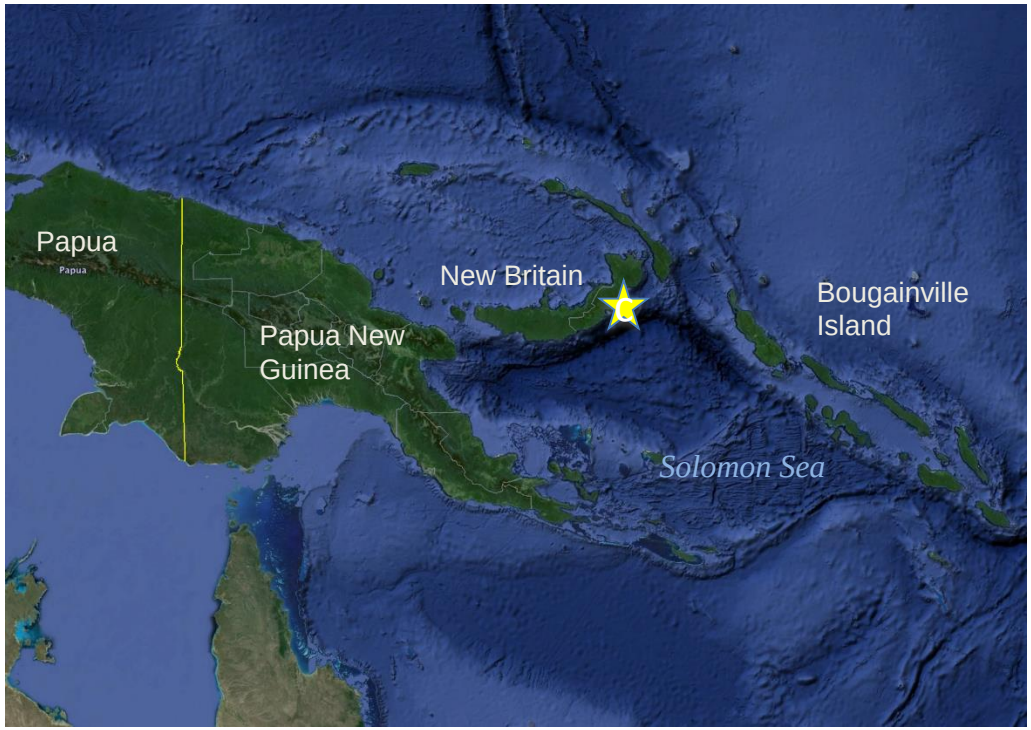
Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

Tuesday, May 5, 2015 at 01:44:05 UTC

A magnitude 7.5 earthquake struck off the eastern coast of Papua New Guinea on Tuesday, approximately 130 km (81 mi) south-southwest of Kokopo at a depth of 42 km (26.1 mi).

There are reports of some structural damage in Kokopo, but no reports of injuries.



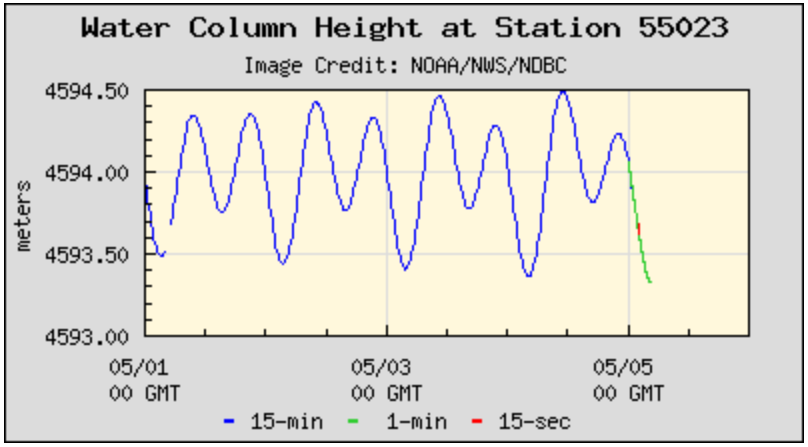
Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

Tuesday, May 5, 2015 at 01:44:05 UTC

No Tsunami Warnings, Advisories or Watches are in currently in effect.

Following the earthquake, the Pacific Tsunami Warning Centre said hazardous tsunami waves were possible within 300 km of the epicenter, and warned that 0.3 to 1 meter tsunami waves would possibly hit some coasts of Papua New Guinea.

To ensure early detection of tsunamis and to acquire data critical to real-time forecasts, NOAA has placed Deep-ocean Assessment and Reporting of Tsunami (DART) stations at sites in regions with a history of generating destructive tsunamis.



The Port Moresby Observatory reported some tsunami oscillations in Rabaul Harbor.

Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

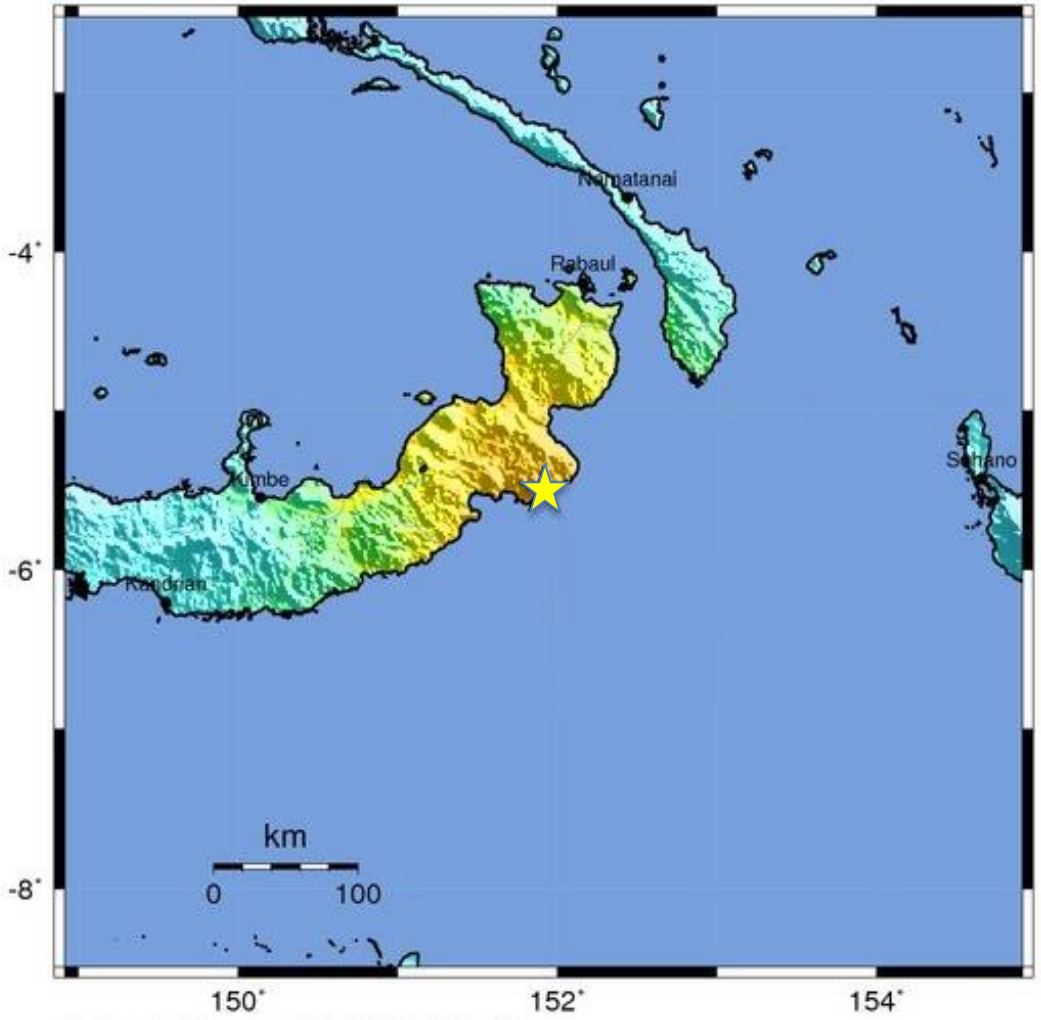
Tuesday, May 5, 2015 at 01:44:05 UTC

The Modified-Mercalli Intensity scale is a twelve-stage scale, from I to XII, that indicates the severity of ground shaking.

The nearest islands experienced moderate to very strong shaking from this earthquake.

