U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

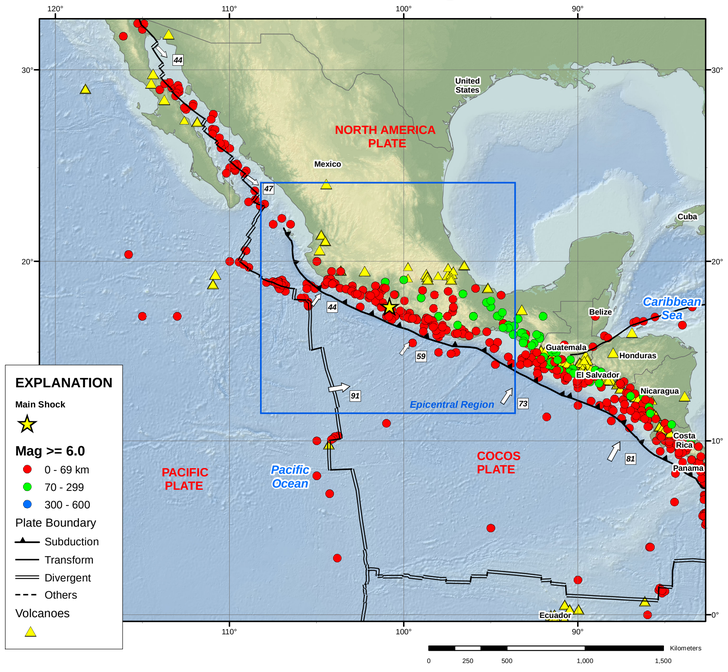
M7.2 Guerrero, Mexico Earthquake of 18 April 2014

EARTHQUAKE SUMMARY MAP

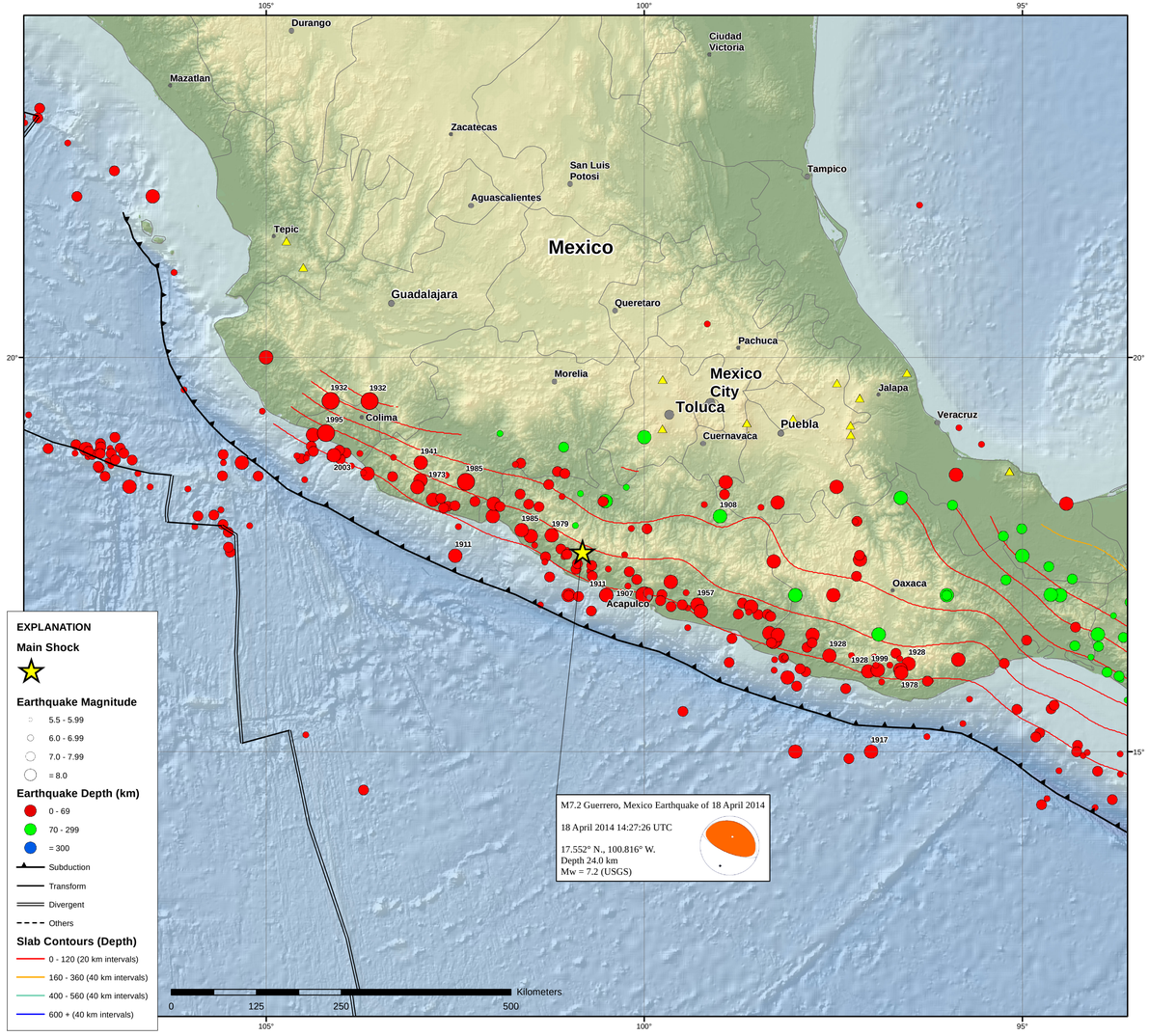
Prepared in cooperation with the Global Seismographic Network

