

# Magnitude 7.0 ACAPULCO, MEXICO

Wednesday, September 8, 2021 at 01:47:47 UTC

A magnitude 7.0 earthquake has occurred in Acapulco, Mexico at a depth of 20 km (12 miles). One death has been reported.

The quake caused buildings to rock and sway in Mexico City 280 km (180 mi) away.



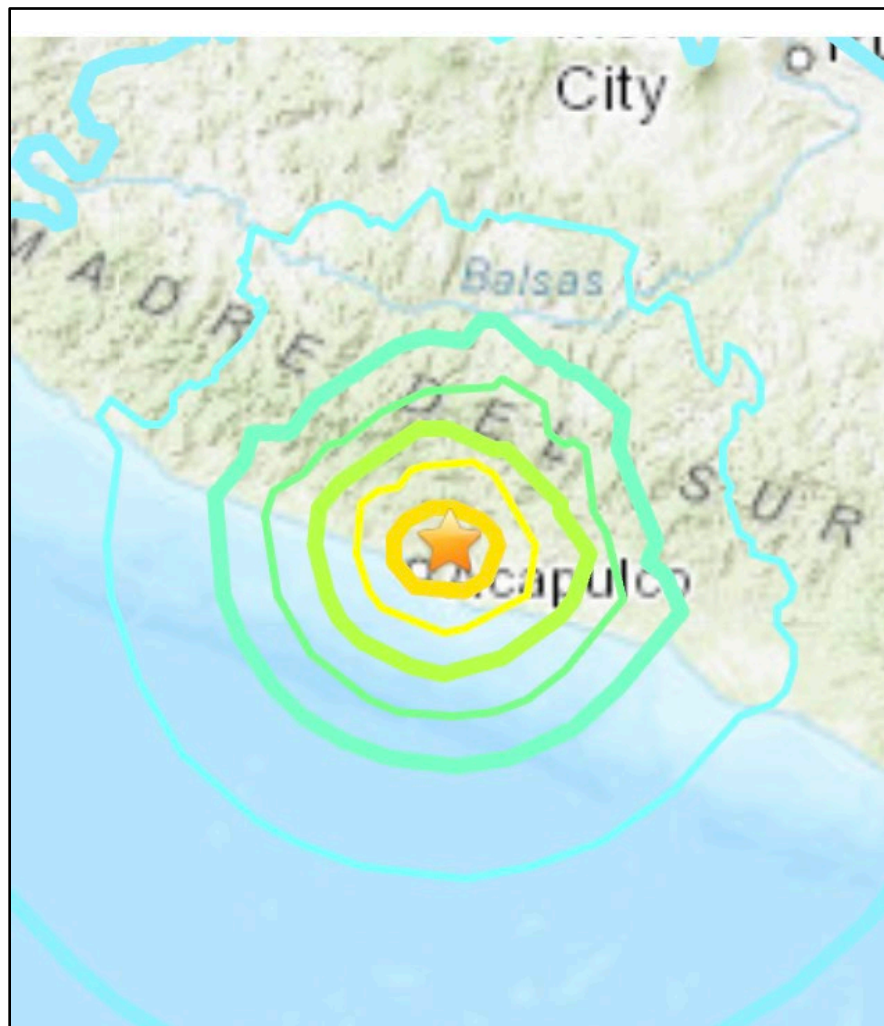
A couple walks past a taxi cab that was damaged by falling debris after a strong earthquake in Acapulco, Mexico,

(AP Photo/ Bernardino Hernandez)

The Modified-Mercalli Intensity scale is a ten-stage scale, from I to X, that indicates the severity of ground shaking.

The area near the epicenter experienced very strong shaking.

