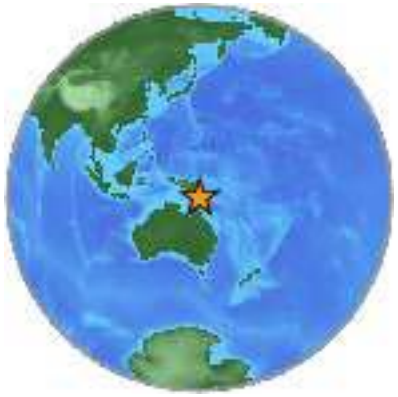
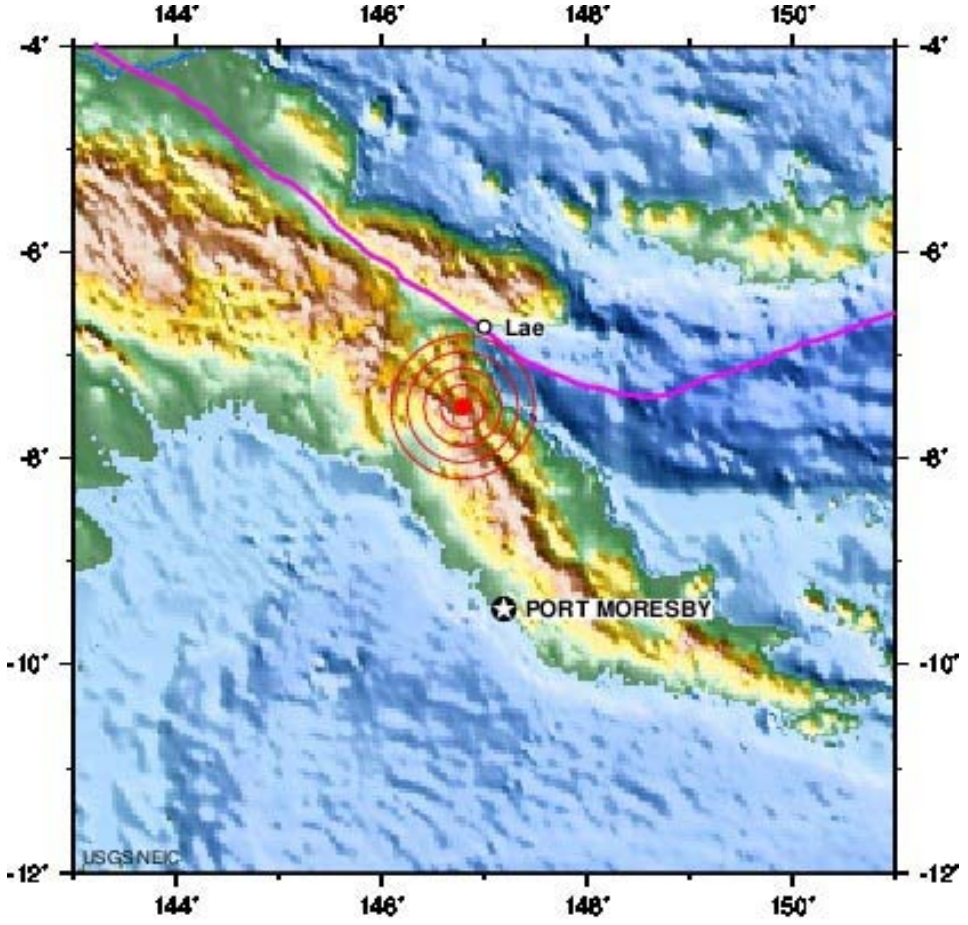
Magnitude 7.1 PAPUA NEW GUINEA
Wednesday, December 14, 2011 at 05:04:57 UTC



(Reuters) – A major earthquake struck the Pacific state of Papua New Guinea Wednesday afternoon 89 km (55 miles) SSW of Lae, New Guinea, but no tsunami warning was issued as the quake occurred inland, and there were no immediate reports of damage.

"It was very, very big," said Dolly Kinibo, a receptionist at the Lae International Hotel. "It lasted for two to three minutes. The whole building moved. The Christmas tree moved, we all moved, people are very shaken. There are no reports of injuries or damage …"

Residents in the capital Port Moresby, 223 km (138 miles) SSE from the epicenter, also reported feeling the quake. This earthquake occurred at a depth of 121.2 km and produced less intense ground shaking than if it had occurred at shallower depth.



