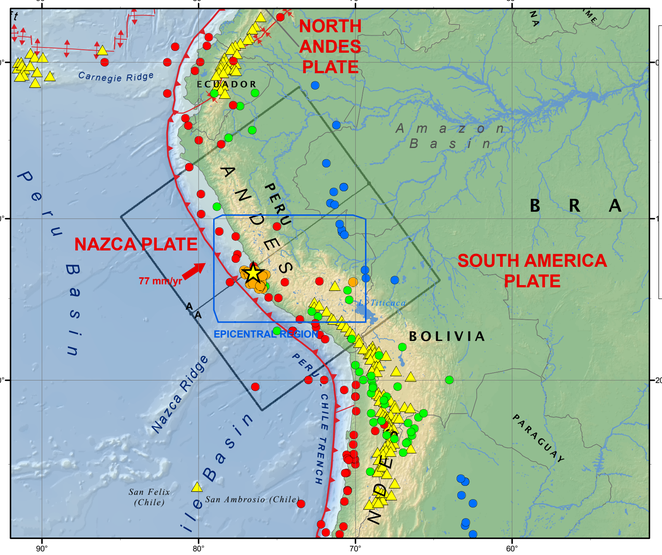
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

EARTHQUAKE SUMMARY MAP XXX

M8.0 Pisco, Peru, Earthquake of 15 August 2007

Prepared in cooperation with the Global Seismographic Network

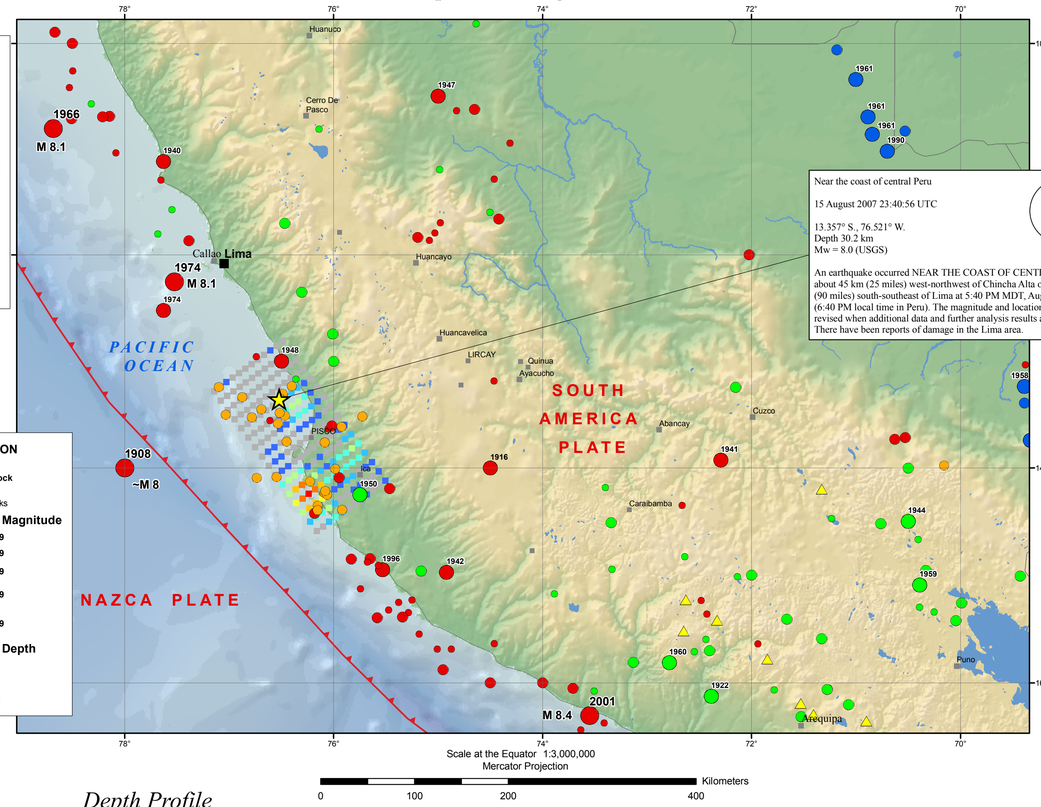
Tectonic Setting



RELATIVE PLATE MOTIONS

The broad red vector represents the motion of the Nazca Plate relative to the South America Plate in the region. The motion of the Nazca Plate is generally northeastward with respect to the South America Plate.

