

Wednesday, 05 September 2012

Mag 7.4 Earthquake in Costa Rica

Costa Rica, 5 September 2012

V1. 8:15 PM

Executive Summary

On September 05th, 2012 a major earthquake occurred at 12:47 UTC of magnitude **7.4 Mw** at a depth of **35 km** hit Costa Rica. The epicentre was located about 10 km ESE of Nicoya. The event initiated a GDACS **Red Alert** for the earthquake and **Orange** for the Tsunami, as heights of **1.8m** were estimated; later the event has been reduced in Magnitude by seismological organizations. The current estimate (at 7:58 PM) is 7.4 with estimated height of 30 cm in Puerto Carazo (Costarica)..

Small tsunami waves have been observed for this event but their interpretation is not easy, as shown below. The most important sea level sensors were not working or badly working and it was necessary to wait long time before having a meaningful result which came from the Galapagos devices. The measured maximum sea level was in the order of about **10 cm in Galapagos** where the online calculations at this point indicated about 5 cm.. The real height will be known only in few days and when the first reports from the field will be available.

Major damages appear to have been caused by the **earthquake**. This event was already identified as highly possible by scientists as a similar event occurred in 1950 (Mag. 7.7, about 1000 injuries) and given the recurrence of 50 years there was a gap of 12 years. The event did not cause however a large Tsunami. Current estimates indicates 2 fatalities: this number needs to be updated in the next hours.

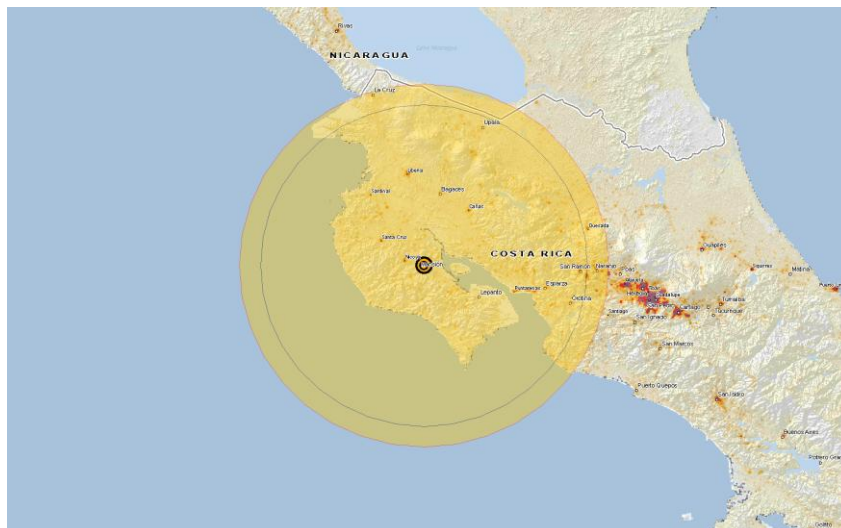












Fig. 1 – Epicentre of the Earthquake

Situation

Event alert (GDACS)

The table below reports the timeline of the data collected by GDACS.

ID	Alert color	Date	Magnitude and depth	Population within 100 km	Tsunami risk (max height)	Delay	Source
119341		9/5/2012 2:42:10 PM	7.9M, 46km	430 thousand	1.8m (at 15:05)	00:07	 NEIC
119342		9/5/2012 2:42:08 PM	7.5M, 10km	720 thousand	1.6m (at 15:00)	00:07	 GEOFON
119343		9/5/2012 2:42:09 PM	7.9M, 20km	460 thousand	3.2m (at 15:05)	00:12	 NEIC
119344		9/5/2012 2:42:10 PM	7.6M, 40.8km	640 thousand	.7m (at 15:00)	00:26	 NEIC
119345		9/5/2012 2:42:09 PM	7.4M, 35km	670 thousand	.6m (at 15:00)	00:29	 GEOFON

The first data have been collected by NEIC, **7 min after** the event while 12 min after the event data coming from NEIC triggered a Red alert as the estimated wave height was **3.2 m**. Later revision of this information led to a reduction to **0.6 m** 29 min after the event and the Alert level became Orange.

