

A magnitude 6.2 earthquake occurred in a mountainous region in Italy at a depth of 6–10 km. Early reports indicate that 120 people have been killed and many more are trapped under debris.

The earthquake woke residents in Rome, nearly 160 km (100 miles) to the southwest. In the hours following this earthquake, the area continues to experience aftershocks.



The sun rises over collapsed buildings following an earthquake in Amatrice, central Italy, Wednesday, Aug. 24, 2016. A strong earthquake in central Italy reduced three towns to rubble as people slept early Wednesday, with early reports that many were killed and many more injured as rescue crews raced to dig out survivors.

(Massimo Percossi/ANSA via AP)

Magnitude 6.2 ITALY

Wednesday, August 24, 2016 at 01:36:33 UTC

Towns across three regions, Umbria, Lazio and Marche, were devastated by the earthquake, which could be felt as far away as Bologna in the north and Naples in the south.

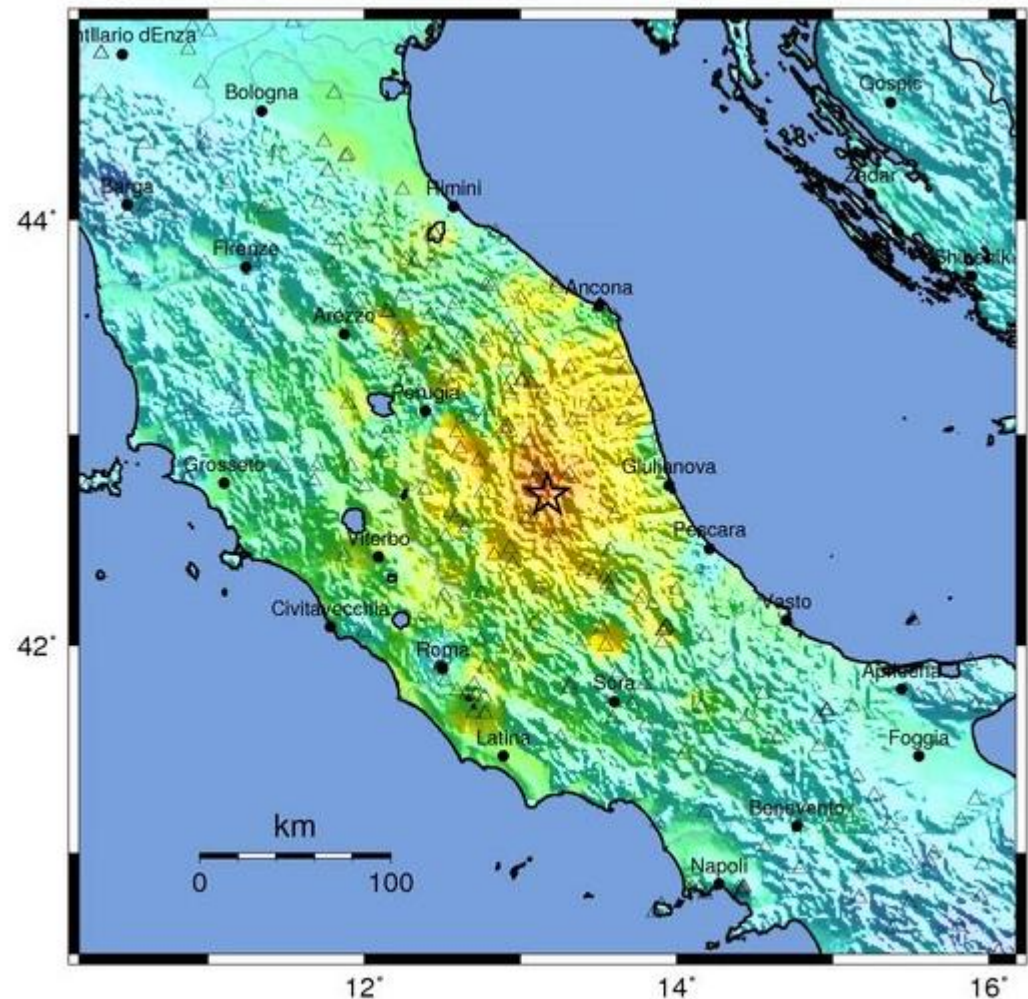


The 20 Regions of the Republic of Italy

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

A wide area experienced strong to very strong shaking from this earthquake.

