

Volcano Data List

Volcano	Region	Location
Soputan	Sulawesi, Indonesia	1.1°N, 124.7°E
Anatahan	Mariana Islands	16.4°N, 145.7°E
Canlaon	Philippines	10.4°N, 123.1°E
Chikurachki	Kurile Island, Russia	50.3°N, 155.5°E
Colima	Mexico	19.5°N, 103.6°W
Fuego	Guatemala	14.5°N, 90.9°W
Karymsky	Kamchatka, Russia	54.0°N, 159.5°W
Kilauea	Hawaii, USA	19.5°N, 155.3°W
Reventador	Ecuador	0.1°S, 77.7°W
Santa Maria	Guatemala	14.8°N, 91.6°W
Shiveluch	Kamchatka, Russia	56.7°N, 161.4°E
Soufriere Hills	Montserrat, West Indies	16.7°N, 62.2°W
Mount St. Helens	Washington, USA	46.2°N, 122.2°W
Tungurahua	Ecuador	1.5°S, 78.4°W
Karthala	Comoros Islands, Indian Ocean	11.8°N, 43.4°E
Aso	Kyushu, Japan	32.8°N, 131.1°E
Kliuchevskoi	Kamchatka, Russia	56.1°N, 160.6°E
Krakatau	Sunda Strait, Indonesia	6.1°S, 105.4°E
Popocatepetl	Mexico	19.0°N, 98.6°W
Talang	Sumatraz, Indonesia	1.0°S, 100.7°E
Villarrica	Chile	39.3°S, 71.9°E
Ulawun	New Britain, Papua New Guinea	5.1°S, 151.3°E
Ebeko	Kuril Islands, Russia	50.7°N, 156.0°E
Manam	Papua New Guinea	4.1°S, 145.0°E
Bagana	Bougainville Island, Papua New Guinea	6.1°S, 155.2°E
Suwanose-Jima	Ryukyu Islands, Japan	29.6°N, 129.7°E
Atka	Aleutian Islands, USA	52.4°N, 174.2°W
Egon	Flores Island, Indonesia	8.7°S, 122.6°E
Spurr	Southwestern Alaska, USA	61.3°N, 152.3°W
Veniaminof	Alaska Peninsula, USA	56.2°N, 159.4°W
Karanteng	Siau Island, Indonesia	2.8°N, 125.4°E
Piton de la Fournaise	Reunion Island, Indian Ocean	21.2°S, 55.7°E
Soufriere St. Vincent	St. Vincent Island, West Indies	13.3°N, 61.2°W
Etna, Sicily	Italy	37.7°N, 15.0°E
Galeras	Colombia	1.2°N, 77.4°W
Poas Volcano	Costa Rica	10.2°N, 84.2°W
Sangay	Ecuador	2.0°S, 78.3°W
Nviragongo	Democratic Republic of the Congo	1.5°S, 29.3°E
Erta Ale	Ethiopia	13.6°N, 40.7°E
Oyama	Miyakejima, Japan	34.1°N, 139.5°E
Ruapehu	New Zealand	39.3°S, 175.6°E
Grimsvötn	Iceland	64.5°N, 17.3°W
Shishaldin	Unimak Island, Alaska	54.8°N, 163.9°W
Asama	Honshu, Japan	36.4°N, 138.5°E
Mauna Loa	Hawaii, USA	19.5°N, 155.6°W

