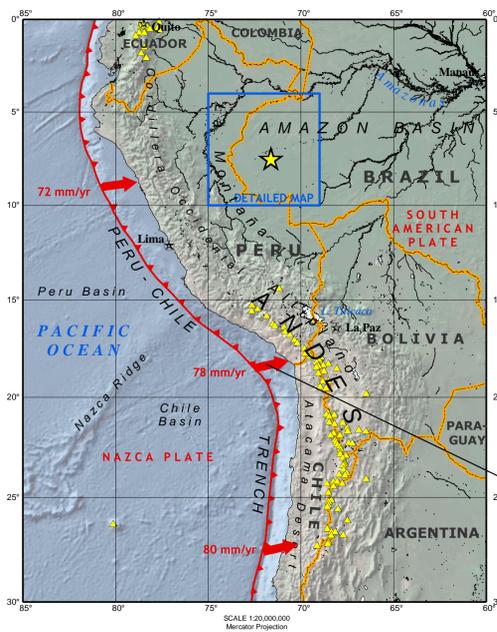


M7.1 Amazonas State, Brazil Earthquake of 20 June 2003

Tectonic Setting



EXPLANATION
Main Shock
★ 20 June 2003
Plate Boundary
▲ Convergent
▲ Volcanoes

RELATIVE PLATE MOTIONS
The relative motion of adjacent tectonic plates is depicted on the map by short vectors located at selected locations on the plate boundary. In this presentation, one plate is assumed to be rigid and fixed. The vector therefore represents the direction of the moving plate relative to the fixed plate. The rate of relative motion is labelled next to the vector.

The components of the vector perpendicular and parallel to the plate margin approximate convergent/divergent and transverse direction of motion between the plates, respectively. As viewed from the fixed plate, an inward directed component suggests convergence at and near the plate boundary that may be expressed as crustal folding, uplift, thrust faulting, or plate subduction. Similarly, an outward directed component suggests plate divergence such as would be expected at a zone of crustal spreading. Transcurrent or transform faulting would be expected when the predominant vector component is parallel to the plate margin.

Generalized Seismic Hazard



EXPLANATION
Main Shock
★ 20 June 2003
Seismic Hazard
0.0 - 0.2 m/sec²
0.2 - 0.4
0.4 - 0.8
0.8 - 1.6
1.6 - 3.2
3.2 - 6.4
6.4 - 9.0
Plate Boundary
▲ Convergent
▲ Volcanoes

DATA SOURCES
EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
IASPEI, Centennial Catalog (1900 - 1999)
Handbook of Seismology and Earthquake Engineering
Global Seismic Hazard Assessment Program