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

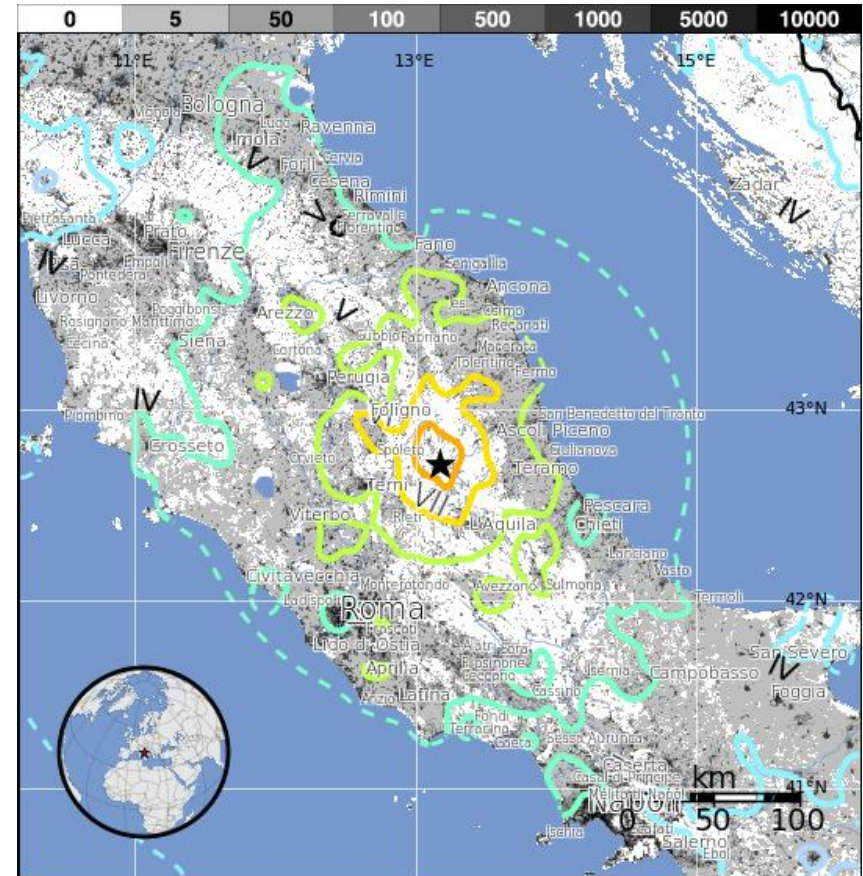


USGS Estimated shaking Intensity from M 6.2 Earthquake

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

Approximately 13,000 people were exposed to severe shaking from this earthquake.

