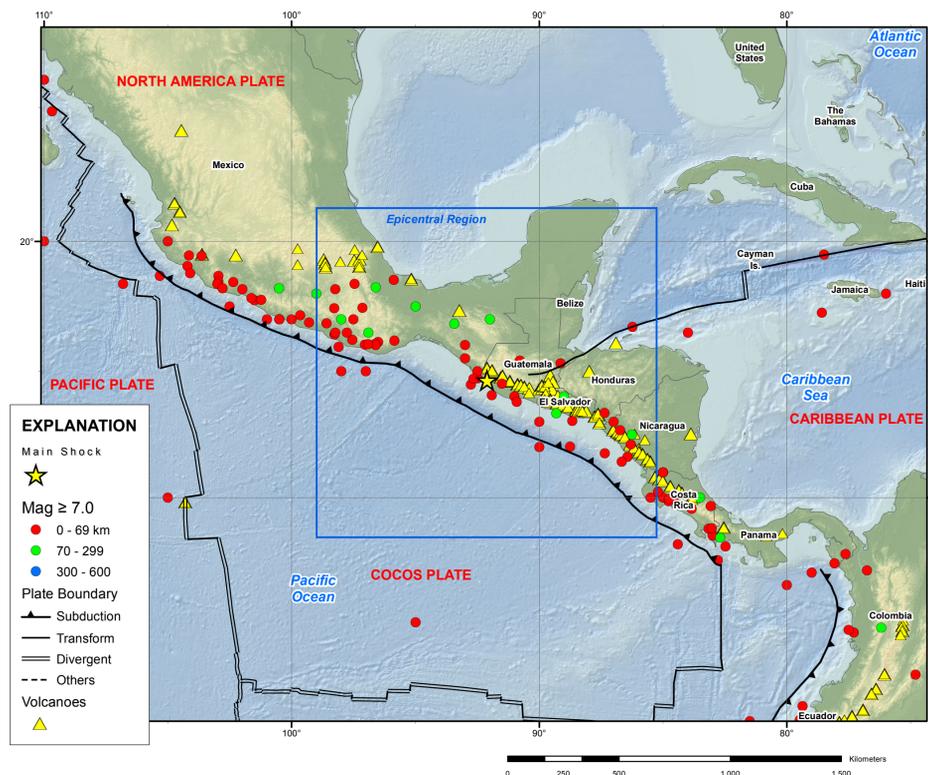


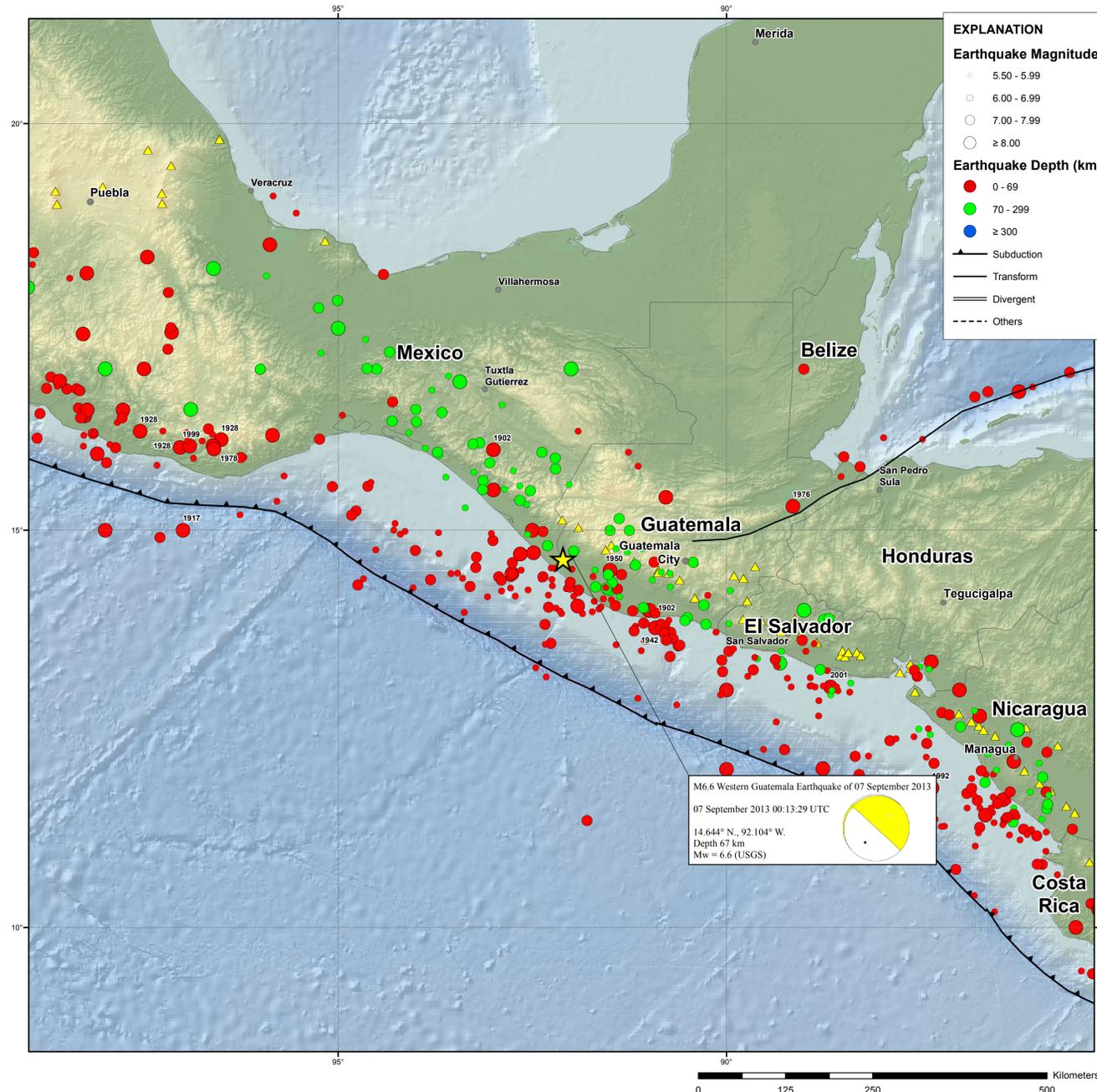
# M6.6 Western Guatemala Earthquake of 07 September 2013



