

Magnitude 6.8 MARIANA ISLANDS

Tuesday, May 14, 2013 at 00:32:25 UTC

A strong, deep earthquake, with a magnitude of 6.8, has occurred near the Mariana Islands. The earthquake was located about 395 km (245 miles) north of Saipan and 42 km (26 miles) west of Agrihan, Northern Mariana Islands, at a depth of 603 km (375 miles).

The closest island, Agrihan, is an unpopulated stratovolcano.

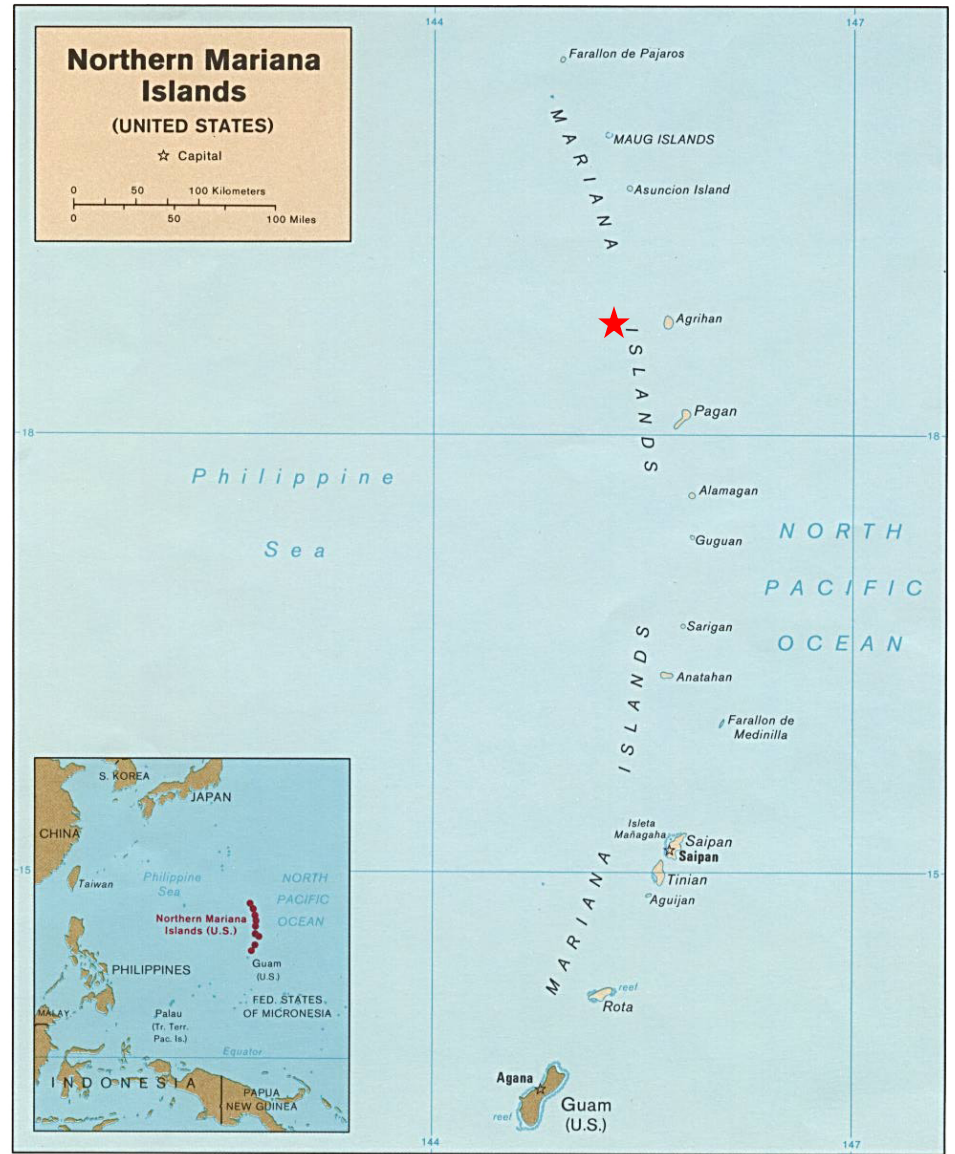


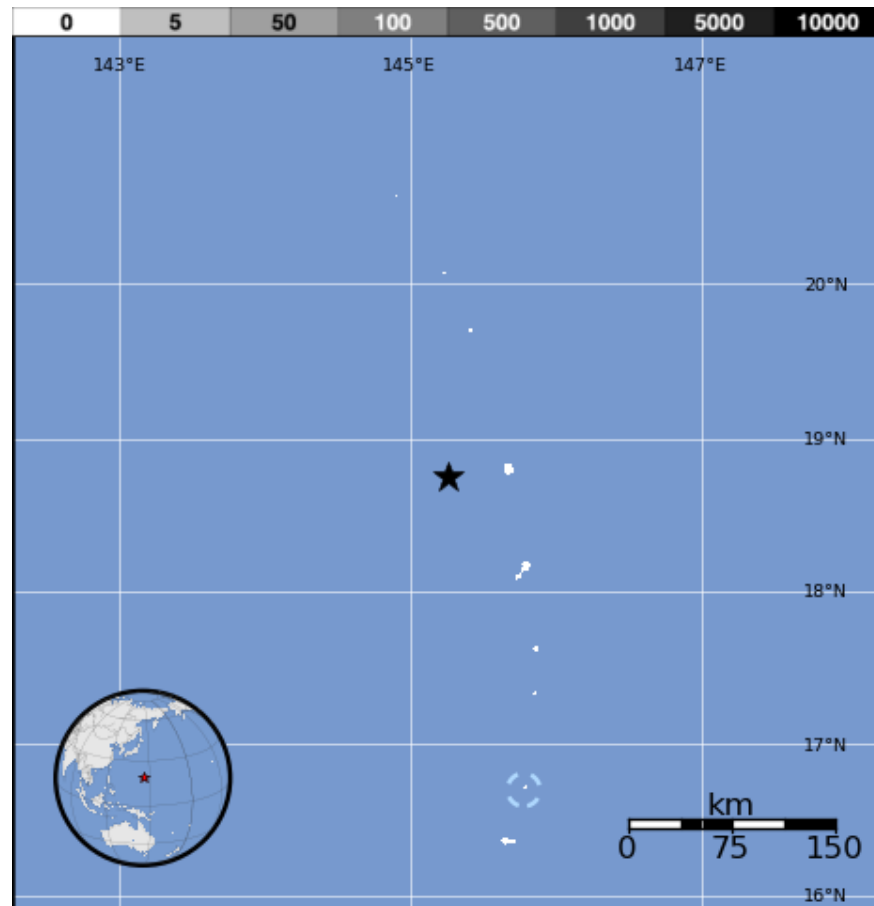
Image courtesy NASA

Due to the depth of the earthquake
At 603 km (375 miles) and the sparsely
populated region, the USGS estimated
that no one felt this earthquake.

Additionally, a tsunami will not be
generated because the ocean floor will
not be displaced by an earthquake at
this depth.

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 Modified Mercalli Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X
Est. Population Exposure	--*	--*	0k	0k	0k	0k	0k	0k	0k
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

Earthquake and Historic Seismicity

The epicenter of this earthquake is shown by the red star on a map of regional seismicity between 1990 through October 2007.

A magnitude 7.2 earthquake occurred in the same area on October 31, 2007 and the epicenter of that event is shown by the blue star. Although the epicenters of these two earthquakes are very close, the depth of the 2007 earthquake was 248 km while the depth of the 2013 earthquake was 603 km.

These two earthquakes fit the general pattern of earthquakes within the Pacific Plate as it subducts steeply to the west beneath the Philippine Plate.

