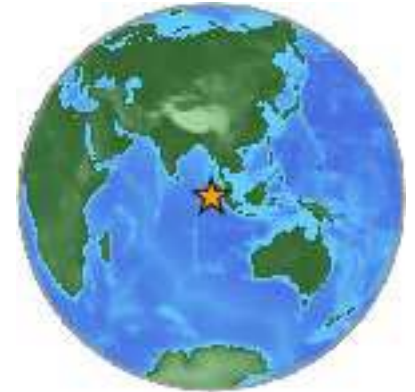


# Magnitude 7.3 OFF WEST COAST OF NORTHERN SUMATRA

Tuesday, January 10, 2012 at 18:37:01 UTC

A major earthquake occurred off the West Coast of Northern Sumatra at 12:37 a.m. local time at a depth of 18.1 miles. The earthquake was centered in the Indian Ocean about 262 miles southwest of Banda Aceh, Sumatra, Indonesia.



There were no immediate reports of damage. Reports vary about the reaction in Banda Aceh, but are consistent in describing locals as nervous about the possibility of a big wave reaching shore.

Banda Aceh was hard-hit in December 2004 when more than 150,000 were killed in the magnitude 9.1 earthquake that occurred off Northern Sumatra and from the resulting tsunami.

Over 227,000 were killed around the Indian Ocean from that tsunami.



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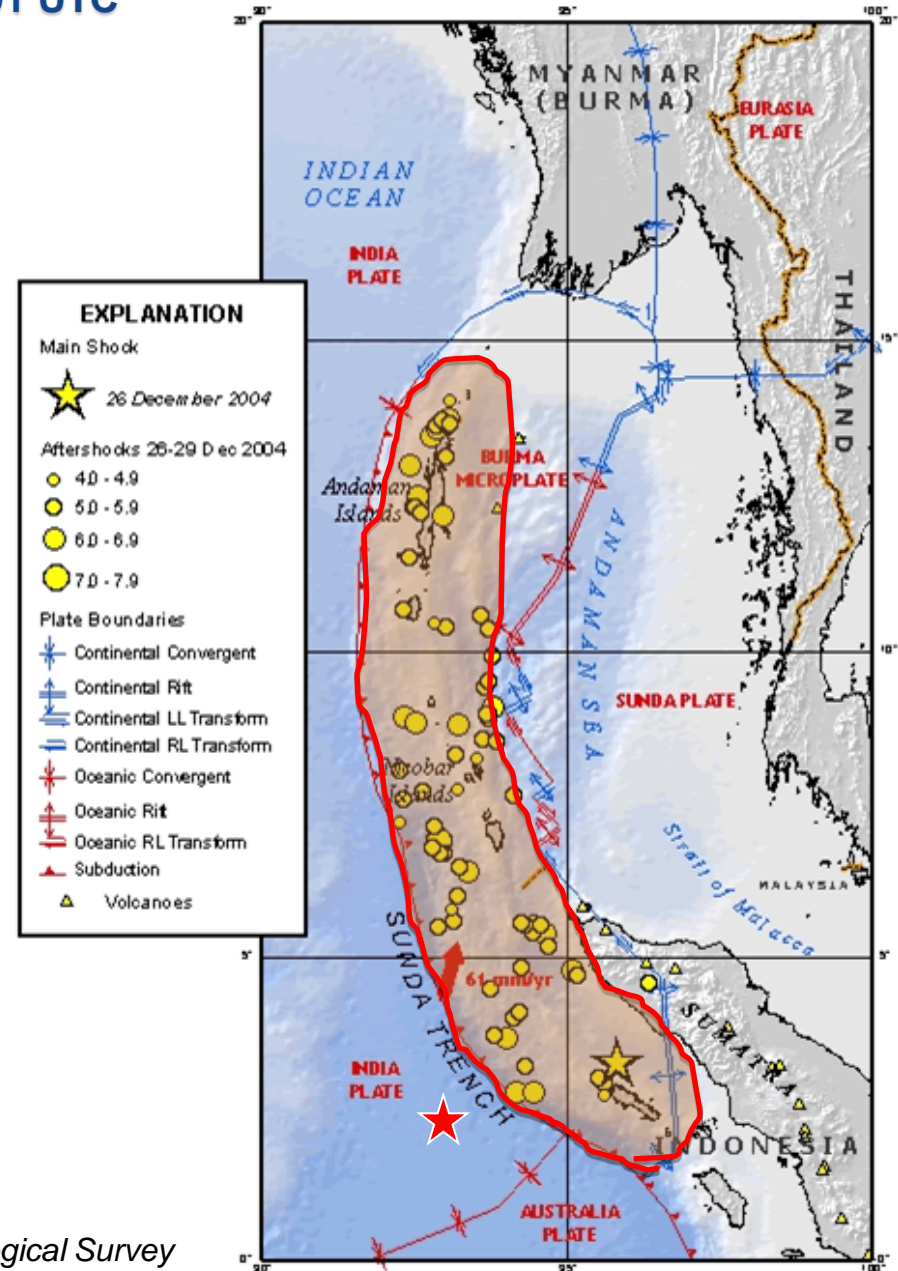
## 2004 Historic Earthquake M 9.1