Images courtesy of the US Geological Survey

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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

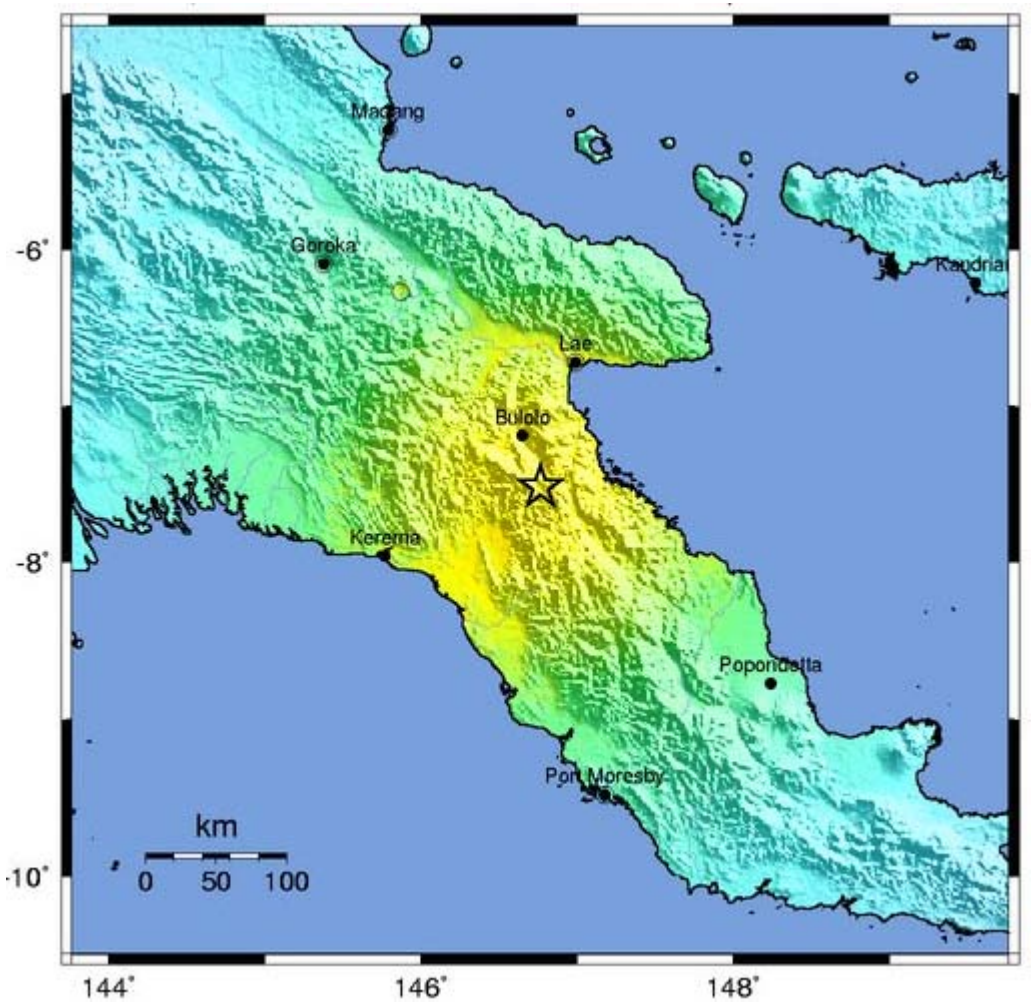

Image courtesy of the US Geological Survey

USGS Estimated shaking Intensity from M 7.1 Earthquake

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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.