Earthquake Data List

Earthquake Region	Magnitude	Date	Location
Los Angeles, CA	4.5	January 9, 2009	34.1° N, 117.3° W
Luzon, Philippines	5.1	January 9, 2009	16.1° N, 119.8° E
Bolivia	4.7	January 9, 2009	19.3° S, 66.6° W
Southern Peru	4.3	January 7, 2009	15.9° S, 69.4° W
Alaska	4.3	January 7, 2009	54.1° N, 165.3° W
Southern Japan	5.0	January 6, 2009	24.1° N, 124.0° E
Japan	5.1	January 5, 2009	37.7° N, 142.9° E
Mariana Islands	4.8	January 5, 2009	20.1° N, 147.0° E
Azores Islands	4.9	January 5, 2009	42.4° N, 30.6° W
Southern Greece	4.2	January 4, 2009	36.8° N, 22.3° E
Nicobar Islands, India	5.3	January 4, 2009	6.3° N, 94.1° E
Northern California	4.2	January 4, 2009	38.8° N, 122.8° W
Santa Cruz Islands	5.4	January 3, 2009	12.4° S, 166.7° E
Bouvet Island Region, Antarctica	5.8	November 14, 2008	53.7° S, 8.8° E
Oregon Coast	5.4	November 14, 2008	43.6° N, 127.5° W
Gulf of California	4.7	November 13, 2008	24.2° N, 109.1° W
South Sandwich Islands	5.6	November 13, 2008	56.0° S, 27.3° W
Puerto Rico	4.7	November 13, 2008	19.5° N, 66.4° W
Democratic Republic of the Congo	5.0	November 13, 2008	6.4° S, 26.9° E
Fiji	5.0	November 13, 2008	21.8° S, 178.1° W
Costa Rica	5.3	November 13, 2008	10.8° N, 86.1° W
Northern Mariana Islands	4.6	November 13, 2008	18.4° N, 145.3° E
Vanuatu	4.9	November 12, 2008	17.4° S, 167.2° E
Central Turkey	4.6	November 12, 2008	38.9° N, 35.5° E
Philippines	5.0	November 12, 2008	7.0° N, 126.3° E
Carlsberg Ridge, Indian Ocean	5.0	November 11, 2008	0.0° N, 67.2° E
Qinghai, China	5.4	November 11, 2008	37.6° N, 95.8° E
Southern Iran	4.9	November 11, 2008	26.7° N, 54.9° E
Guatemala	4.9	November 11, 2008	14.1° N, 90.7° W
Myanmar	4.8	November 11, 2008	19.3° N, 95.3° E
Sumatra, Indonesia	5.0	November 11, 2008	4.2° S, 102.2° E
Halmahera, Indonesia	4.9	November 10, 2008	1.8° N, 127.4° E
Northern Peru	4.6	November 10, 2008	8.8° S, 79.2° W
Papua New Guinea	4.8	November 10, 2008	5.6° S, 151.9° E
Aleutian Islands, Alaska	4.3	November 10, 2008	51.2° N, 178.4° W
Hokkaido, Japan	4.7	November 10, 2008	45.2° N, 145.3° E
Kermadec Islands	5.2	November 10, 2008	32.1° S, 179.2° W
Sumatra, Indonesia	5.2	November 10, 2008	0.2° S, 100.0° E
Fiji	5.1	November 10, 2008	17.9° S, 178.5° W
Southern Alaska	4.3	November 9, 2008	60.0° N, 153.2° W
Chile	4.8	November 9, 2008	30.6° S, 70.7° W
Tonga	5.5	November 8, 2008	15.2° S, 174.2° W
Sakha, Russia	5.1	November 8, 2008	56.8° N, 123.0° E
Tajikistan	4.3	November 8, 2008	38.6° N, 69.5° E
Banda Sea	6.2	November 7, 2008	6.8° S, 129.3° E

Table 1 — Combined Richter and Modified Mercalli Intensity Scales

(Approximate intensity values are in **bold type** followed by description)

Descriptor	Richter Magnitudes	MMIS Values	Earthquake Effects	Summary Damage Description	Frequency of Occurrence
Micro	Less than 2.0	I	Not felt. Recorded on seismographs only.		About 8,000 per day
		II	Felt only by persons at rest, on upper floors of buildings, or favorably placed (near epicenter).		About 1,000 per day
Very minor	2.0–2.9	I	Not felt. Recorded on seismographs only.		49,000 (estimated) per year
		II	Felt only by persons at rest, on upper floors of buildings, or favorably placed (near epicenter).		
Minor	3.0–3.9	III	Felt indoors. Hanging objects swing. Vibration like passing of light truck. May not be recognized as an earthquake.	Pictures Move Objects Fall	6,200 (estimated) per year
		IV	Hanging objects swing. Vibration like passing of heavy trucks or the sensation of a jolt like a heavy ball striking the walls. Standing cars rock. Windows, dishes, doors rattle. Glasses clink. In the upper range of IV, wooden walls and frame creak.		
Light	4.0–4.9	V	Felt outdoors; direction estimated. Sleepers awakened. Liquids disturbed, some spill. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.	Nonstructural Damage	800 per year
		VI	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., fall off shelves and pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees and bushes visibly shaken, or heard to rustle.		
Moderate	5.0–5.9	VII	Difficult to stand. Noticed by drivers. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices, also unbraced parapets and architectural ornaments. Some cracks in masonry C. Waves on ponds, water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.	Moderate Damage	120 per year
Strong	6.0–6.9	VIII	Steering of cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved off foundations if not bolted down; loose panel walls thrown out. Decayed pilings broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.	Heavy Damage	18 per year
Major	7.0–7.9	IX	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. General damage to foundations. Frame structures, if not bolted, shifted off foundations. Frames bent. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In flood plains, sand and mud ejected creating earthquake fountains, sand craters.	Extreme Damage	1 per year
Great	8.0–8.9	X	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown onto banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Railroad rails bent slightly.		
Rare Great	9.0 or greater	XI	Rails bent greatly. Underground pipelines completely out of service		1 per 20 years
		XII	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air. Fault lines appear, course of rivers are changed and new lakes formed.		

(Adapted from U.S. Geological Survey documents.)

Masonry A: Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.

Masonry B: Good workmanship and mortar; reinforced, but not designed in detail to resist lateral forces.

Masonry C: Ordinary workmanship and mortar; no extreme weaknesses like failing to tie in at corners, but neither reinforced nor designed against horizontal forces.

Masonry D: Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