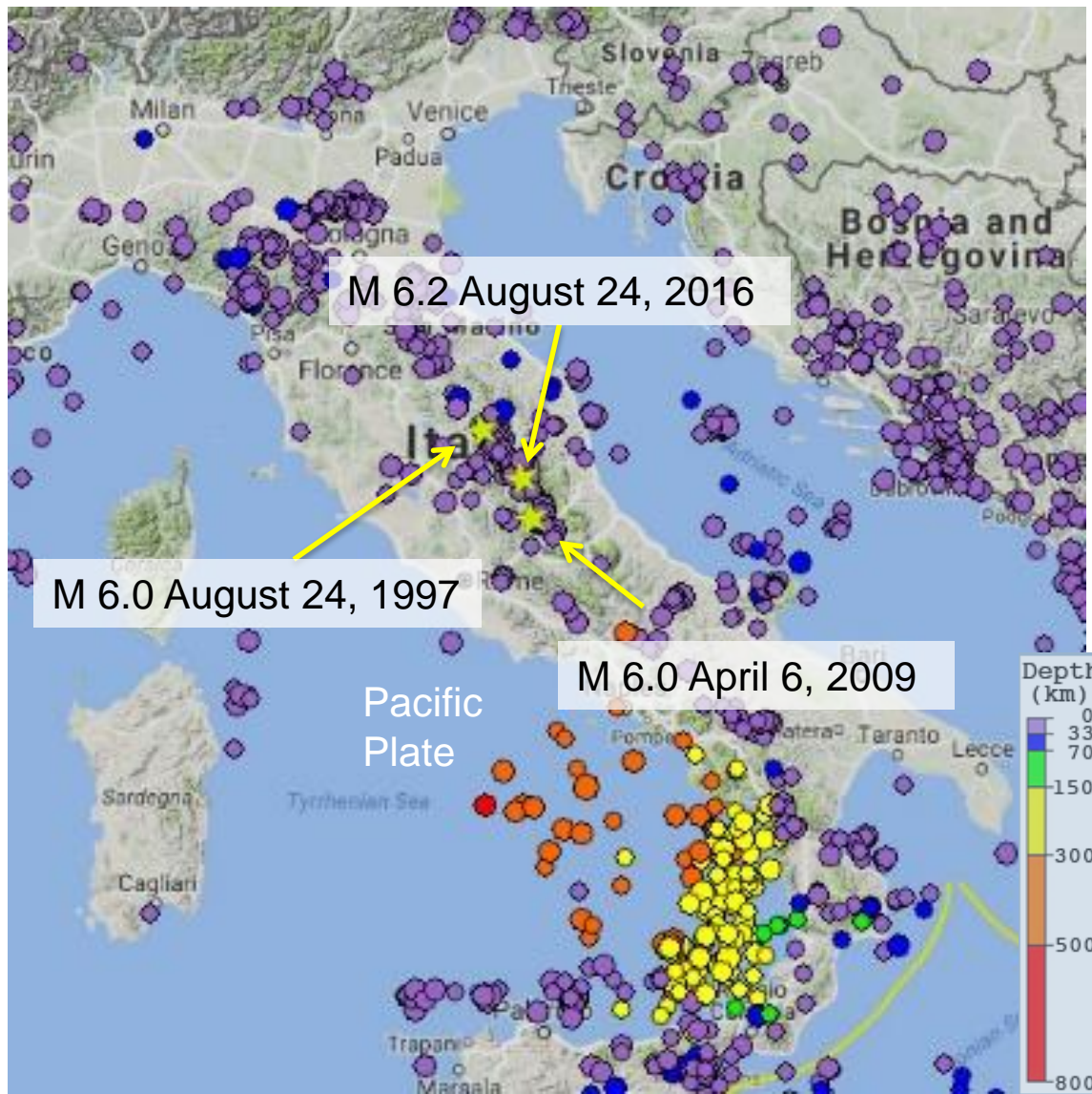
MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	1,025 k*
IV	Light	13,290 k*
V	Moderate	8,127 k
VI	Strong	1,954 k
VII	Very Strong	234 k
VIII	Severe	13 k
IX	Violent	0 k
X	Extreme	0 k



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.

Magnitude 6.2 ITALY

Wednesday, August 24, 2016 at 01:36:33 UTC



The earthquake is labeled on the map with historical earthquakes magnitude ≥ 5 . It is the latest in a series of deadly earthquakes.

