

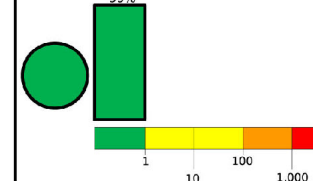
M7.0 Santiago del Estero, Argentina, Earthquake of 01 January 2011



PAGER

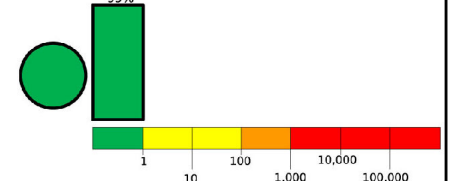
Earthquake Shaking Green Alert
M 7.0, SANTIAGO DEL ESTERO, ARGENTINA
Origin Time: Sat 2011-01-01 09:56:59 UTC (06:56:59 local)
Location: 26.75°S 63.10°W Depth: 583 kmPAGER
Version 2
Created: 1 hour, 40 minutes after earthquake

Estimated Fatalities



Green alert for shaking-related fatalities and economic losses. There is a low likelihood of casualties and damage.

Estimated Economic Losses



Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (k = 1000)	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
	Vulnerable Structures	none	none	none	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy

Population Exposure

Overall, the population in this region resides in structures that are vulnerable to earthquake shaking, though some resistant structures exist.

Historical Earthquakes (with MMI levels):

Date	Dist. (km)	Mag.	Max. Shaking (MMI)	Deaths
1937-07-15	374	4.7	VI (G21)	0
1974-01-07	246	5.8	VIII (G8)	0
2004-08-07	326	6.1	IX (G11)	1