Modified Mercalli Intensity	Perceived Shaking
X	Extreme
IX	Violent
VIII	Severe
VII	Very Strong
VI	Strong
V	Moderate
IV	Light
II-III	Weak
I	Not Felt

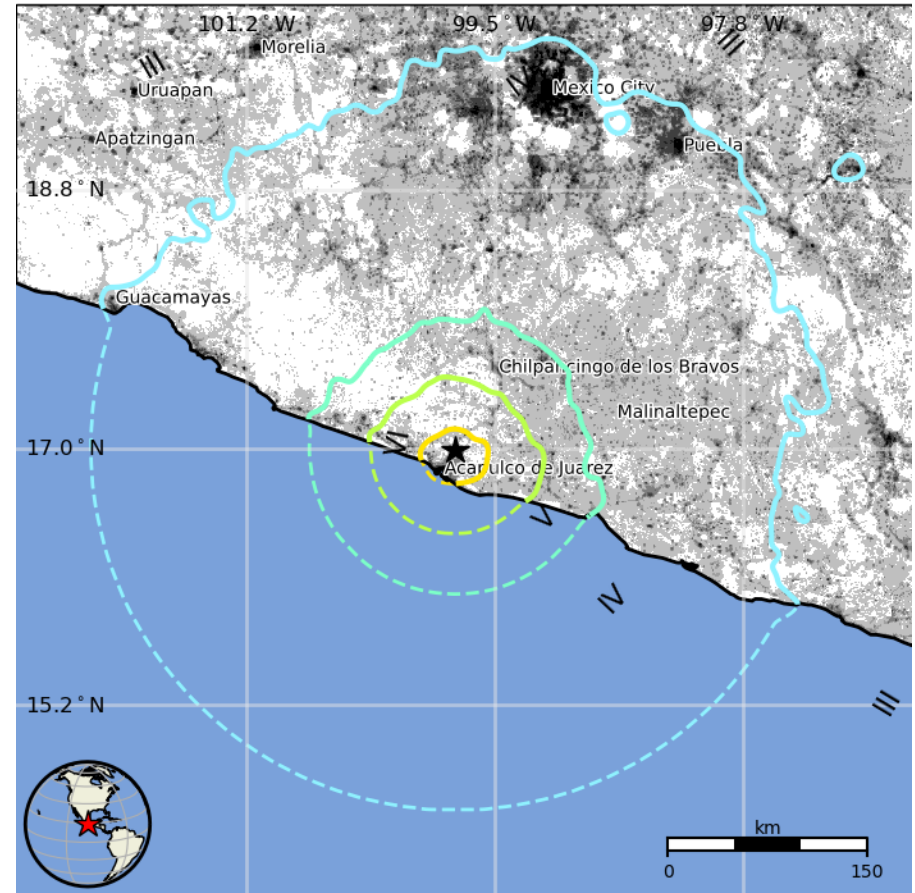


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The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels. From this earthquake, 985,000 people felt very strong shaking. Over 2 million people experienced moderate to strong shaking.

I	Not Felt	0 k*
II-III	Weak	13,330 k*
IV	Light	37,432 k
V	Moderate	1,790 k
VI	Strong	274 k
VII	Very Strong	985 k
VIII	Severe	0 k
IX	Violent	0 k
X	Extreme	0 k

