Magnitude 7.3 IRAQ
Sunday, November 12, 2017 at 18:18:17 UTC

A magnitude 7.3 earthquake has occurred in the northern border region of Iran and Iraq centered about 350 kilometers (217 miles) north of Baghdad at a depth of 33.9 km (21 miles). The earthquake was felt as far away as Turkey, Israel and Kuwait.

Early reports indicate that 140 have been killed with over 800 injuries reported.

In this photo provided by the Iranian Students News Agency, ISNA, people look at destroyed buildings after an earthquake at the city of Sarpol-e-Zahab in western Iran. A powerful earthquake shook the Iran-Iraq border late Sunday, killing more than one hundred people and injuring some 800 in the mountainous region of Iran alone, state media there said.

(Pouria Pakizeh/ISNA via AP)

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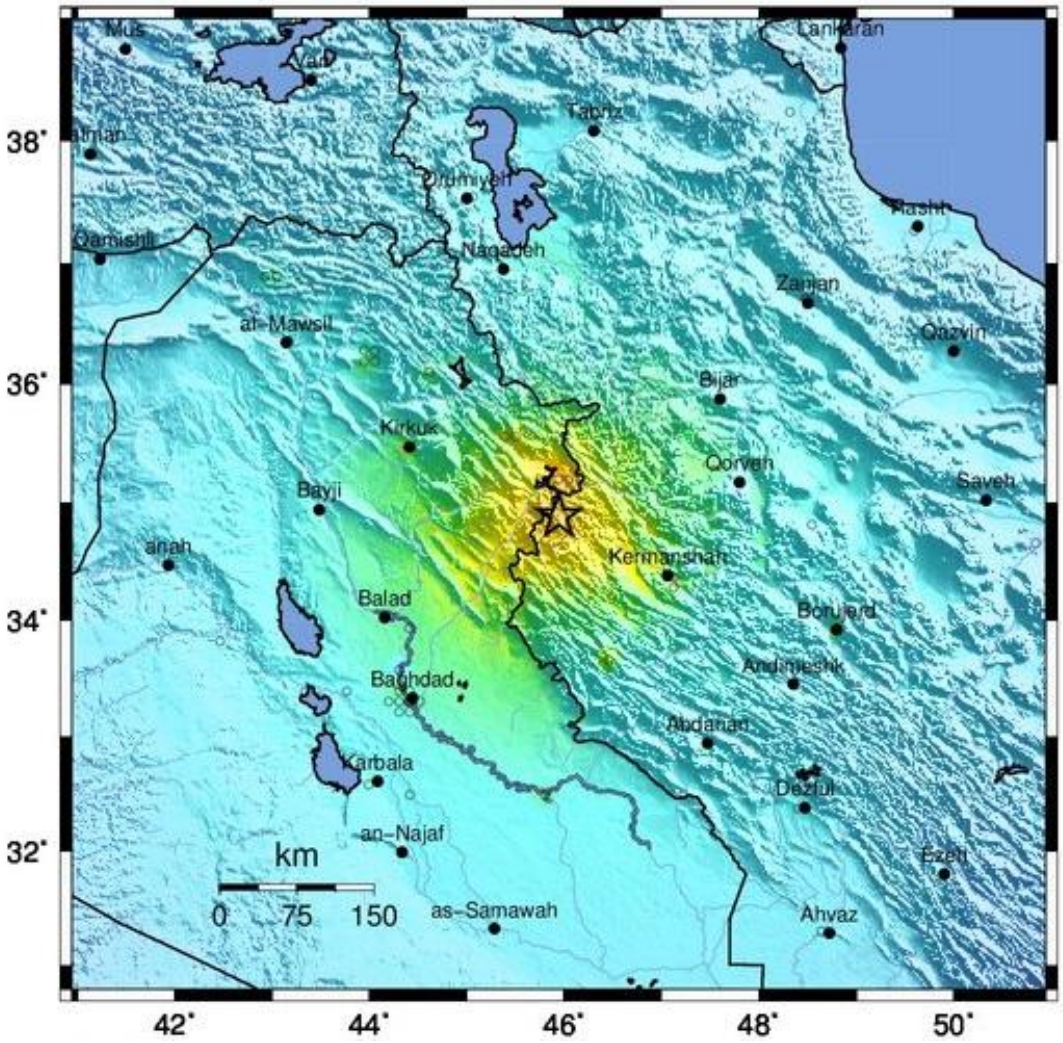
The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