Due to a technical issue, GDACS was not able to send all SMS messages for the Red alert. Only after 2 hours, the Orange alerts based on the last information were sent out.


Affected area and population

- The earthquake was inland and there are about 660,000 people in the radius of 100 km.

Tsunami impact

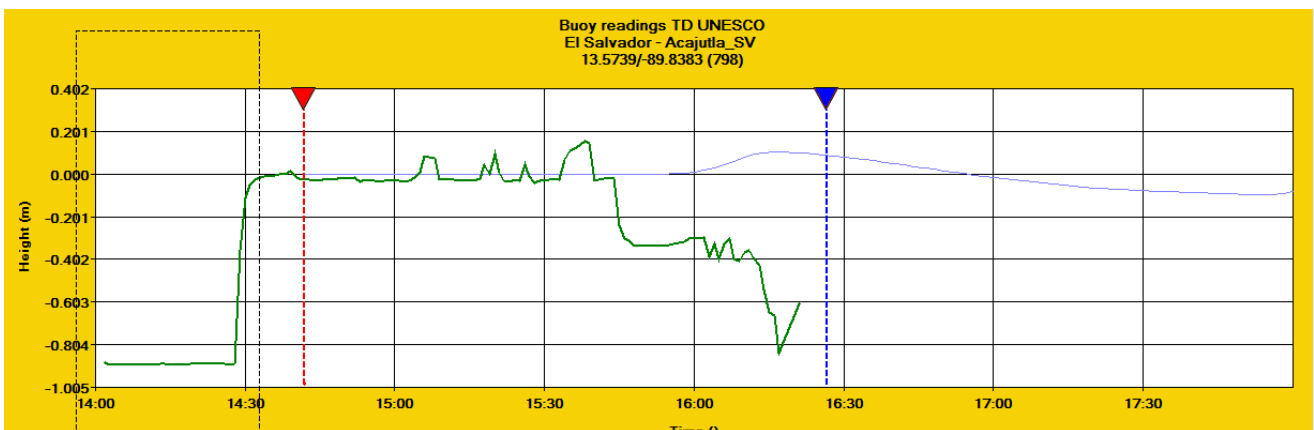
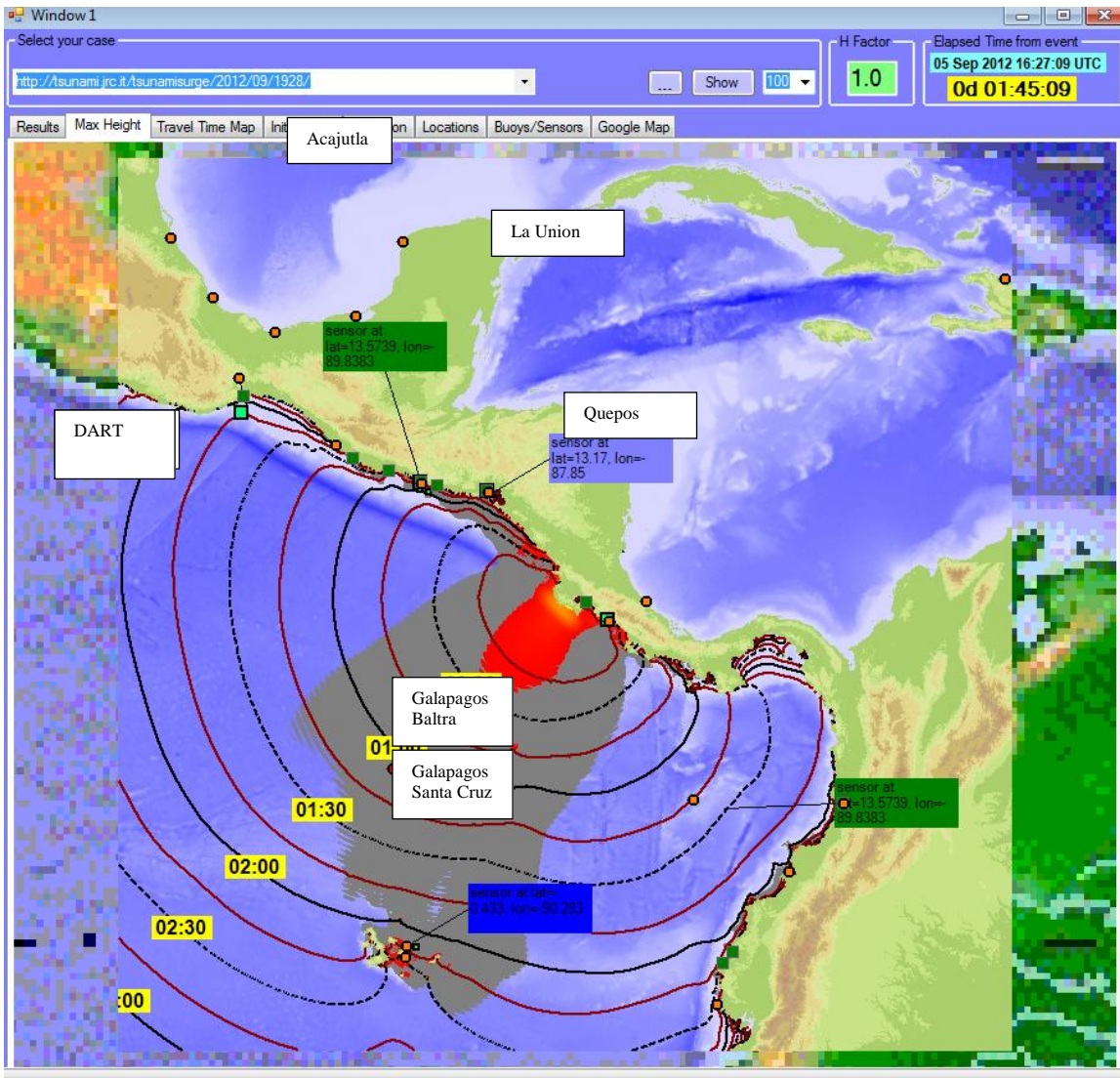
Calculations