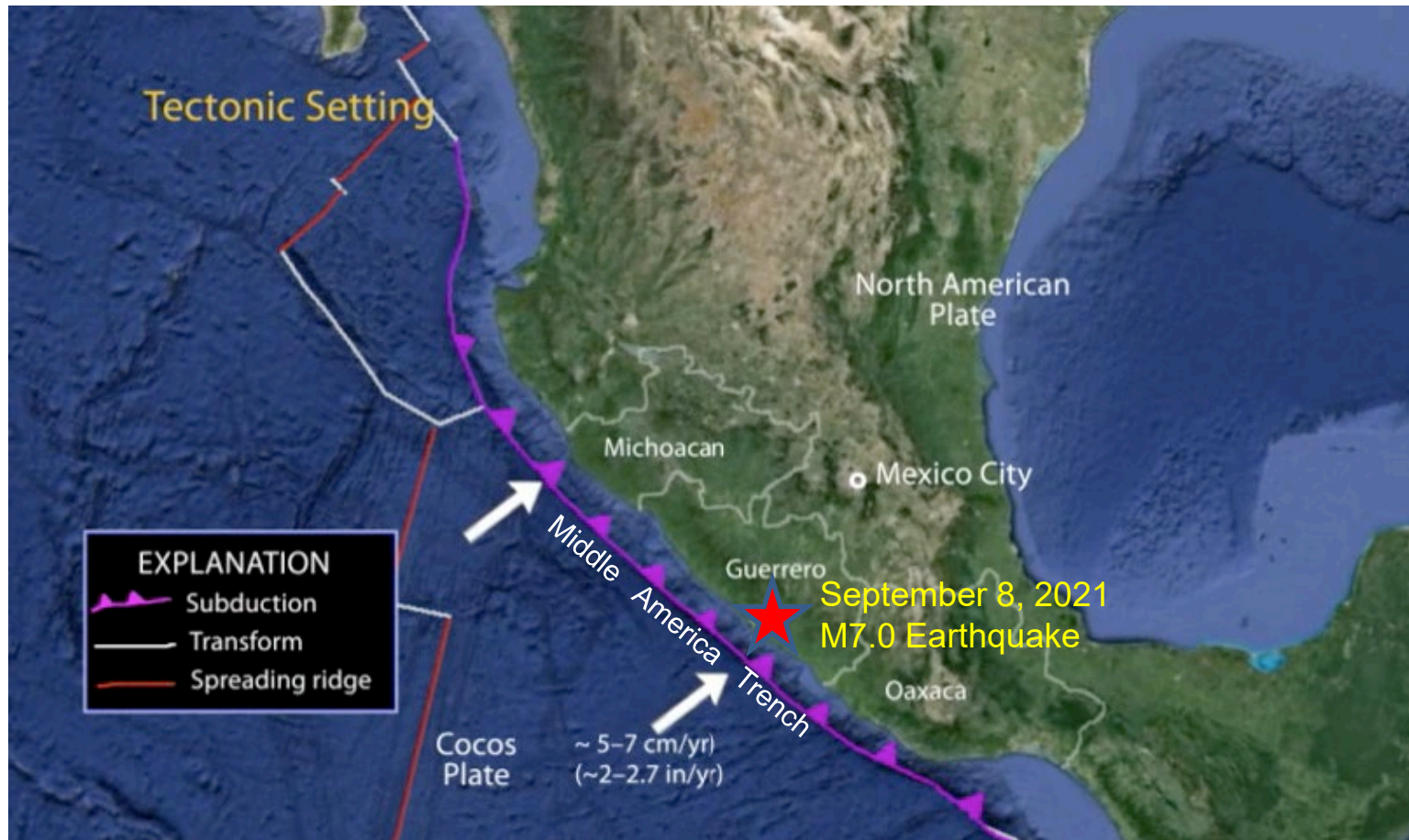


The color coded contour lines outline regions of MMI intensity. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. The estimated population exposure to each MMI Intensity is shown in the table.