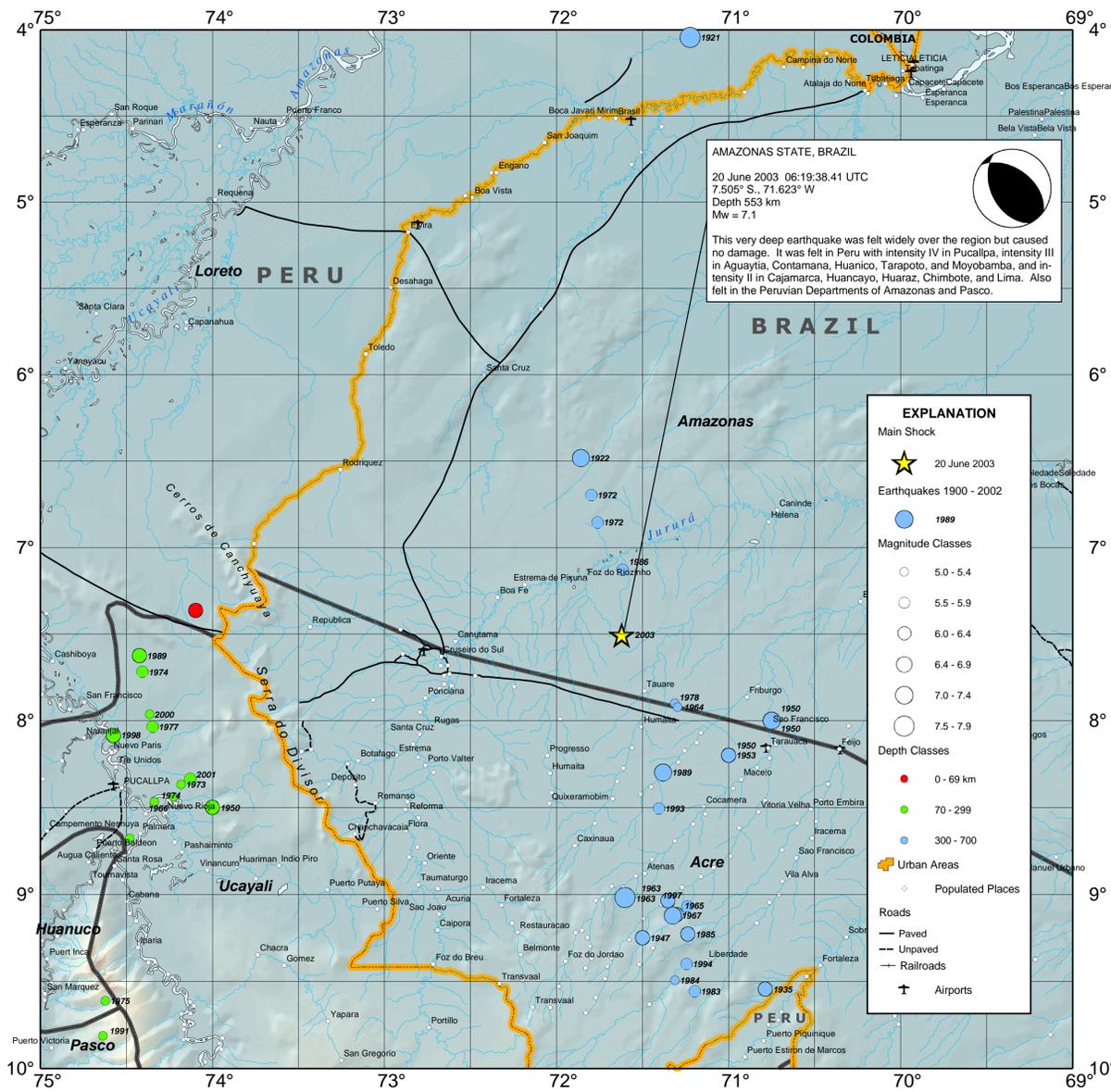
PLATE TECTONICS
Smithsonian Institution, Global Volcano Program

BASE MAP
NIMA and ESRI, Digital Chart of the World
USGS, EROS Data Center

ONLINE RESOURCES
<http://earthquakes.usgs.gov>

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.

Epicentral Area



AMAZONAS STATE, BRAZIL
20 June 2003 06:19:38.41 UTC
7.505° S, 71.623° W
Depth 553 km
Mw = 7.1

This very deep earthquake was felt widely over the region but caused no damage. It was felt in Peru with intensity IV in Fucallpa, intensity III in Aguyaita, Contamana, Huanico, Tarapoto, and Moyobamba, and intensity II in Cajamarca, Huancayo, Huaraz, Chimbote, and Lima. Also felt in the Peruvian Departments of Amazonas and Pasco.

EXPLANATION
Main Shock
★ 20 June 2003
Earthquakes 1900 - 2002
Magnitude Classes
5.0 - 5.4
5.5 - 5.9
6.0 - 6.4
6.4 - 6.9
7.0 - 7.4
7.5 - 7.9
Depth Classes
0 - 69 km
70 - 299
300 - 700
Urban Areas
Populated Places
Roads
Paved
Unpaved
Railroads
Airports

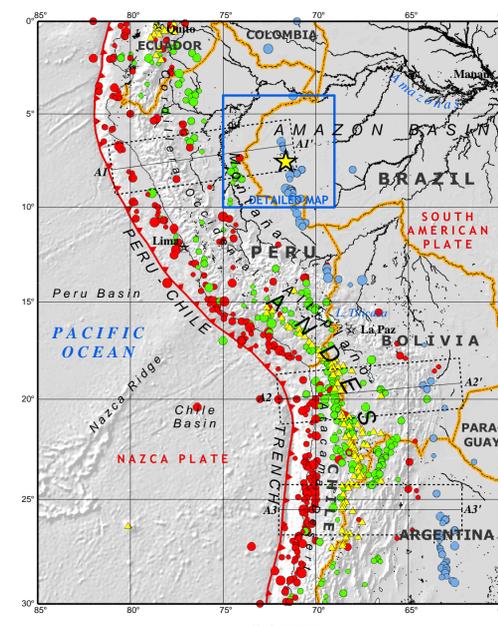
SCALE 1:2,000,000
Mercator Projection
0 20 40 80 120 160 Kilometers



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.

