U.S. Department of the Interior
U.S. Geological Survey

General Interest Product xxx

M7.8 Rat Islands, Alaska Earthquake of 17 November 2003

LARGEST EARTHQUAKES 1900 - 2003 M GE 7.0
ALEUTIAN ISLANDS

YR	MO	DY	LAT	LONG	DEPTH	MAG
1901	12	31	52.000	-177.000	0.0	7.1
1902	1	1	55.000	-165.000	0.0	7.0
1903	1	17	50.000	-170.000	0.0	7.0
1905	2	14	53.000	-178.000	0.0	7.2
1905	3	22	50.000	180.000	0.0	7.0
1906	8	17	51.000	179.000	0.0	7.8
1907	9	2	52.000	173.000	0.0	7.3
1909	4	10	52.000	175.000	0.0	7.0
1909	9	8	52.500	-169.000	90.0	7.0
1910	9	9	51.500	-176.000	25.0	7.0
1911	9	17	51.000	180.000	0.0	7.1
1912	10	18	54.600	179.200	60.0	7.1
1916	4	18	53.250	-170.000	170.0	7.4
1926	10	13	51.771	-175.361	35.0	7.9
1929	3	7	50.786	-169.524	25.0	7.8
1929	7	5	51.424	-178.136	35.0	7.0
1929	7	7	51.347	-177.910	35.0	7.2
1929	12	17	53.783	171.512	35.0	7.7
1935	2	22	53.273	175.017	35.0	7.1
1937	9	3	52.447	-177.398	35.0	7.2
1940	4	16	52.818	173.345	35.0	7.1
1940	7	14	52.117	178.159	35.0	7.4
1940	8	22	53.000	-165.500	60.0	7.0
1944	7	27	54.000	-165.500	70.0	7.1
1946	4	1	52.750	-163.500	0.0	7.3
1946	11	1	51.500	-174.500	40.0	7.6
1948	5	14	54.500	-161.000	0.0	7.3
1953	1	5	53.582	171.202	17.3	7.2
1957	3	9	52.501	-169.430	48.6	7.2
1957	3	9	51.556	-175.392	30.0	9.1
1957	3	11	52.535	-168.904	30.0	7.1
1957	3	12	51.678	-176.627	35.0	7.1
1957	3	14	51.298	-176.644	35.0	7.2
1957	3	16	51.519	-178.765	35.0	7.1
1957	3	22	53.678	-165.681	45.2	7.1
1965	2	4	51.209	178.499	30.1	8.7
1965	2	4	51.397	179.560	8.2	7.8
1965	3	30	50.314	177.935	20.0	7.7
1966	7	4	51.824	179.875	13.4	7.3
1969	5	14	51.278	-179.856	14.0	7.0
1971	5	2	51.433	-177.248	21.0	7.1
1975	2	2	53.036	173.595	13.1	7.1
1980	3	24	52.946	-167.708	36.2	7.0
1981	1	30	51.835	176.183	35.3	7.0
1986	5	7	51.557	-174.813	28.2	8.0
1991	5	30	54.550	-161.741	28.0	7.0
1996	6	10	51.613	-177.615	28.0	7.9
1996	6	10	51.415	-176.887	27.5	7.3
2003	3	17	51.400	177.939	33.0	7.0

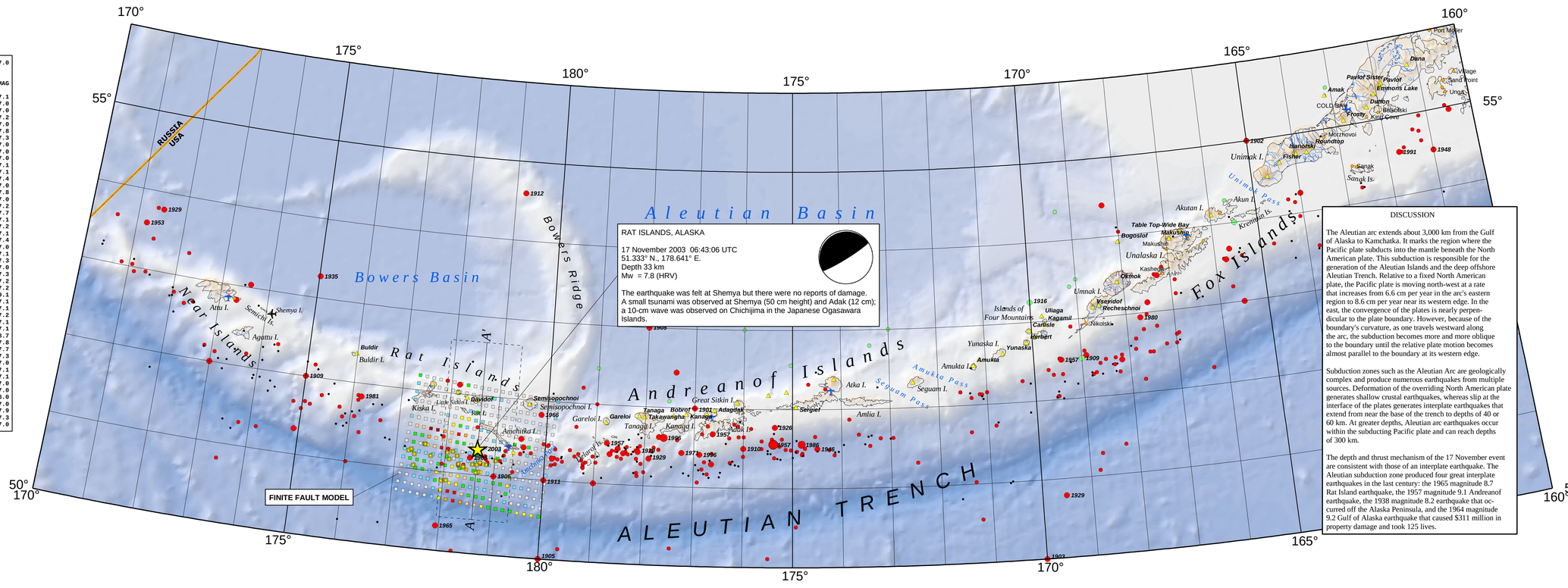
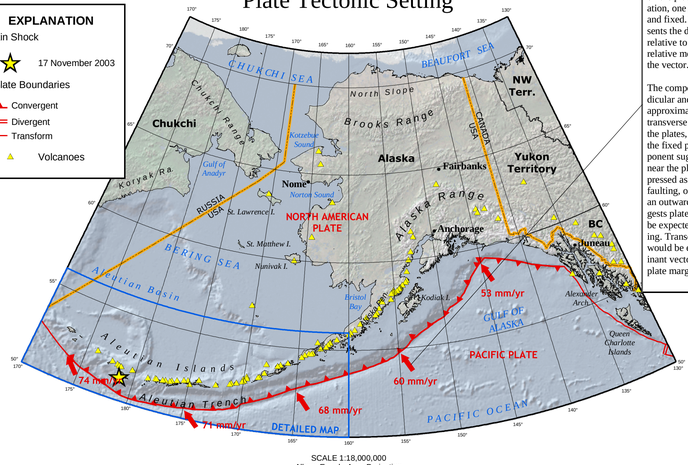