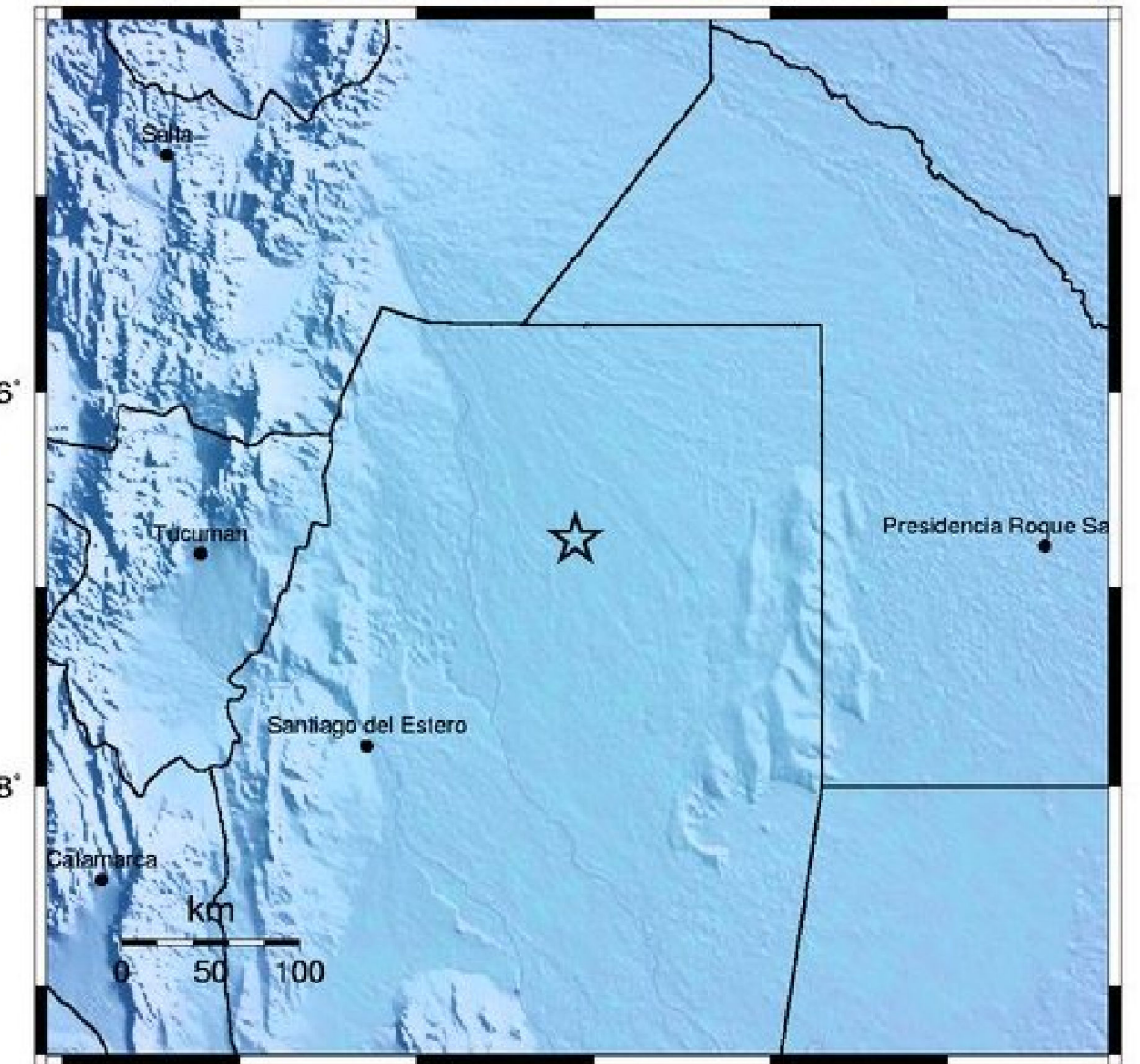
Selected City Exposure

MMI City	Population
III Santiago del Estero	355k
II Cafayate	12k
II Salta	513k
II San Pedro	58k
II Campo Quijano	5k

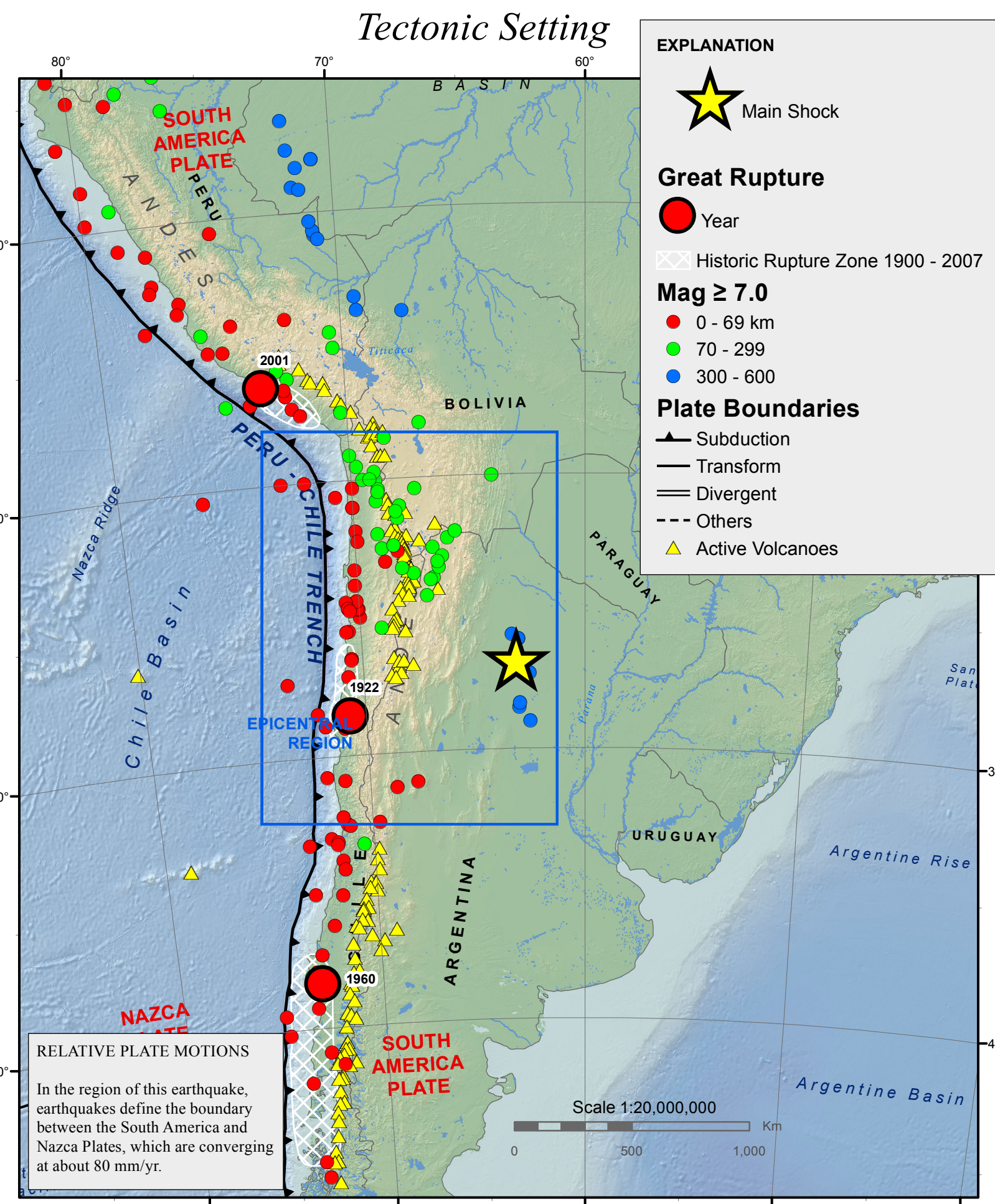
(k = x1000)