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 7.5 Earthquake

Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

Tuesday, May 5, 2015 at 01:44:05 UTC

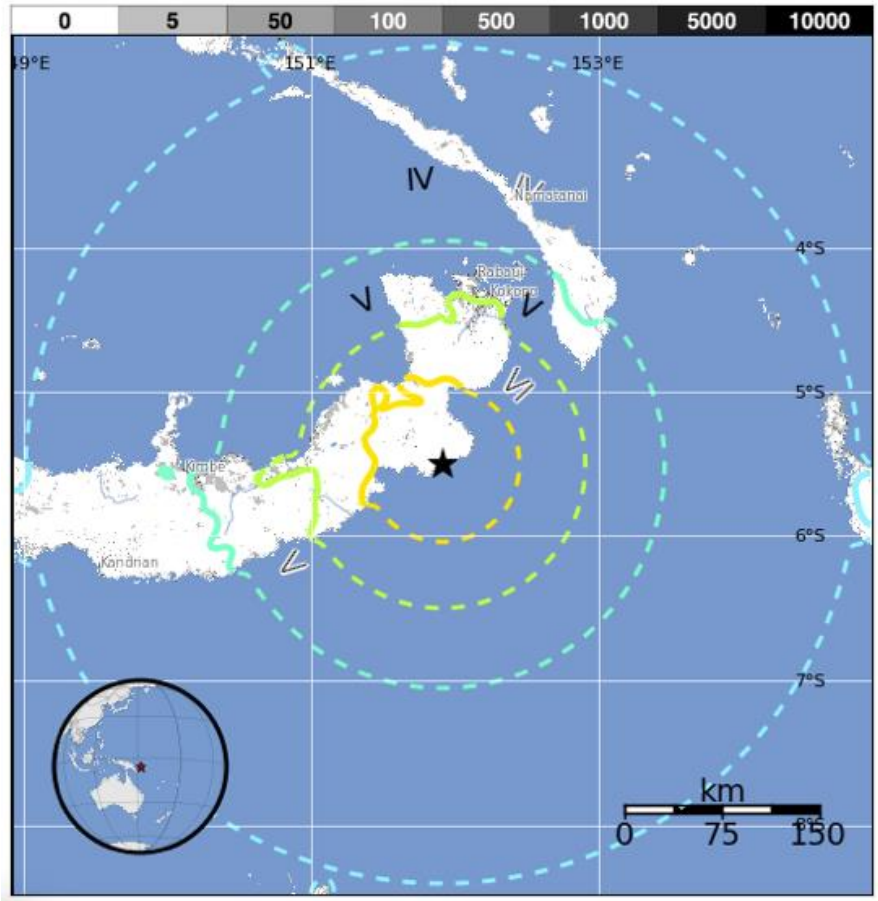
USGS PAGER

Population Exposed to Earthquake Shaking

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

12,000 people were exposed to severe shaking while 149,000 were experienced strong to very strong shaking from this earthquake.

MMI	Shaking	Pop.
I	Not Felt	--*
II-III	Weak	9k*
IV	Light	318k
V	Moderate	192k
VI	Strong	131k
VII	Very Strong	18k
VIII	Severe	12k
IX	Violent	0k