*Image courtesy of the US Geological Survey*

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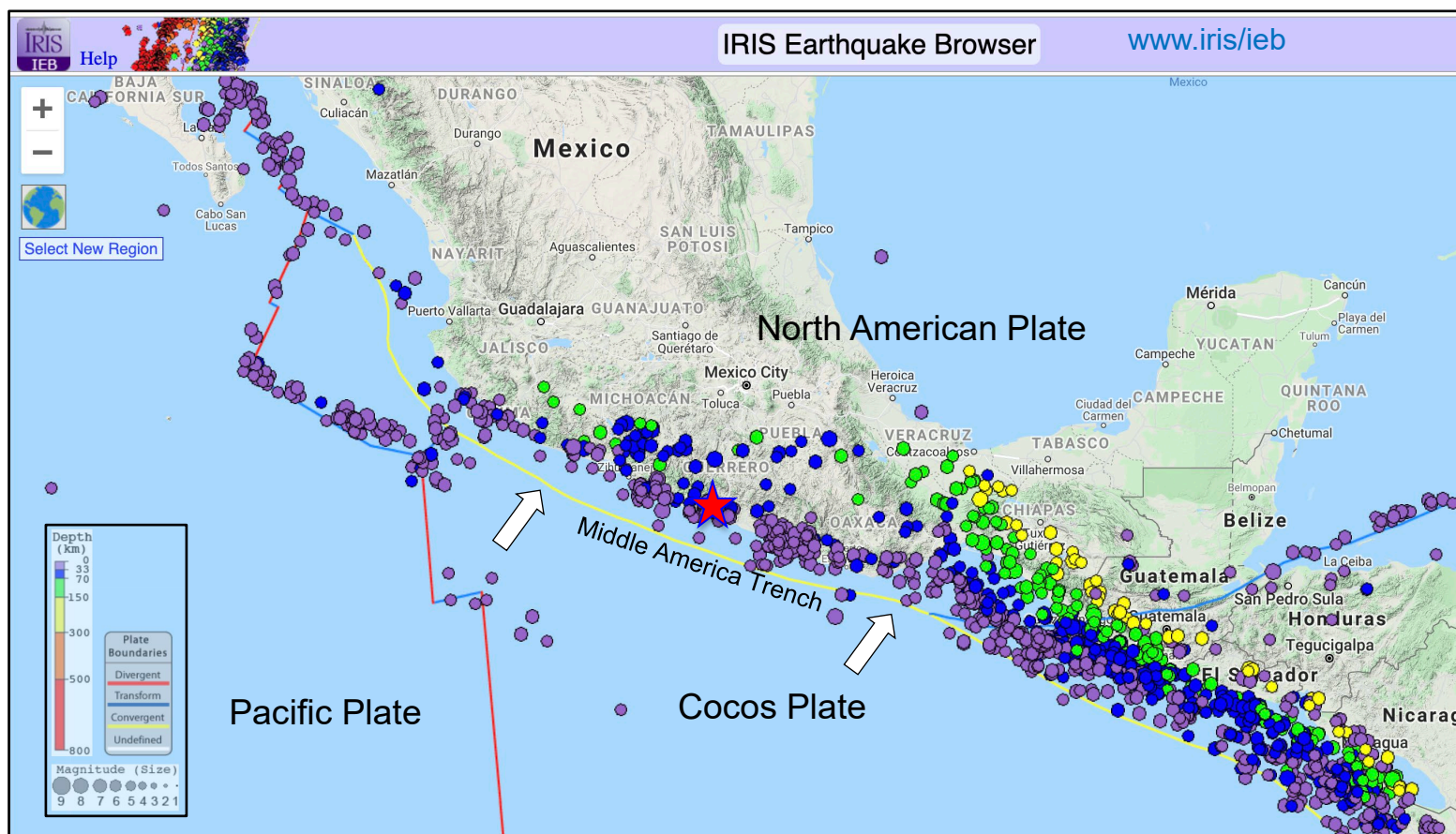


As part of the circum-Pacific “Ring of Fire”, Mexico is one of the most seismologically and volcanically active regions on Earth. Most of Mexico is on the North American Plate. Offshore of southern Mexico, the oceanic Cocos Plate subducts beneath the North American Plate at the Middle America Trench. In the area of this earthquake, the Cocos Plate subducts toward the northeast at a rate of approximately 6.5 cm/yr.

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The epicenter of this earthquake is shown by the red star on the map below. The IRIS Earthquake Browser shows 30 years of earthquakes greater than M5. Interestingly, until today there have been no M7 earthquakes along this coastal stretch during this century.



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This epicenter of this earthquake is shown by the blue star on the map below. The Cocos Plate subducts towards the north-northeast beneath the North American Plate at the Middle America Trench. The depth of this earthquake fits the pattern of shallow and intermediate depth earthquakes that cluster along the megathrust plate boundary.