GSN

Tectonic Setting



Epicentral Region



PAGER

M 7.2, GUERRERO, MEXICO
Origin Time: Fri 2014-04-18 14:27:26 UTC (09:27:26 local)
Location: 17.55°N 100.82°W Depth: 24 km

Earthquake Shaking: Yellow Alert

PAGER Version 4
Created: 1 day, 0 hours after earthquake

Estimated Fatalities

Yellow alert level for shaking-related fatalities. Some casualties are possible and the impact should be relatively localized. Past events with this alert level have required a local or regional level response.

Green alert level for economic losses. There is a low likelihood of damage.

Estimated Economic Losses

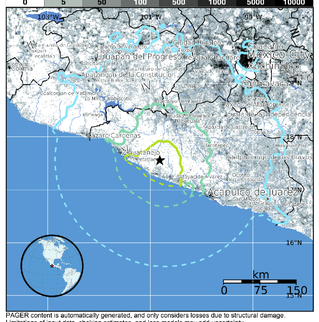
Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)	- -*	19,138k*	24.543k	611k	263k	0	0	0	0
ESTIMATED MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme
POTENTIAL DAMAGE: Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
POTENTIAL DAMAGE: Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

*Estimated exposure only includes population within the map area.

Population Exposure

population per ~1 sq. km from Landscan



Structures:
Overall, the population in this region resides in structures that are a mix of vulnerable and earthquake resistant construction. The predominant vulnerable building types are mud wall and adobe block with concrete bond beam construction.

Historical Earthquakes (with MMI levels):

Date (UTC)	Dist. (km)	Mag.	Max MMI(#)	Shaking Deaths
1981-03-09	368	5.9	VII(11k)	0
1960-10-24	273	7.1	VIII(11k)	65
1985-09-19	197	8.0	VIII(353k)	10k

Recent earthquakes in this area have caused secondary hazards such as tsunamis and landslides that might have contributed to losses.