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

Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

Tuesday, May 5, 2015 at 01:44:05 UTC

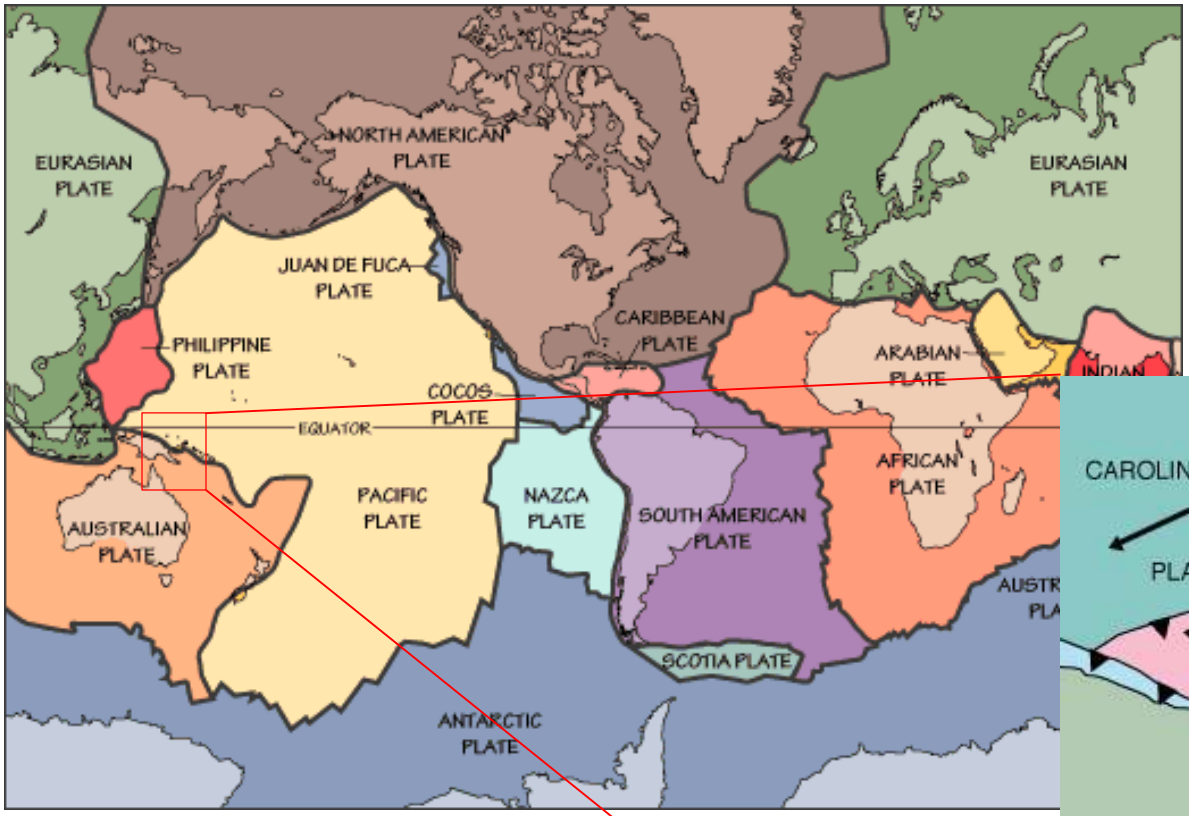


Image courtesy of the US Geological Survey

In this region of the Pacific, the Australian Plate is subducting under the overriding Pacific Plate.

In detail, there are numerous microplates (fragments of larger plates). Arrows show net plate motion relative to the Australian Plate.

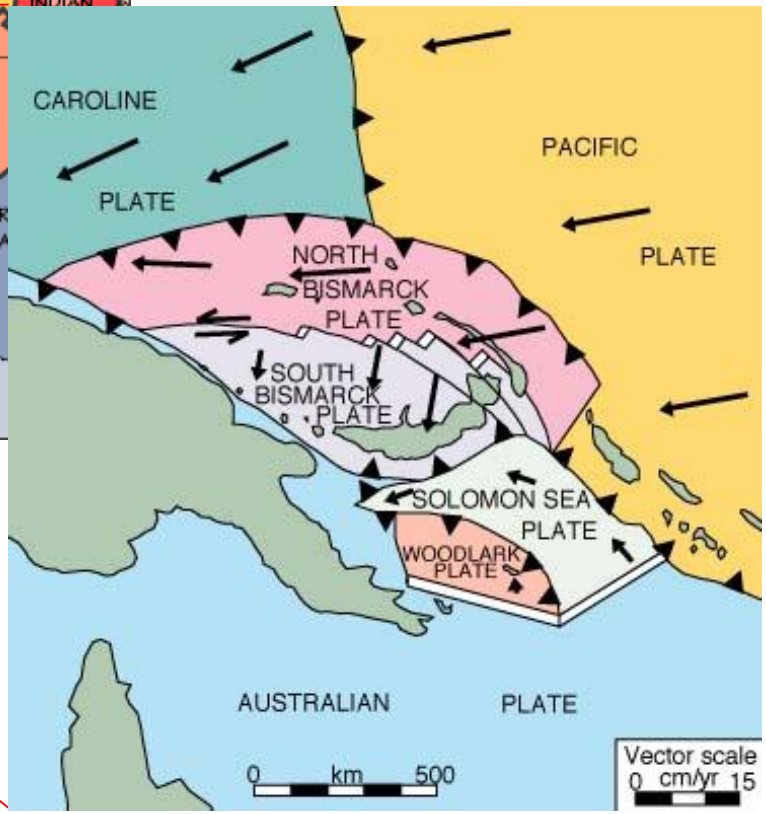
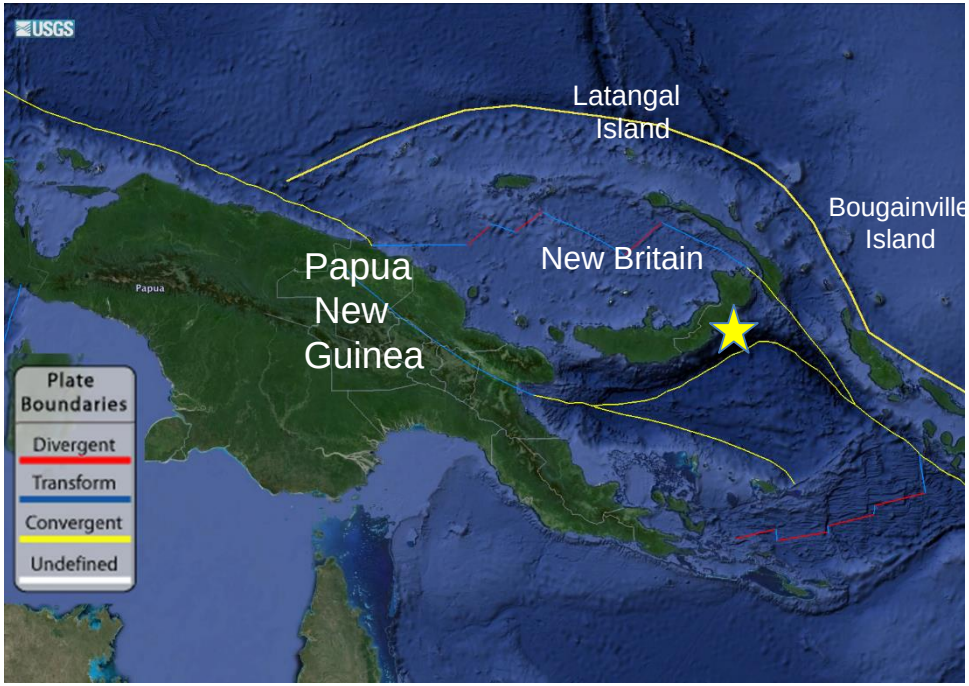