The red zone shows the approximate 1200-km area ruptured by the magnitude 9.1 earthquake that occurred in the region on December 26, 2004.

The main shock of the 2004 earthquake is represented with a yellow star and the aftershocks are plotted throughout the rupture zone as yellow dots.

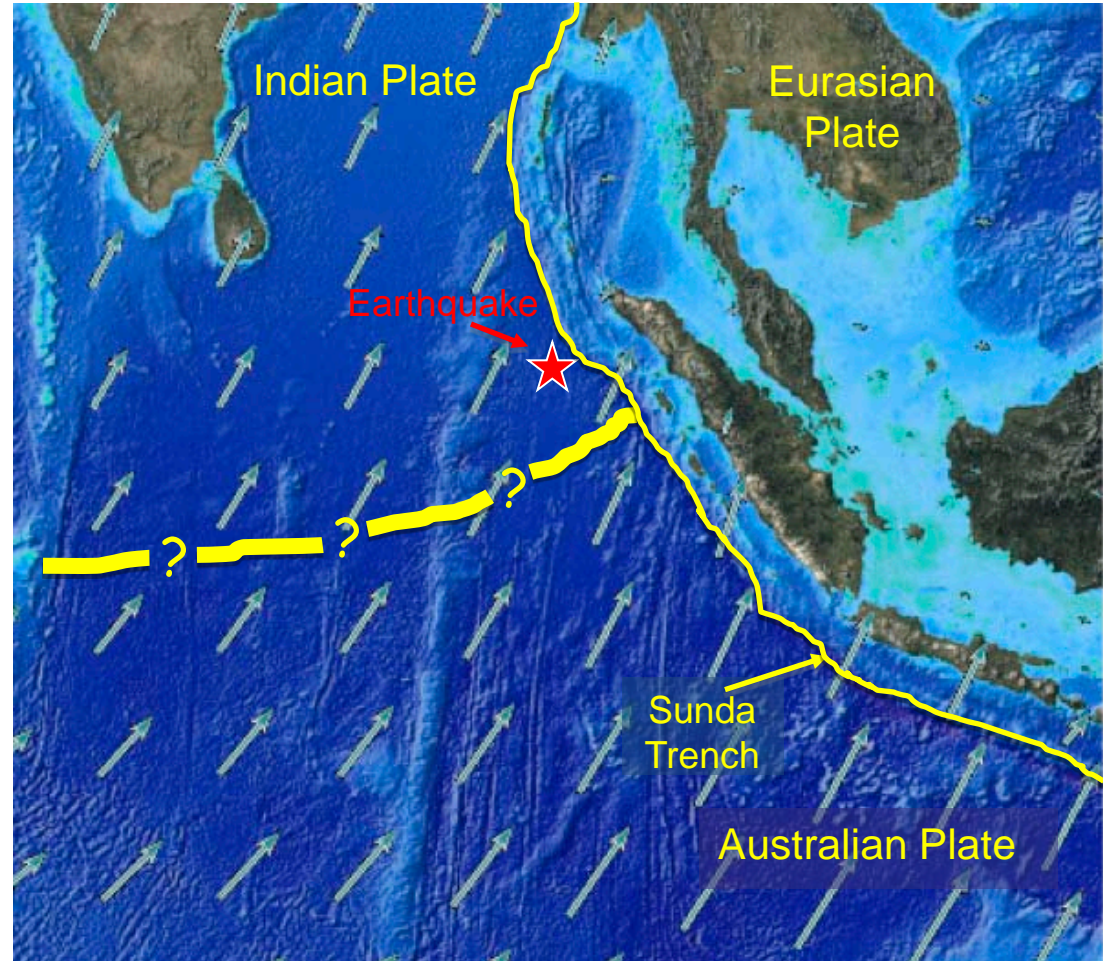
## 2012 Current Earthquake M 7.3

The January 10, 2012 earthquake is represented with a red star.



