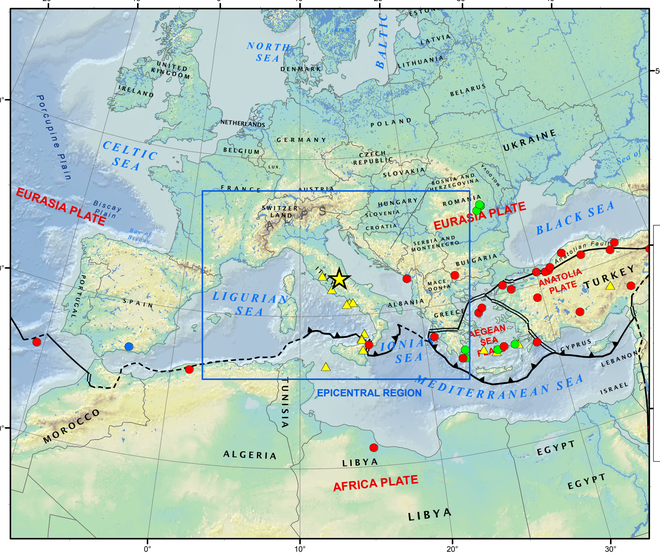
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

EARTHQUAKE SUMMARY MAP

Prepared in cooperation with the Global Seismographic Network
GSN

M6.3 L'Aquila, Italy, Earthquake of 6 April 2009

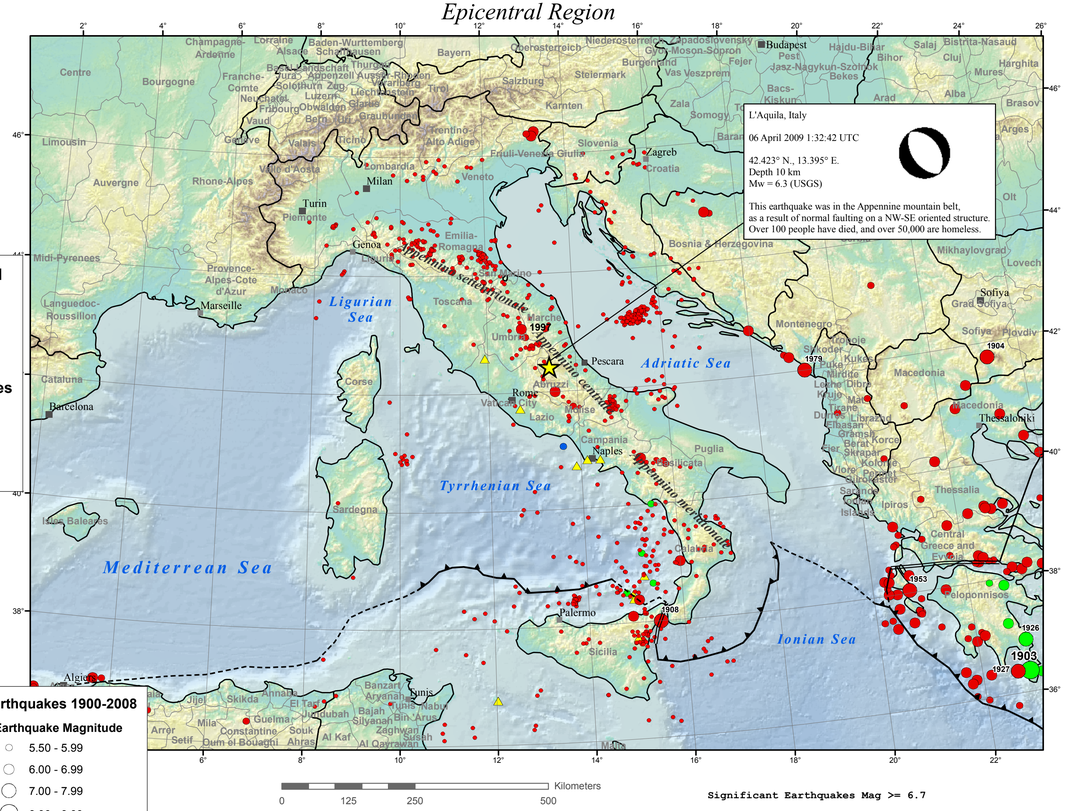
Tectonic Setting



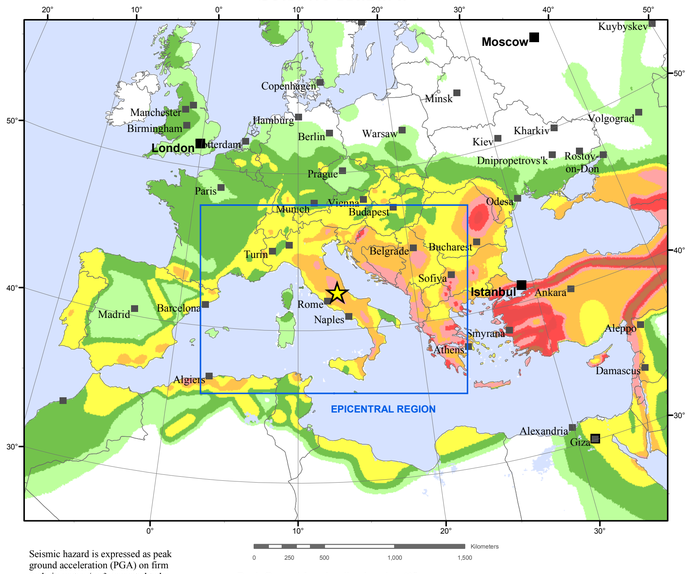
RELATIVE PLATE MOTIONS

The Africa Plate is moving north-northwestward relative to the Eurasia Plate at a rate of about 7 mm/yr.

Epicentral Region



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.

Peak Ground Acceleration in m/sec**2

.2 .4 .8 1.6 2.4 3.2 4.0 4.8

Earthquakes 1900-2008

Earthquake Magnitude
- 5.50 - 5.99
- 6.00 - 6.99
- 7.00 - 7.99
- 8.00 - 8.99
- 9.00 - 9.99

Earthquake Depth
- 0 - 69
- 70 - 299
- 300 - 700

Earthquakes 2000-2009
- M 3.5 - 5.4

Active Volcanoes

TECTONIC SUMMARY

The April 6th 2009 earthquake in Central Italy occurred as a result of normal faulting on a NW-SE oriented structure in the central Apennines, a mountain belt that runs from the Gulf of Taranto in the south to the southern edge of the Po basin in northern Italy. Geologically, the Apennines are largely an accretionary wedge formed as a consequence of subduction. This region is tectonically and geologically complex, involving both subduction of the Adria micro-plate beneath the Apennines from east to west, continental collision between the Eurasia and Africa plates building the Alpine mountain belt further to the north and the opening of the Tyrrhenian basin to the west. The evolution of this system has caused the expression of all different tectonic styles acting at the same time in a broad region surrounding Italy and the central Mediterranean. The April 6th, 2009 earthquake is related to normal faulting and the east-west extensional tectonics that dominate along the entire Apennine belt, primarily a response to the Tyrrhenian basin opening faster than the compression between the Eurasian and African plates.

The central Apennine region has experienced several significant earthquakes in recorded history. In 1997, a significant Mw 6.0 earthquake 85 km north-northwest of the April 6th 2009 event killed 11, injured over 100 and destroyed approximately 80,000 homes in the Marche and Umbria regions. This 1997 event was part of a series of earthquakes known as the Umbria-Marche seismic sequence, which included eight events of magnitude greater than M5.0 in a two-month

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.