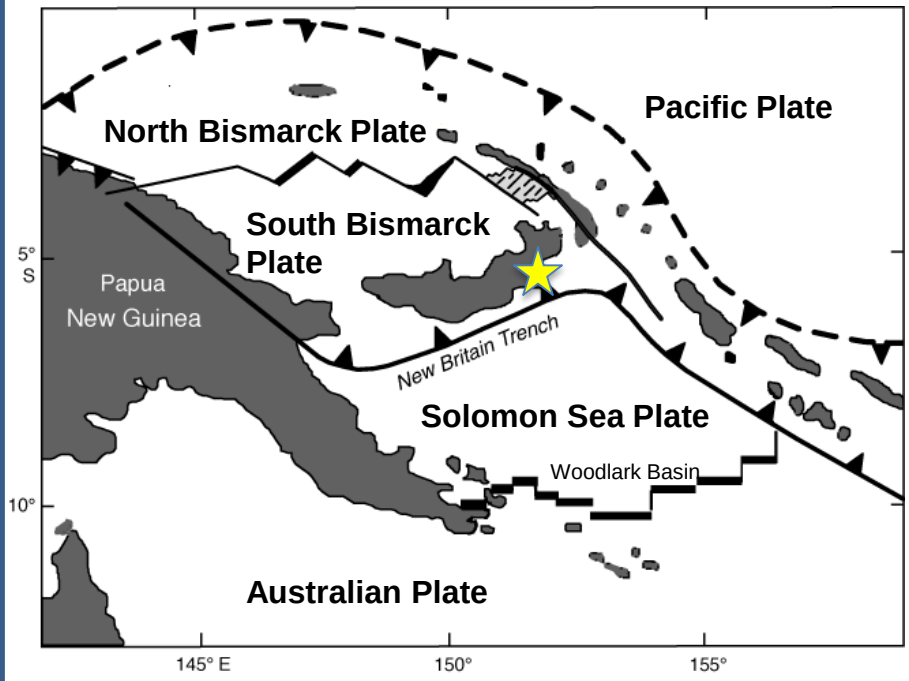
Image courtesy OSU; simplified from Hamilton (1979)

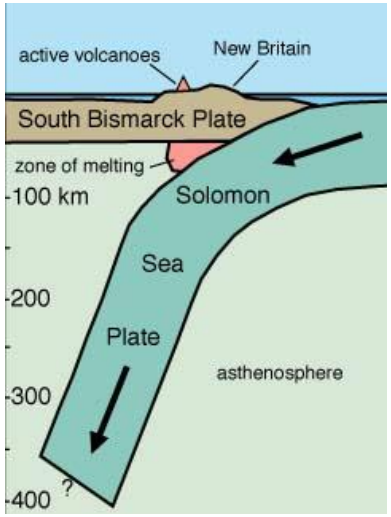
Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

Tuesday, May 5, 2015 at 01:44:05 UTC

This region of tectonic microplates accommodate convergence between the larger Australia and the Pacific Plates. The Solomon Sea Plate moves slightly faster and more northeasterly with respect to the Pacific Plate than does the Australia Plate due to sea-floor spreading in the Woodlark Basin.







Cross-section of the subduction zone below New Britain.

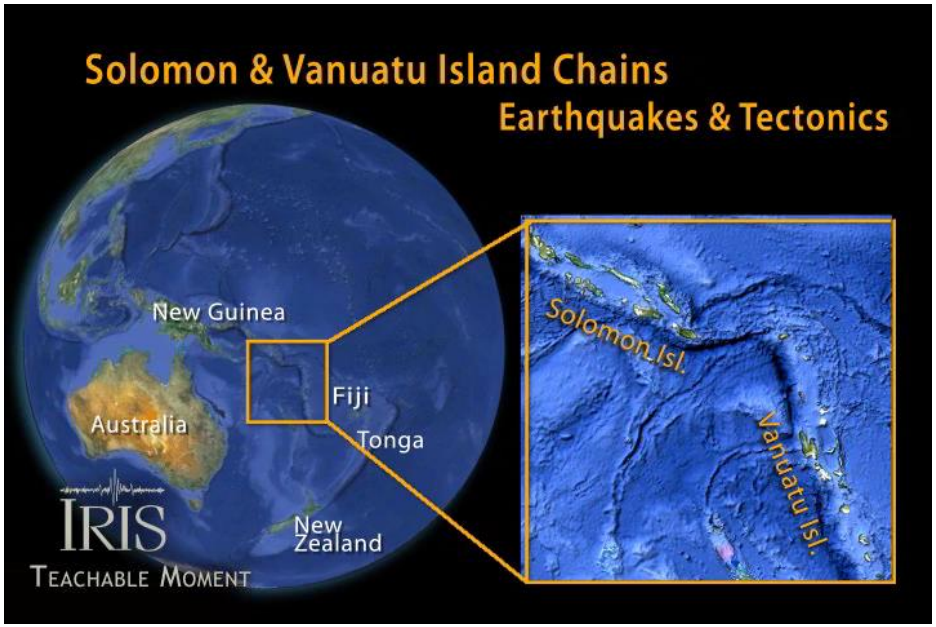
From Johnson (1976)

Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

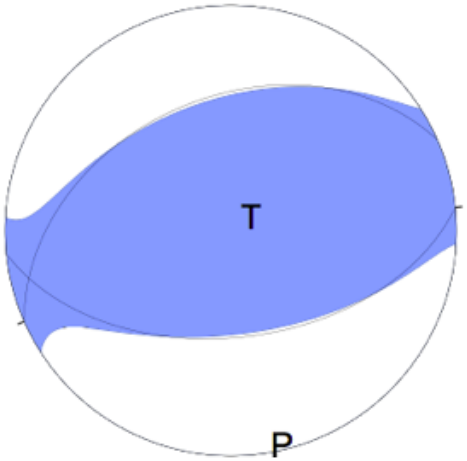
Tuesday, May 5, 2015 at 01:44:05 UTC

According to the USGS, this earthquake occurred as the result of thrust faulting on or near the plate boundary interface between the subducting Australia and overriding Pacific Plates.

At the location of the earthquake, the Australia plate moves towards the east-northeast at a velocity of 105 mm/yr with respect to the Pacific plate, and begins its subduction into the mantle beneath New Britain at the New Britain Trench south of the earthquake.



Regional tectonic complexities involving the convergence of the Australian and Pacific Plates.



W-phase Moment Tensor Solution

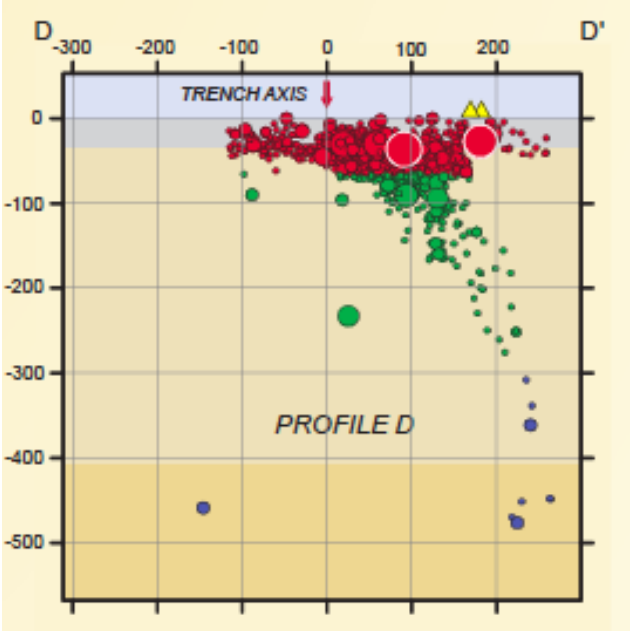
The tension axis (T) reflects the minimum compressive stress direction.
The pressure axis (P) reflects the maximum compressive stress direction.

Images courtesy of the U.S. Geological Survey

Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA
Tuesday, May 5, 2015 at 01:44:05 UTC

This earthquake is shown by the blue star on the map at the right. It is a seismically active area with frequent large earthquakes.

The Australian Plate subducts at a steep angle towards the north beneath the Pacific Plate at the New Britain Trench shown below in a S-N cross section.