Several calculations have been automatically triggered by various seismological information soon after the event but also later when the focal mechanisms of the event have been published.

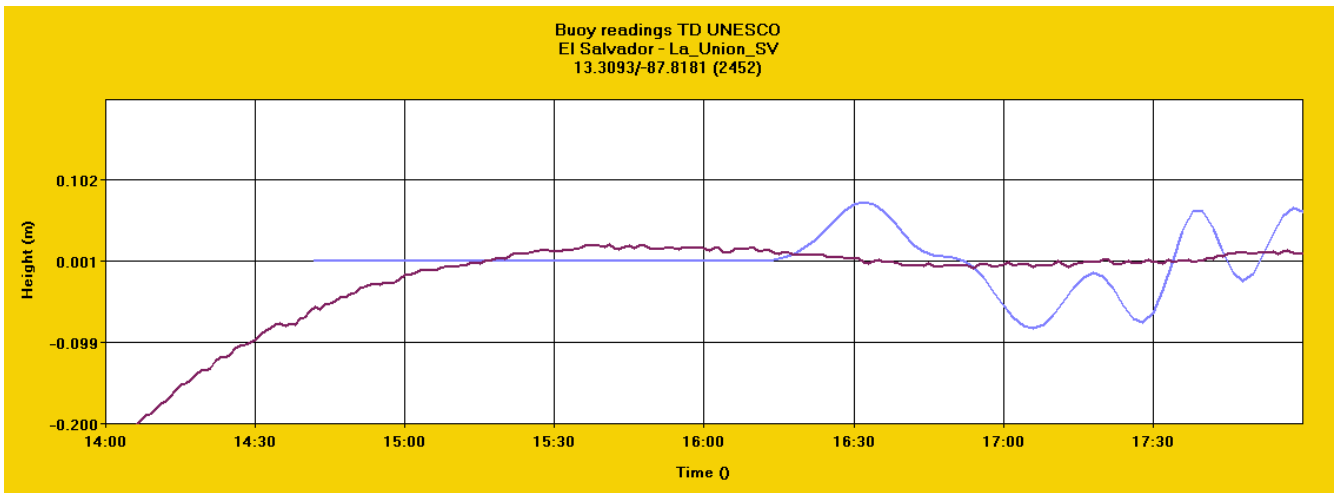
Locations affected by Tsunami wave (15 of 49)			
Date	Name	Country	Tsunami wave height (m)
04 Oct 2012 15:42:00	Puerto Carazo	Costa Rica	 0.3m
04 Oct 2012 15:42:00	Nancite	Costa Rica	 0.2m
04 Oct 2012 15:42:00	Colorado	Costa Rica	 0.2m
04 Oct 2012 15:56:00	Samara	Costa Rica	 0.2m
04 Oct 2012 16:00:00	Carrillo	Costa Rica	 0.2m
04 Oct 2012 15:42:00	Abangaritos	Costa Rica	 0.2m
04 Oct 2012 15:42:00	Abangares	Costa Rica	 0.2m
04 Oct 2012 15:56:00	Garza	Costa Rica	 0.2m
04 Oct 2012 15:56:00	Boca del Nosara	Costa Rica	 0.2m
04 Oct 2012 15:42:00	Corozal	Costa Rica	 0.2m
04 Oct 2012 15:42:00	Lepanto	Costa Rica	 0.2m
04 Oct 2012 15:42:00	Lagarto	Costa Rica	 0.2m
04 Oct 2012 15:42:00	Morales	Costa Rica	 0.2m
04 Oct 2012 15:56:00	Primavera	Costa Rica	 0.2m