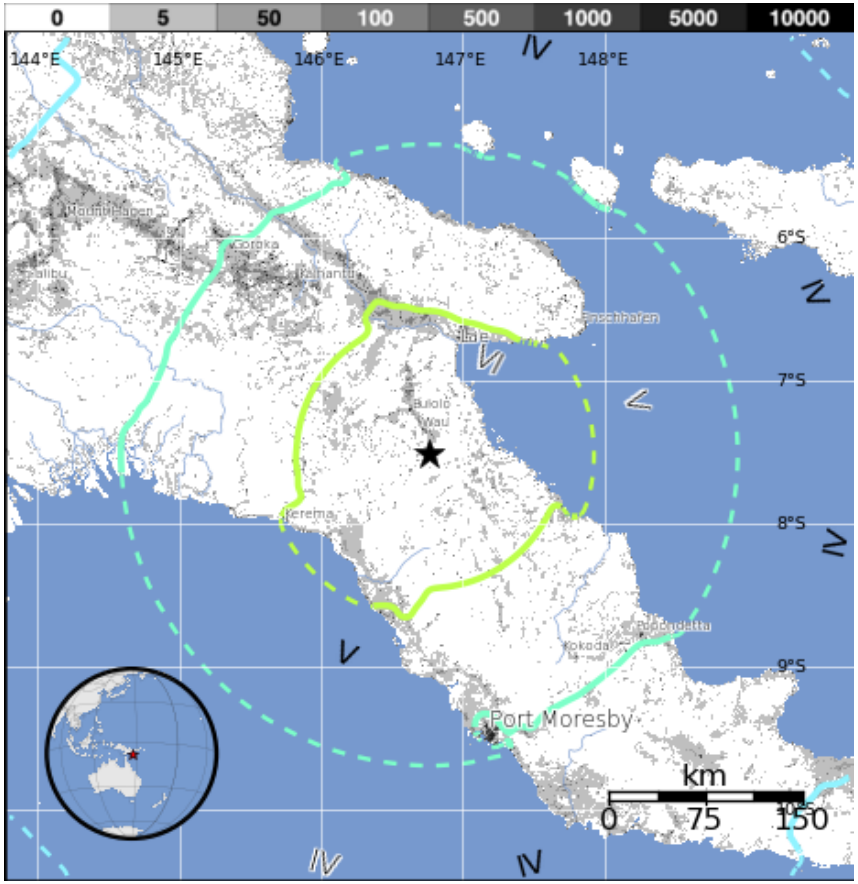

Image courtesy of the US Geological Survey

Estimated Modified Mercalli Intensity	I	II-III	IV	V	VI	VII	VIII	IX	X
Est. Population Exposure	---*	30k*	2,017k*	973k	506k	0	0	0	0
Perceived Shaking	Not Felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme

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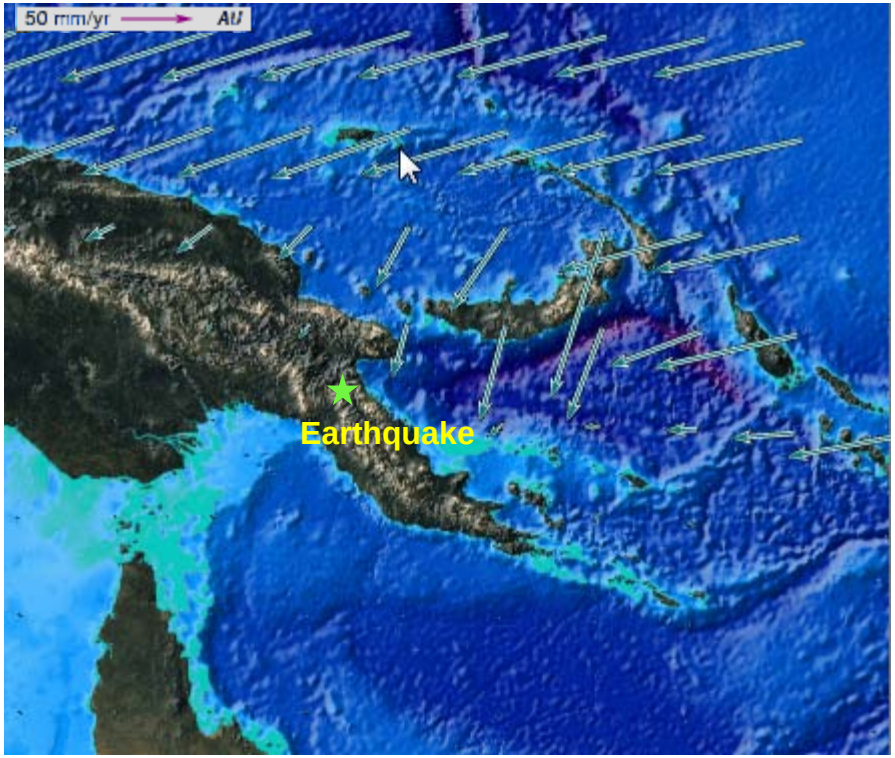
The basic plate tectonics of this region involves convergence with the Pacific Plate subducting beneath Papua New Guinea at the northern fringe of the Australia Plate.