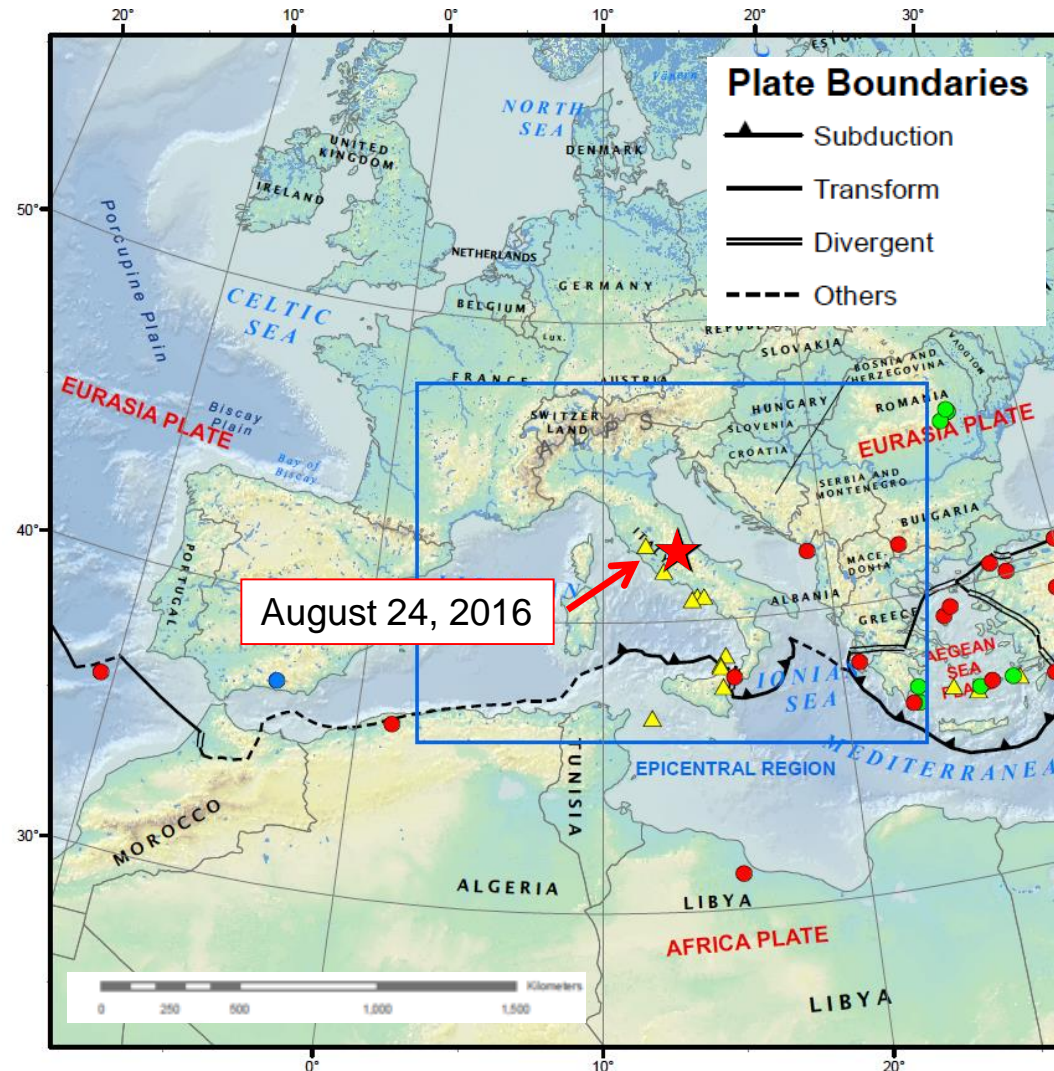
This earthquake was 50 km south-southwest of the M 6.0 August 24, 1997 earthquake which killed 11, injured over 100 and damaged or destroyed more than 80,000 homes.

This earthquake was 45 km north-northwest of the M 6.3 April 6, 2009 earthquake near L'Aquila that killed 295, injured over 1,000 and left over 55,000 homeless.

The location of this earthquake is shown on a plate tectonic map centered on the Mediterranean Sea. Current motion of the African Plate with respect to the Eurasian Plate is north-northwest at about 7 mm/yr (0.7 cm/yr).

On a broad scale, the plate boundary between the African and Eurasian Plates is convergent with resulting compressional mountain building in the Alps and other regions.

At a finer scale, the Mediterranean region is broken the into a complex zone of smaller (micro)plates with a variety of tectonic interactions and counter-clockwise rotation of the Italian Peninsula.



Magnitude 6.2 ITALY

Wednesday, August 24, 2016 at 01:36:33 UTC

This map of major faults (right) in Italy and the surrounding region shows the complexity of the regional tectonics.

This region is experiencing subduction of the Adria Microplate beneath the Apennines from east to west, continental collision between the Eurasian and African Plates, and the opening of the Tyrrhenian Basin to the west.



