Magnitude 7.3 NEPAL
Tuesday, May 12, 2015 at 07:05:19 UTC

A magnitude 7.3 earthquake has occurred near Mount Everest. Early reports suggest 32 people have been killed and at least 1,000 were injured in the earthquake. The region is still in recovery from a 7.8 magnitude earthquake that occurred on April 25, killing more than 8,000 people.

A rescue worker stands beside buildings that collapsed in an earthquake in Kathmandu, Nepal, Tuesday, May 12, 2015. A major earthquake has hit Nepal near the Chinese border between the capital of Kathmandu and Mount Everest less than three weeks after the country was devastated by a quake.

(AP Photo/Ranup Shrestha)

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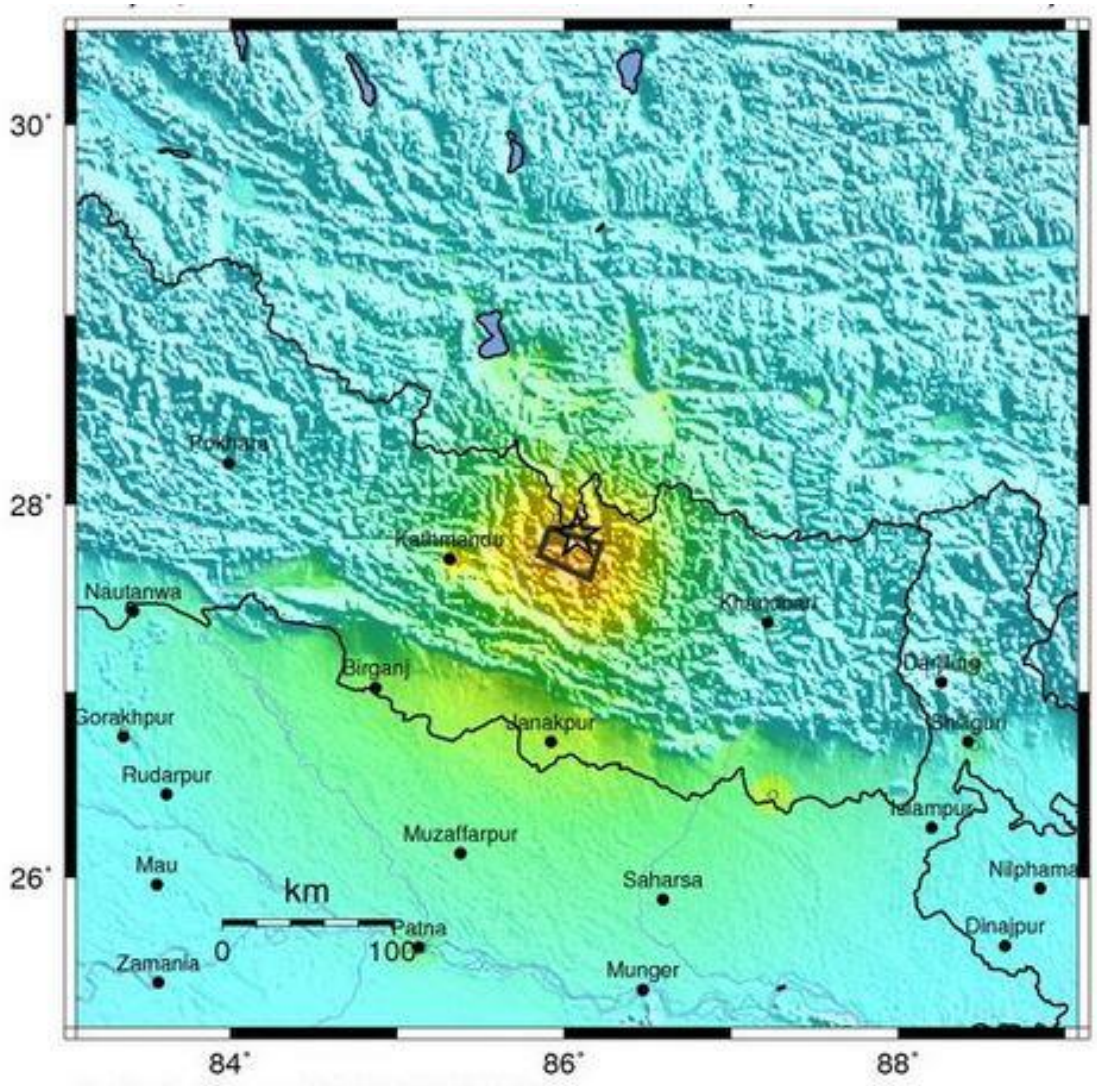
Shaking Intensity

The Modified Mercalli Intensity (MMI) scale depicts shaking severity.

