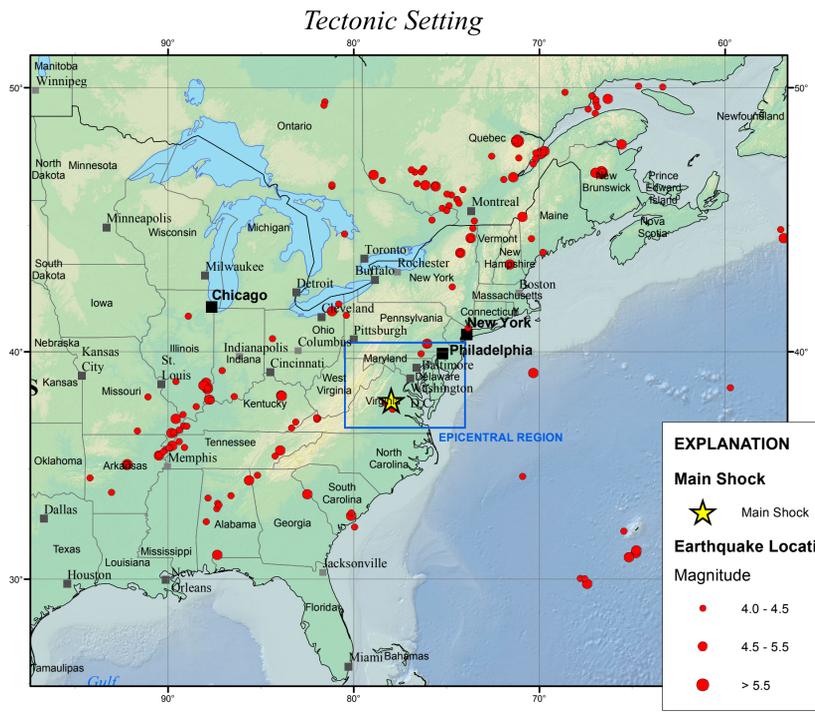




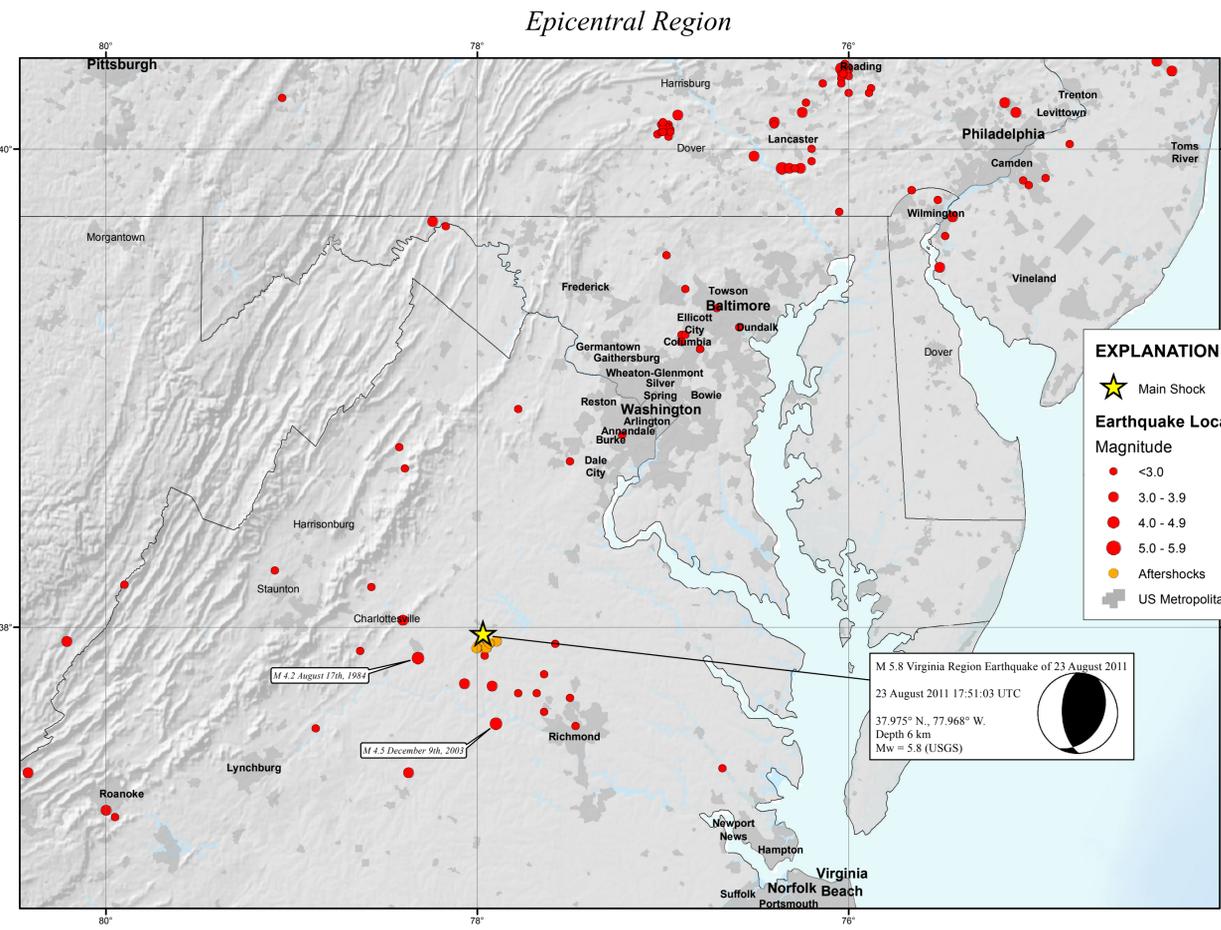
M5.8 Central Virginia Earthquake of 23 August 2011