Significant Earthquakes Mag >= 6.7

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1903	08	11	0432	36.360	22.970	80	8.3
1904	04	04	1026	41.750	23.250	0	7.1
1905	09	08	0143	39.000	16.000	0	6.8
1905	11	08	2206	40.000	24.000	0	6.8
1908	05	17	1230	35.000	24.000	100	6.8
1908	12	28	0420	38.000	15.500	0	7.2
1910	02	18	0509	36.000	24.500	150	6.9
1911	04	04	1543	36.500	25.500	140	7.0
1912	01	24	1623	38.000	20.500	60	6.8
1913	06	14	0933	43.500	25.500	0	6.8
1915	01	13	0652	42.000	13.500	0	6.9
1926	08	30	1138	36.901	22.996	85.2	7.1
1927	07	01	0818	36.381	22.723	35	7.0
1928	04	14	0900	42.402	25.667	15	6.8
1928	04	18	1922	42.386	25.087	15	6.8
1930	02	14	1838	36.067	24.789	35	6.8
1931	03	08	0150	41.337	22.666	25	6.8
1932	09	26	1920	40.333	23.732	35	6.9
1935	02	25	0251	36.084	24.703	35	6.8
1938	04	13	0245	38.112	14.925	35	6.8
1947	10	06	1955	37.000	22.000	0	6.9
1953	08	11	0332	38.300	20.800	0	6.8
1953	08	12	0923	38.046	20.766	15	7.2
1954	04	30	1302	39.187	22.239	25	6.8
1956	07	09	0311	36.617	26.026	35	7.8
1956	07	09	0324	36.508	25.956	35	6.9
1957	03	08	1214	39.201	22.750	10	6.8
1957	03	08	1221	39.267	22.607	10	6.9
1959	11	15	1708	37.751	20.508	25	6.8
1962	08	28	1059	37.874	22.737	107	6.8
1967	03	04	1758	39.099	24.618	8.7	7.1
1968	02	19	2245	39.372	24.946	8.1	7.2
1979	04	15	0619	42.001	19.154	15	7.0
1980	10	10	1225	36.154	1.417	15	7.1
1980	11	23	1834	40.794	15.312	6.8	6.9
1981	12	19	1410	39.184	25.313	10	6.9
1982	01	18	1931	39.966	24.506	50	6.8
1983	01	17	1241	38.015	20.324	6	6.9
2003	05	21	1844	36.964	3.634	12	6.8
2006	01	08	1134	36.311	23.212	66	6.7
2008	02	14	1009	36.501	21.670	29	6.9

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M 6.3, CENTRAL ITALY
Origin Time: Mon 2009-04-06 01:32:42 UTC
Location: 42.42°N 13.39°E Depth: 10 km

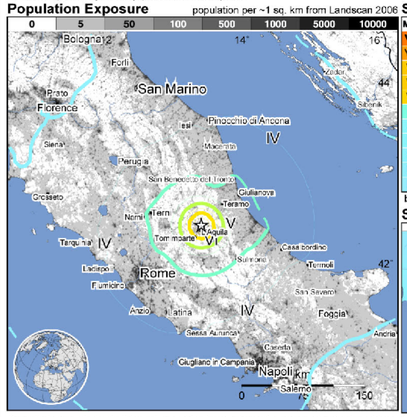
PAGER
Version 3
Created: 11 hrs, 14 mins after earthquake

Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = x1000)		-.-*	3,422k*	16,482k	1,323k	34k	28k	68k	0	0
ESTIMATED MODIFIED MERCALLI INTENSITY		I	II-III	IV	V	VI	VII	VIII	IX	X+
PERCEIVED SHAKING		Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	Resistant Structures	none	none	none	V. Light	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy	V. Heavy

*Estimated exposure only includes population within the map area.

Population Exposure population per ~1 sq. km from Landscan 2006

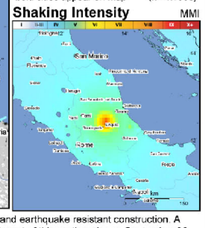


Selected City Exposure

MMI	City	Population
VIII	L'Aquila	68k
VIII	Pizzoli	3k
VII	Scoppito	2k
VII	Ocre	1k
VII	Cagnano Amiterno	1k
IV	Rome	2,563k
IV	Napoli	988k
IV	San Marino	4k
IV	Prato	172k
III	Bologna	371k
III	Florence	371k

bold cities appear on map (k = x1000)

Shaking Intensity MMI



Overall, the population in this region resides in structures that are a mix of vulnerable and earthquake resistant construction. A magnitude 6.0 earthquake occurred near the Umbria-Marche, Italy, region 88 km northwest of this earthquake on September 26, 1997 (UTC), with estimated population exposures of 10,000 at intensity VIII and 112,000 at intensity VII, resulting in an estimated 11 fatalities. A magnitude 6.9 earthquake occurred near the Irpinia, Italy, region 242 km southeast of the location of this earthquake on November 23, 1980 (UTC), with estimated population exposures of 37,000 at intensity IX or greater and 252,000 at intensity VIII, resulting in an estimated 2,483 fatalities. Recent earthquakes in this area have caused landslides that may have contributed to losses.

This information has been reviewed by a seismologist.

http://earthquake.usgs.gov/pager Event ID: us2009fcaf

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

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Map prepared by U.S. Geological Survey
National Earthquake Information Center
7 April 2009
Map not approved for release by Director USGS