

A magnitude 7.5 earthquake occurred in the Hindu Kush mountains, in the sparsely populated province of Badakhshan, Afghanistan which borders Pakistan, Tajikistan and China. The epicenter was 212 kilometers (130 miles) deep and 73 kilometers (45 miles) south of the provincial capital, Fayzabad.

An Afghan man clears rubble from a damaged house following a strong earthquake, in Kabul, Afghanistan, Monday, Oct. 26, 2015.

(AP Photo/Rahmat Gul)



This earthquake occurred at a depth of 212 km which is considered an intermediate depth earthquake. Intermediate depth earthquakes typically cause less damage on the ground surface than a similar magnitude shallow earthquake, but may be felt at great distance from their epicenters.

This earthquake was felt across Asia, shaking buildings from Kabul to New Delhi, cutting power and communications, and killing more than 200 people, mostly in the remote mountain regions near the Afghan-Pakistan border. The number of casualties on both sides of the border is expected to rise.



Shaking Intensity

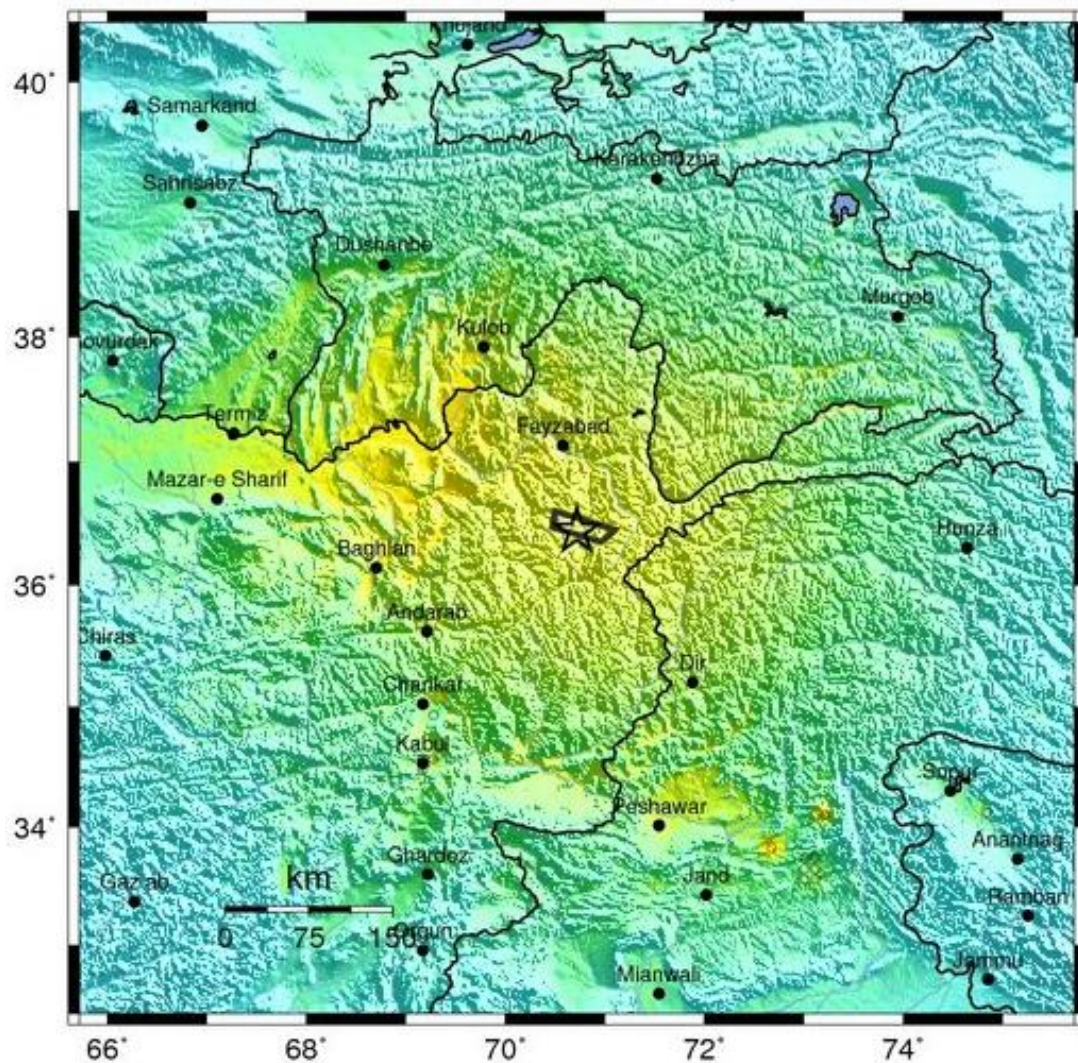
The Modified Mercalli Intensity (MMI) scale depicts shaking severity. A large area experienced strong to very strong ground shaking.