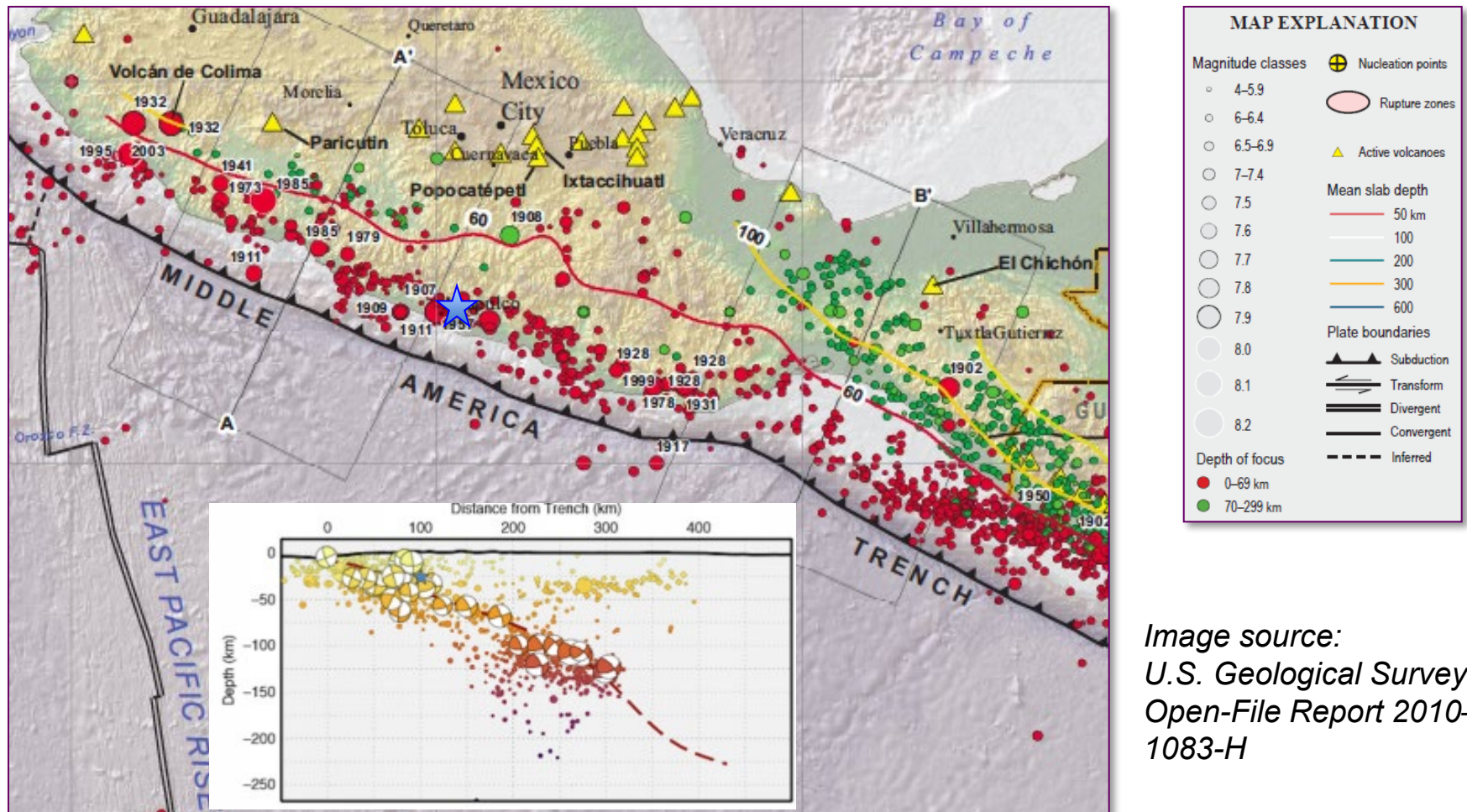
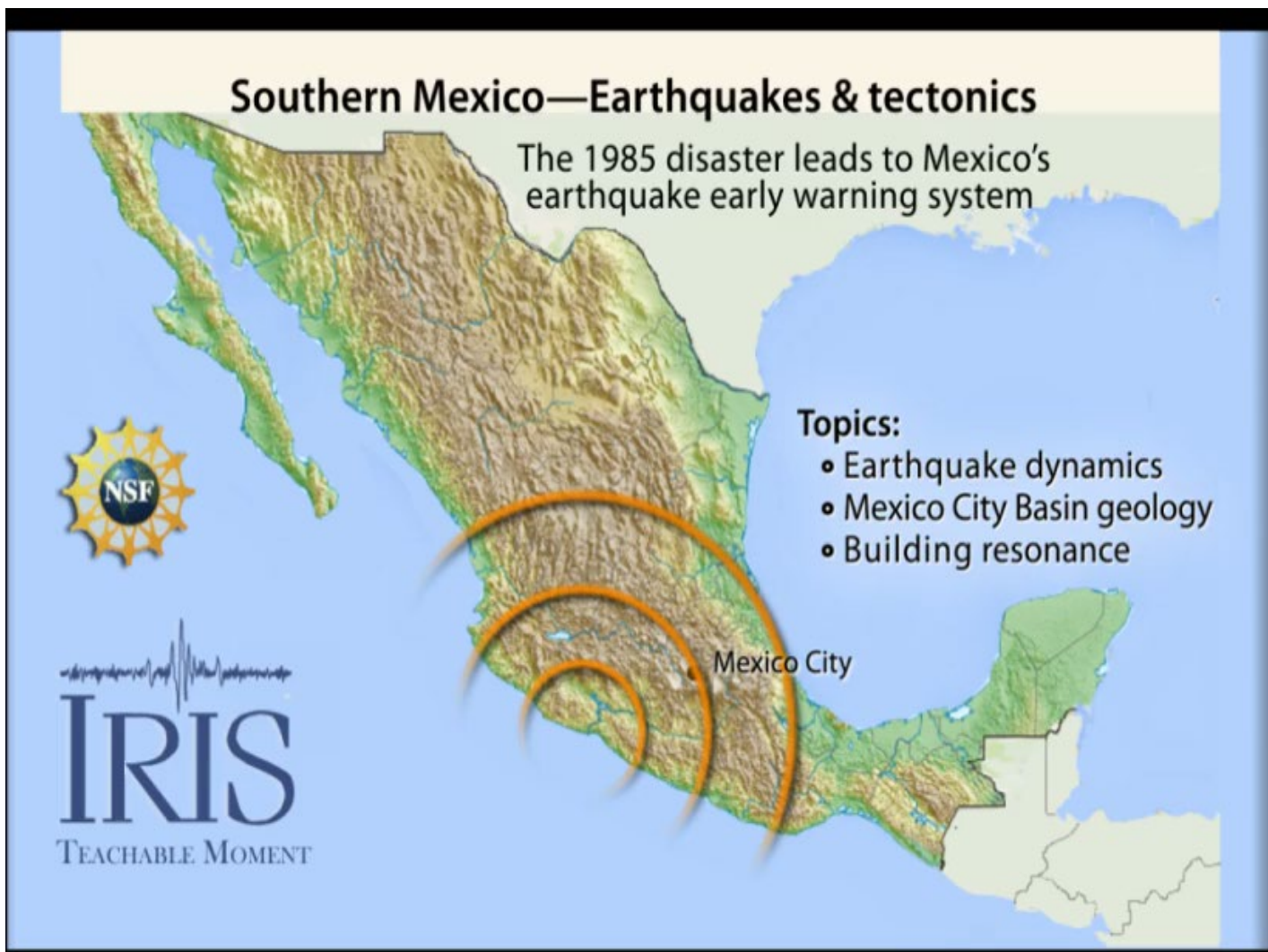