Katmandu experienced strong shaking in this aftershock.

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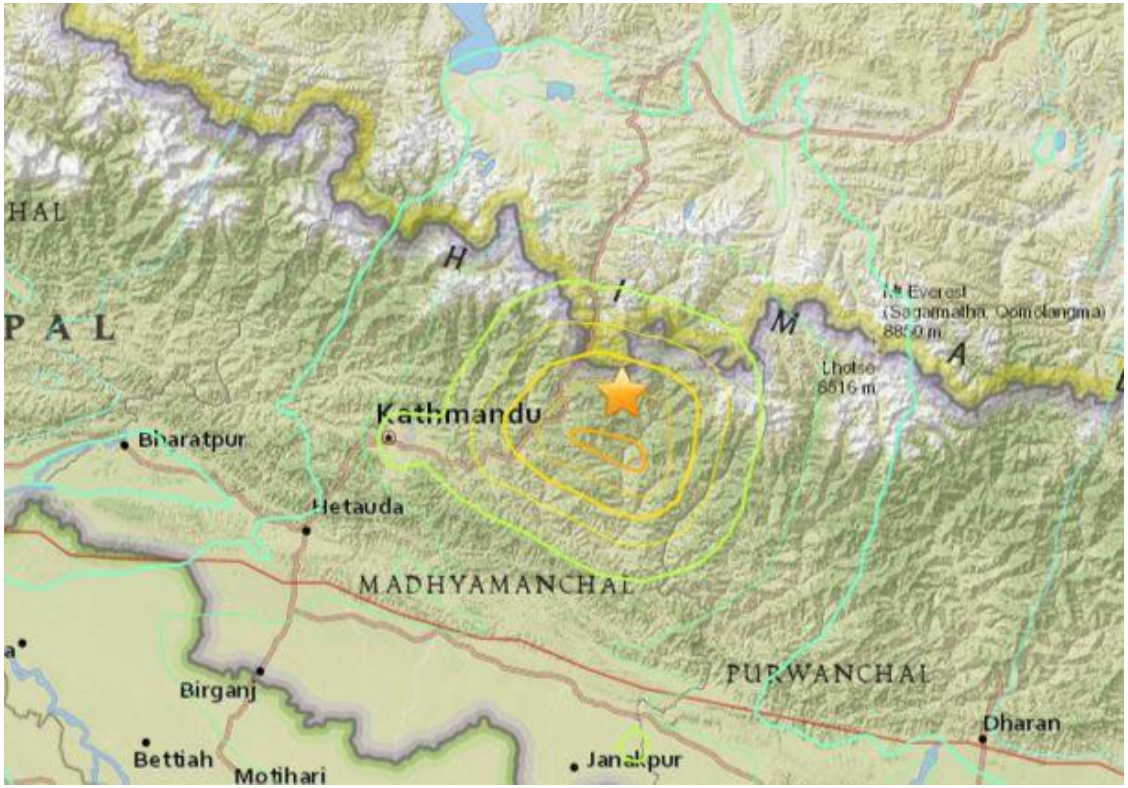
The USGS PAGER map shows the population exposed to different Modified Mercalli Intensity (MMI) levels.

67,000 people experienced severe ground shaking during this earthquake.

MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	26k*
IV	Light	95,415k*
V	Moderate	60,510k
VI	Strong	3,886k
VII	Very Strong	304k
VIII	Severe	67k
IX	Violent	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