Seismicity 1900 - 2002

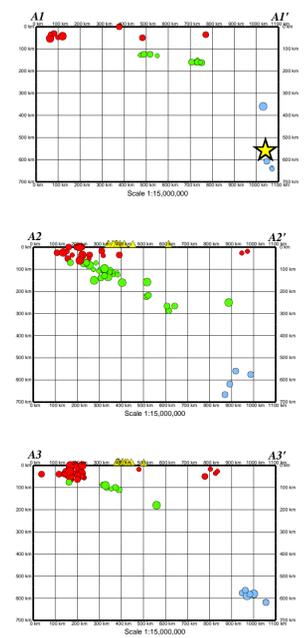


EXPLANATION
Main Shock
★ 20 June 2003
Depth Classes
0 - 69 km
70 - 299
300 - 700
Magnitude Classes
5.0 - 5.9
6.0 - 6.9
7.0 - 7.9
8.0 - 8.9
Plate Boundary
▲ Convergent
▲ Volcanoes

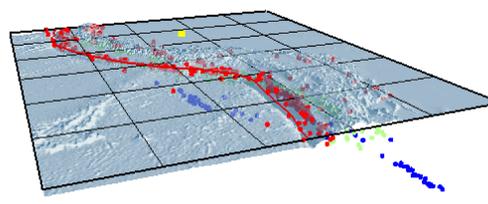
LARGE EARTHQUAKES IN THE EPICENTRAL AREA 1900 - 2002

YR	MO	DY	LAT	LONG	DEPTH	MAG
1921	12	18	-4.043	-71.223	545	7.50
1922	1	17	-6.482	-71.859	359	7.40
1929	5	25	-7.363	-74.097	35	6.80
1935	12	14	-9.545	-70.786	630	6.90
1950	7	9	-8.000	-70.750	650	7.00
1950	3	14	-8.200	-74.000	160	6.80
1953	4	14	-8.200	-71.000	603	6.70
1963	11	9	-9.017	-71.601	586	7.70
1963	11	10	-9.036	-71.352	596	6.80
1964	11	28	-7.922	-71.296	642	5.80
1965	11	3	-9.116	-71.302	593	6.70
1966	5	1	-8.439	-74.228	158	5.70
1967	2	15	-9.121	-71.325	601	7.00
1968	9	9	-8.678	-74.480	142	5.90
1972	1	12	-6.854	-71.763	570	6.40
1972	1	21	-6.696	-71.798	566	6.10
1973	9	8	-8.367	-74.182	160	5.50
1974	8	9	-8.467	-74.337	154	6.00
1974	12	5	-7.718	-74.408	160	6.00
1975	9	30	-9.612	-74.622	132	5.80
1977	3	13	-8.034	-74.348	607	6.00
1978	7	11	-7.899	-71.313	637	5.80
1983	6	2	-9.557	-71.197	596	6.20
1984	12	24	-9.494	-71.331	540	6.90
1985	5	1	-9.228	-71.236	606	6.60
1986	3	26	-7.128	-71.616	608	6.30
1989	5	5	-8.298	-71.381	593	7.10
1989	12	3	-7.625	-74.425	160	6.50
1991	4	9	-9.813	-74.635	124	5.80
1993	5	6	-8.505	-71.405	573	6.10
1994	11	4	-9.399	-71.244	591	6.10
1997	3	25	-9.069	-71.239	609	6.00
1998	4	3	-8.066	-74.575	160	6.60
2000	11	1	-7.963	-74.365	150	5.90
2001	12	28	-8.335	-74.129	162	6.00

Depth Profiles



EXPLANATION
Main Shock
★ 20 June 2003
Depth Classes
0 - 69 km
70 - 299
300 - 700
Magnitude Classes
5.0 - 5.9
6.0 - 6.9
7.0 - 7.9
Volcanoes



Perspective view of the earthquake foci portrayed on the Epicentral Map. The view is from the south. The hypocenters are projected onto granitics at the surface and at 700 km depth, respectively. The 20 June 2003 shock is the orange dot.

Map prepared by U.S. Geological Survey
National Earthquake Information Center
22 July 2003
Map not approved for release by Director USGS