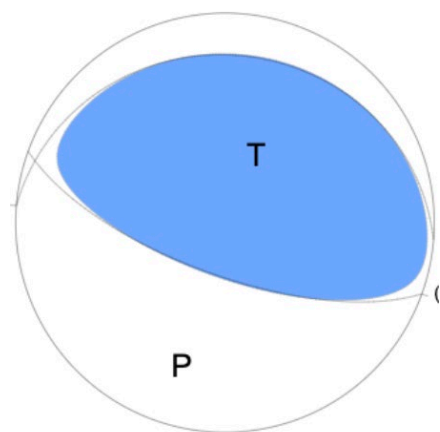
Image source:  
U.S. Geological Survey  
Open-File Report 2010-  
1083-H

Animation of the regional tectonics and earthquake history of SW Mexico.

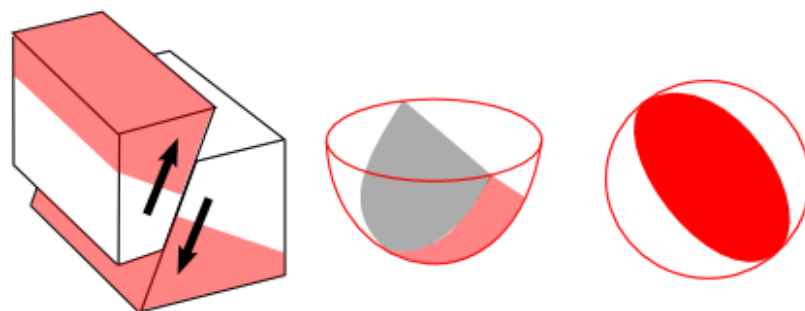


The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Since an earthquake occurs as slip on a fault, it generates primary (P) waves in quadrants of compression (shaded) and extension (white). The orientation of these quadrants determined from recorded seismic waves determines the type of fault that produced the earthquake.

The location, depth, and thrust-faulting mechanism of this earthquake suggest that it occurred on the interface between the Cocos and North American Plates.