Modified Mercalli Intensity



Perceived Shaking

Extreme
Violent
Severe
Very Strong
Strong
Moderate
Light
Weak
Not Felt



Magnitude 7.5 AFGHANISTAN

Monday, October 26, 2015 at 09:09:32 UTC

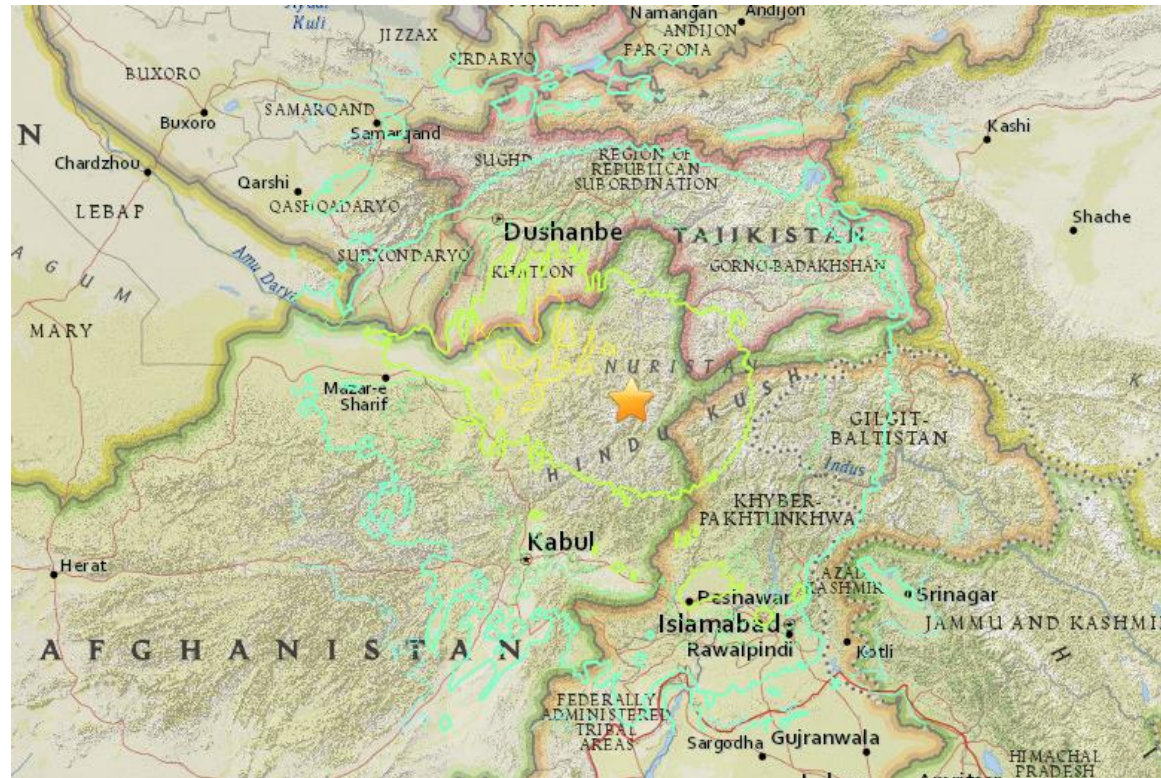
The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels.