## Tectonic Setting



## Epicentral Region



## PAGER

**USGS Earthquake Shaking Yellow Alert**

**M 6.6, GUATEMALA**  
Origin Time: Sat 2013-09-07 00:13:29 UTC (18:13:29 local)  
Location: 14.64°N 92.10°W Depth: 67 km

**Estimated Fatalities**  
Yellow alert for shaking-related fatalities and economic losses. Some casualties and damage are possible and the impact should be relatively localized. Past yellow alerts have required a local or regional level response.

**Estimated Economic Losses**  
Estimated economic losses are less than 1% of GDP of Guatemala.

**Estimated Population Exposed to Earthquake Shaking**

ESTIMATED POPULATION EXPOSURE (k = 1000)	I	II-III	IV	V	VI	VII	VIII	IX	X+
ESTIMATED MODIFIED MERCALLI INTENSITY	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

**Population Exposure**

**Selected City Exposure**

City	Population	MMI
VII Ciudad Tecun Uman	11k	VII
VII La Libertad	4k	VII
VI Frontera Hidalgo	3k	VI
VI Ocosingo	9k	VI
VI Suchiate	14k	VI
VI Champeyuc	8k	VI
VI Quetzaltenango	132k	VI
IV Guatemala City	995k	IV
IV Santa Tecla	125k	IV
IV Tuxtla Gutierrez	451k	IV
IV San Salvador	526k	IV