### Reverse/Thrust/Compression



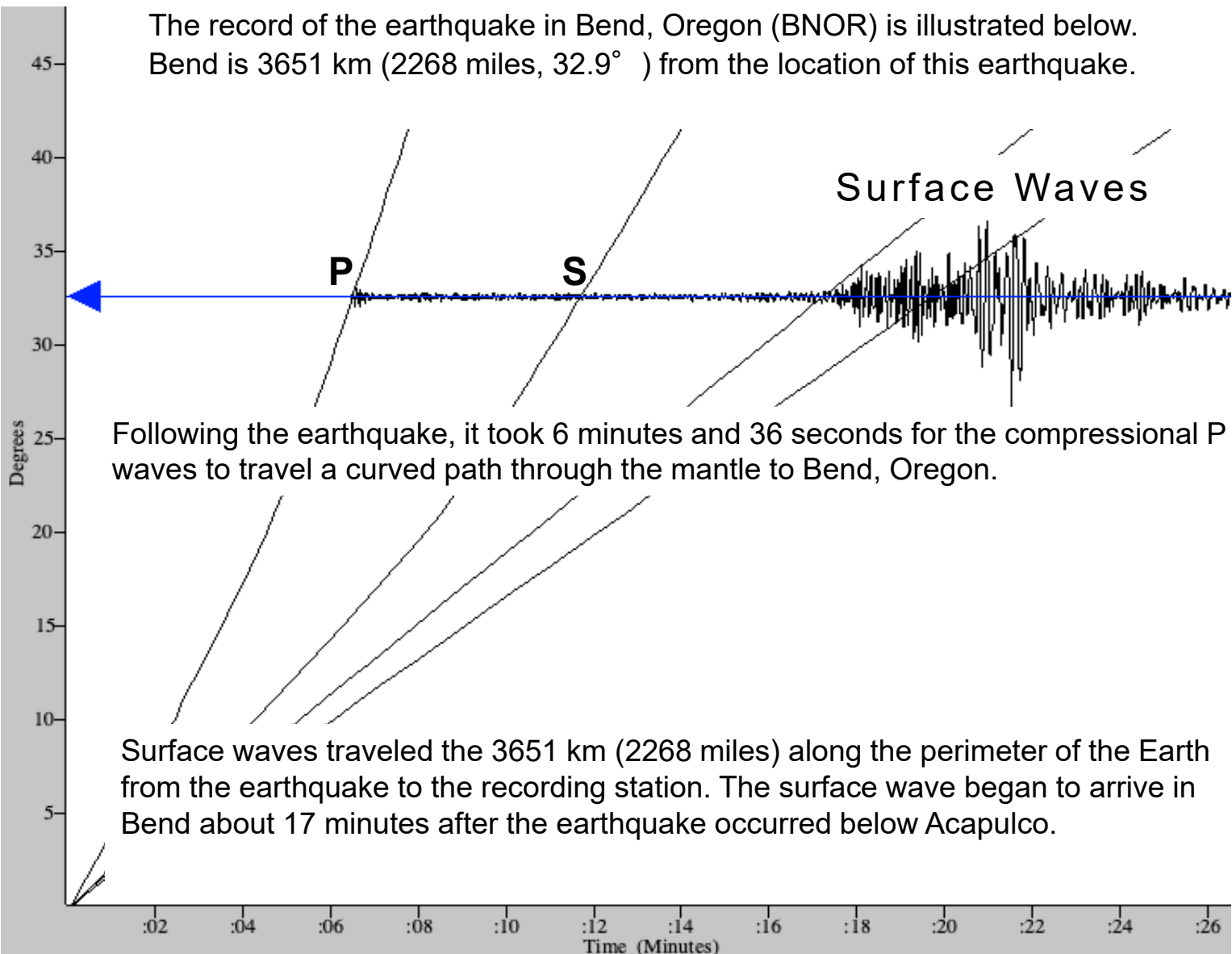
The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.



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The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 3651 km (2268 miles,  $32.9^\circ$ ) from the location of this earthquake.



Surface Waves

Following the earthquake, it took 6 minutes and 36 seconds for the compressional P waves to travel a curved path through the mantle to Bend, Oregon.

Surface waves traveled the 3651 km (2268 miles) along the perimeter of the Earth from the earthquake to the recording station. The surface wave began to arrive in Bend about 17 minutes after the earthquake occurred below Acapulco.

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