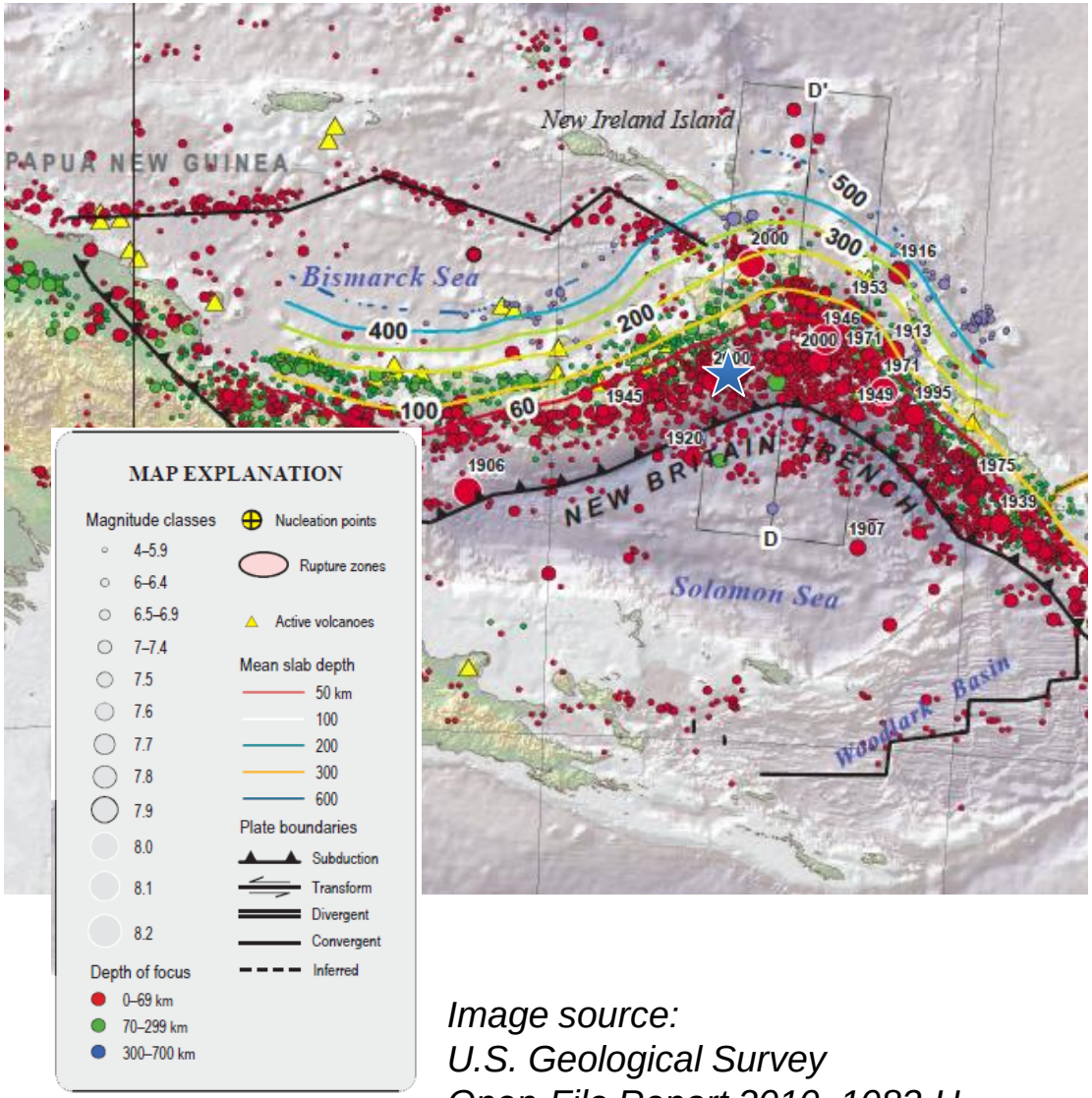


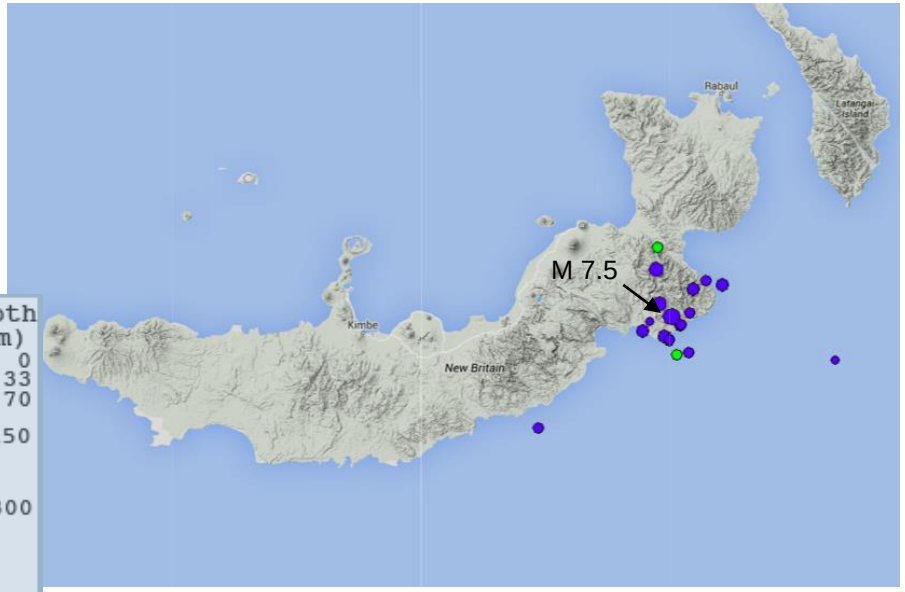
Image source:
U.S. Geological Survey
Open-File Report 2010–1083-H

Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

Tuesday, May 5, 2015 at 01:44:05 UTC

This earthquake is the latest in an ongoing sequence of seismicity in the same region over the past week. The image on the right is a map of 13 earthquakes in the past week prior to the M7.5, the image on the left is the seismicity of the previous week.