The area of the January 10, 2012 earthquake is one of complex plate tectonics. The basics are that the “Indo-Australia” Plate subducts toward the north-northeast beneath the Eurasia Plate at the Sunda Trench with a rate of about 5 cm/yr.

In detail, the Indian and Australian plates are distinct from one another, although the location and nature of the boundary between them is uncertain and a topic of current research. Accordingly, that plate boundary is shown as a dashed line on this map.



The arrows show the motion of the Australian and Indian plates with respect to the Eurasian Plate. The epicenter of the January 10, 2012 earthquake is shown by the red star that is near the boundary between the Australian Plate and the Indian Plate.

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## Northeast Indian Ocean Region Tectonic Setting

An additional tectonic complication in this region is that the southeast Asia portion of the Eurasian Plate is subdivided into “microplates” that have small relative motions between them.

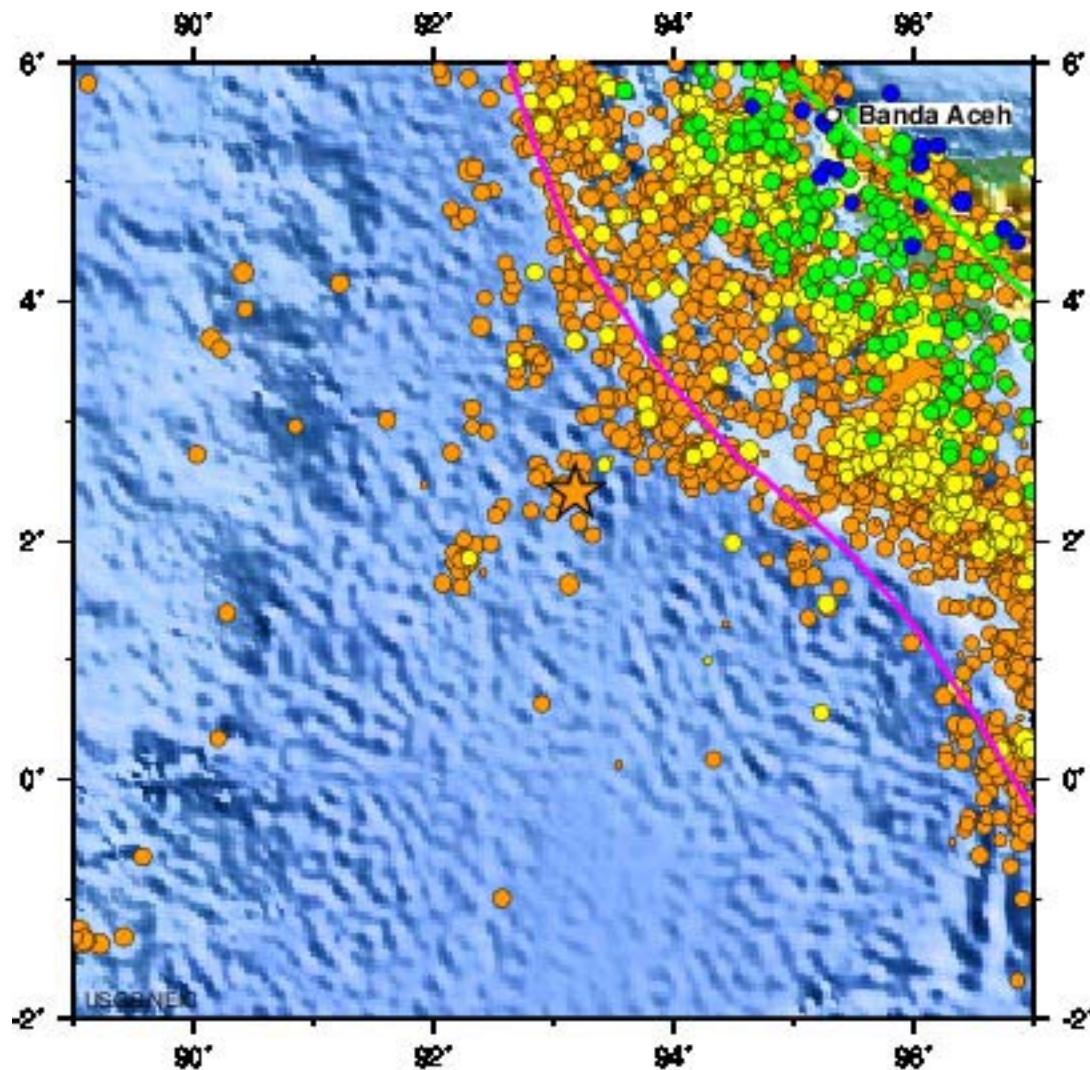
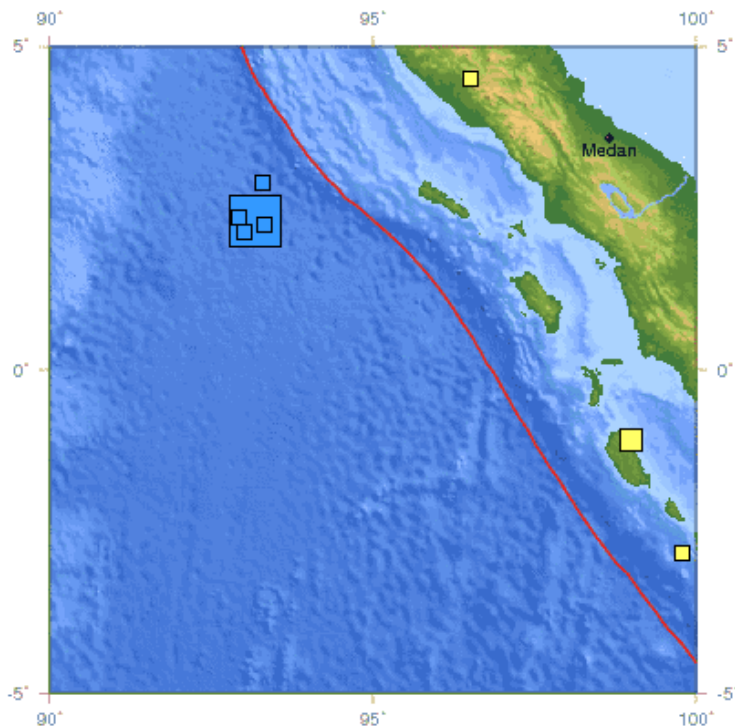