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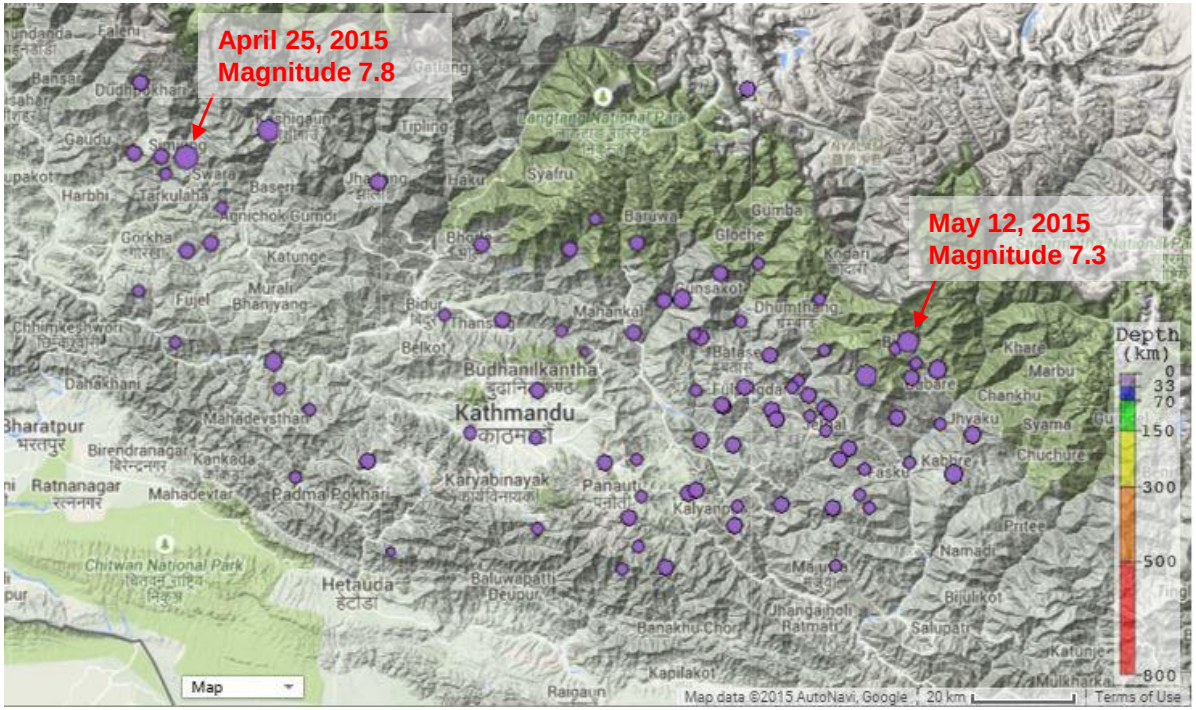
Aftershocks following the magnitude 7.8 mainshock on April 25th have resulted in additional damage and have been a major disruption to recovery efforts.

This earthquake is the direct result of stress redistribution that occurred during the April 25 M7.8 earthquake. The M7.8 earthquake redistributed the stress within and adjacent to its rupture zone. That redistribution in stress eventually caused the May 12 M7.3 earthquake.