42,000 people experienced very strong ground shaking during this earthquake.

MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	--*
IV	Light	34,319k*
V	Moderate	55,919k*
VI	Strong	18,881k
VII	Very Strong	42k
VIII	Severe	0k

USGS PAGER

Population Exposed to Earthquake Shaking



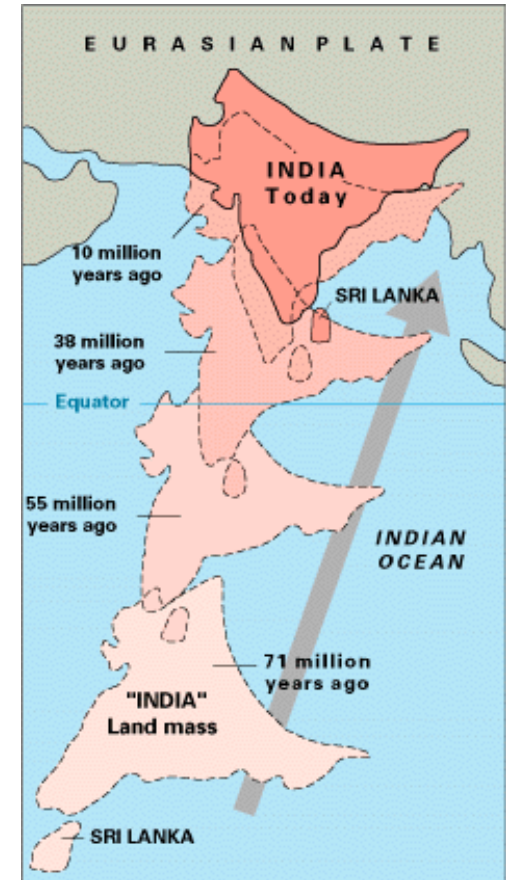
The color coded contour lines outline regions of MMI intensity. The total population exposure to a given MMI value is obtained by summing the population between the contour lines. The estimated population exposure to each MMI Intensity is shown in the table.

Image courtesy of the US Geological Survey

Earthquakes in this region are caused by the ongoing continent-continent collision between the Indian and Eurasian Plates. This collision causes uplift that produces the highest mountain peaks in the world including the Himalayan, the Karakoram, the Pamir and the Hindu Kush ranges. The collision zone wraps around the northwest promontory of the Indian continent in the Hindu Kush region of Tajikistan and Afghanistan then extends to the southeast through Nepal and Bhutan.