Selected City Exposure
from GeoNames.org

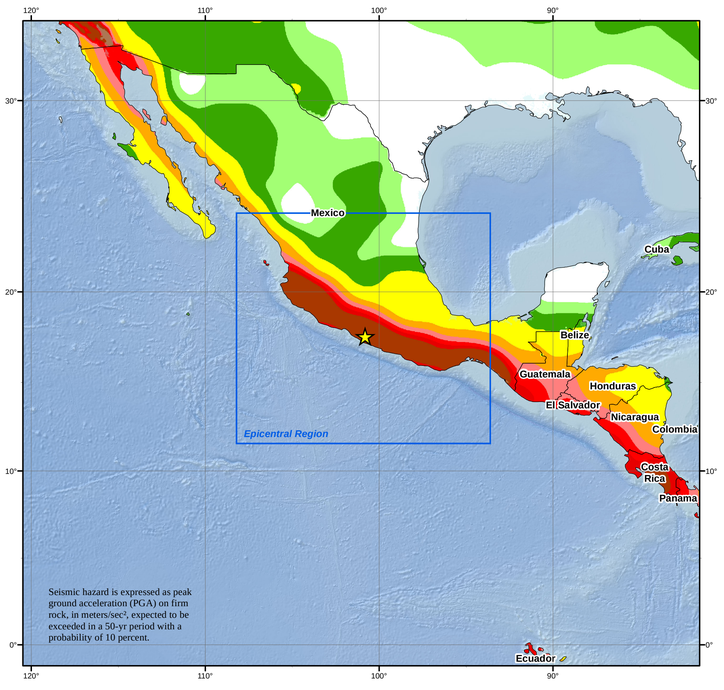
MMI	City	Population
VI	Tecpan de Galeana	15k
VI	San Jeronimito	6k
VI	El Coacoyul	6k
VI	Petatlan	21k
VI	Atoyac de Alvarez	21k
IV	Mexico City	12,294k
IV	Cuernavaca	344k
IV	Toluca	506k
IV	Morelia	593k
III	Puebla de Zaragoza	1,590k

bold cities appear on map (k = x1000)

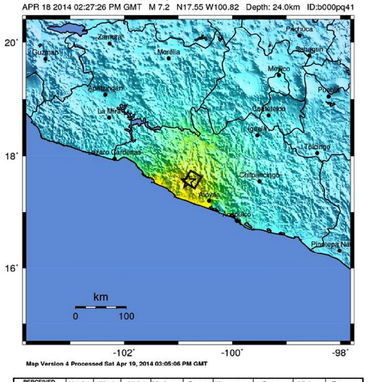
PAGER content is automatically generated, and only considers losses due to structural damage. Limitations of input data, shaking estimates, and loss models may add uncertainty.
http://earthquake.usgs.gov/pager

Event ID: usb000pq41

Seismic Hazard



ShakeMap



Map Version 4 Processed Sat Apr 19, 2014 03:05:06 PM GMT

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	*<0.02*	*0.1*	*1.4*	*4.7*	*9.6*	*20*	*41*	*86*	*>178*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2011)

TECTONIC SUMMARY

The April 18, 2014 M 7.2 earthquake near the Pacific coast of Mexico occurred in the state of Guerrero, 265 km southwest of Mexico City. The earthquake occurred as the result of thrust motion at shallow depths. The initial location, depth, and mechanism of the April 18 earthquake are broadly consistent with slip on or near the plate boundary interface between the subducting Cocos oceanic sea plate and the North America plate.

The broad scale tectonics of the Pacific coast of Mexico are controlled by the northeastward subduction of the Cocos plate beneath the North America plate at a rate of approximately 65 mm/yr. Earthquakes are a common occurrence along the Middle American subduction zone. The April 2014 earthquake occurred northwest of the rupture area of the 1957 M 7.8 Guerrero Earthquake, and since 1975, 23 events of M > 6.0 have occurred within 200 km of the April 2014 earthquake, including events of M 8.0 and M 7.6 (September 1985), M 7.2 (October 1981), and M 7.5 (March 1979), all to the northwest of the April 18 epicenter. The 1981 and 1979 events caused 9 and 5 shaking-related fatalities, respectively. The 1985 M 8.0 earthquake, 195 km to the northwest of the April 2014 event, led to more than 9,500 fatalities, mostly in Mexico City, and generated small, local tsunamis. That event was influential in initiating efforts to establish earthquake early warning systems in Mexico City.

The April 2014 earthquake occurred within the “Guerrero Seismic Gap” – an approximately 200 km long segment of the Cocos-North America plate boundary identified to have experienced no significant earthquakes since 1911 (M 7.6). The plate interface in this region is known to be locked, with an earthquake of M 8.1-8.4 thought possible should the entire gap rupture in a single event.