# Magnitude 7.3 OFF WEST COAST OF NORTHERN SUMATRA

Tuesday, January 10, 2012 at 18:37:01 UTC


The earthquake (orange star) is plotted (right) with epicenters of earthquakes in the region since 1990.

A snapshot of aftershocks (below) 12 hours after the earthquake.



■ day   
 ■ week   
 mag >7   
 □ 6   
 □ 5   
 □ 4   
 □ 2.5   
 ⊗ ?


Seismicity 1990 to Present



● ● ● ● ● ● ●

<=3    4    5    6    7    8    9

Magnitude (size)



■ ■ ■ ■ ■ ■

-800    -500    -300    -150    -70    -35    0

Depth in km (color)

Images courtesy of the US Geological Survey

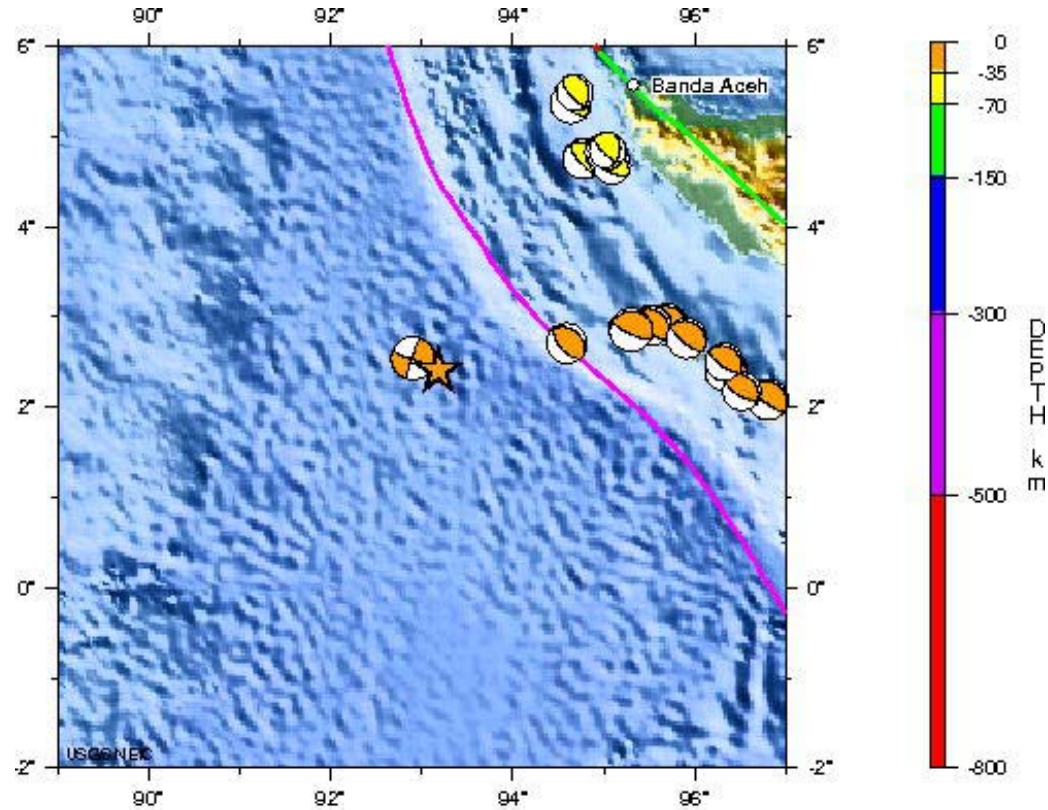
# Magnitude 7.3 OFF WEST COAST OF NORTHERN SUMATRA

Tuesday, January 10, 2012 at 18:37:01 UTC

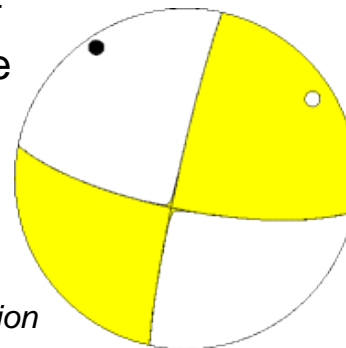
According to the USGS: "The January 10, 2012 earthquake...occurred as a result of strike-slip faulting within the oceanic lithosphere of the Indo-Australia plate. ...

While rare, large strike-slip earthquakes are not unprecedented in this region of the Indo-Australian plate...Since the massive M 9.1 earthquake that ruptured a 1300-km-long segment of the Sumatran megathrust plate boundary in December of 2004, two Mw 6.2 strike-slip events have occurred within 50 km of the January 10 2012 event, on April 19 2006, and October 4 2007.

These events seem to align with fabric of the sea floor in the diffuse boundary zone between the Indian and Australian plates."