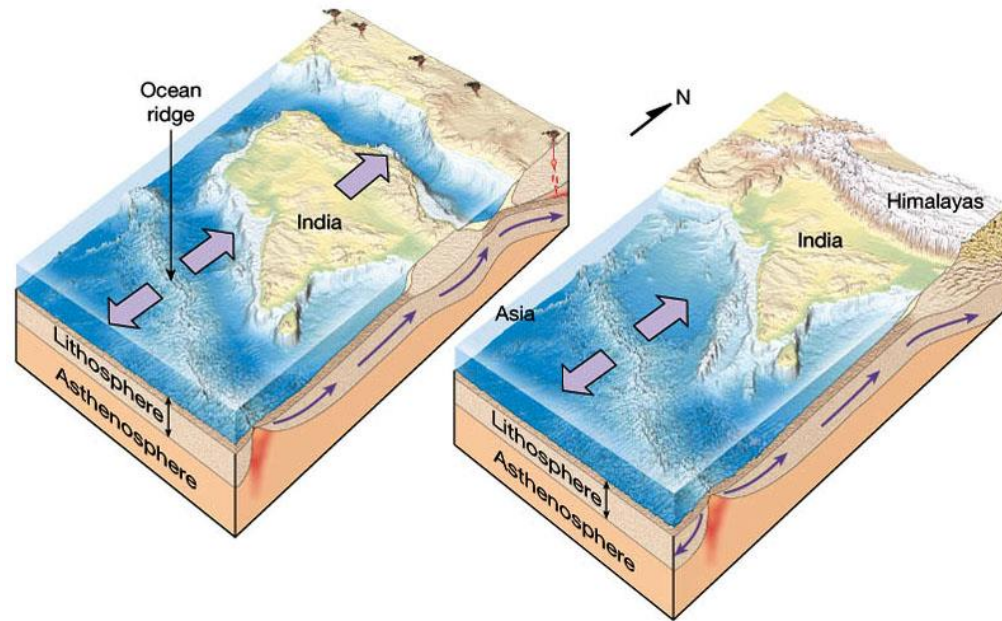


The motion of India into Asia is essentially perpendicular to the Himalaya Mountains in Nepal. So thrust faulting earthquakes are the most common kind of earthquake in the region.

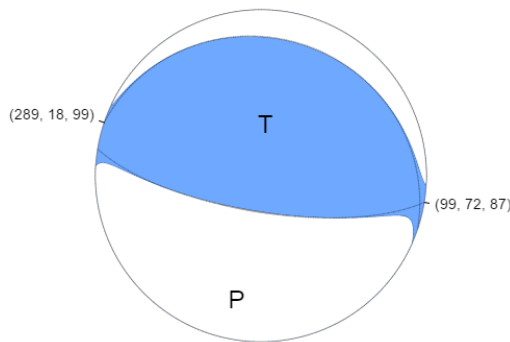


This earthquake occurred as the result of thrust faulting between the subducting Indian Plate and the overriding Eurasian Plate to the north.

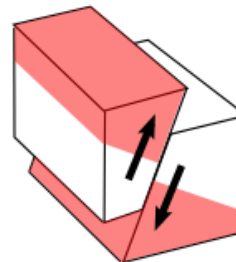
At the latitude of the earthquake, the India subcontinent moves northward and collides with Eurasia at a velocity of about 37 mm/yr.