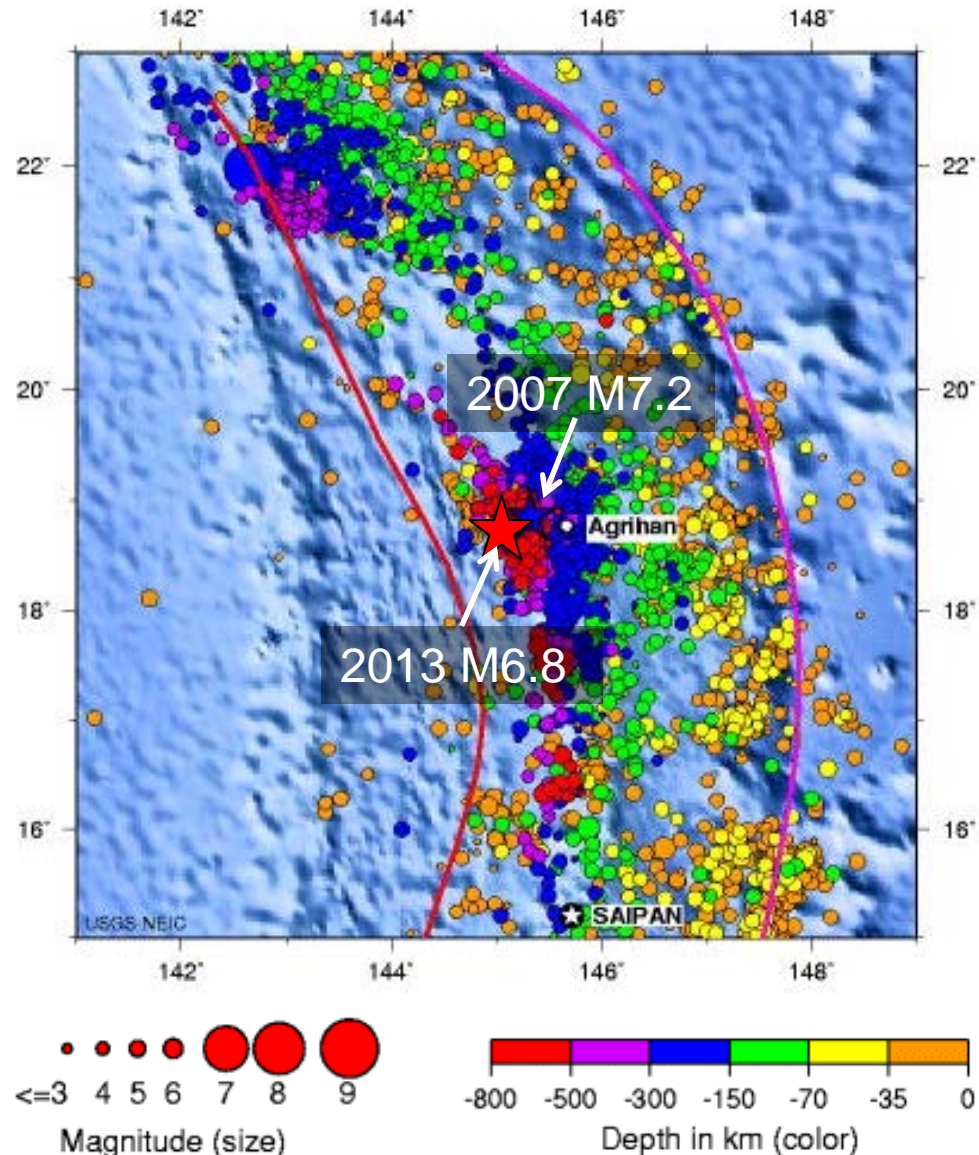


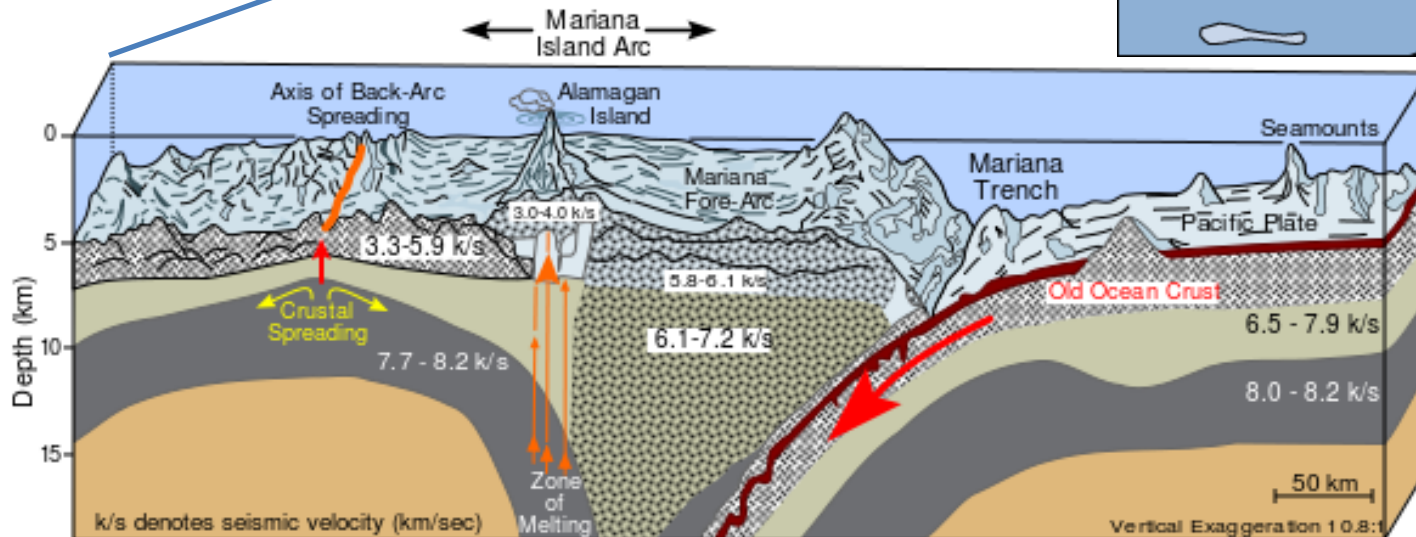
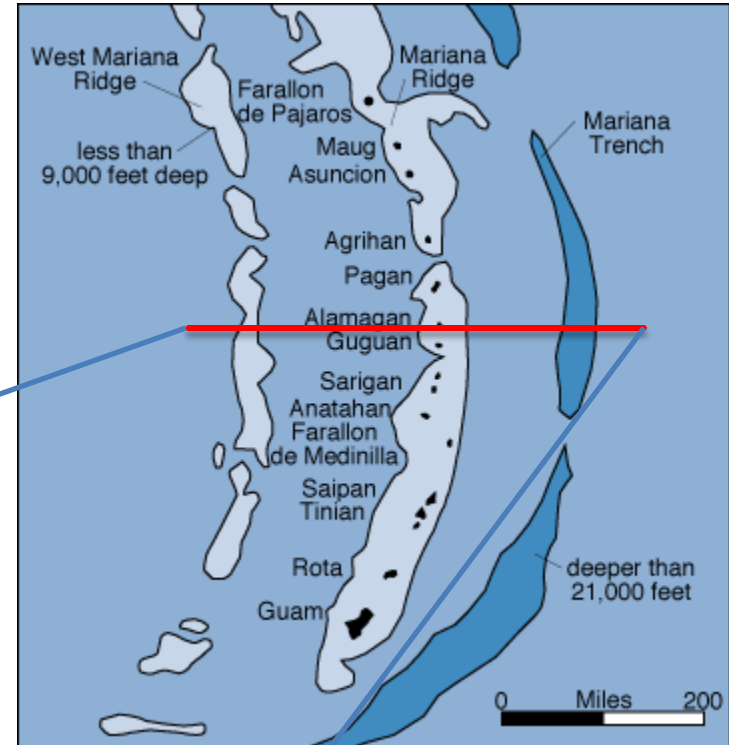
Image courtesy of the US Geological Survey

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The Mariana Islands are a classic example of an island arc, a curved line of stratovolcanoes that rise up from the ocean floor.

The Pacific Plate is subducted into the mantle beneath the Mariana Island arc. As described by the USGS, 'This subduction zone is characterized by rapid plate convergence and high-level seismicity extending to depths of over 600 km.'