Regional earthquakes since April 25th from www.iris.edu/ieb

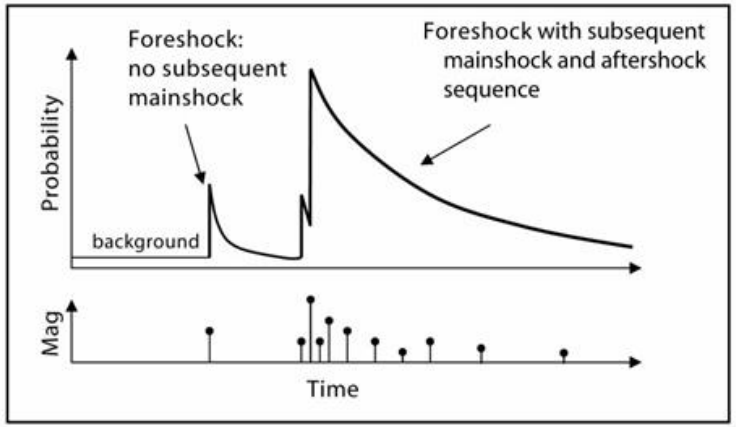


Image courtesy of the US Geological Survey

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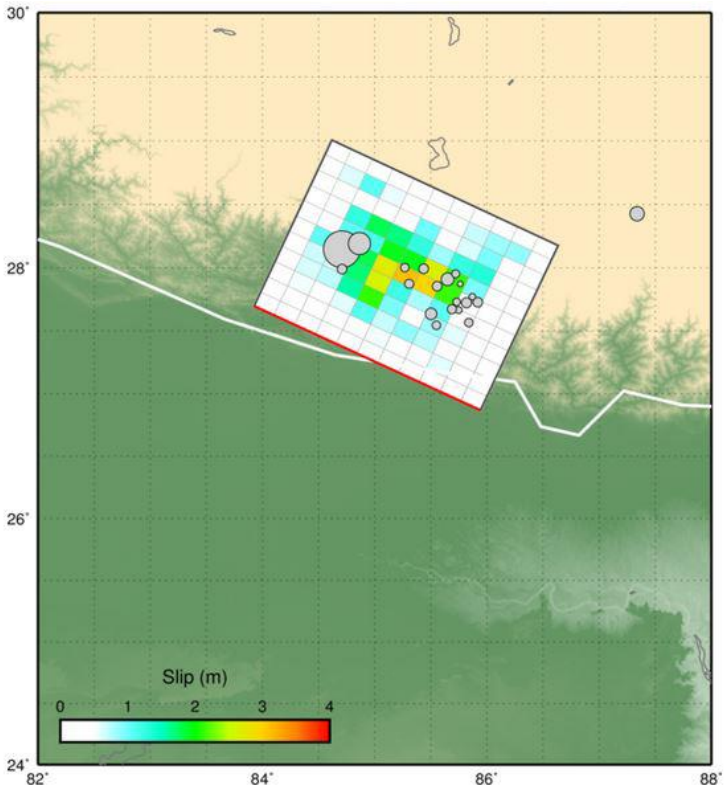
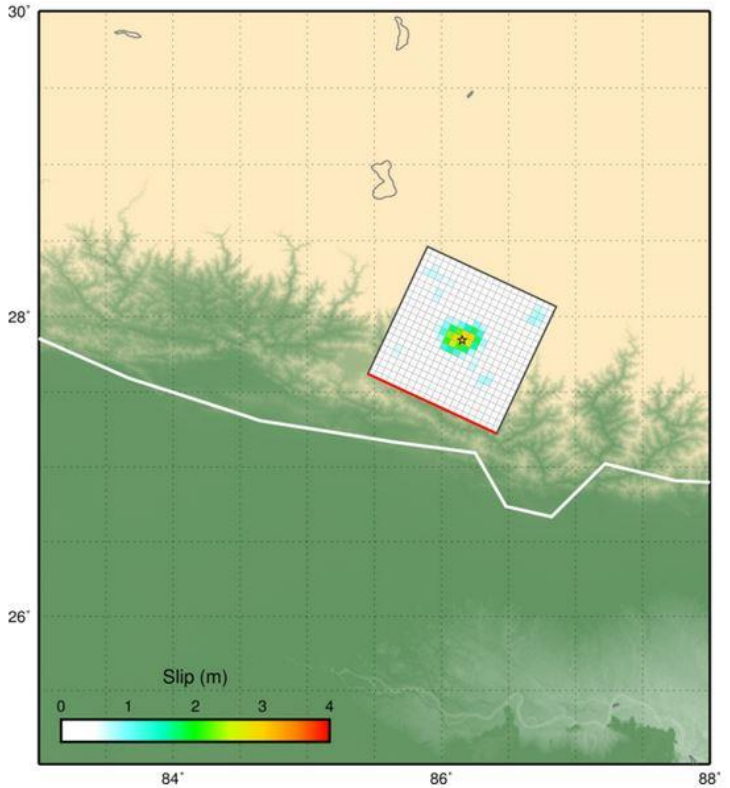
While commonly plotted as points on maps, earthquakes of this size are more appropriately described as slip over a larger fault area. The maps below plot the surface projection of the slip distribution for both the April 25 M7.8 earthquake and this May 12 M7.3 aftershock that is at the northeastern edge of the M7.8 rupture zone.



The M 7.8 mainshock had approximate dimensions of ~120x80 km, directed from its hypocenter eastwards, and towards Kathmandu.



The M 7.3 aftershock had approximate dimensions of ~ 55x30 km. It was located just beyond the northeastern perimeter of the M 7.8 rupture.