EXPLANATION

- Main Shock
- Earthquake Locations
- Magnitude

- 4.0 - 4.5
- 4.5 - 5.5
- > 5.5



EXPLANATION

- Main Shock
- Earthquake Locations
- Magnitude
- Aftershocks
- US Metropolitan Areas

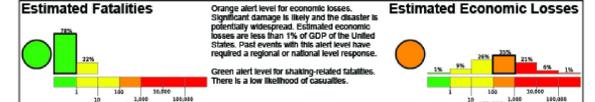
M 5.8 Virginia Region Earthquake of 23 August 2011
23 August 2011 17:51:03 UTC
37.975° N, 77.968° W
Depth 6 km
Mw = 5.8 (USGS)

PAGER

USGS Earthquake Shaking Orange Alert

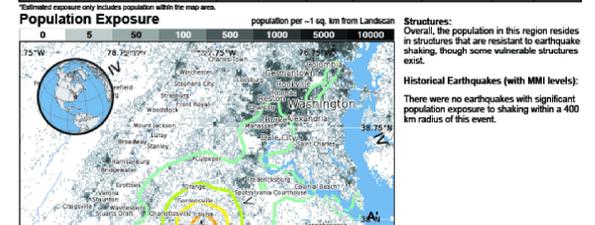
USAID PAGER Version 1

M 5.8, VIRGINIA
Origin Time: Tue 2011 08 23 17:51:04 UTC (13:51:04 local)
Location: 37.94°N 77.93°W Depth: 6 km



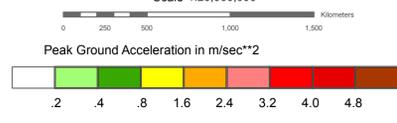
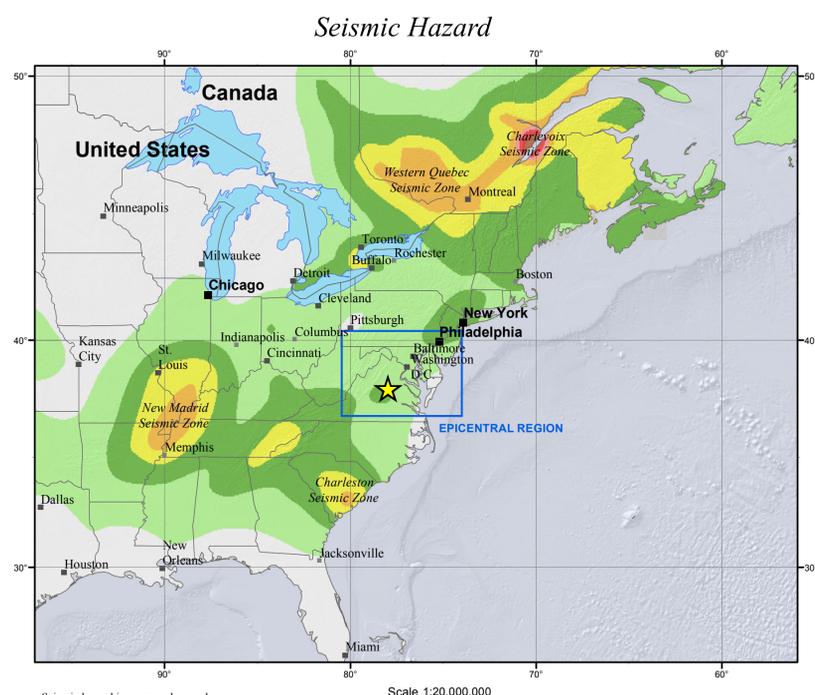
Estimated Population Exposed to Earthquake Shaking

ESTIMATED POPULATION EXPOSURE (N x 1000)	<3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15
ESTIMATED MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X	X+			
PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very Strong	Severe	Violent	Extreme				
POTENTIAL DAMAGE	None	None	None	None	Light	Moderate	Moderate/Heavy	Heavy	V. Heavy				



Selected City Exposure

City	Population	MMI
VII Louisa	24	VII
VI Gordonsville	24	VI
VI Newington	21	VI
VI Orange	44	VI
VI Wever City	14	VI
VI Lake Monticello	10	VI
V Virginia Beach	425	V
IV Washington	552	IV
IV Richmond	1914	IV
IV Baltimore	6114	IV
IV Annapolis	308	IV



TECTONIC SUMMARY

The Virginia earthquake of 2011 August 23 occurred as reverse faulting on a north or northeast-striking plane within a previously recognized seismic zone, the "Central Virginia Seismic Zone." The Central Virginia Seismic Zone has produced small and moderate earthquakes since at least the 18th century. The previous largest historical shock from the Central Virginia Seismic Zone occurred in 1875. The 1875 shock occurred before the invention of effective seismographs, but the felt area of the shock suggests that it had a magnitude of about 4.8. The 1875 earthquake shook bricks from chimneys, broke plaster and windows, and overturned furniture at several locations. A magnitude 4.5 earthquake on 2003, December 9, also produced minor damage.