Image courtesy AGI

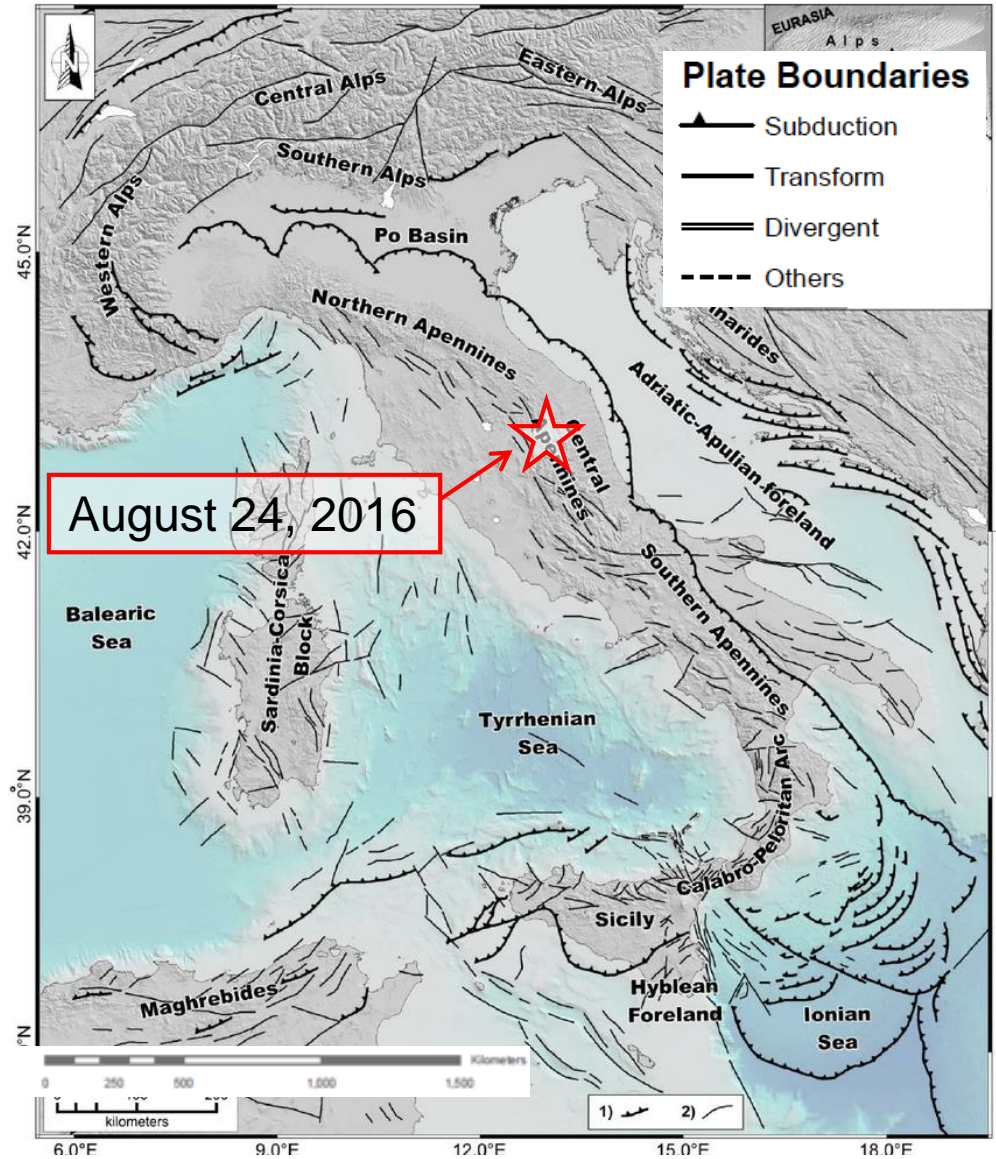


Image redrawn from Cadet & Fuciniello 2004; Polonia et al. 2011

According to the USGS, this earthquake is an expression of east-west extensional tectonics that now dominate along the Apennine belt, primarily in response to the Tyrrhenian Basin opening faster than the compression between the Eurasian and African Plates.