Event ID: usc0000xky

ShakeMap

USGS ShakeMap: SANTIAGO DEL ESTERO, ARGENTINA
Sat Jan 1, 2011 09:56:59 GMT M 7.0 S26.76°W63.10° Depth: 583.6km ID:c0000xky

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC (%g)	<0.17	0.17-1.4	1.4-2.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL (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+



Tectonic Summary

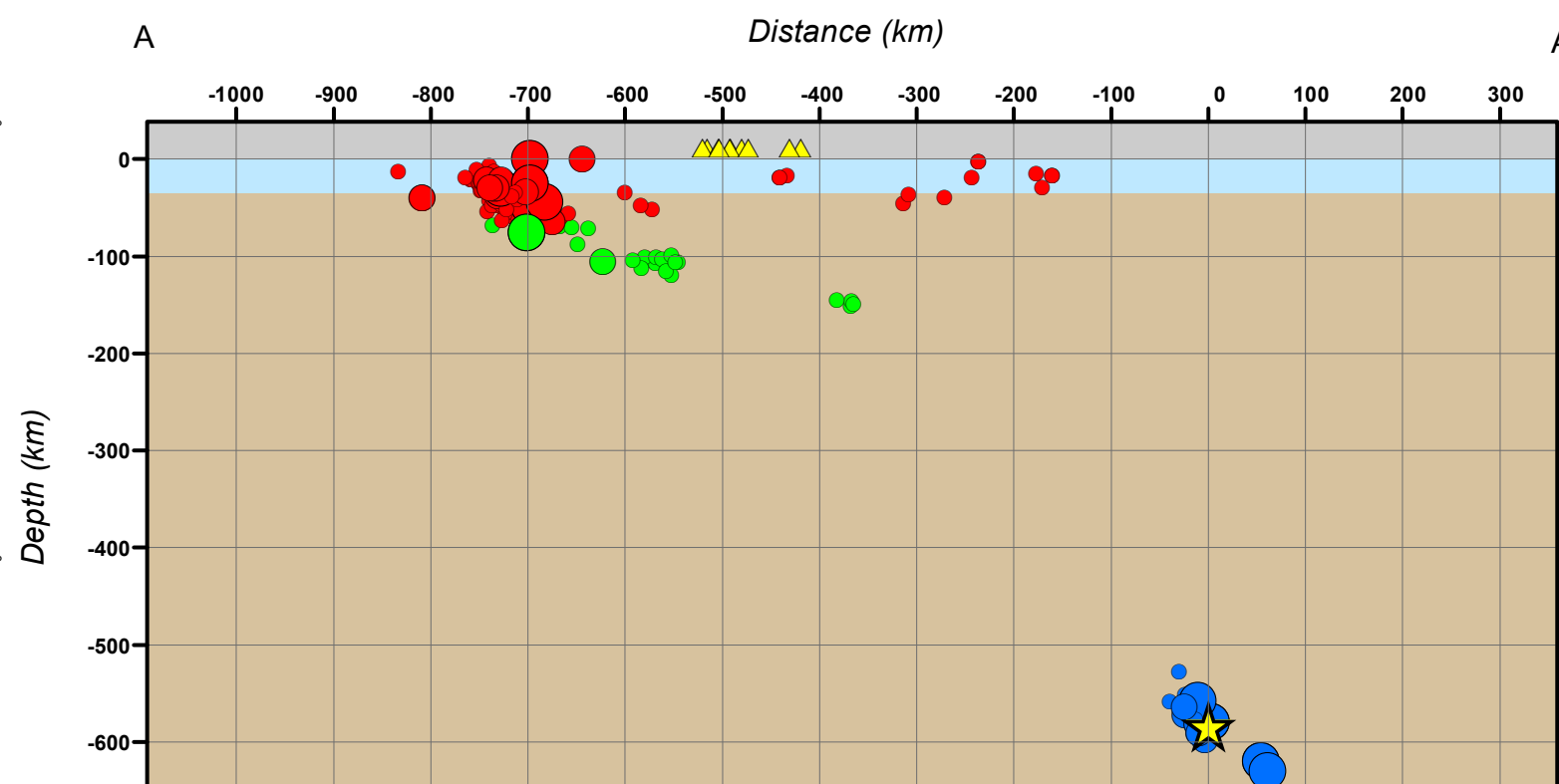
This major earthquake occurred within the subducted lithosphere of the oceanic Nazca plate. At the latitude of the earthquake, the Nazca plate moves east relative to the South America plate at a rate of about 7 cm per year. It is overridden by the South America plate at the Peru-Chile trench, west of the Chilean coast, and sinks into the earth's mantle beneath South America. This earthquake occurred as normal faulting within a segment of the subducted plate that has produced frequent earthquakes with focal depths of 500 km to 625 km beneath the earth's surface. In the past quarter century, two other shocks of magnitude 7 or larger have occurred in the segment of subducted Nazca plate that lies beneath northern Argentina.