Previous seismicity in the Central Virginia Seismic Zone has not been causally associated with mapped geologic faults. Previous, smaller, instrumentally recorded earthquakes from the Central Virginia Seismic Zone have had shallow focal depths (average depth about 8 km). They have had diverse focal mechanisms and have occurred over an area with length and width of about 120 km, rather than being aligned in a pattern that might suggest that they occurred on a single causative fault. Individual earthquakes within the Central Virginia Seismic Zone occur as the result of slip on faults that are much smaller than the overall dimensions of the zone. The dimensions of the individual fault that produced the 2011 August 23 earthquake will not be known until longer-term studies are done, but other earthquakes of similar magnitude typically involve slippage along fault segments that are 5 - 15 km long.

Earthquakes in the central and eastern U.S., although less frequent than in the western U.S., are typically felt over a much broader region. East of the Rockies, an earthquake can be felt over an area as much as ten times larger than a similar magnitude earthquake on the west coast. A magnitude 4.0 eastern U.S. earthquake typically can be felt at many places as far as 100 km (60 mi) from where it occurred, and it infrequently causes damage near its source. A magnitude 5.5 eastern U.S. earthquake usually can be felt as far as 500 km (300 mi) from where it occurred, and sometimes causes damage as far away as 40 km (25 mi).

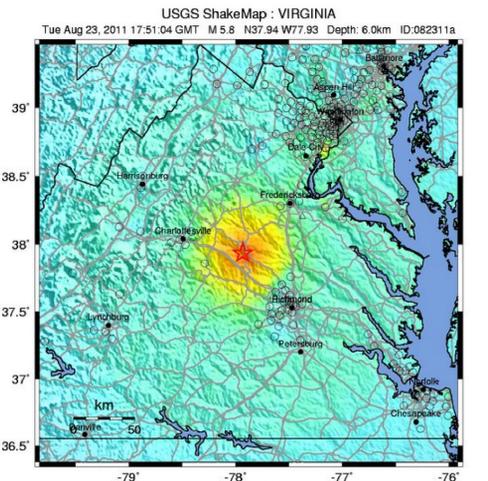
Significant Earthquakes Mag >= 4.0 Since 1973

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1984	04	23	01:36	39.921	-76.355	5	4.4
1984	08	17	18:05	37.868	-78.324	8	4.2
1994	01	16	00:42	40.327	-76.007	5	4.0
1994	01	16	01:49	40.33	-76.037	5	4.6
2003	12	09	18:54	37.587	-77.903	5	4.5
2011	08	23	17:51	37.936	-77.933	6	5.8

DISCLAIMER

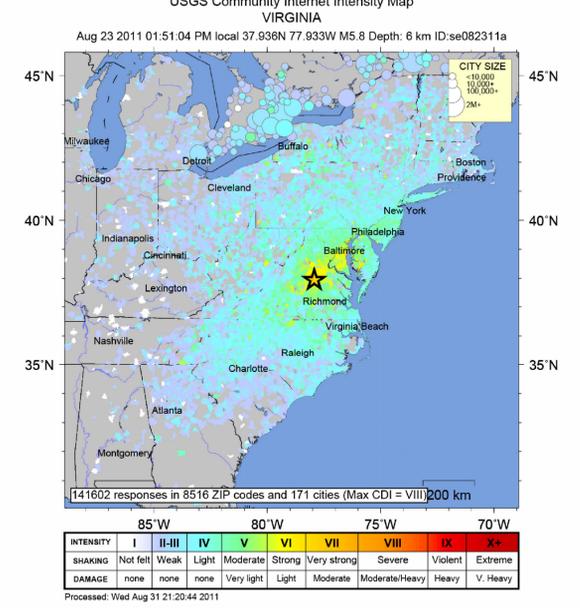
Base map data, such as place names and political boundaries, are the best available but may not be current or may contain inaccuracies and therefore should not be regarded as having official significance.

ShakeMap



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)	<.17	.17-1.4	1.4-2.9	2.9-9.2	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+

Did You Feel It?



DATA SOURCES

EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
HDF (unpublished earthquake catalog) (Engdahl, 2003)
Global Seismic Hazard Assessment Program

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

Map prepared by U.S. Geological Survey
National Earthquake Information Center
23 August 2011
Map not approved for release by Director USGS