The area near the earthquake epicenter experienced severe ground 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

Image courtesy of the US Geological Survey



USGS Estimated shaking intensity from M 7.3 Earthquake

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IRIS Teachable Moments

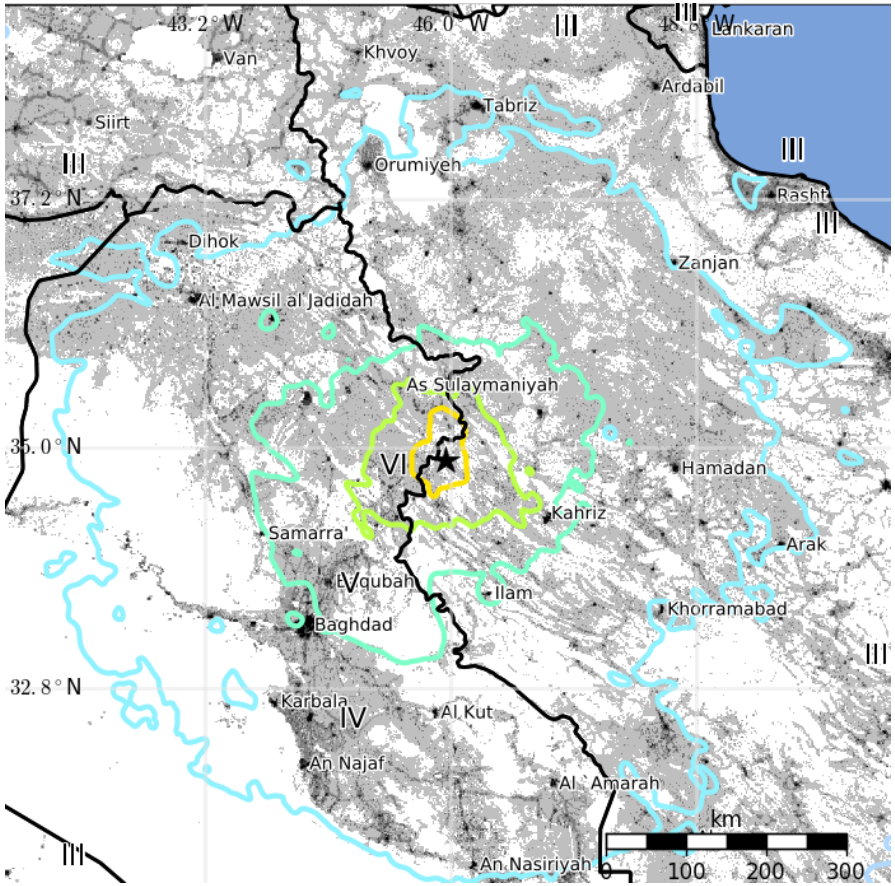
The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels.

The USGS estimates that 18,000 people felt severe shaking from this earthquake.

MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	19,176 k*
IV	Light	38,108 k
V	Moderate	10,387 k
VI	Strong	2,493 k
VII	Very Strong	221 k
VIII	Severe	18 k
IX	Violent	0 k
X	Extreme	0 k

USGS PAGER

Population Exposed to Earthquake Shaking



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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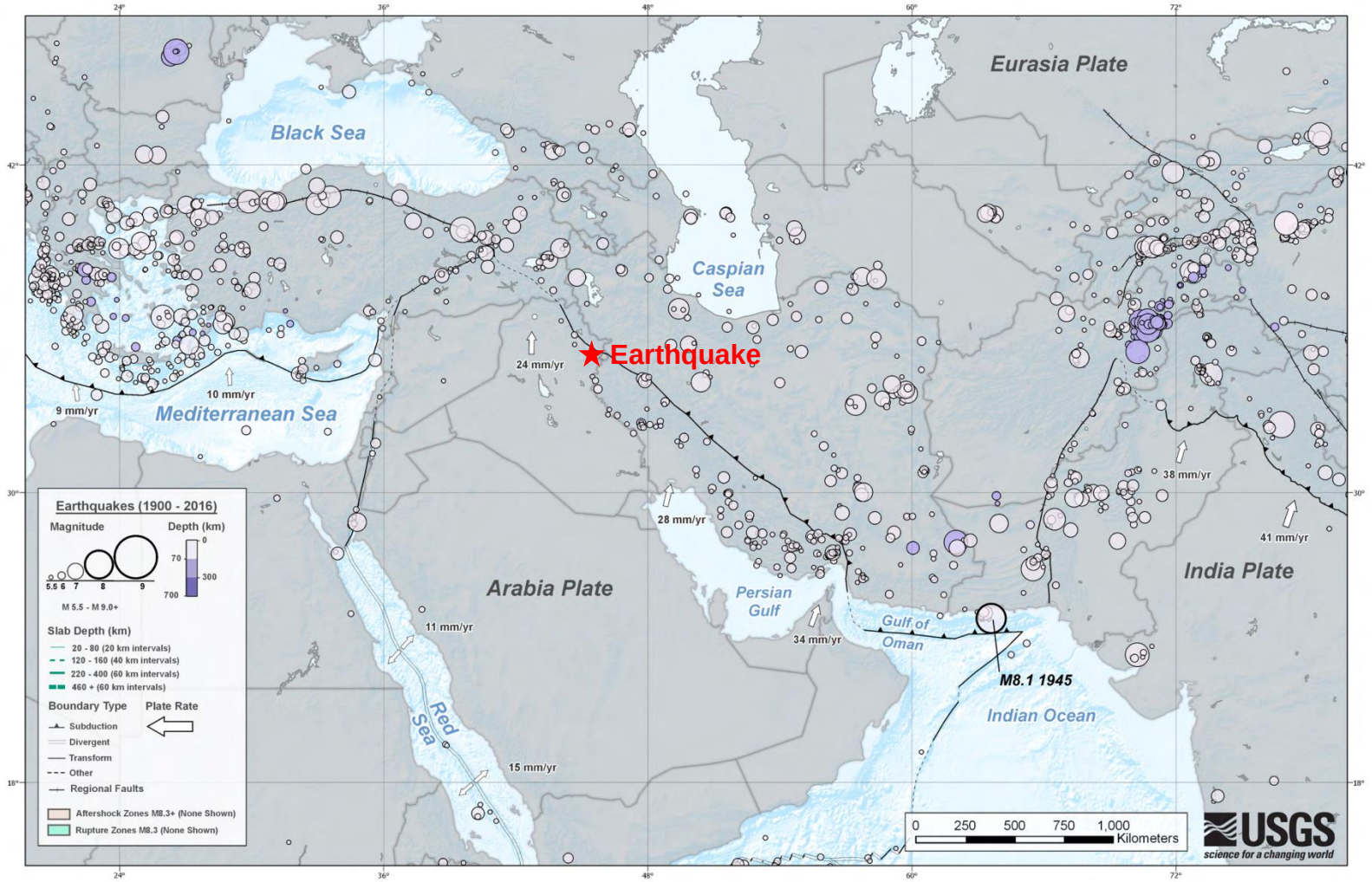
Middle East tectonics and earthquakes result from the interaction of the Eurasia, Arabia, India, and Africa Plates. This regional tectonics map shows plate motions with respect to the Eurasian Plate. The location of the earthquake is shown by the red star.