Significant Earthquakes Mag >= 7

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1900	01	20	0633	20.000	-105.000	0	7.3
1903	01	14	0147	15.000	-98.000	0	7.4
1907	04	15	0608	17.000	-100.000	0	7.9
1908	03	26	2303	18.000	-99.000	80	7.7
1908	03	27	0345	17.000	-101.000	0	7.0
1909	07	30	1051	17.000	-100.500	0	7.6
1911	06	07	1102	17.500	-102.500	0	7.6
1911	12	16	1914	17.000	-100.500	50	7.6
1916	06	02	1359	17.500	-95.000	150	7.0
1917	12	29	2250	15.000	-97.000	0	7.7
1925	11	16	1155	18.375	-106.809	25	7.0
1928	03	22	0417	16.127	-96.505	35	7.5
1928	06	17	0319	16.028	-97.036	35	7.7
1928	08	04	1826	16.418	-98.266	35	7.2
1928	10	09	0301	16.229	-97.550	35	7.5
1931	01	15	0150	16.053	-96.614	35	7.8
1932	06	03	1036	19.457	-104.146	25	7.9
1932	06	18	1012	19.452	-103.632	54.3	7.9
1934	11	30	0205	18.679	-105.319	25	7.0
1937	07	26	0347	18.523	-95.878	35	7.2
1937	12	23	1318	17.431	-98.287	35	7.4
1941	04	15	1909	18.677	-102.957	35	7.6
1943	02	22	0920	17.750	-101.500	0	7.4
1948	01	06	1725	17.000	-98.000	80	7.0
1950	12	14	1415	17.000	-97.500	0	7.3
1951	12	12	0137	16.500	-96.900	160	7.0
1957	07	28	0840	16.881	-99.297	37.2	7.8
1959	05	24	1917	17.450	-97.145	69.6	7.0
1962	05	11	1411	17.171	-99.651	35	7.3
1964	07	06	0722	18.194	-100.510	92.7	7.2
1965	08	23	1946	16.178	-95.846	10.5	7.4
1968	08	02	1406	16.494	-97.771	49.8	7.3
1973	01	30	2101	18.455	-102.960	37.2	7.6
1973	08	28	0950	18.233	-96.608	80.7	7.3
1978	11	29	1952	16.012	-96.602	24.5	7.8
1979	03	14	1107	17.759	-101.222	24.6	7.5
1980	10	24	1453	18.176	-98.236	64.9	7.2
1981	10	25	0322	18.161	-101.990	19	7.2
1985	09	19	1317	18.437	-102.358	15	8.0
1985	09	21	0137	17.827	-101.622	18.4	7.6
1986	04	30	0707	18.371	-103.000	22.8	7.0
1995	09	14	1404	16.852	-98.588	23	7.4
1995	10	09	1535	19.052	-104.208	26.2	8.0
1996	02	25	0308	15.949	-98.104	22.6	7.1
1997	01	11	2028	18.211	-102.791	35	7.2
1999	06	15	2042	18.374	-97.457	63	7.0
1999	09	30	1631	16.049	-96.912	40	7.5
2003	01	22	0206	18.770	-104.104	24	7.6
2012	03	20	16.493	-98.231	20	7.4	
2014	04	18	1427	17.552	-100.816	24	7.2

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
PB2002 (Bird, 2003)
Hayes, G. P., Wald, D. J., and Johnson R. L., 2012, A three-dimensional model of globalsubduction zone geometries: Journal of Geophysical Research, v. 117, B01302, doi:10.1029/2011JB008524.
DeMets, C., Gordon, R.G., Argus, D.F., 2010. Geologically current plate motions, Geophys. J. Int. 181, 1-80.

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

REFERENCES

Bird, P., 2003, An updated digital model of plate boundaries: Geochem. Geophys. Geosyst., v. 4, no. 3, pp. 1027-80.

Engdahl, E.R., and Villasenor, 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 Buland, 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 U.S. Geological Survey National Earthquake Information Center
21 April 2014
http://earthquake.usgs.gov/
Map not approved for release by Director USGS