Tab I - List of locations with **estimated** wave height

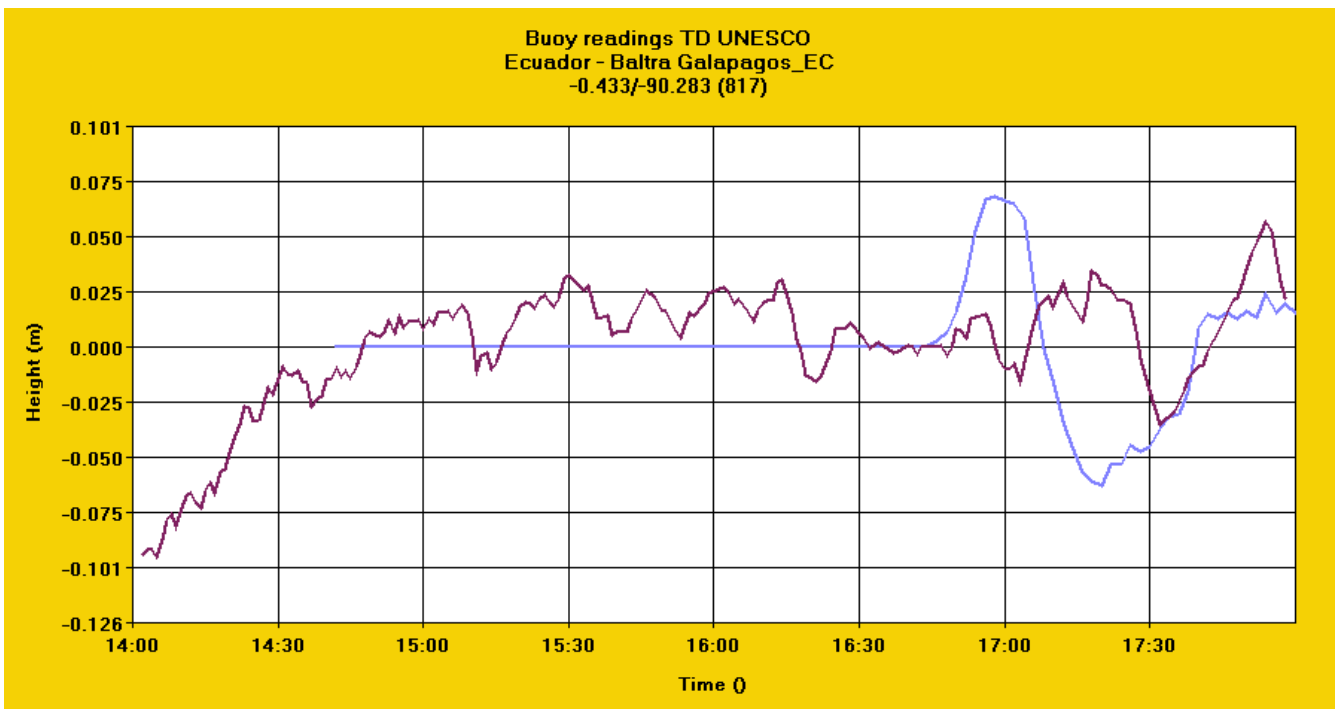
Sea Level Measurements



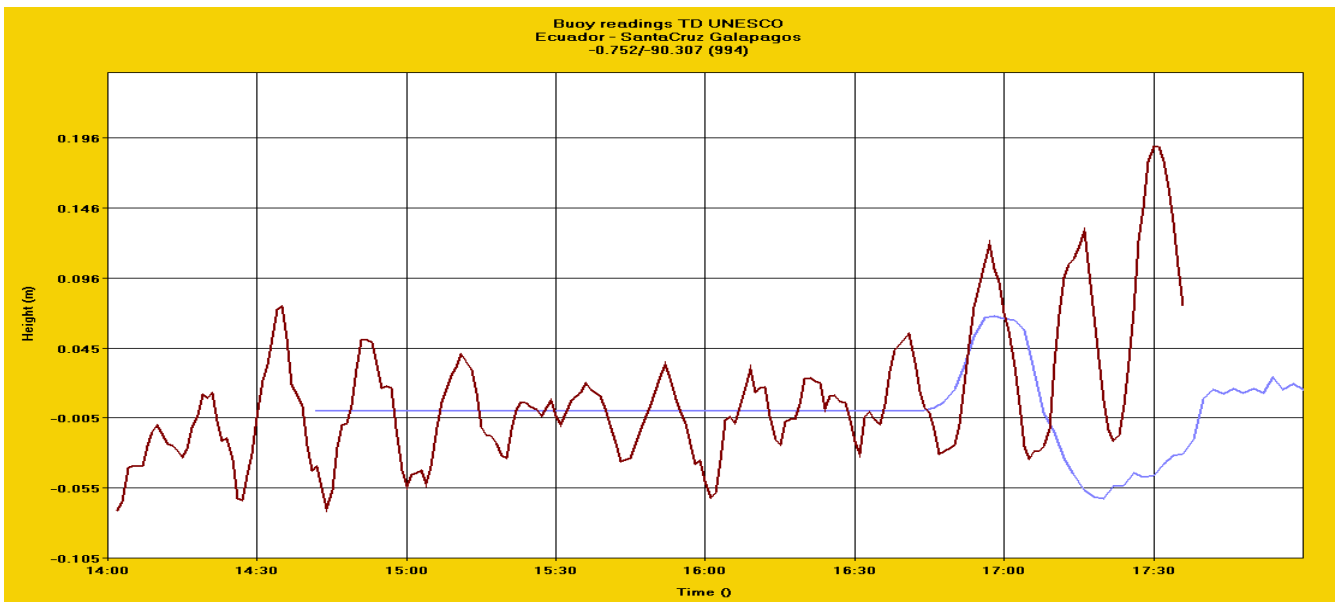
Online calculation with measured data in Acajutla, El Salvador (on 16:27 UTC).



Online calculation with measured data in La Union, El Salvador (on 16:27 UTC).



Online calculation with measured data in Baltra, Galapagos, Ecuador (on 17:11 UTC).