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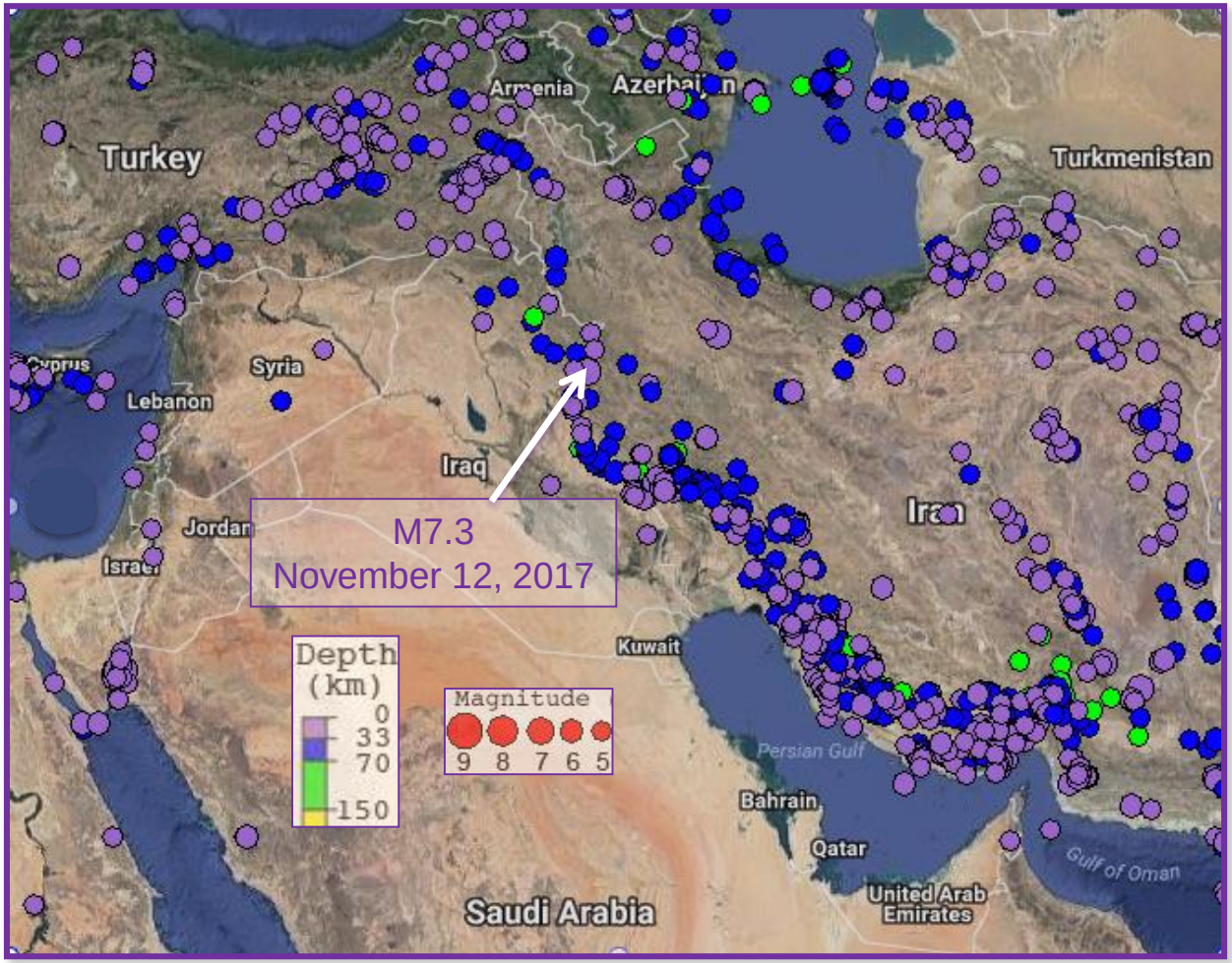
This seismicity map shows locations of the most recent 924 earthquakes with magnitude (M) ≥ 5 in the area surrounding the Arabia – Eurasian Plate boundary.

