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

M8.3 Kuril Islands Earthquake of 15 November 2006

Kuril Islands, Russia

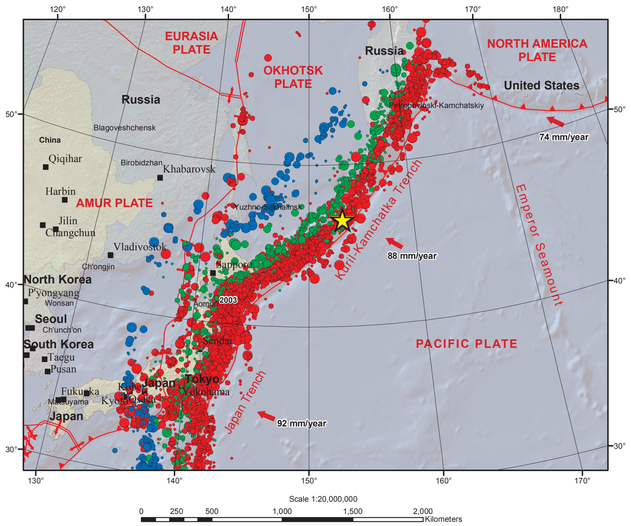
15 November 2006 11:14:16 UTC
46.616° N, 153.224° E
Depth 28.5 km

Mw = 8.3 (Harvard)

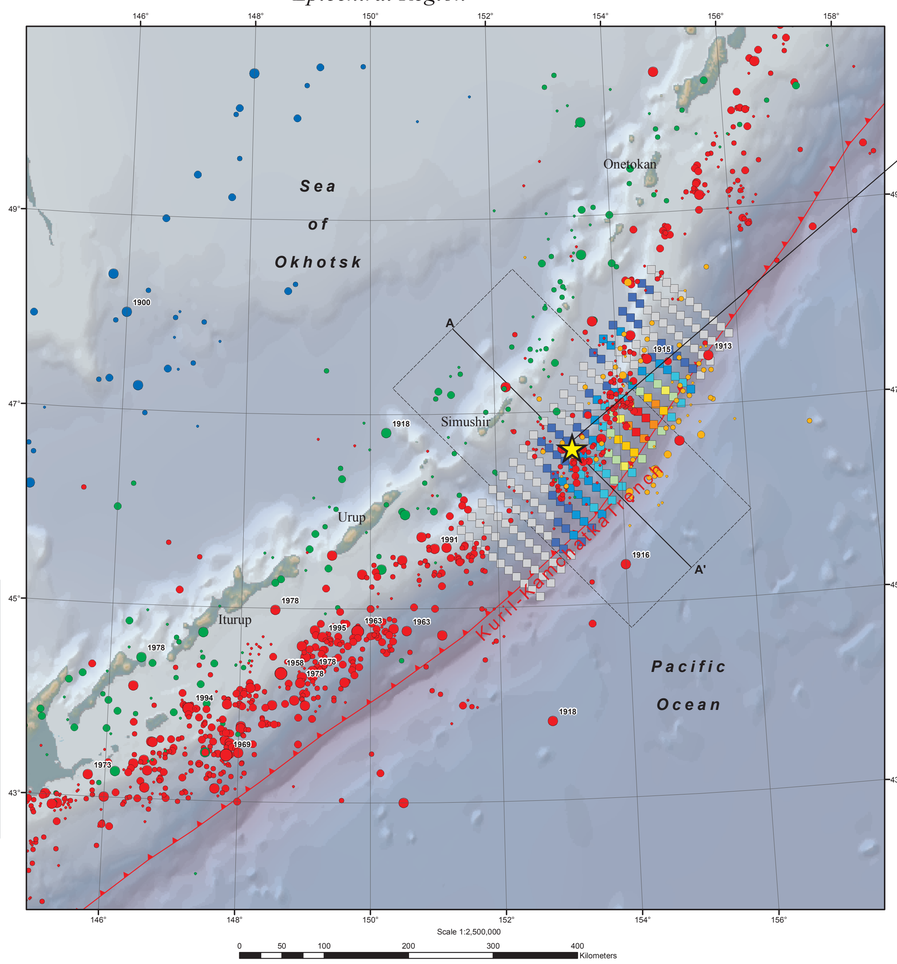
A great earthquake occurred 495 km (305 miles) SSW of Severo-Kuril'sk, Kuril Islands, Russia and 1665 km (1030 miles) NE of Tokyo, Japan, at 5:14 AM MDT, Nov 15, 2006 (10:14 PM local time in Russia). The magnitude and location may be revised when additional data and further analysis results are available.