Reverse/Thrust/Compression



USGS Centroid
Moment Tensor
Solution



Block model



Focal
Sphere

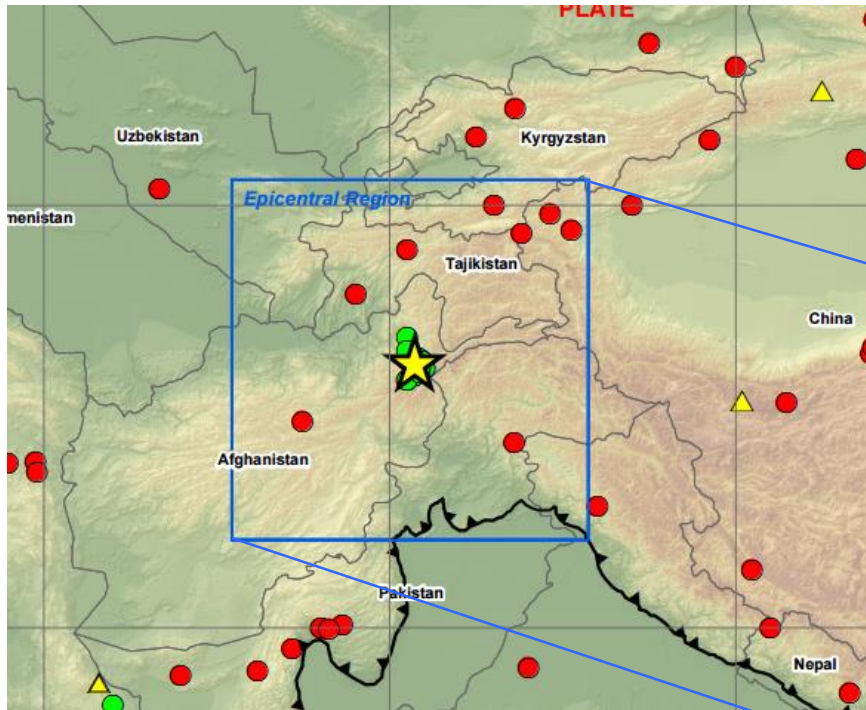


2D Projection
of Focal Sphere

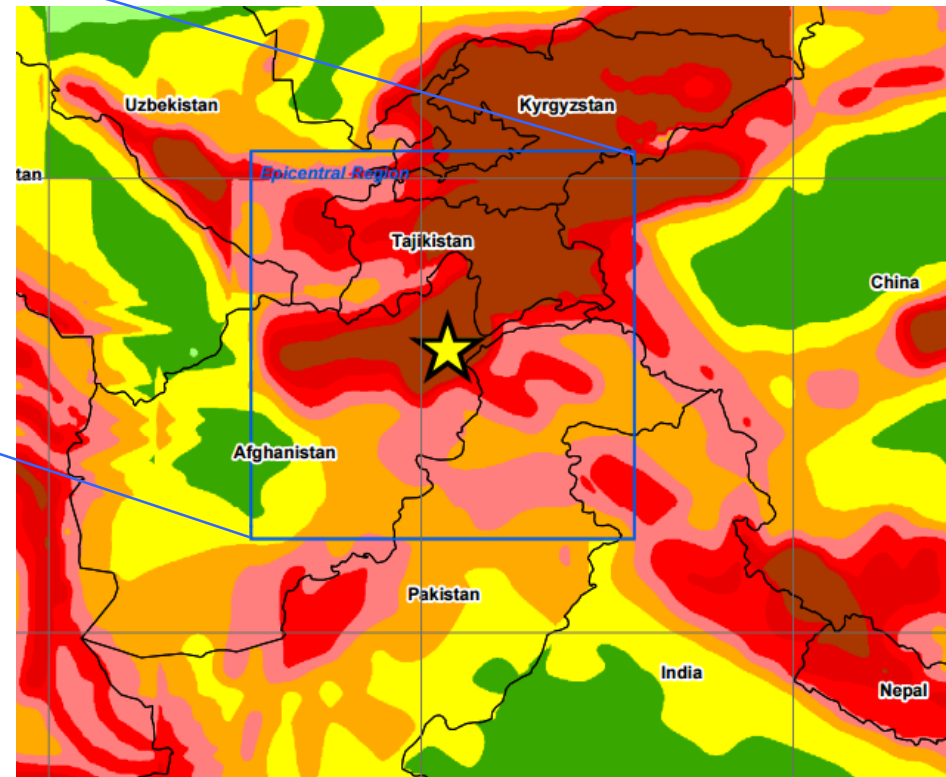
The tension axis (T) reflects the minimum compressive stress direction.
The pressure axis (P) reflects the maximum compressive stress direction.

Magnitude 7.5 AFGHANISTAN

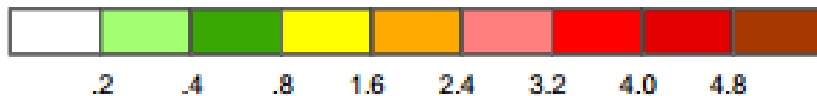
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Northward underthrusting of India beneath Eurasia generates numerous earthquakes and consequently makes this area one of the most seismically hazardous on Earth.