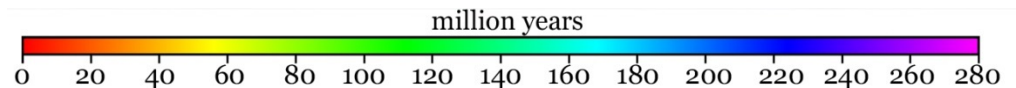
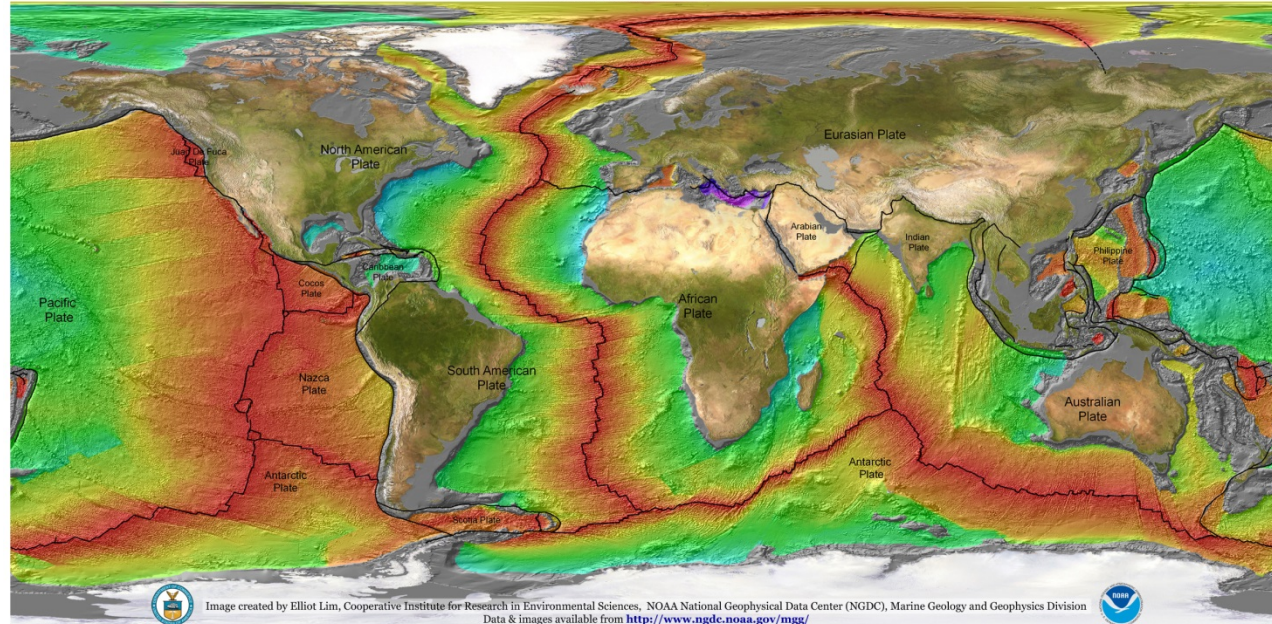


(After Hussong and Fryer, 1981)

The Pacific Plate is over 150 million years old at the Marianas Trench. This part of the Pacific Plate is some of the oldest oceanic plate on Earth. As an oceanic plate moves away from the spreading center at which it formed, it cools because its top surface is in contact with cold deep-ocean water. As the plate ages and cools, it shrinks and therefore becomes more dense. The 150 million year age and resulting high density of the Pacific Plate at the Mariana Trench accounts for its steep angle of subduction as it dives beneath the Philippine Plate.

Age of Oceanic Lithosphere (m.y.)

Data source:
Muller, R.D., M. Sdrolias, C. Gaina, and W.R. Roest 2008. Age, spreading rates and spreading symmetry of the world's ocean crust, *Geochem. Geophys. Geosyst.*, 9, Q04006, doi:10.1029/2007GC001743.



The record of this earthquake on the Mount Tabor Middle School (MTOR) seismometer in Portland, Oregon is illustrated below with IRIS's jAmaSeis software.