In detail, there are several convergent and transform (strike-slip) boundaries between numerous microplates that accommodate this convergence.



Arrows show net plate motion relative to the Australia Plate.

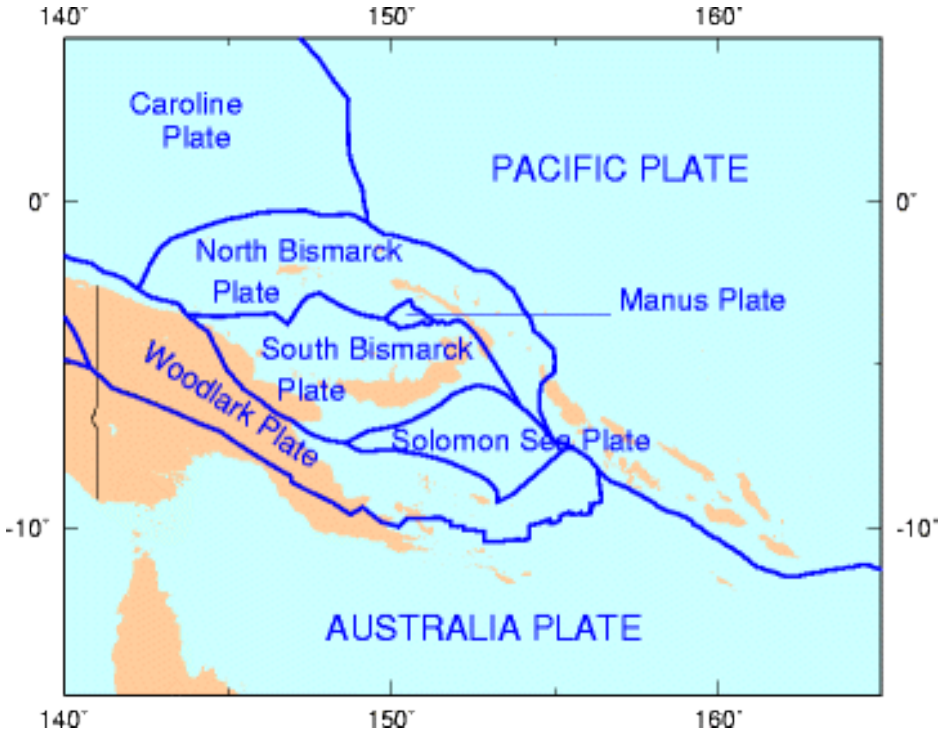


Image courtesy of the US Geological Survey

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IRIS Teachable Moments

