

An Investigation of southern California Earthquakes

U.S. Geological Survey; California Earthquake History 1769-Present.

DIRECTIONS:

Using a map of southern California, plot the location of each major earthquake. Use a different color pencil and slightly larger dot to represent each magnitude.

DATE	TIME(GMT)	LATITUDE	LONGITUDE	MAG	LOCATION	
year	month dy	hr min	(N)	(W)		
1769	7 28	0 0	34 0.00	118 0.00	6.0	Los Angeles Basin
1800	11 22	2130	33 0.	117 18.00	6.5	San Diego region
1812	12 8	15 0	34 22.00	117 39.00	7.0	Wrightwood
1812	12 21	19 0	34 12.00	119 54.00	7.0	Santa Barbara Channel
1827	9 24	4 0	34 0.	119 0.	5.5	Los Angeles region
1852	11 29	20 0	32 30.00	115 0.	6.5	Volcano Lake, B.C.
1855	7 11	415	34 6.00	118 6.00	6.0	Los Angeles region
1858	12 16	10 0	34 0.	117 30.00	6.0	San Bernardino region
1862	5 27	20 0	32 42.00	117 12.00	6.0	San Diego region
1872	5 3	1 0	33 0.	115 0.	5.75	Imperial Valley (?)
1875	11 15	2230	32 30.00	115 30.00	6.25	Imperial Vly to Colorado R. delta
1883	9 5	1230	34 12.00	119 54.00	6.25	Santa Barbara Channel
1890	2 9	12 6	33 24.00	116 18.00	6.5	San Jacinto or Elsinore fault region
1891	7 30	1410	32 0.	115 0.	6.0	Colorado R. delta region
1892	2 24	720	32 33.00	115 38.00	7.0	Laguna Salada, B.C.
1892	5 28	1115	33 12.00	116 12.00	6.5	San Jacinto or Elsinore fault region
1893	5 19	035	34 6.00	119 24.00	5.75	Pico Canyon
1894	7 30	512	34 18.00	117 36.00	6.0	Lytle Creek region
1894	10 23	23 3	32 48.00	116 48.00	5.75	E. of San Diego
1899	7 22	2032	34 18.00	117 30.00	5.75	Lytle Creek region
1899	12 25	1225	33 48.00	117 0.	6.4	San Jacinto and Hemet
1903	1 24	527	31 30.00	115 0.00	6.6	Colorado R. delta region
1906	4 19	030	32 54.00	115 30.00	6.2	Imperial Valley
1907	9 20	154	34 12.00	117 6.00	5.3	San Bernardino region
1910	5 15	1547	33 42.00	117 24.00	5.5	Glen Ivy Hot Springs
1915	6 23	359	32 48.00	115 30.00	6.0	Imperial Valley
1915	6 23	456	32 48.00	115 30.00	5.9	Imperial Valley
1915	11 21	013	32 0.	115 0.	7.1	Volcano Lake, B.C.
1916	10 23	244	34 54.00	118 54.00	5.3	Tejon Pass region
1918	4 21	2232	33 48.00	117 0.	6.9	San Jacinto
1923	7 23	730	34 0.	117 18.00	6.0	San Bernardino region
1925	6 29	1442	34 18.00	119 48.00	6.3	Santa Barbara
1927	11 4	1350	34 42.00	120 48.00	7.3	SW of Lompoc
1933	3 11	154	33 37.00	117 58.00	6.3	Long Beach
1934	12 30	1352	32 15.00	115 30.00	6.5	Laguna Salada, B.C.
1934	12 31	1845	32 0.	114 45.00	7.0	Colorado R. delta
1935	2 24	145	31 59.00	115 12.00	5.3	Colorado R. delta
1937	3 25	1649	33 24.00	116 16.00	6.0	Buck Ridge
1940	5 19	436	32 44.00	115 30.00	7.1	Imperial Valley
1940	12 7	2216	31 40.00	115 5.00	5.5	Colorado R. delta
1941	4 9	1708	31 0.00	114 0.00	5.3	Gulf of California