Epicentral Region



Near the coast of central Peru

15 August 2007 23:40:56 UTC

13.357° S., 76.521° W.
Depth 30.2 km
Mw = 8.0 (USGS)

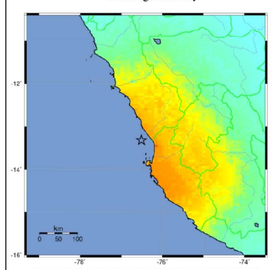
An earthquake occurred NEAR THE COAST OF CENTRAL PERU, about 45 km (25 miles) west-northwest of Chincha Alta or about 145 km (90 miles) south-southeast of Lima at 5:40 PM MDT, Aug 15, 2007 (6:40 PM local time in Peru). The magnitude and location may be revised when additional data and further analysis results are available. There have been reports of damage in the Lima area.

Prompt Assessment of Global Earthquakes for Response (PAGER)

PAGER V2(Thu Aug 16, 2007, 12:26:04 PM GMT)

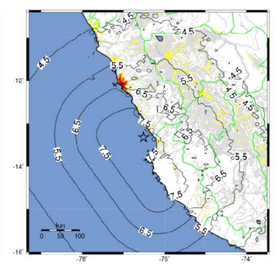
M8.0 NEAR THE COAST OF CENTRAL PERU
S13.32 W76.50 30.2km Wed Aug 15, 2007 11:40:58 PM GMT

Shaking Intensity



	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
PERCEIVED SHAKING	not felt	weak	rarely	very light	light	Moderate	Moderate/heavy	heavy	Very Heavy
POTENTIAL DAMAGE	none	none	none	none	none	Very light	light	Moderate	Moderate/heavy
PGA MMI (%g)	<0.17	0.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PGV MMI (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Population per km²



(Data from LandScan 2003)

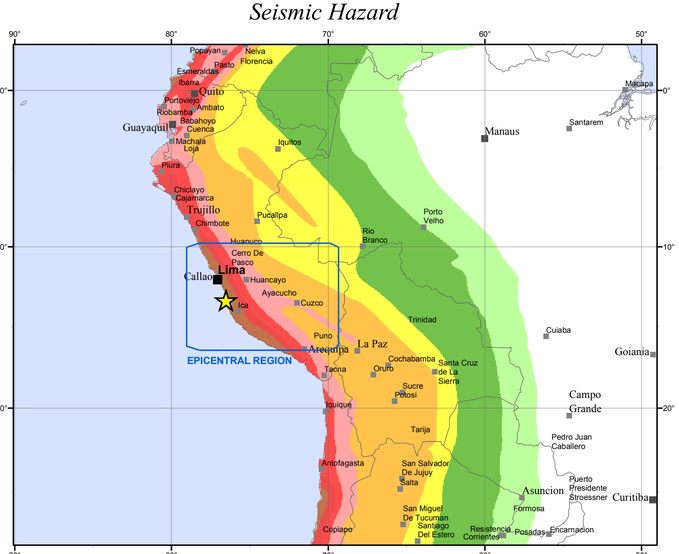
Population exposed to shaking

MMI Intensity	Population
VIII	583,000
VII	846,000
VI	8,410,000*

* - MMI level extends beyond map boundary, actual population exposure may be much larger

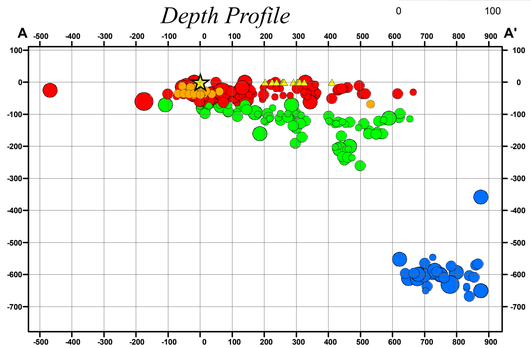
These results are from a prototype system and users are cautioned to carefully consider, and use common sense, in any decisions relating to personal or public safety or the allocation of resources. PAGER results are often updated as more earthquake information is reported or derived. Considerable effort has been made to provide accurate information, but reliance on earthquake impact information from a single source is not advised.

Seismic Hazard



Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec², expected to be exceeded in a 50-yr period with a probability of 10 percent.

