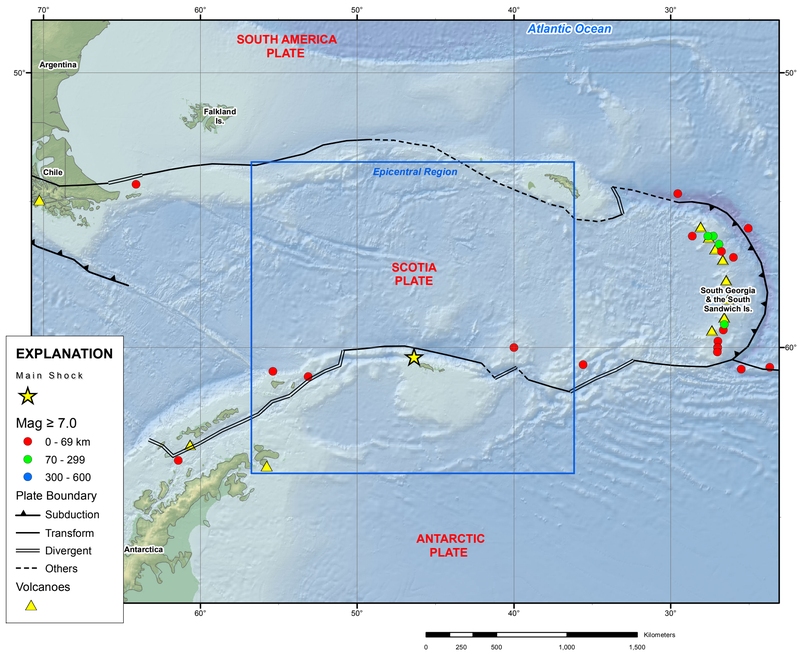
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

EARTHQUAKE SUMMARY MAP

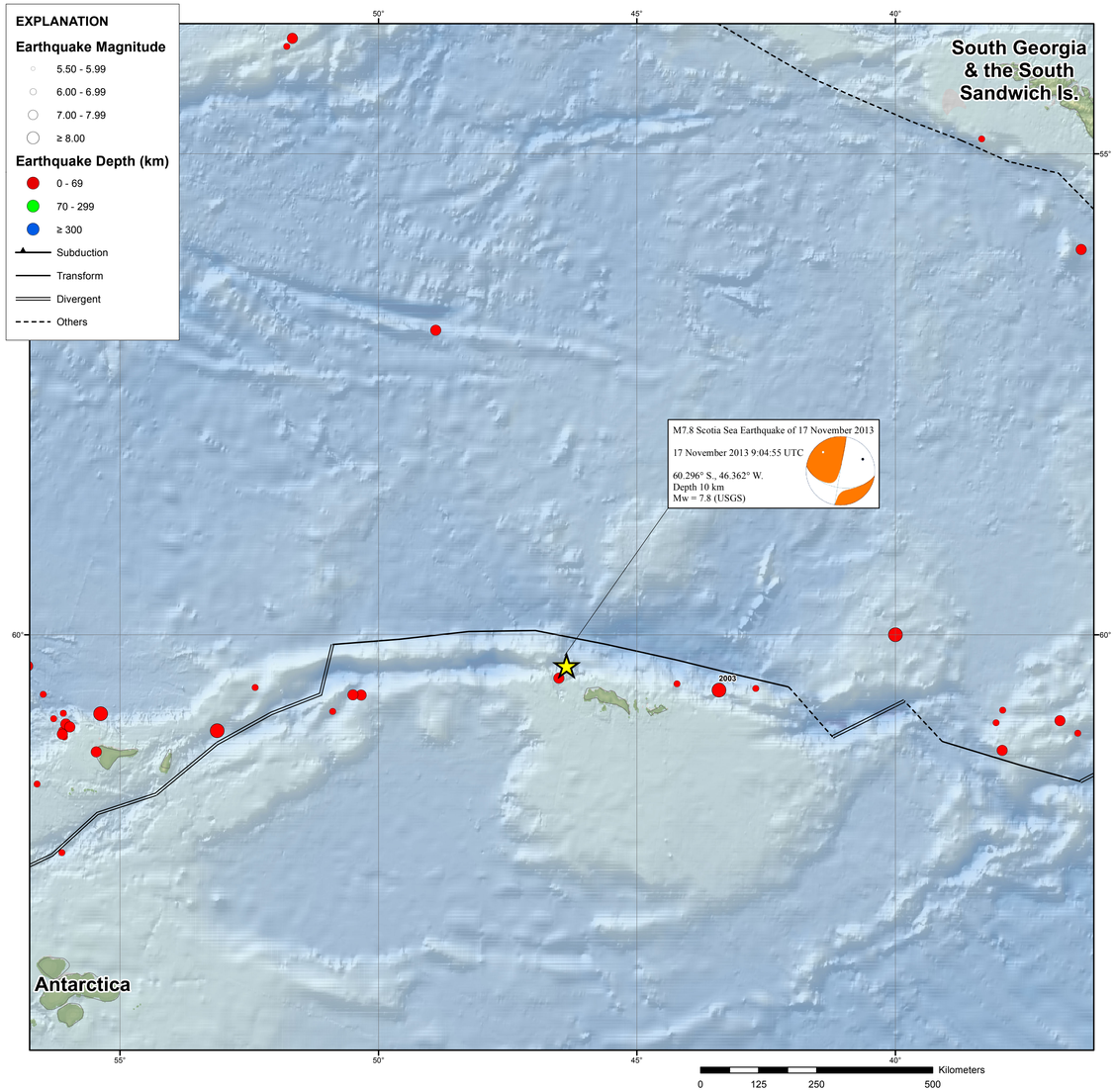
Prepared in cooperation with the Global Seismographic Network