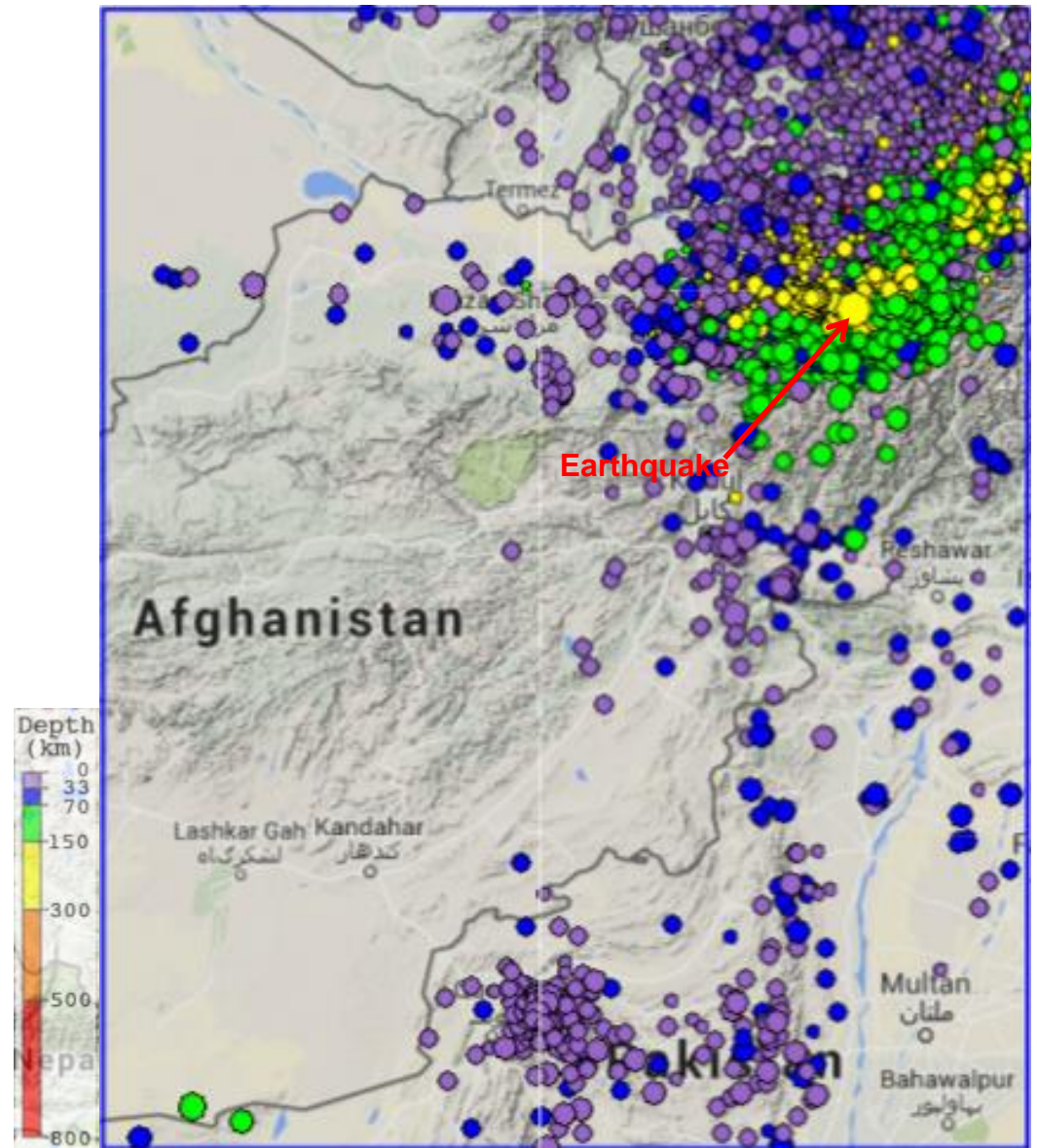
Peak Ground Acceleration in m/sec^{**2}



This earthquake hazard map illustrates the peak ground acceleration expected to be exceeded with 10% probability during a 50-year period. The dark red zones indicate accelerations of about 0.5g where g =acceleration of gravity.

This map shows a subset of earthquakes (> magnitude 4) in this region.

According to the USGS, seven magnitude 7 or greater earthquakes have occurred within 250 km of this event over the preceding century, the most recent being a magnitude 7.4 earthquake in March 2002 just 20 km to the west of this earthquake, with a similar depth and thrust fault orientation. The 2002 event caused over 150 fatalities and the damage or destruction of over 400 houses in relation to an associated landslide.



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