

# Quaternary Fault and Fold Database of the United States

As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the [interactive fault map](#).

## Pleito fault zone, Western Pleito section (Class A) No. 76a

Last Review Date: 2000-07-31

*citation for this record:* Bryant, W.A., compiler, 2000, Fault number 76a, Pleito fault zone, Western Pleito section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, <https://earthquakes.usgs.gov/hazards/qfaults>, accessed 12/14/2020 02:02 PM.

### Synopsis

**General:** Significant Holocene active south-dipping thrust fault located along the border of the Transverse Ranges and Great Valley. The Pleito fault zone here is divided into two sections, the Western Pleito section and Eastern Pleito section. Detailed studies by Hall (1984 #5935) documented evidence of Holocene thrust fault displacement along the Eastern Pleito section. Hall (1984 #5935) reported a Holocene slip rate of 1.3–1.4 mm/yr for the past 1.5 ka, based on displacement of Hall's alluvial unit Q6(O). The net slip rate for the past 100 ka is 0.3–2.0 mm/yr. Based on observed average dip-slip displacement of 0.77 m and a Holocene slip rate of 1.3–1.4 mm/yr, Hall inferred a recurrence interval of 500–600 yr. Hall (1984 #5935) reported that one and possibly two events have occurred between 500 AD and 1600 AD.

**Sections:** This fault has 2 sections.

<p><b>Name comments</b></p>	<p><b>General:</b></p> <p><b>Section:</b> The Western Pleito section is informally designated in this compilation. The Western Pleito section extends from Santiago Creek about 4.5 km east of the San Andreas fault [1] eastward to the vicinity of Telegraph Creek.</p> <p><b>Fault ID:</b> Refers to number 309 (Pleito fault) of Jennings (1994 #2878).</p>
<p><b>County(s) and State(s)</b></p>	<p>KERN COUNTY, CALIFORNIA</p>
<p><b>Physiographic province(s)</b></p>	<p>PACIFIC BORDER</p>
<p><b>Reliability of location</b></p>	<p>Good Compiled at 1:62,500 scale.</p> <p><i>Comments:</i> Location based on digital revisions to Jennings (1994 #2878) using original mapping by Hoots (1930 #5938) at 1:62,500; mapping by McGill (1951 #5940) at 1:31,680; mapping by Dibblee (1973 #5934) at 1:24,000.</p>
<p><b>Geologic setting</b></p>	<p>Pleito fault zone is a component of the of the Pleito-Wheeler Ridge thrust-fault system that forms the boundary between the San Emigdio Mountains (part of the Transverse Ranges) and the southern San Joaquin Valley (Davis, 1983 #5933). The Pleito-Wheeler Ridge thrust fault system consists of the south dipping Pleito fault zone and the south-dipping, predominantly blind Wheeler Ridge thrust fault [75] located a few kilometers to the north. The Pleito fault zone extends from Santiago Creek about 4.5 km east of the San Andreas fault [1] eastward to about 4 km east of Grapevine Canyon. Cumulative dip-slip displacement on the Pleito-Wheeler Ridge fault system is about 7 km during the past 5 Ma. Hall (1984 #5935) noted that the lowest of several topographic benches just south of the active traces of the Pleito fault zone are underlain by concealed thrust faults. Hall (1984 #5935) also pointed out the Holocene slip rate of 1.3–1.4 mm/yr is not sufficient to account for the geomorphic relief of the San Emigdio Mountains that has been produced during the past 2.5–3 Ma. Hall (1984 #5935) concluded that the active trace of the Pleito fault zone has migrated northward (basin-ward) and that a significant portion of slip occurs on the Wheeler Ridge fault [75].</p>

<b>Length (km)</b>	This section is 24 km of a total fault length of 38 km.
<b>Average strike</b>	N71°E (for section) versus N85°E (for whole fault)
<b>Sense of movement</b>	Reverse  <i>Comments:</i> Hoots (1930 #5938), McGill (1951 #5940), Dibblee (1973 #5934).
<b>Dip</b>	50°  <i>Comments:</i> Hoots (1930 #5938) depicts the Western Pleito section as dipping between 48° and 58° on his cross-sections A-A', C-C', and D-D'. McGill (1951 #5940) stated that the Western Pleito section west of San Emigdio Canyon probably dips at a high angle almost due south.
<b>Paleoseismology studies</b>	
<b>Geomorphic expression</b>	Traces of the Western Pleito section are delineated by north-facing bedrock escarpments, benches, and scarps in older Quaternary alluvium (Smith, 1984 #5941).
<b>Age of faulted surficial deposits</b>	Traces of the Western Pleito section offset Oligocene to upper Miocene marine sedimentary rocks, and upper Miocene to lower Pleistocene non marine sedimentary rocks. Fault does not offset Pleistocene age alluvium of San Emigdio Canyon. Keller and others (1989 #5939) reported that late Pleistocene deposits overlay the Pleito fault zone at San Emigdio and Los Lobos Creeks. However, these deposits are broadly warped over the fault. East of Pleito Creek the fault does not offset Pleistocene Riverbank(?) Formation (McGill, 1951 #5940; Davis, 1983 #5933).
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	undifferentiated Quaternary (<1.6 Ma)  <i>Comments:</i>
<b>Recurrence interval</b>	
<b>Slip-rate</b>	Between 0.2 and 1.0 mm/yr