Plate Tectonic Setting



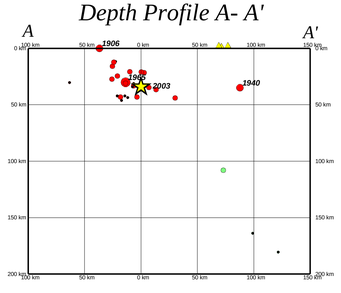
RELATIVE PLATE MOTIONS

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.

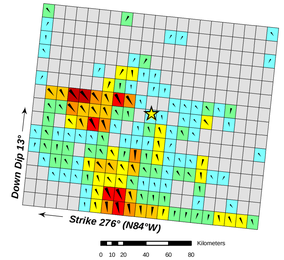
The components of the vector perpendicular and parallel to the plate margin approximate convergent/divergent and transverse direction of motion between the plates, respectively. As viewed from the fixed plate, an inward directed component suggests convergence at and near the plate boundary that may be 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.

EXPLANATION
Main Shock
17 November 2003
Depth Classes
0 - 69 km
70 - 250
Magnitude Classes
5.0 - 5.9
6.0 - 6.9
7.0 - 7.9
8.0 - 8.7
Volcano

Depth Profile A- A'



Finite Fault Model



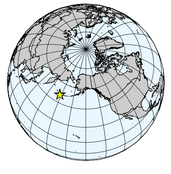
FINITE FAULT MODEL
(C. Ji, California Institute of Technology)

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, perpendicular to the fault plane.

The fact that 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 reflects differing methods of analysis and data sets.

The strike of the fault rupture plane is N84°W and the dip is 13°. The dimensions of the subfault elements are 10 km in the strike direction and 12 km in the dip direction.

EXPLANATION
Amount of Slip
0 cm
30
60
90
120
150
180
210



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.

DATA SOURCES

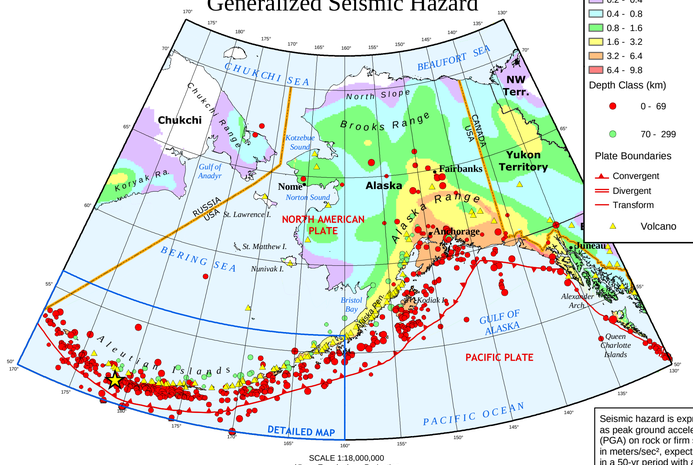
EARTHQUAKES AND SEISMIC HAZARD
USGS, National Earthquake Information Center
NOAA, National Geophysical Data Center
IASPEI, Centennial Catalog (1900 - 1999)
Handbook of Seismology and Earthquake Engineering
Global Seismic Hazard Assessment Program

PLATE TECTONICS
Smithsonian Institution, Global Volcano Program

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

NEWS REPORTS
Anchorage Daily News http://www.adn.com
Japan Today News http://www.japantoday.com

Generalized Seismic Hazard



Seismic hazard is expressed as peak ground acceleration (PGA) on rock or firm soil, in meters/sec², expected in a 50-yr period with a probability of 10 percent.

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