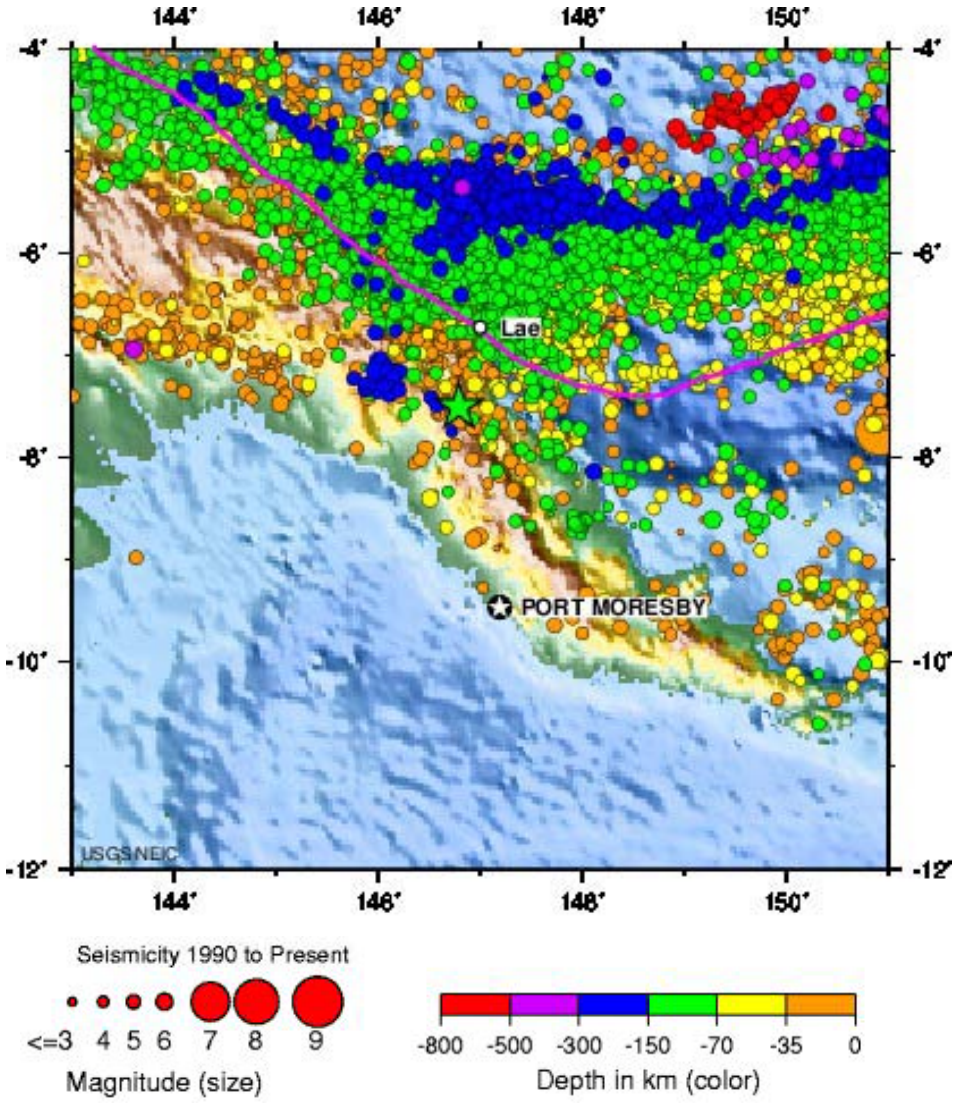
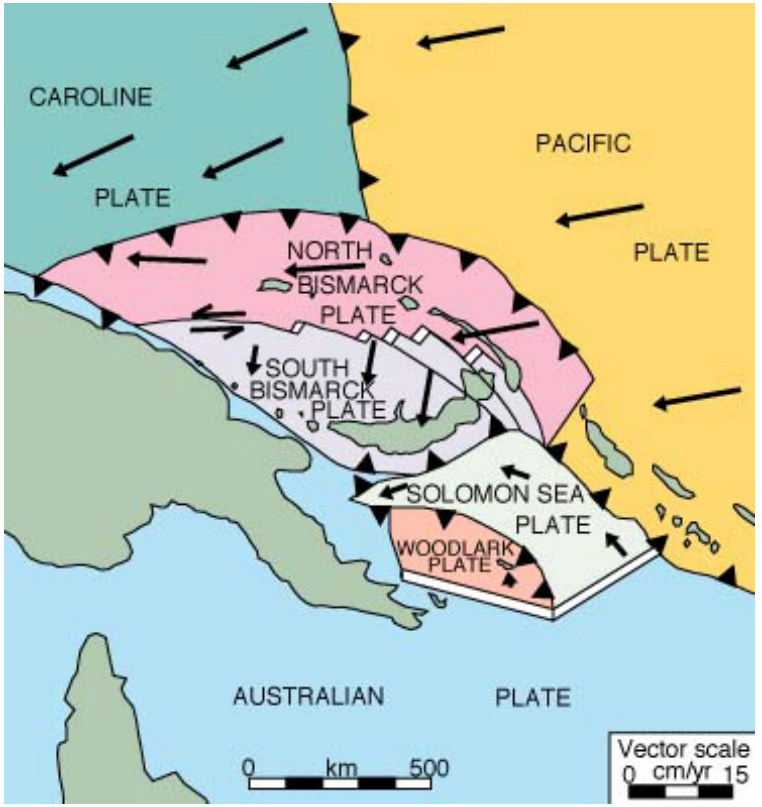


Image courtesy of the US Geological Survey

The earthquake (green star) is plotted (left) along with epicenters of earthquakes in the region since 1990. The pattern complexity is due to the microplate relationships (below). Arrows show net plate motion relative to the Australia Plate.



