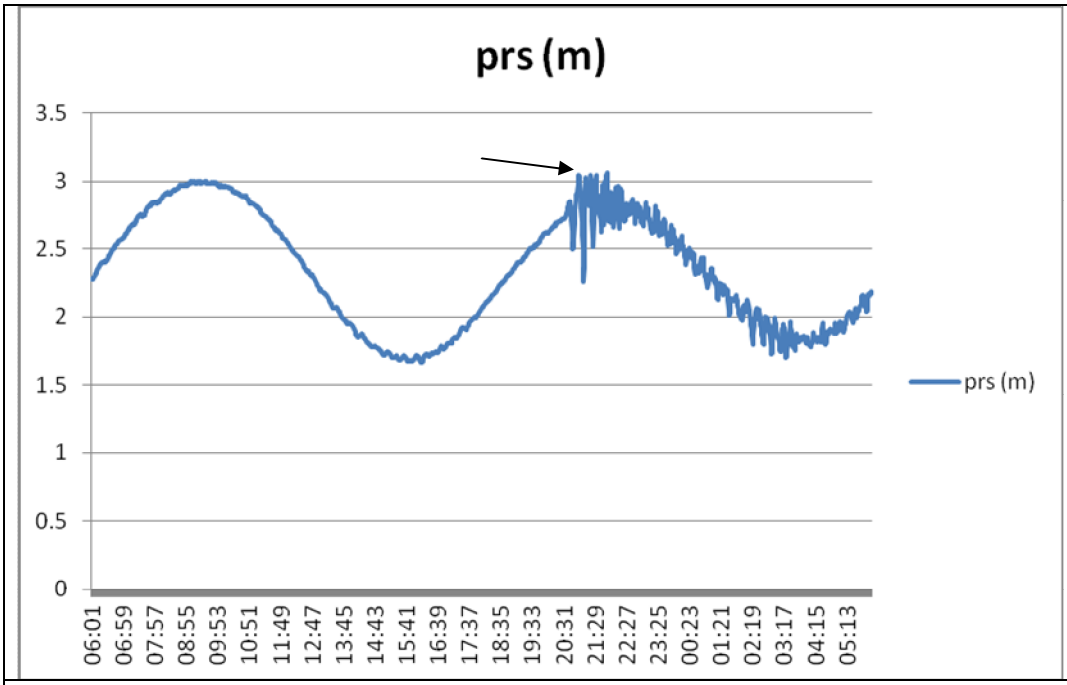


Figure 6: Tide gauge reading (GMT time), 25/10/10 – 26/10/10 at Port Mathurin(Rodrigues)

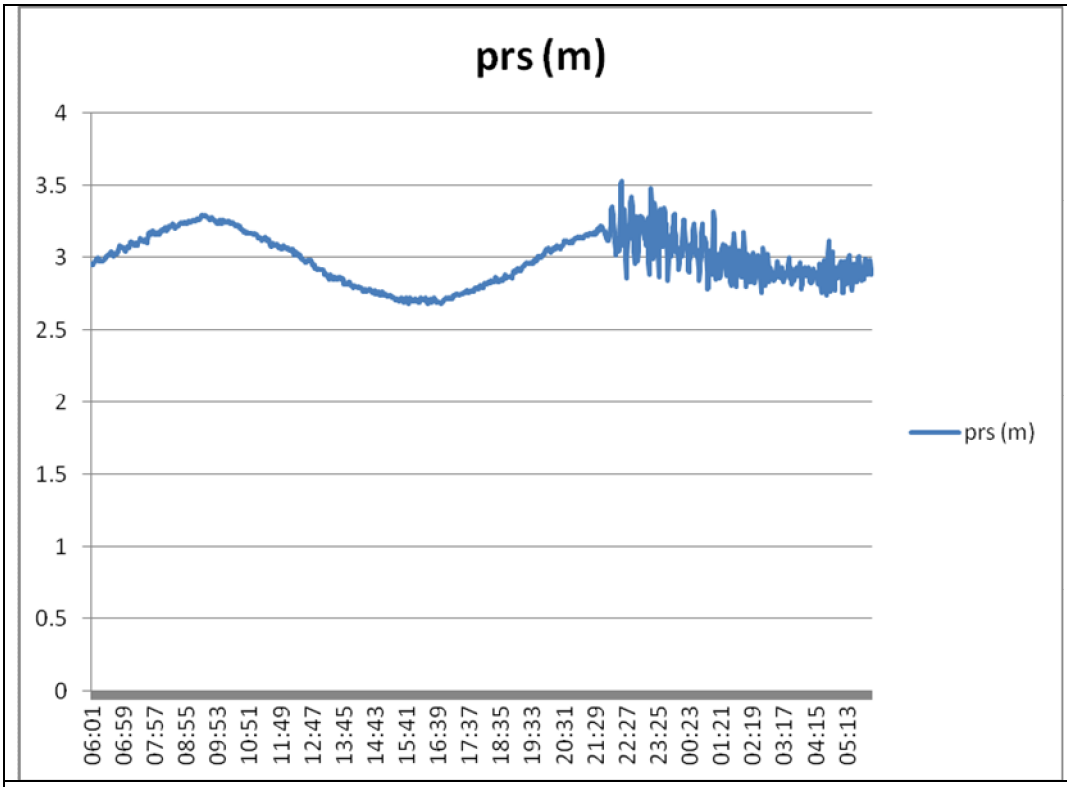


Figure 7: Tide gauge reading, 25/10/10 – 26/10/10 at Port Louis(Island of Mauritius)