Images courtesy of the US Geological Survey

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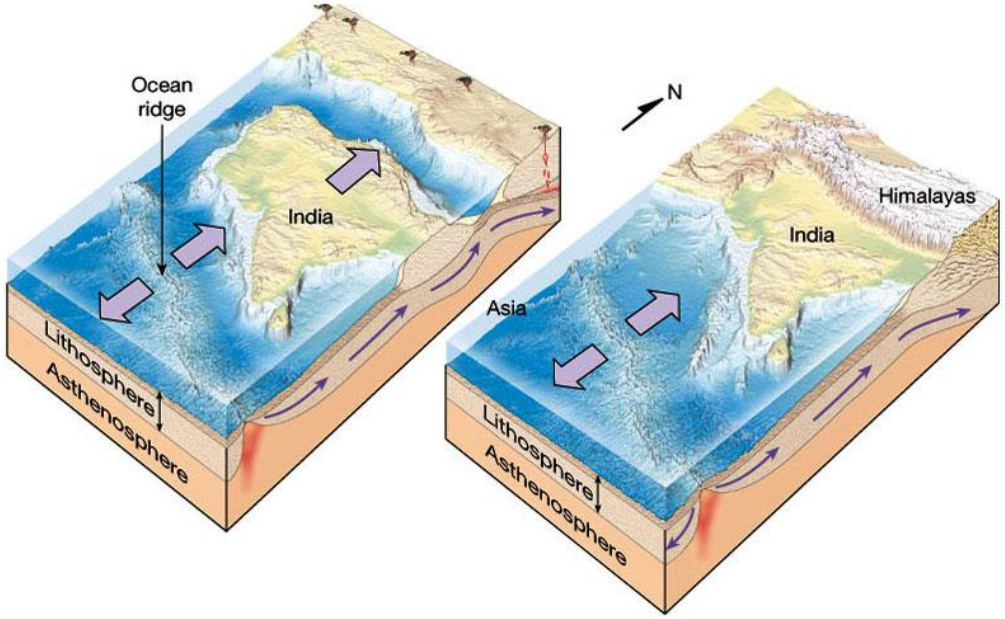
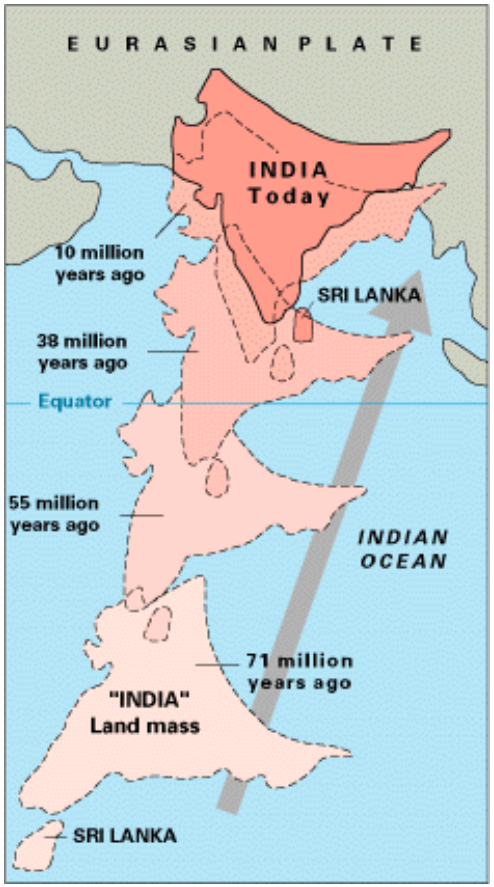
When Pangaea broke apart about 200 million years ago, India began to move northward. The Indian-Eurasian Plate boundary was an ocean-continent collision, subducting the more dense Tethyan oceanic plate beneath the more buoyant Eurasian continental plate. When India reached Asia about 40 to 50 million years ago, and essentially crashed into Asia, its northward advance slowed by about half. The collision and associated decrease in the rate of plate movement marked the beginning of the rapid uplift of the Himalayas.





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The conversion to a continental-continental boundary led to thrust faulting. The Himalayas and the Tibetan Plateau to the north have risen very rapidly due to this faulting, which accounts for their high elevation.