USGS Historic Moment Tensors Solutions



USGS WPhase Centroid Moment Tensor Solution

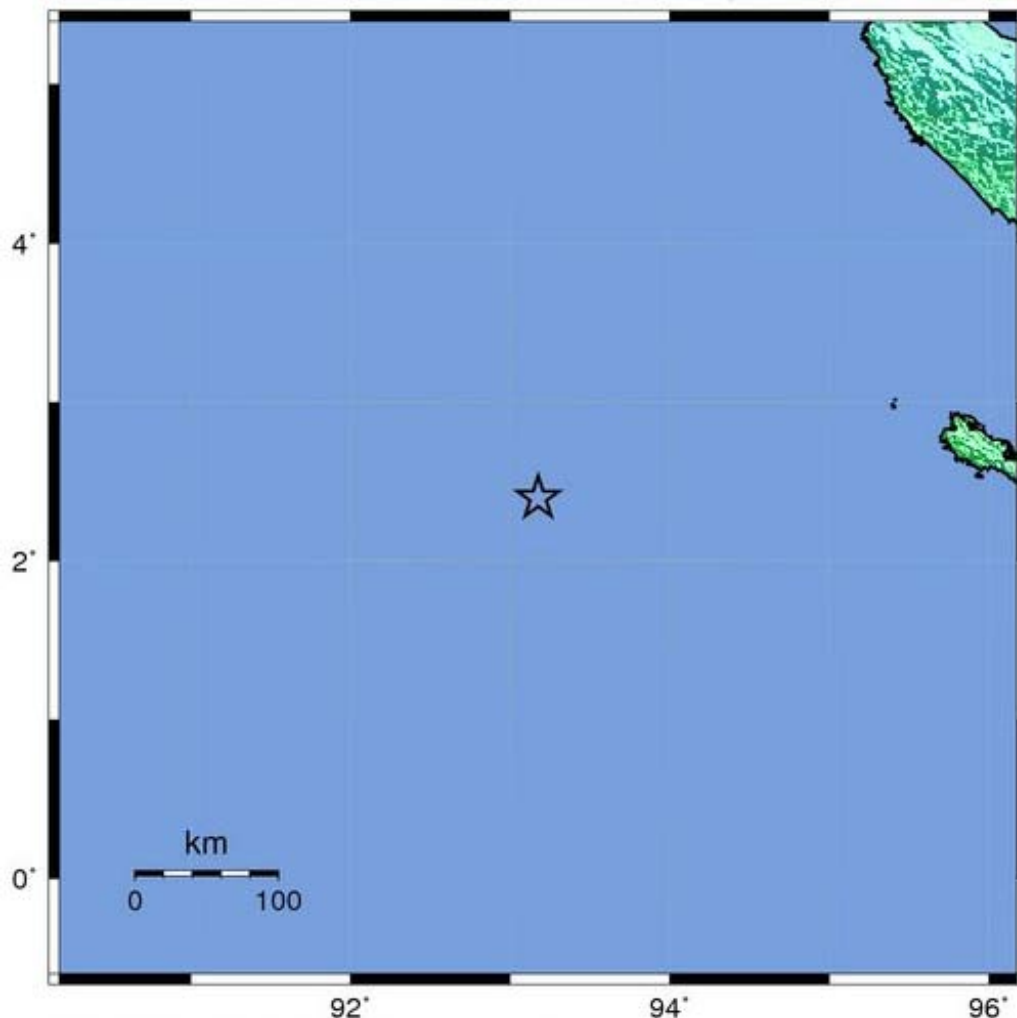
Shaded areas show quadrants of the focal sphere in which the P-wave first-motions are away from the source, and unshaded areas show quadrants in which the P-wave first-motions are toward the source. The dots represent the axis of maximum compressional strain (in black, called the "P-axis") and the axis of maximum extensional strain (in white, called the "T-axis") resulting from the earthquake.