<p><b>category</b></p>	<p><i>Comments:</i> Slip rate should be less than the Eastern Pleito section, based on the assumption that the geomorphic expression of the Western Pleito section is less well defined and is not delineated by geomorphic features indicative of late Pleistocene and Holocene alluvium (Smith, 1984 #5941; Jennings, 1994 #2878). Slip rate assigned to the entire Pleito fault by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 2.0 mm/yr (with minimum and maximum assigned slip rates of 1.0 mm/yr and 3.0 mm/yr, respectively).</p>
<p><b>Date and Compiler(s)</b></p>	<p>2000 William A. Bryant, California Geological Survey</p>
<p><b>References</b></p>	<p>#5932 Callaway, D.C., and Rheem, R.S., 1961, Pleito Creek oil field, <i>in</i> SEPM, SEG, AAPG, and SJGS, Pacific Section Meeting 1961 Spring Field Trip, Guidebook, p. 32-33.</p> <p>#5933 Davis, T.L., 1983, Late Cenozoic structure and tectonic history of the western "Big Bend" of the San Andreas fault and adjacent San Emigdio Mountains: Santa Barbara, University of California, unpublished Ph.D. dissertation, 580 p., 9 pls.</p> <p>#5934 Dibblee, T.W., Jr., 1973, Geologic maps of the Santiago Creek, Eagle Rest Peak, Pleito Hills, Grapevine, and Pastoria Creek quadrangles, Kern County, California: U.S. Geological Survey Open-File Report 73-57, scale 1:24,000.</p> <p>#5935 Hall, N.T., 1984, Late Quaternary history of the eastern Pleito thrust fault, northern Transverse Ranges, California: Stanford, California, Stanford University, unpublished Ph.D. dissertation, 89 p., 16 pls., scale 1:6,000.</p> <p>#5936 Hall, N.T., Cotton, W.R., and Hay, E.A., 1981, Recurrence intervals on the Pleito thrust fault, Transverse Ranges, California, <i>in</i> Charonnat, B.B., Rodriguez, R.R., and Seiders, W.H., eds., Prepared by participants in National Earthquake Hazards Reduction Program, Summaries of technical reports: U.S. Geological Survey Open-File Report 81-833, v. 12, p. 129-132.</p> <p>#5937 Hoots, H.W., 1925, Geology of the Wheeler Ridge area, Kern County, California: Stanford, California, Stanford University, unpublished Ph.D. dissertation, 78 p., 10 pls., scale 1:62,500.</p>

#5938 Hoots, H.W., 1930, Geology and oil resources along the southern border of San Joaquin Valley, California, *in* Contributions to economic geology: U.S. Geological Survey Bulletin 812-D, p. 243-338, scale 1:62,500.

#2878 Jennings, C.W., 1994, Fault activity map of California and adjacent areas, with locations of recent volcanic eruptions: California Division of Mines and Geology Geologic Data Map 6, 92 p., 2 pls., scale 1:750,000.

#5939 Keller, E.A., Johnson, D.L., Laduzinsky, D.M., Rockwell, T.K., Seaver, D.B., Zepeda, R.L., and Zhao, X., 1989, Tectonic geomorphology and late Pleistocene soil chronology of the Wheeler Ridge, San Emigdio Mountains and Frazier Mountain areas, *in* Friends of the Pleistocene, Field Trip, Guide Book, p. 301.

#5940 McGill, J.T., 1951, Quaternary geology of the north-central San Emigdio Mountains, California: Los Angeles, University of California, unpublished Ph.D. dissertation, 102 p., 3 pls., scale 1:31,680.

#4860 Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation, Division of Mines and Geology Open-File Report 96-08 (also U.S. Geological Open-File Report 96-706), 33 p.

#5941 Smith, T.C., 1984, Wheeler Ridge and Pleito fault systems, southwestern Kern County, California: California Division of Mines and Geology Fault Evaluation Report FER-150, microfiche copy in Division of Mines and Geology Open-File Report 90-14, scale 1:24,000.

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