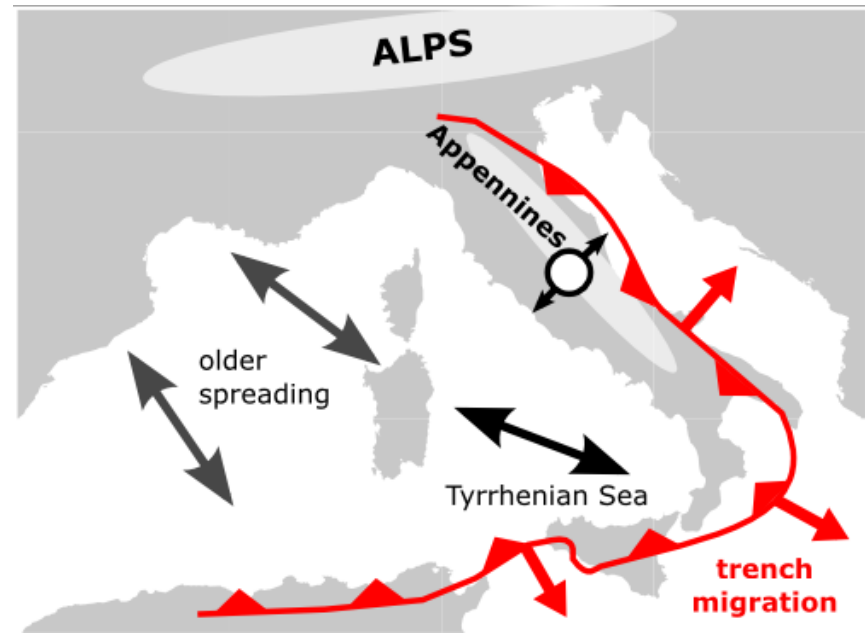
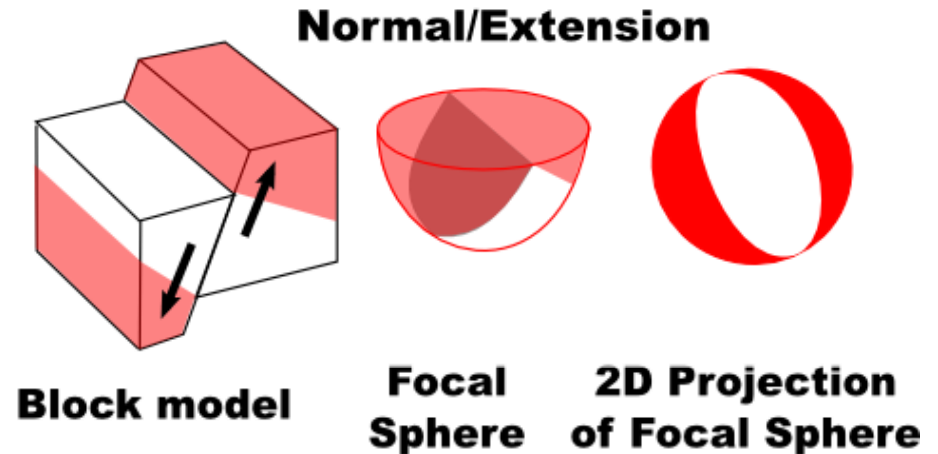
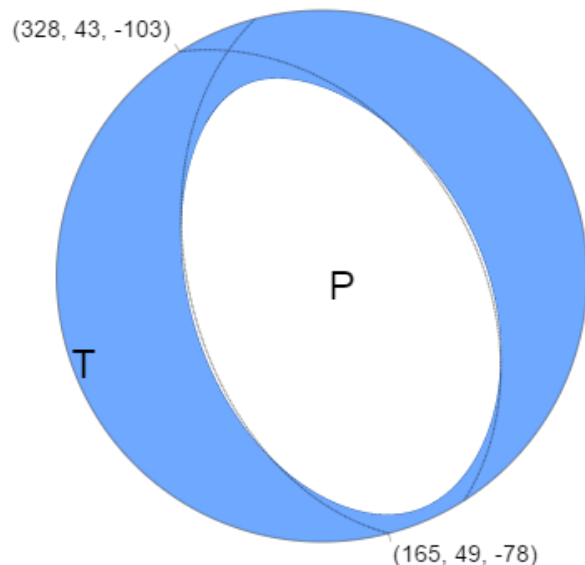


Image courtesy Chris Rowan

The Adria Microplate is subducting beneath Italy and the European Plate.

Image courtesy AGI

Based on the focal mechanism for this earthquake, it occurred as a result of normal faulting on a NW - SE oriented fault in the Central Apennines.