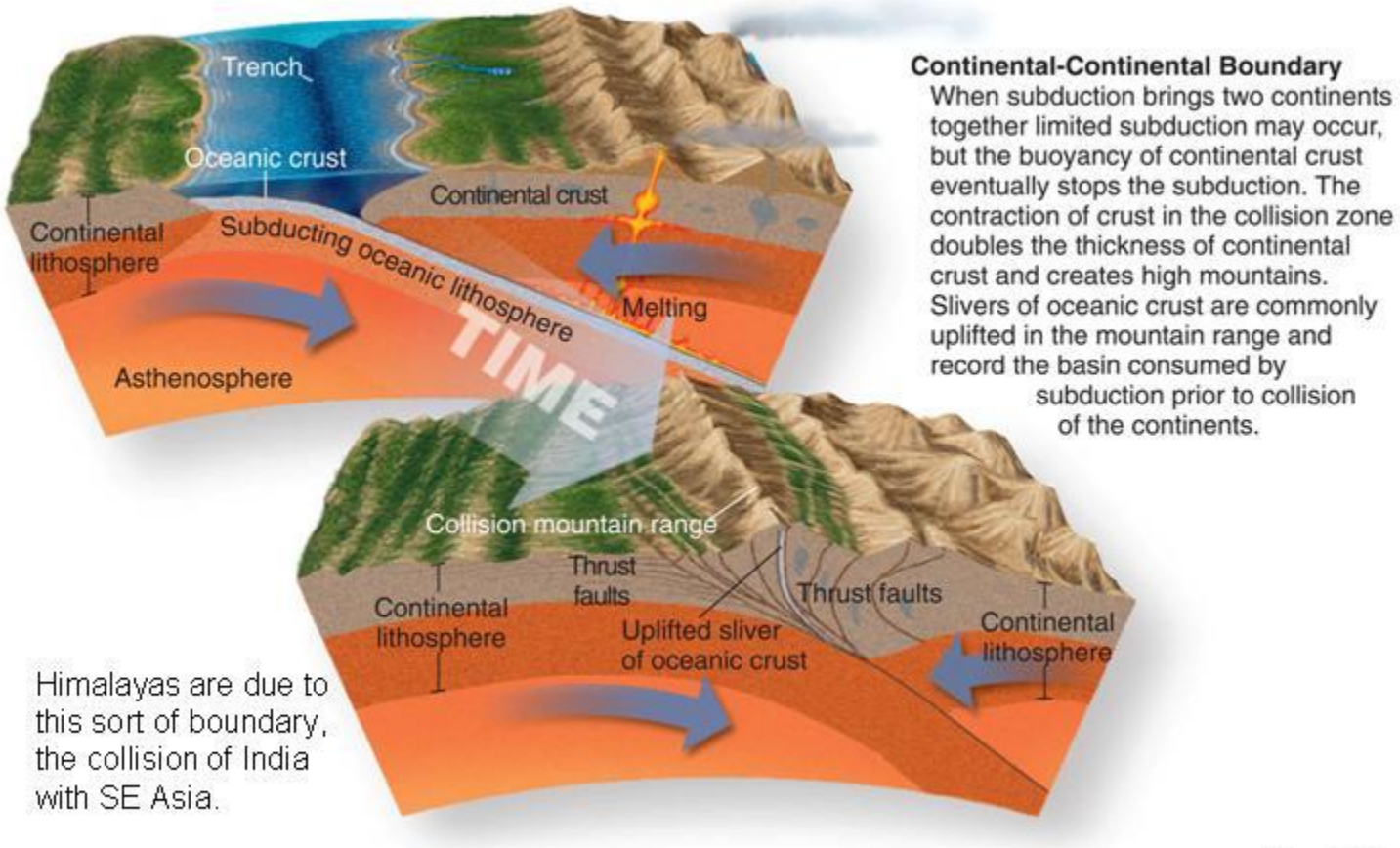

Fig 12.26

IRIS Teachable Moments

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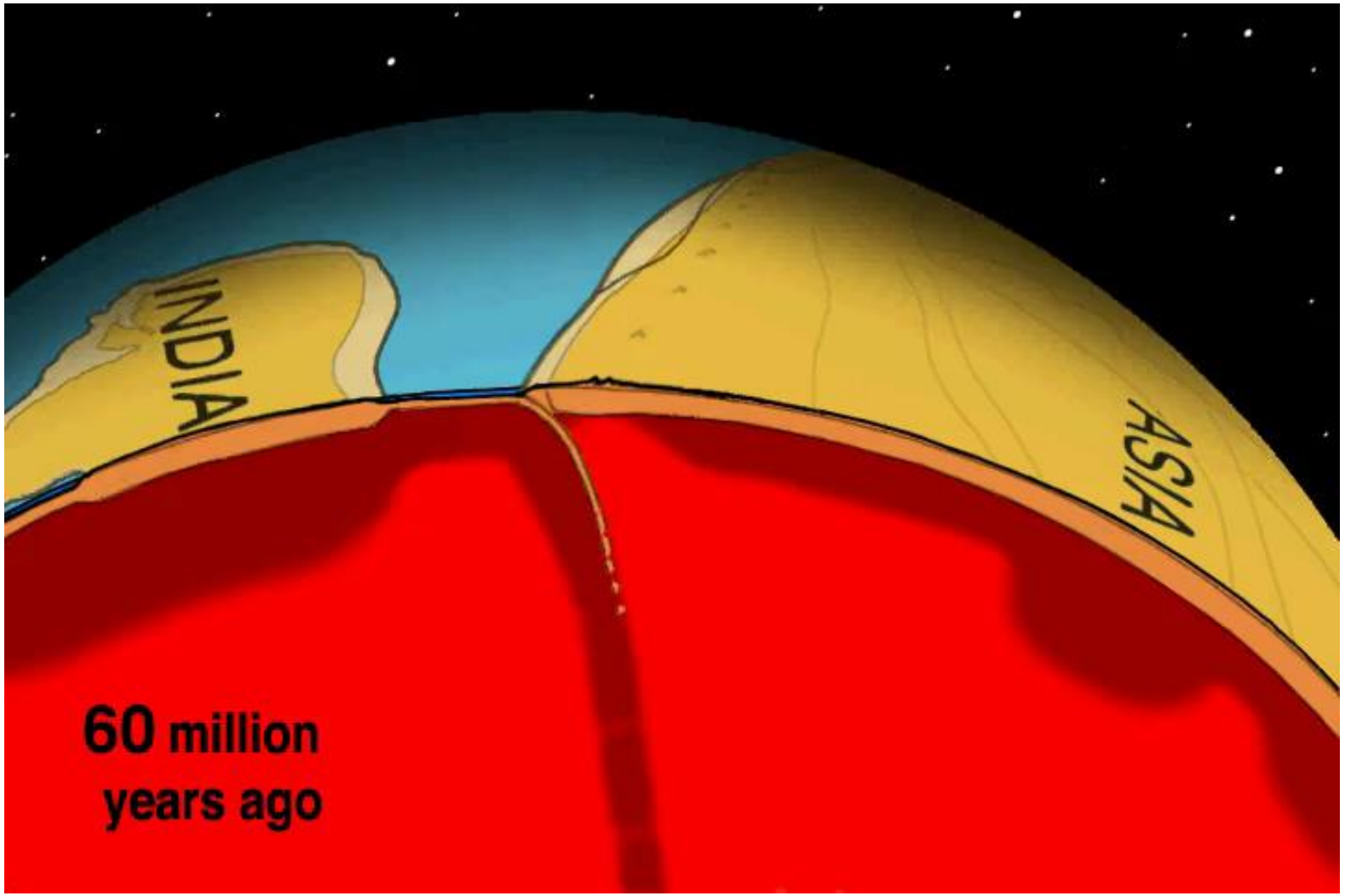

Animation by Tanya Atwater (http://emvc.geol.ucsb.edu) depicts the 60-million year history of the India-Asia continental collision

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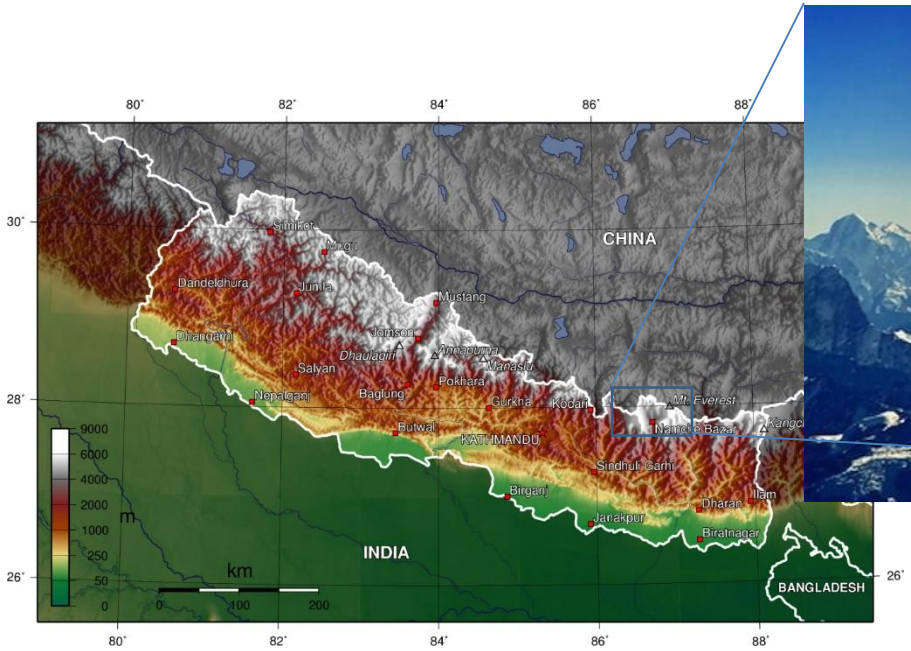
Thrust fault motions, like the motion that produced the recent Nepal earthquakes, are the tectonic motions that "jack up" the Himalaya Mountains. The mountains closest to the fault that moved in a particular earthquake will go up more than the other mountains. But over time, thrust faults all along the Himalaya Mountain Range will rupture in earthquakes and jack up mountains all along the range, although perhaps not by the same amounts. Remember that, in addition to being jacked up by thrust fault motions, the mountains are also being worn down by erosion. So the elevation of any mountain is the result of "uplift" due to thrust fault motions within the India-Asia collision zone MINUS erosion off the top.