Felt at Misawa and Yokosuka, Japan and at Petropavlovsk-Kamchatskiy, Russia. At least three docks at Crescent City, California, were damaged by a tsunami with a measured wave height of 1.8 m. Measured wave heights (peak-to-trough) of the tsunami: 0.60 m at Tokachi, 0.40 m at Nemuro and 0.20 m at Kushiro, Japan; 1.52 m at Kahului, 1.14 m at Haleiwa, 0.99 m at Waianae, 0.99 m at Hilo, 0.89 m at Nawiliwili and 0.89 m at Kalaupapa, Hawaii; 0.20 m at Shemya Island and 0.08 m at Amchitka Island, Alaska.

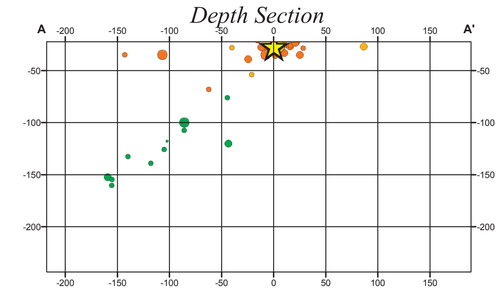
Seismotectonic Setting



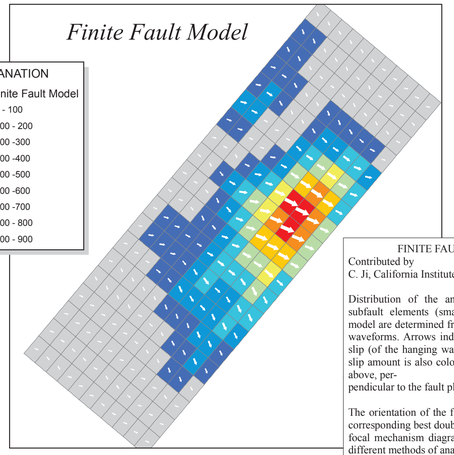
Epicentral Region



Depth Section



Finite Fault Model



FINITE FAULT MODEL
Contributed by
C. Ji, California Institute of Technology

Distribution of the amplitude and direction of slip for subfault elements (small rectangles) of the fault rupture model are determined from the inversion of teleseismic body waveforms. Arrows indicate the amplitude and direction of slip (of the hanging wall with respect to the foot wall); the slip amount is also color-coded as shown. The view is from above, per-
pendicular to the fault plane.

The orientation of the finite fault plane may differ from the corresponding best double couple nodal plane depicted in the focal mechanism diagram on the main map. This is due to different methods of analysis.

The strike of the fault rupture plane is 214 (S 34 W) and the dip is 15°. The dimensions of the subfault elements are 20 km in the strike direction and 12.5 km in the dip direction.

EXPLANATION

- 15 November 2006
- Aftershocks

Earthquake Magnitude
- 4.50 - 4.99
- 5.00 - 5.99
- 6.00 - 6.99
- 7.00 - 7.99
- 8.00 - 8.99