Earthquakes that have focal depths greater than 300 km are commonly termed "deep-focus" earthquakes. Deep-focus earthquakes cause less damage on the ground surface above their foci than is the case with similar magnitude shallow-focus earthquakes, but large deep-focus earthquakes may be felt at great distance from their epicenters. The largest recorded deep-focus earthquake had a magnitude of 8.2, occurring within the subducted Nazca plate beneath Bolivia in June 1994.

Significant Earthquakes Mag >= 7.5

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1918	05	20	1755	-28.899	-71.893	35	7.6
1918	12	04	1147	-27.275	-73.464	25	7.5
1922	11	11	0432	-28.553	-70.755	35	8.7
1943	04	06	1607	-30.750	-72.000	0	8.2
1950	12	09	2138	-23.500	-67.500	100	7.7
1959	06	14	0012	-20.369	-68.881	111	7.5
1966	12	28	0818	-25.502	-70.655	30	7.7
1966	12	28	0818	-25.502	-70.656	30	7.8
1971	07	09	0303	-32.558	-71.085	59	7.8
1971	07	09	0303	-32.558	-71.085	58.9	7.5
1976	11	30	0041	-20.472	-68.893	133	7.6
1976	11	30	0041	-20.472	-68.896	133	7.6
1977	11	23	0926	-31.082	-67.778	17.7	7.5
1977	11	23	0926	-31.083	-67.778	18.3	7.5
1983	10	04	1852	-26.538	-70.503	24.6	7.7
1983	10	04	1852	-26.539	-70.503	24.6	7.7
1987	03	05	0917	-24.395	-70.102	45.3	7.6
1987	03	05	0917	-24.397	-70.101	45.6	7.6
1995	07	30	0511	-23.285	-70.103	46	8.0
2005	06	13	2244	-19.987	-69.197	115	7.8
2007	11	14	1540	-22.247	-69.890	40	7.7

Depth Profile



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
PIB2002 (Bird, 2003)

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: Geochim. 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 Academic 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.

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.

Map prepared by U.S. Geological Survey
National Earthquake Information Center
11 March 2010 V6
Map not approved for release by Director USGS