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Shaking intensity scales were developed to standardize the measurements and ease comparison of different earthquakes. The Modified-Mercalli Intensity scale is a twelve-stage scale, numbered from I to XII. The lower numbers represent imperceptible shaking levels, XII represents total destruction. A value of IV indicates a level of shaking that is felt by most people.

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



# Magnitude 7.3 OFF WEST COAST OF NORTHERN SUMATRA

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USGS PAGER

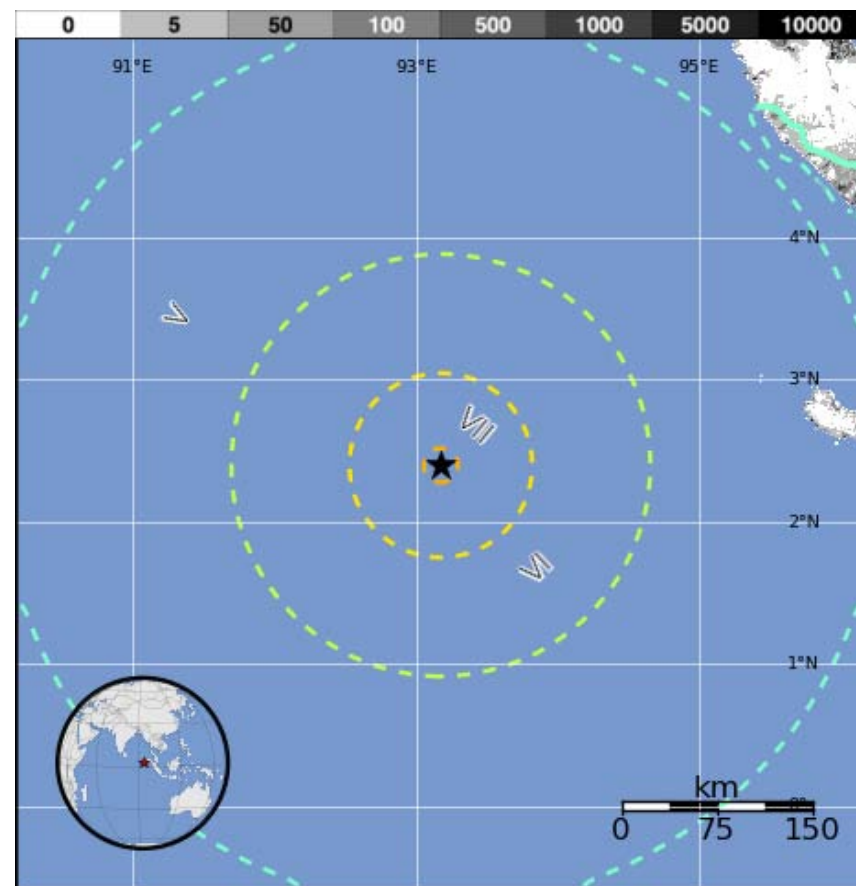
Population Exposed to Earthquake Shaking