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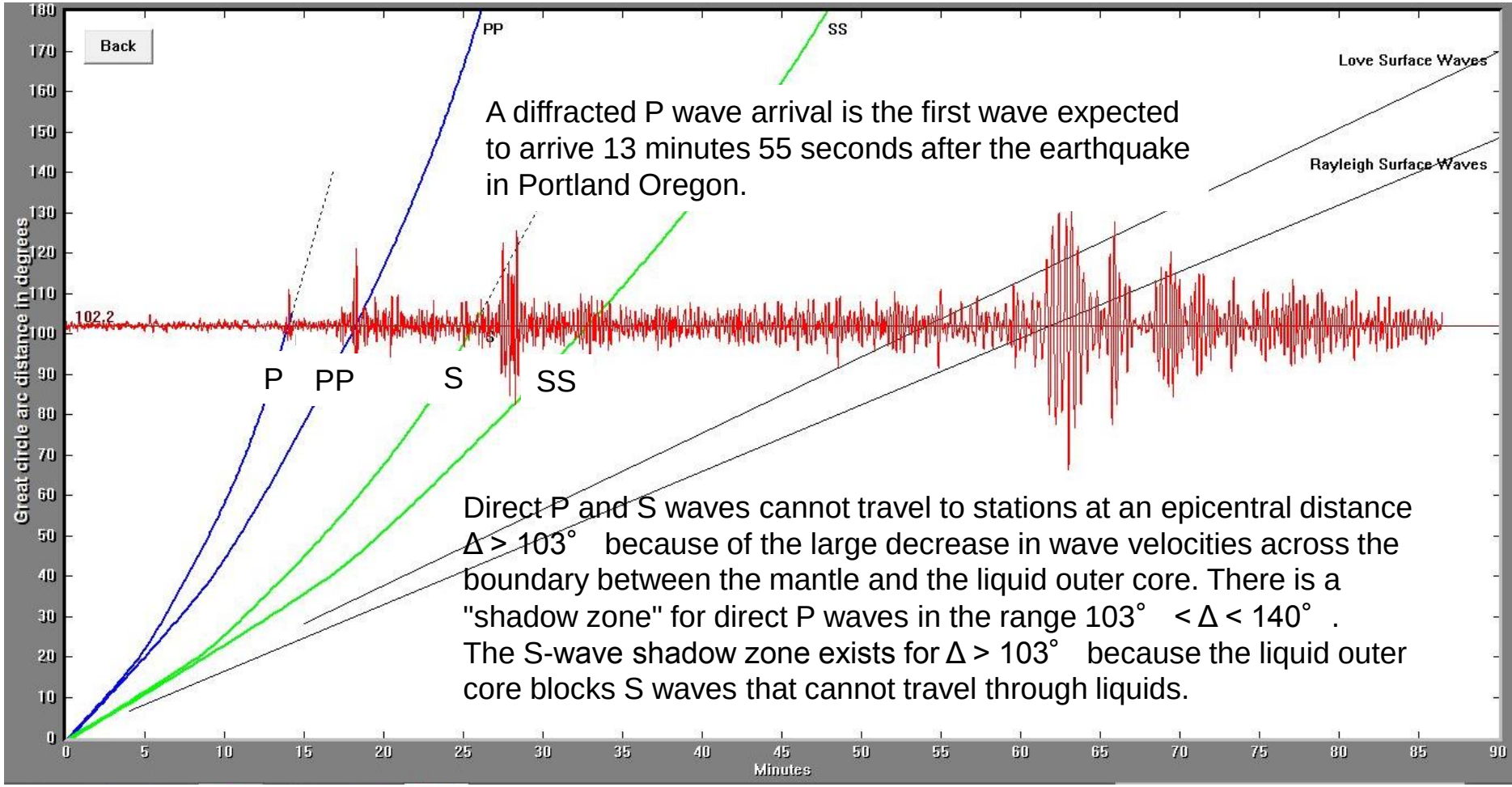
The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is about 11,328 km (~7038 miles, 102.06 degrees) from the location of this earthquake.



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Teachable Moments are a service of

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