Depth Profile



TECTONIC SUMMARY

This earthquake occurred at the boundary between the Nazca and South American tectonic plates. The two plates are converging at a rate of 77 mm per year. The earthquake occurred as thrust-faulting on the interface between the two plates, with the South American plate moving up and seaward over the Nazca plate.

Coastal Peru has a history of very large earthquakes. The August 15 shock originated just south of the source region of the magnitude 8.1 earthquake of October 1974 and just north of the source regions of major earthquakes that occurred in August 1942 (magnitude 7.7) and 1996 (magnitude 7.7). The largest coastal Peru earthquake of the last two centuries was the magnitude 9 earthquake of 1868, which was centered about 700 km southeast of the August 15 earthquake. The 1868 shock produced a tsunami that killed several thousand people along the South American coast and also caused damage in Hawaii.

Significant Earthquakes Mag ≥ 8.0

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1908	12	12	1208	-14.000	-78.000	60	8.2
1966	10	17	2141	-10.807	-78.684	20.7	8.2
1974	10	03	1421	-12.254	-77.524	33.9	8.1
2001	06	23	2033	-16.305	-73.550	29.8	8.4

DISCLAIMER

Base map data, such as place names and political boundaries, are the best available but may not be current or may contain inaccuracies and therefore should not be regarded as having official significance.

DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
IASPEI, Centennial Catalog (1900 - 1999) and extensions (Engdahl and Villaseñor, 2002)
HDF (unpublished earthquake catalog) (Engdahl, 2003)
Global Seismic Hazard Assessment Program

PLATE TECTONICS AND FAULT MODEL
PB2002 (Bird, 2003)
Finite Fault Model, Chen Ji, UC Santa Barbara (2007)

BASE MAP
NIMA and ESRI, Digital Chart of the World
USGS, EROS Data Center
NOAA GEBCO and GLOBE Elevation Models

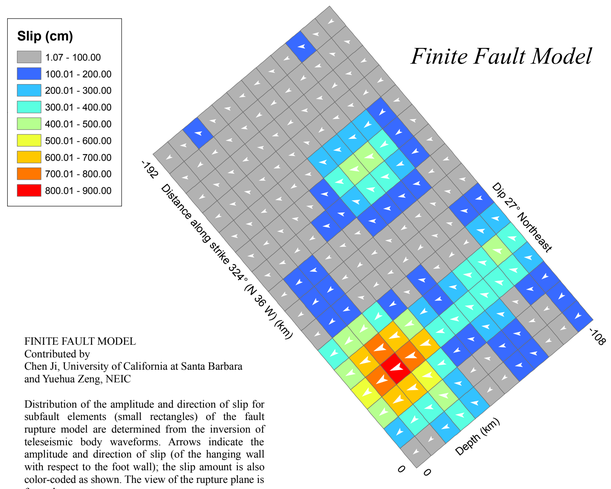
REFERENCES

Bird, P., 2003, An updated digital model of plate boundaries: Geochem. Geophys. Geosyst., v. 4, no. 3, pp. 1027- 80.

Engdahl, E.R. and Villaseñor, A., 2002, Global Seismicity: 1900 - 1999, chap. 41 of Lee, W.H.K., and others,eds., International Earthquake and Engineering Seismology, Part A: New York, N.Y., Elsevier Academeic Press, 932 p.

Engdahl, E.R., Van der Hilst, R.D., and Buland, R.P., 1998, Global teleseismic earthquake relocation with improved travel times and procedures for depth determination: Bull. Seism. Soc. Amer., v. 88, p. 722-743.

Finite Fault Model



FINITE FAULT MODEL
Contributed by
Chen Ji, University of California at Santa Barbara
and Yuehua Zeng, NEIC

Distribution of the amplitude and direction of slip for subfault elements (small rectangles) of the fault rupture model are determined from the inversion of teleseismic body waveforms. Arrows indicate the amplitude and direction of slip (of the hanging wall with respect to the foot wall); the slip amount is also color-coded as shown. The view of the rupture plane is from above.

The strike of the fault rupture plane is N36W and the dip is 27 NE. The dimensions of the subfault elements are 12 km in the strike direction and 9 km in the dip direction.

Map prepared by U.S. Geological Survey
National Earthquake Information Center
17 August 2007
Map not approved for release by Director USGS