M7.8 Scotia Sea Earthquake of 17 November 2013

Tectonic Setting



Epicentral Region



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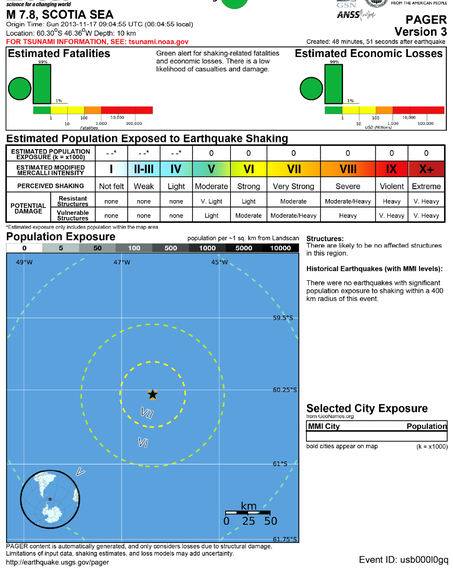
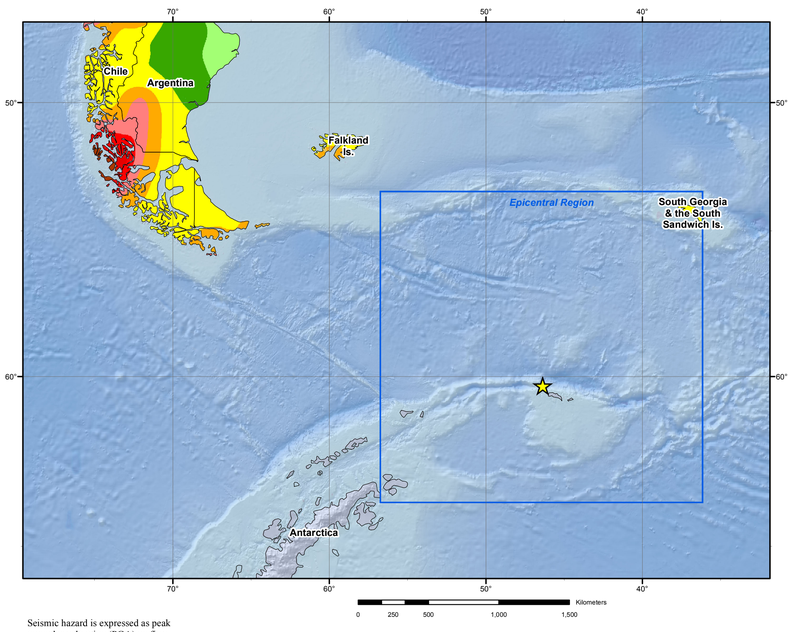
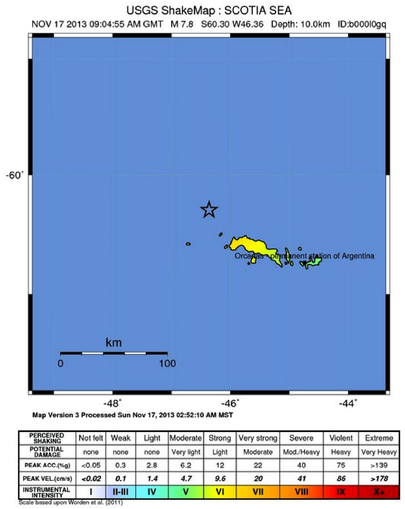