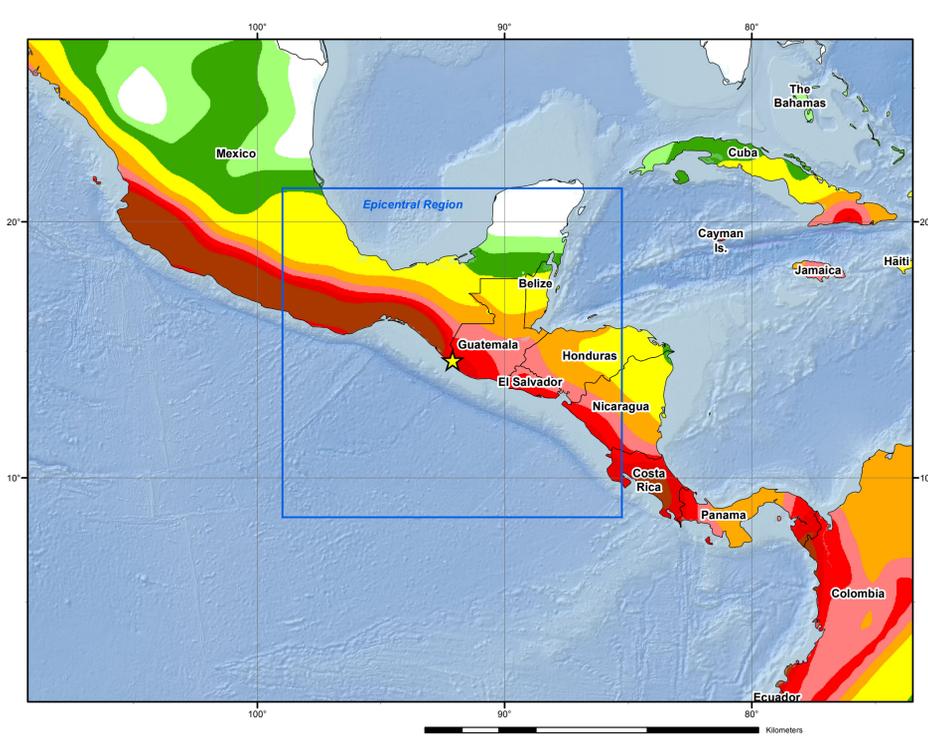
**Historical Earthquakes (with MMI levels)**

Date	Dist. (km)	Mag	Max Shaking (MMI)	Deaths
1770-02-03	337	5.6	VII	0
1991-09-18	123	6.2	VIII	25
1976-02-04	322	7.5	IX	23

**Did You Feel It?**  
USGS Community Internet Intensity Map  
GUATEMALA  
Sep 6 2013 06:13:29 PM local 14.6435N 92.1042W M6.6 Depth: 67 km ID:usb000jkmw

174 responses in 1 ZIP code and 41 cities (Max CDI = VII)

## Seismic Hazard



## TECTONIC SUMMARY

The September 7, 2013 M 6.6 earthquake near the west coast of Guatemala in the Middle America subduction zone occurred close to the interface between the Cocos and North America plates. The depth and style of faulting of the earthquake indicates slip likely occurred on a very shallow, or near-vertical thrust fault consistent with intraplate faulting within the subducting Cocos plate, rather than on the overlying thrust interface. At the latitude of this event, the Cocos plate moves towards the north-northeast with respect to the North American plate at a rate of approximately 78 mm/yr.

The broad scale tectonics of the western and southwestern coast of Central America are dominated by the northeastward subduction of the Cocos oceanic plate beneath the North America plate. Thrust- and normal-type earthquakes are a common occurrence along this plate boundary and the Guatemala region, with events occurring both within the subduction zone - on the megathrust interface and within the subducting plate - and also in the overriding plate. Over the past 40 years, 27 events of M 6.0 or greater have occurred within 300 km of the September 2013 event. Events of note in this region include earthquakes on November 2012 (M 7.4) offshore of Guatemala, which caused around 40 fatalities; September 1993 (M 7.2) offshore of Chiapas, Mexico, which killed one person; and December 1983 (M 7.0) offshore of Guatemala. Other early 20th century earthquakes in the Guatemala region include the August 1942 M 7.9 event, which caused around 40 fatalities, and the April 1902 M 7.5 earthquake, which killed more than 5000 people.