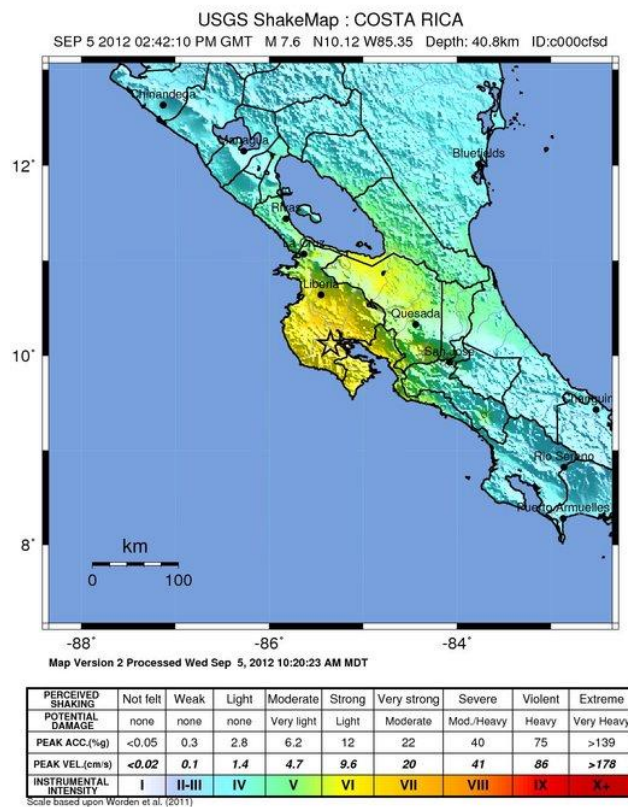


Online calculation with measured data in Santa Cruz Galapagos, Ecuador (on 18:15 UTC).

USGS shake maps

According to USGS shake map –PAGER (magnitude:7.6 and depth 40.8km), 55,000 people were exposed to “Very Strong” shaking and 805,000 people to “strong” . Very strong shaking for the cities of Nandayure, Santa Cruz, Nicoya.

Source: <http://earthquake.usgs.gov/earthquakes/eventpage/usc000cfsd#pager>



<http://earthquake.usgs.gov/earthquakes/eventpage/usc000cfsd#shakemap>

Media Reports

According to local media some damage was reported from schools in the western province of **Guanacaste**, near the epicenter of the quake. Local media quoted that in the town of **Hojancha** near the epicenter, city official **Kenia Campos**, said the quake knocked down some houses and landslides blocked two roads.

CNN quoted: “. Other photos showed floors littered with merchandise inside of stores and homes with minor damages” and “there is some damage, including debris that has fallen on the roads, and damage to the roads themselves at a spot on the Nicoya Peninsula about 14 kilometers (8 miles) from the epicenter, Boddinger said.”

According to Earthquake report (as of 17:46 UTC) has died because of an heart attack in Filadelfia, Guanacaste and there were 20 people injured.

Images in TWITTER/Facebook:



Bridge collapsed on Rio Sucio



Landslide caused by the earthquake in Guanacaste



Damaged church in Buena Vista in Nandayure (Guanacaste province)

Tsunami warnings (other than GDACS)

The Pacific Tsunami Warning Centre issued a Pacific Ocean-wide Tsunami Warning at 15:25 UTC (for the first estimation of 7.9M), concerning Costa Rica, Panama and Nicaragua.

The Warning was cancelled at 17:02 UTC (Bulletin N.4). According to this PTWC bulletin, no tsunami was observed in Acajutla, El Salvador.

References

For updated information on the disaster, please consult the following web sites:

- <http://www.gdacs.org>: Global Disaster Alert and Coordination System
- <http://mic-echo.jrc.ec.europa.eu>: MIC Portal

Media reports

Costaricanewssite: <http://www.costaricanewssite.com/7878/powerful-earthquake-reported-in-costa-rica/>

CNN: http://edition.cnn.com/2012/09/05/world/americas/costa-rica-earthquake/index.html?hpt=hp_t1

Earthquake-report: <http://earthquake-report.com/2012/09/05/massive-quake-hits-costa-rica/>

Reuters: <http://www.reuters.com/article/2012/09/05/us-chile-costarica-tsunami-idUSBRE88410O20120905>

Chicago Tribune (quoting Reuters, 10:06 a.m. CDT, September 5, 2012):
<http://www.chicagotribune.com/news/sns-rt-us-chile-tsunami-warningbre8840ya-20120905,0,3661987.story>

NBC News (Updated at 12:17 p.m. ET):
<http://worldnews.nbcnews.com/news/2012/09/05/13681490-usgs-major-earthquake-hits-costa-rica-tsunami-warning-issued?lite>

The Daily Telegraph: <http://www.dailytelegraph.com.au/news/world/tsunami-warning-from-mexico-to-peru-after-quake/story-fnddckzi-1226466042002>

BBC: <http://www.bbc.co.uk/news/world-latin-america-19490503>