Seismic Hazard



Seismic hazard is expressed as peak ground acceleration (PGA) on firm rock, in meters/sec^2, expected to be exceeded in a 50-yr period with a probability of 10 percent.

ShakeMap



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	76	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale fitted upon Worden et al. (2011)

TECTONIC SUMMARY

The November 17, 2013 earthquake in the Scotia Sea, to the northwest of the South Orkney Islands, occurred as the result of either left-lateral strike slip faulting on an east-west oriented plane, or right-lateral faulting on a north-south plane. The location of the event adjacent to the east-west oriented plate boundary between the Antarctica and Scotia Sea plates implies the left-lateral faulting scenario is most likely. At the latitude of this earthquake, the Antarctica plate moves eastwards with respect to the Scotia Sea plate at a velocity of 6 mm/yr.

The November 17 earthquake is the latest in a series of moderate-to-large earthquakes to strike the same region over the past several days. The sequence began with a M 6.1 event on November 13 approximately 50 km to the west of the November 17 quake. On November 15, a M 6.8 earthquake struck very close to the preceding M 6.1. Since then, 9 aftershocks have been recorded in the area, ranging from M 4.7 to M 5.4, both near the previous earthquakes and in the same approximate location as the November 17 event.

Though the region surrounding the Scotia Sea is familiar with earthquakes, the majority occur around the subduction zone adjacent to the South Sandwich Islands, to the east of the November 17 earthquake. Just two events of M6 or greater have occurred within 250 km of this earthquake over the past 40 years – a M 6.0 230 km to the west in September 1979, and a M 7.6 160 km to the east in August 2003. These two events involved normal and oblique-normal faulting, respectively, associated with the same plate boundary. Neither is known to have caused damage or fatalities.

Significant Earthquakes Mag >= 6.5

Year	Mon	Day	Time	Lat	Long	Dep	Mag
1908	08	17	1032	-60.000	-40.000	0	7.2
1941	11	18	1014	-60.757	-55.375	35	7.1
1983	07	11	1256	-60.918	-53.121	7.7	7.0
1993	09	27	1337	-53.693	-51.662	13	6.6
2002	11	15	1958	-56.051	-36.404	10	6.6
2003	08	04	0437	-60.532	-43.411	10	7.6
2012	01	15	-60.948	-56.113	8	6.6	
2013	11	17	0904	-60.296	-46.362	10	7.8

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)
EHB catalog (Engdahl et al., 1998)
HDF (unpublished earthquake catalog, Engdahl, 2003)
Global Seismic Hazard Assessment Program

PLATE TECTONICS AND FAULT MODEL
PB2002 (Bird, 2003)
Ji, C., D.J. Wald, and D.V. Helmberger, Source description of the 1999 Hector Mine, California earthquake; Part I: Wavelet domain inversion theory and resolution analysis, Bull. Seism. Soc. Am., Vol 92, No. 4. pp. 1192-1207, 2002.
DeMets, C., Gordon, R.G., Argus, D.F., 2010. Geologically current plate motions, Geophys. J. Int. 181, 1-80.

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 Villasenor, 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 signnfiance.

Map updated by U.S. Geological Survey National Earthquake Information Center
17 November 2013
http://earthquake.usgs.gov/
Map not approved for release by Director USGS