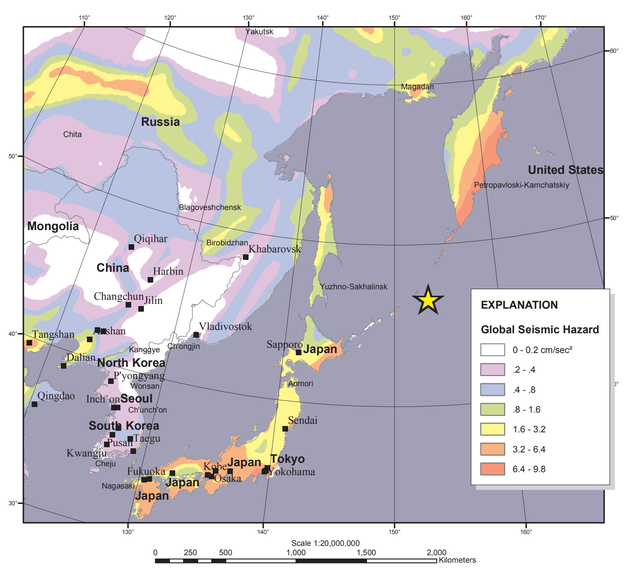
Earthquake Depth
- 0 - 65 km
- 65 - 300
- 300 - 600

Plate Boundary
- Subduction
- Transform
- Divergent
- Convergent

Significant Earthquakes Mag ≥ 7.5

Year	Mn	Dy	Lat	Long	Dep	Mag
1900	1	31	48.000	146.000	450	7.5
1913	8	1	47.500	155.500	0	7.7
1915	5	1	47.500	154.500	35	7.9
1916	10	31	45.400	154.000	0	7.6
1918	9	7	46.812	150.253	242	7.6
1918	11	8	43.816	152.775	63	7.5
1958	11	6	44.329	148.623	35	8.4
1963	10	13	44.770	149.798	13	8.6
1963	10	20	44.772	150.563	27	7.9
1969	8	11	43.478	147.815	45	8.2
1973	6	17	43.223	145.743	43	7.8
1978	3	23	44.982	148.523	21	7.6
1978	3	23	44.359	149.113	8	7.5
1978	3	24	44.233	148.923	12	7.5
1978	12	6	44.455	146.475	181	7.8
1991	12	22	45.615	151.010	25	7.6
1994	10	4	43.945	147.224	14	8.3
1995	12	3	44.663	149.300	33	7.9

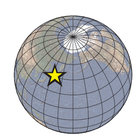
Seismic Hazard



EXPLANATION

Global Seismic Hazard
- 0 - 0.2 cm/sec²
- .2 - .4
- .4 - .8
- .8 - 1.6
- 1.6 - 3.2
- 3.2 - 6.4
- 6.4 - 9.8

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.



DISCUSSION

The Kuril Islands earthquake of 15 November 2006, occurred as thrust-faulting on the boundary between the Pacific plate and the Okhotsk plate. In the region of the earthquake's epicenter, the Pacific plate moves northwest with respect to the Okhotsk plate with a velocity of about 90 mm/year. The Pacific plate subducts beneath the Okhotsk plate at the Kuril-Kamchatka Trench and becomes progressively deeper to the northwest, remaining seismically active to a depth of 680 km. The 15 November mainshock occurred at shallow depth within about 80 km of the trench axis.

The 15 November earthquake is the largest earthquake to have occurred in the central Kuril Islands since the early 20th century. A central Kuril Islands earthquake in 1915 is estimated to have had a magnitude of about 8. The central Kuril Islands commonly experiences one or more shocks of magnitude 6 or greater in a decade. To the southwest, the southern Kuril Islands chain experienced a magnitude 8.5 earthquake in 1963. To the northeast, a magnitude 9 earthquake occurred offshore of Kamchatka in 1952.

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.

REFERENCES

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Bassin, C., Laske, G. and Masters, G., The Current Limits of Resolution for Surface Wave Tomography in North America, EOS Trans AGU, 81, F897, 2000.

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 (GSHAP, 1999)

PLATE TECTONICS
- PB2002 (Bird, 2003)

BASE MAP
- ESRI (1992), Digital Chart of the World
- GLOBE (1999)
- IOC, IHO, and BODC (2003)

Map prepared by U.S. Geological Survey
National Earthquake Information Center
2006
Map not approved for release by Director USGS