The USGS PAGER map shows the population exposed to different Modified-Mercalli Intensity (MMI) levels. MMI describes the severity of an earthquake in terms of its effect on humans and structures and is a rough measure of the amount of shaking at a given location.

Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist.

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 below.

*Image courtesy of the US Geological Survey*



Estimated <a href="#">Modified Mercalli Intensity</a>	I	II-III	IV	V	VI	VII	VIII	IX	X
Est. Population Exposure	---	---	502k*	380k	0	0	0	0	0
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme



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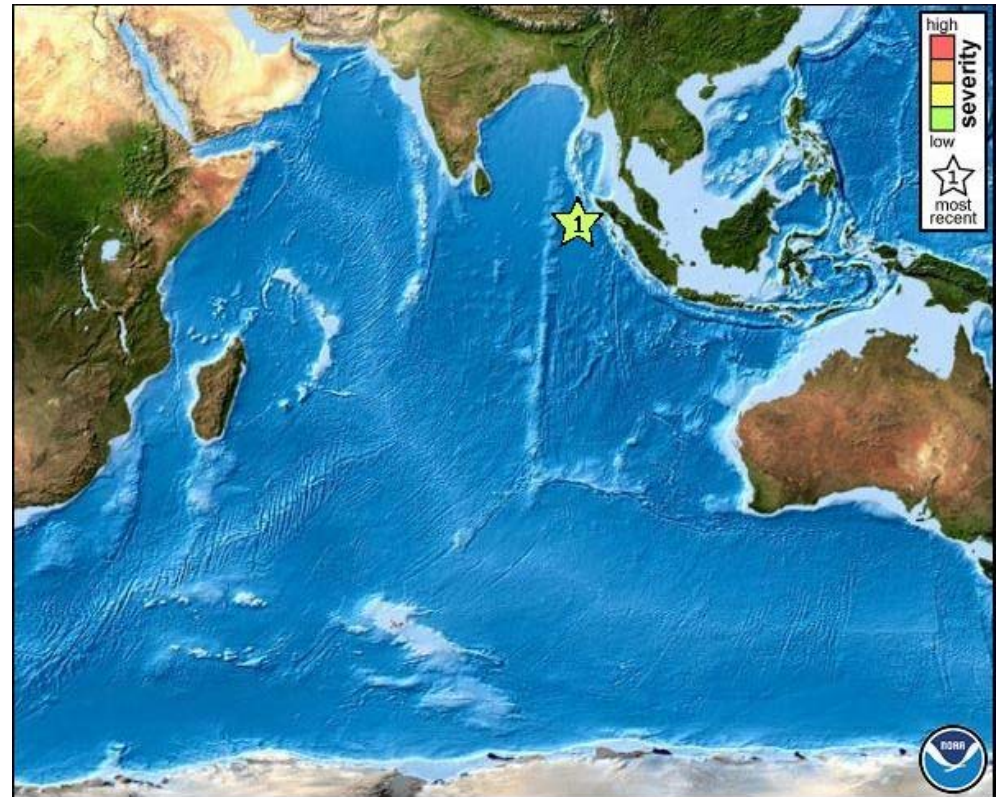
**No Current Warning, Watch, or Advisory in Effect**

[Click here to read the latest tsunami message.](#)

Within 8 minutes of the earthquake, NOAA's Pacific Tsunami Warning Center issued the following Tsunami Information Bulletin:

**A destructive widespread tsunami threat does not exist based on historical earthquake and tsunami data.**

**However – there is a very small possibility of a local tsunami that could affect coasts located usually no more than a hundred kilometers from the earthquake epicenter.**



Pacific Tsunami Warning Center (PTWC) is the interim warning center for the Indian Ocean Tsunami Warning System.