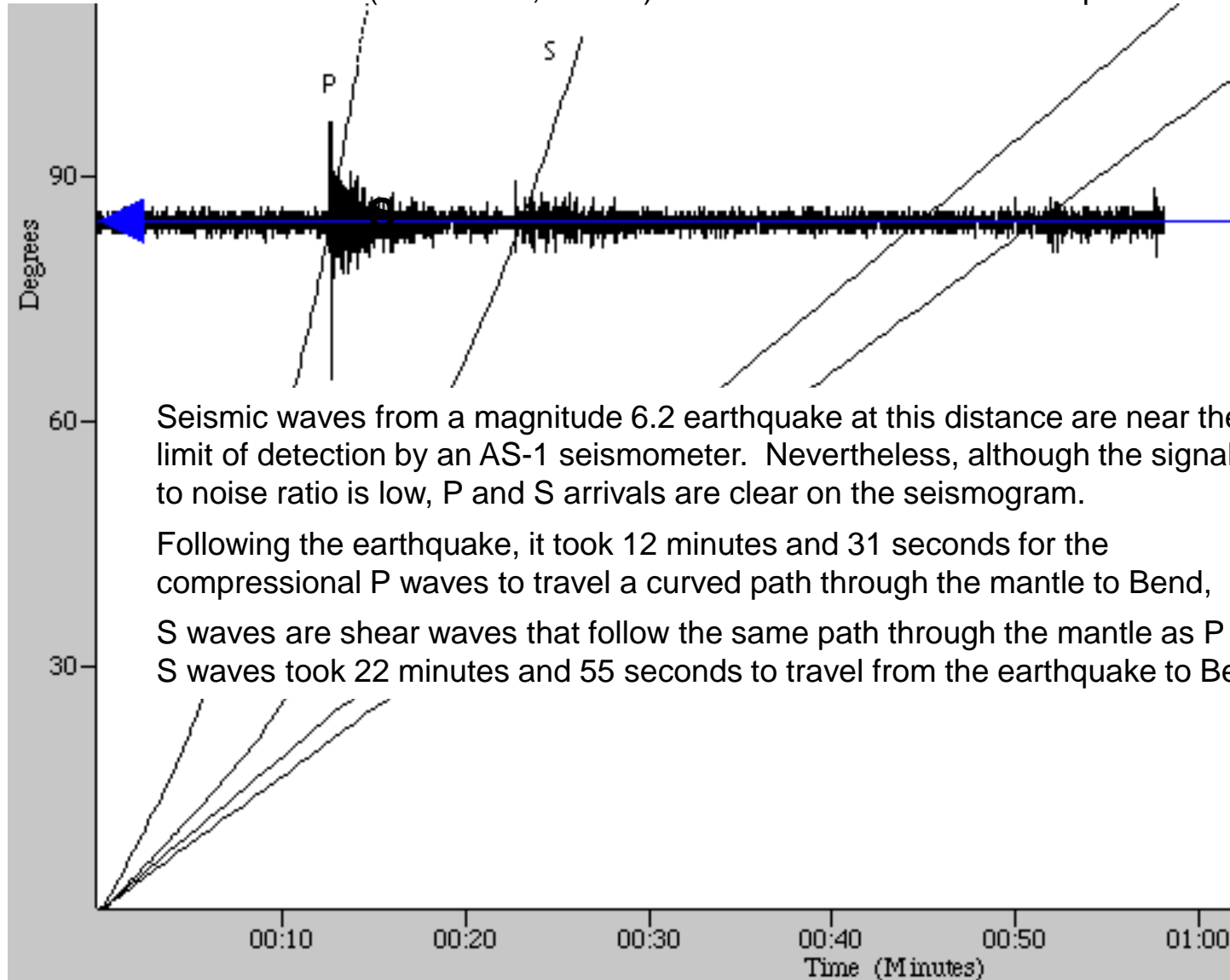


The tension axis (T) reflects the minimum compressive stress direction. The pressure axis (P) reflects the maximum compressive stress direction.

Magnitude 6.2 ITALY

Wednesday, August 24, 2016 at 01:36:33 UTC

The record of the earthquake in Bend, Oregon (BNOR) is illustrated below. Bend is 9365 km (5819 miles, 84.4°) from the location of this earthquake.



Seismic waves from a magnitude 6.2 earthquake at this distance are near the limit of detection by an AS-1 seismometer. Nevertheless, although the signal to noise ratio is low, P and S arrivals are clear on the seismogram.

Following the earthquake, it took 12 minutes and 31 seconds for the compressional P waves to travel a curved path through the mantle to Bend,

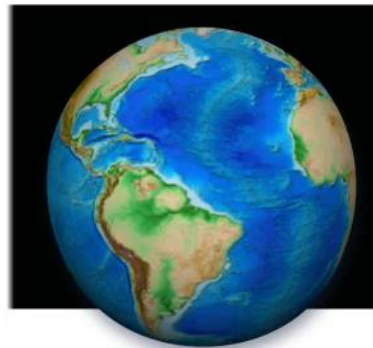
S waves are shear waves that follow the same path through the mantle as P waves. S waves took 22 minutes and 55 seconds to travel from the earthquake to Bend.

Teachable Moments are a service of

The Incorporated Research Institutions for Seismology
Education & Public Outreach
and
The University of Portland

Please send feedback to tkb@iris.edu

To receive automatic notifications of new Teachable Moments
subscribe at www.iris.edu/hq/retm



www.iris.edu/earthquake