1941	7	1	750	34	22.00	119	35.00	5.9	Carpenteria
1942	10	21	1622	33	3.00	116	5.	6.5	Fish Creek Mountains
1947	4	10	1558	34	59.00	116	33.00	6.4	Manix
1948	12	4	2343	33	56.00	116	23.00	6.5	Desert Hot Springs
1949	5	2	1125	34	1.	115	41.00	5.9	Pinto Mountain
1951	12	26	046	32	48.00	118	18.00	5.9	San Clemente Island
1954	19		954	33	17.00	116	11.00	6.2	Arroyo Salada
1954	10	24	944	31	30.00	116	0.	6.0	W. of Santo Tomas, B.C.
1954	11	12	1226	31	30.00	116	0.	6.3	W. of Santo Tomas, B.C.
1956	2	9	1432	31	45.00	115	55.00	6.8	San Miguel, B.C.
1956	2	9	1524	31	45.00	115	55.00	6.1	San Miguel, B.C.
1956	2	14	1833	31	30.00	115	30.00	6.3	San Miguel, B.C.
1956	2	15	120	31	30.00	115	30.00	6.4	San Miguel, B.C.
1956	12	13	1315	31	0.	115	0.	6.0	W. shore, Gulf of California
1966	8	7	1736	31	48.00	114	30.00	6.3	Gulf of California
1968	4	9	228	33	11.00	116	8.00	6.5	Borrogo Mountain
1971	2	9	14 0	34	25.00	118	24.00	6.5	San Fernando
1973	2	21	1445	34	4.00	119	2.00	5.2	Point Mugu
1979	10	15	2316	32	36.00	115	18.00	6.5	Imperial Valley
1980	6	9	328	32	12.00	115	5.00	6.4	Victoria, B.C.
1981	4	26	1209	33	8.00	115	39.00	6.0	Westmorland
1981	6	4	1550	33	40.00	119	7.00	5.9	N. of Santa Barbara Island
1986	7	8	920	34	0.	116	36.00	6.0	North Palm Springs
1987	10	1	1442	34	3.00	118	5.00	5.8	Whittier Narrows
1987	11	24	153	33	4.00	115	47.00	6.2	Elmore Ranch fault
1987	11	24	1316	33	1.00	115	51.00	6.6	Superstition Hills
1989	10	18	0004	37	2.19	121	52.98	7.1	Loma Prieta
1992	4	23	450	33	58.00	116	19.00	6.1	Joshua Tree
1992	6	28	1157	34	12.00	116	26.00	7.3	Landers
1992	6	28	1505	34	12.00	116	50.00	6.2	Big Bear
1994	1	17	1230	34	13.00	118	32.00	6.7	Northridge

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Magnitude reported is "summary magnitude" for comparison which is the adjusted intensity magnitude for most events prior to 1898, and is the surface wave magnitude for events after 1898. In the future, we will adjust some of these magnitudes to reflect the best measure of the earthquake and label the type of magnitude being reported.

Source:

Ellsworth, William L., "Earthquake History, 1769-1989" in USGS Professional Paper 1515, Robert E. Wallace, ed., 1990; William Ellsworth, personal communication; and USGS earthquake catalogs.

ANALYSIS OF DATA:

- 1- Looking at your map, are the major earthquakes distributed equally or at random across the map, or is there a pattern to their distribution? Describe.
- 2- In general, where did most of the major earthquakes in southern California happen?
- 3- Can any lines be drawn on your map when the distribution of major earthquakes have been plotted? Describe.
- 4- Looking at the data chart, how often will southern California experience a major earthquake?
- 5- What is the maximum historic number of major earthquakes in a single year? When?
- 6- From the raw data included in this investigation, count the number of major earthquakes that occur in each five year interval. On a piece of your own graph paper, plot a line graph showing the five year time intervals on the horizontal axis and number of major earthquakes on the vertical.
- 7- (a) Summarize what this graph shows. (b) Describe any pattern in the frequency of major earthquakes. (c) Based on this graph, when should the next "big one" hit?
- 8- Do you personally remember any of the major earthquakes listed? What was it like for you? Did your family or friends suffer any injuries or property damage?
- 9- What magnitude and where was the largest major earthquake to hit southern California? How did the magnitude of the one you remembered in #8 compare to the magnitude of the largest 'quake on the list?

EXTENDED INVESTIGATIONS:

Plot a graph and discuss the patterns of earthquake distribution by month, day, or time of day.

SO. CALIFORNIA EARTHQUAKES INVESTIGATION