## Significant Earthquakes Mag >= 7

Year	Mon	Day	Time	Lat	Long	Depth (km)	Mag
1900	06	21	20:52	10.000	-85.500	0	7.2
1900	11	09	16:10	13.000	-90.000	0	7.0
1901	10	08	02:14	13.000	-87.000	0	7.3
1902	04	19	02:23	14.000	-91.000	0	7.5
1902	09	23	20:18	16.000	-93.000	0	7.8
1903	01	14	01:47	15.000	-98.000	0	7.4
1907	12	30	05:26	12.100	-86.300	0	7.2
1912	12	09	08:32	15.500	-93.000	0	7.1
1914	03	30	00:41	17.000	-92.000	150	7.2
1915	09	07	01:20	14.000	-89.000	80	7.4
1916	02	27	20:20	12.000	-90.000	0	7.3
1916	06	02	13:59	17.500	-95.000	150	7.0
1917	12	29	22:50	15.000	-97.000	0	7.7
1921	02	04	08:22	15.411	-90.780	35	7.4
1921	03	28	07:49	13.356	-87.361	35	7.2
1926	02	08	15:17	12.011	-88.758	35	7.1
1926	11	05	07:55	12.870	-86.736	35	7.1
1928	03	22	04:17	16.127	-96.505	35	7.5
1928	06	17	03:19	16.028	-97.036	35	7.7
1928	08	04	18:26	16.418	-98.266	35	7.2
1928	10	09	03:01	16.229	-97.550	35	7.5
1931	01	15	01:50	16.053	-96.614	35	7.8
1935	12	14	22:05	14.718	-92.484	35	7.2
1937	07	26	03:47	18.523	-95.878	35	7.2
1937	12	23	13:18	17.431	-98.287	35	7.4
1942	08	06	23:37	13.780	-90.913	35	7.7
1944	06	28	07:58	15.000	-92.500	0	7.1
1947	01	28	10:06	12.500	-86.250	170	7.0
1948	01	06	17:25	17.000	-98.000	80	7.0
1950	10	23	16:13	14.500	-91.500	0	7.5
1950	12	14	14:15	17.000	-97.500	0	7.3
1951	12	12	01:37	16.500	-96.900	160	7.0
1956	10	24	14:42	11.619	-86.436	35	7.2
1959	05	24	19:17	17.450	-97.145	68	7.0
1965	08	23	19:46	16.178	-95.846	10	7.4
1968	08	02	14:06	16.494	-97.771	49	7.3
1970	04	29	14:01	14.461	-92.760	50	7.3
1973	08	28	09:50	18.233	-96.608	80	7.3
1976	02	04	09:01	15.297	-89.145	12	7.5
1978	11	29	19:52	16.012	-96.602	24	7.8
1980	10	24	14:53	18.176	-98.236	64	7.2
1982	06	19	06:21	13.337	-89.312	73	7.1
1983	12	02	03:09	14.055	-91.914	31	7.0
1992	09	02	00:16	11.766	-87.352	45	7.7
1993	09	10	19:12	14.702	-92.656	34	7.2
1995	09	14	14:04	16.852	-98.588	23	7.4
1995	10	21	02:38	16.842	-93.434	159	7.2
1996	02	25	03:08	15.949	-98.104	22	7.1
1999	06	15	20:42	18.374	-97.457	63	7.0
1999	09	30	16:31	16.046	-96.912	40	7.5
2001	01	13	17:33	13.038	-88.661	38	7.7
2004	10	09	21:28	11.422	-86.665	35	7.0
2009	05	28	08:24	16.720	-86.233	10	7.3
2012	03	20	18:03	16.493	-98.231	20	7.4

## DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD  
USGS, National Earthquake Information Center  
NOAA, National Geophysical Data Center  
IASPEI Centennial Catalog (1900 - 1999) and extensions (Engdahl and Villaseñor, 2002)  
EHB catalog (Engdahl et al., 1998)  
HDF (unpublished earthquake catalog, Engdahl, 2003)  
Global Seismic Hazard Assessment Program

PLATE TECTONICS AND FAULT MODEL  
PEB2002 (Bird, 2003)  
Ji, C., 1999. Earthquake, and D.V. Helmberger, Source description of the 1999 Hector Mine, California earthquake; Part I: Wavelet domain inversion theory and resolution analysis, Bull. Seism. Soc. Am., Vol 92, No. 4, pp. 1192-1207, 2002.  
DeMets, C., Gordon, R.G., Argus, D.F., 2010. Geologically current plate motions, Geophysics, J. Int. 181, 1-80.

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Bird, P., 2003. An updated digital model of plate boundaries: Geochim. Geophys. Res., v. 4, no. 3, pp. 1027-80.  
Engdahl, E.R., and Villaseñor, A., 2002. Global Seismicity: 1900-1999, chap. 41 of Lee, W.H.K., and others, eds., International Earthquake and Engineering Seismology, Part A: New York, N.Y., Elsevier Academic Press, 932 p.  
Engdahl, E.R., Van der Hilst, R.D., and Dandekar, R.P., 1998. Global teleseismic earthquake relocation with improved travel times and procedures for depth determination, Bull. Seism. Soc. Amer., v. 88, p. 722-743.

## DISCLAIMER

Base map data, such as place names and political boundaries, are the best available but may not be current or may contain inaccuracies and therefore should not be regarded as having official significance.  
Map updated by the U.S. Geological Survey National Earthquake Information Center  
07 September 2013  
http://earthquake.usgs.gov/  
Map not approved for release by Director USGS

Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec<sup>2</sup>, expected to be exceeded in a 50-yr period with a probability of 10 percent.

BASE MAP  
NIMA and ESRI Digital Chart of the World  
USGS, EROS Data Center  
NOAA GEBCO and GLOBE Elevation Models