Regional Seismicity April 21 – 28, 2015

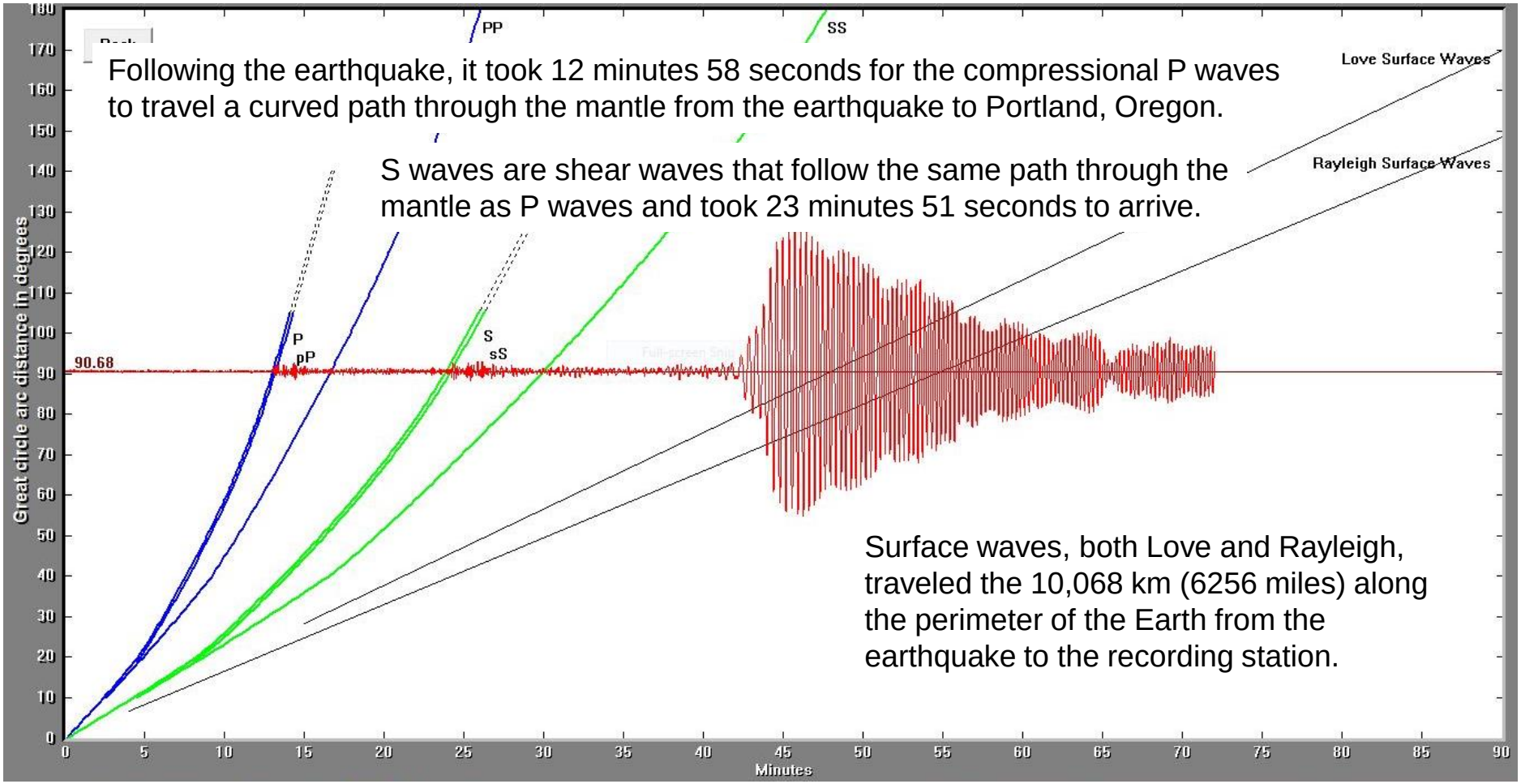


Regional Seismicity April 28 – May 5, 2015

Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA

Tuesday, May 5, 2015 at 01:44:05 UTC

The record of the earthquake on the University of Portland seismometer (UPOR) is illustrated below. Portland is 10,068 km (6256 miles, 90.7˚) from the location of this earthquake.



Magnitude 7.5 NEW BRITAIN REGION, PAPUA NEW GUINEA
Tuesday, May 5, 2015 at 01:44:05 UTC

Teachable Moments are a service of

IRIS Education & Public Outreach
and
The University of Portland