Hamilton (1979) via Oregon State University

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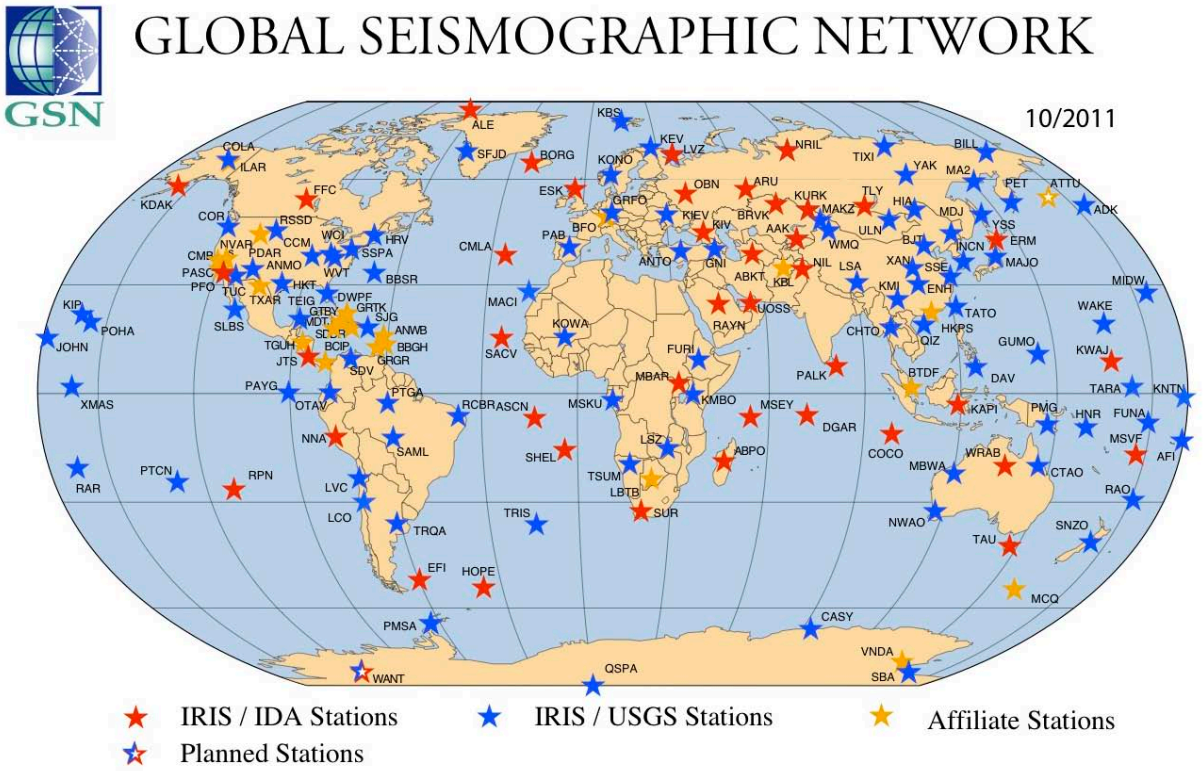
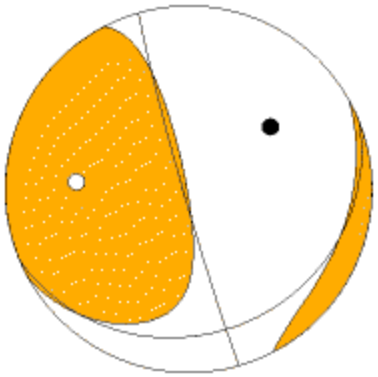
Using global data recorded from the earthquake, the nature of the fault that ruptured can be determined.

The focal mechanism (below) is created based on waveform modeling from a number of seismic stations. The focal mechanism for this earthquake indicates that the motion on the fault that ruptured experienced oblique normal faulting.





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.

USGS WPhase Centroid Moment Tensor Solution