This M7.3 earthquake is within the broad zone of earthquakes along the Zagros Mountains and Bitlis Suture that form the plate boundary.

Notice that earthquake depths are dominantly less than 70 km indicating that most of these events are on crustal faults.



Map created with the IRIS Earthquake Browser

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The boundary between the Arabian and Eurasian Plates is a zone of oblique convergence with a combination of folds and thrust faults and right-lateral strike slip faults.

The Zagros Mountains are a fold and thrust belt extending across western Iran into northeastern Iraq. Thrust faulting in the foothills of the northwestern Zagros Mountains caused this earthquake.

In this region, the Arabian Plate moves in a north-northeasterly direction at about 2.5 cm/yr with respect to the Eurasian Plate.

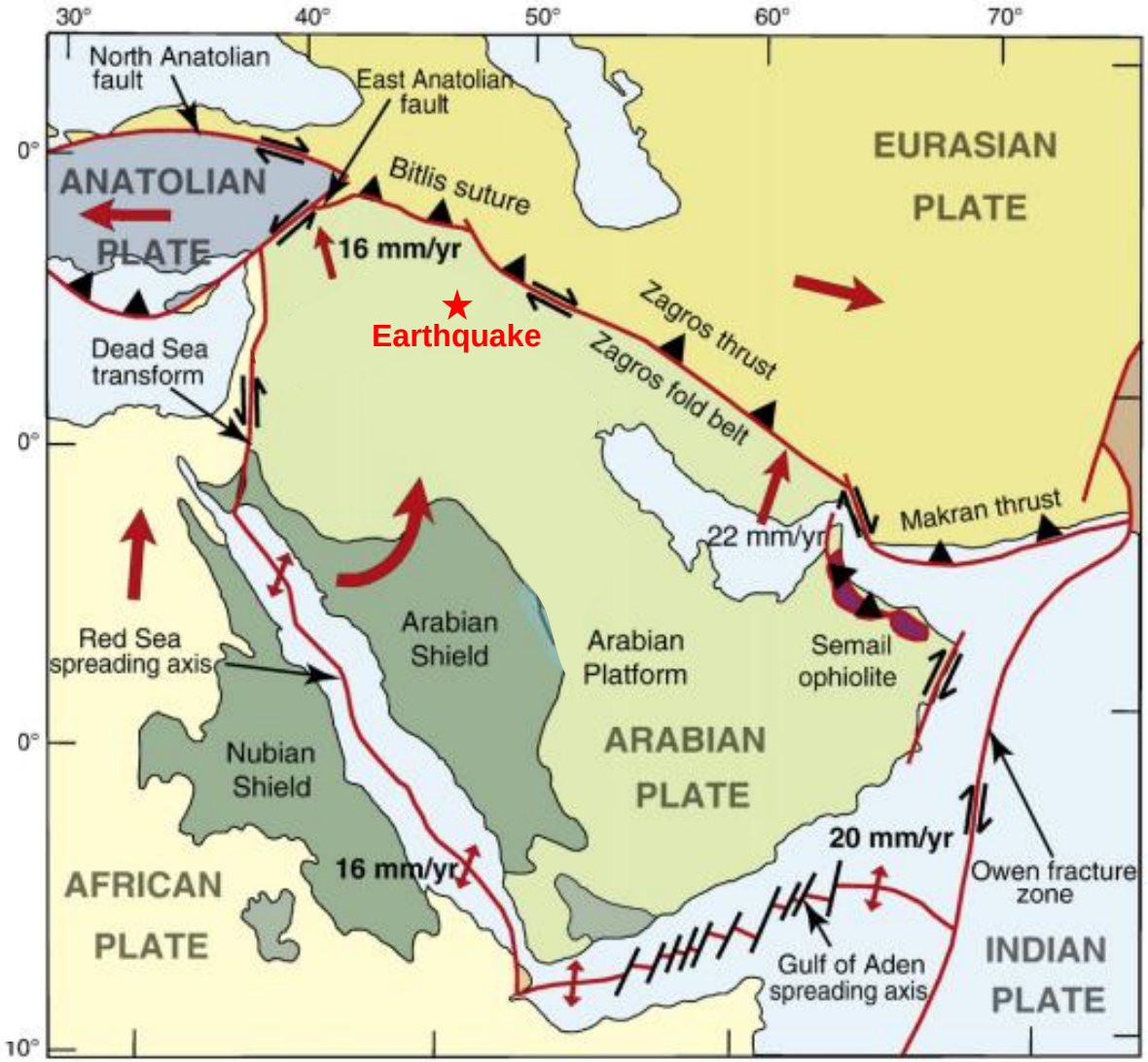

Figure courtesy of R. J. Stern, University of Texas at Dallas

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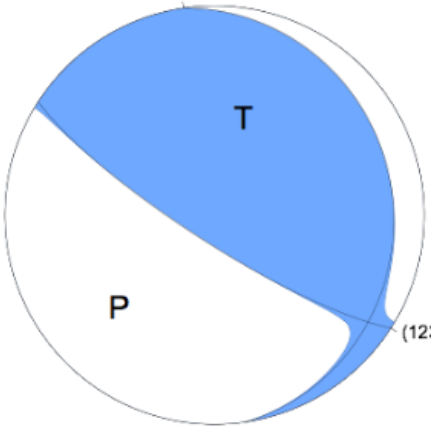
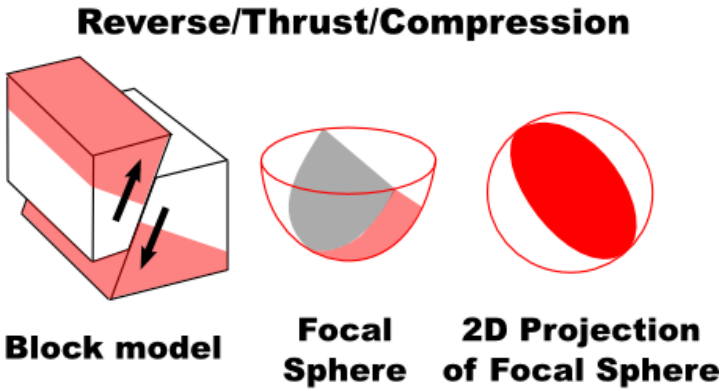
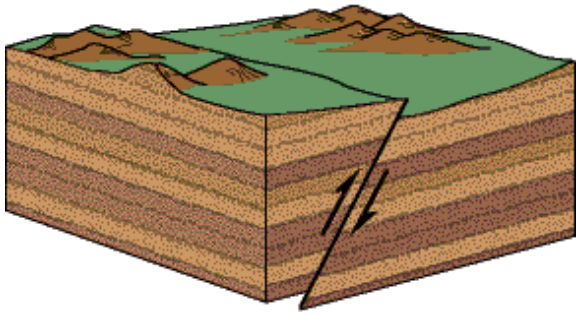
The focal mechanism is how seismologists plot the 3-D stress orientations of an earthquake. Because an earthquake occurs as slip on a fault, it generates primary (P) waves in quadrants of compression (shaded) and extension (white). The orientation of these quadrants determined from recorded seismic waves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



USGS W-phase Moment Tensor Solution

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





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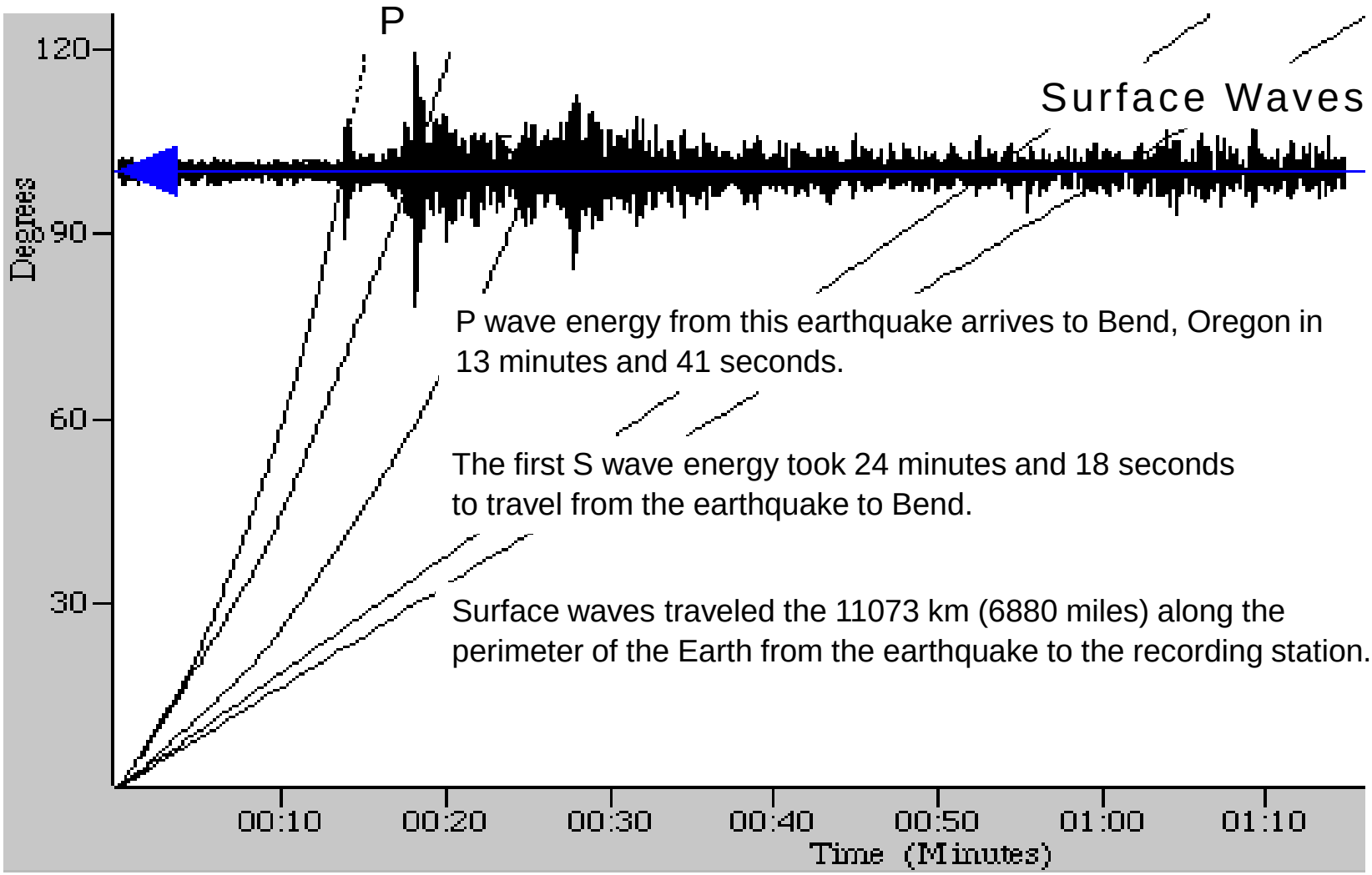
The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 11073 km (6880 miles, 99.76˚) from the location of this earthquake.



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