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Pleito fault zone, Eastern Pleito section (Class A) No. 76b

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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.

Name comments	**General:** **Section:** The Eastern Pleito section is informally designated in this compilation. The Eastern Pleito section extends from the vicinity of Telegraph Creek eastward to the large landslide complex east of Highway 5 southeast of Grapevine. **Fault ID:** Refers to number 309 (Pleito fault) of Jennings (1994 #2878).
County(s) and State(s)	KERN COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER CASCADE-SIERRA MOUNTAINS
Reliability of location	Good Compiled at 1:62,500 scale. *Comments:* Locations based on digital revisions to Jennings (1994 #2878) using original mapping by Hoots (1930 #5938) at 1:62,500; mapping by Dibblee (1973 #5934) and Smith (1984 #5941) at 1:24,000; mapping by Hall (1984 #5935) at 1:6,000.
Geologic setting	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].

Length (km)	This section is 16 km of a total fault length of 38 km.
Average strike	N69°W (for section) versus N85°E (for whole fault)
Sense of movement	Thrust *Comments:* Hoots (1925 #5937; 1930 #5938), Dibblee (1973 #5934), Davis (1983 #5933), and Hall (1984 #5935) document north-vergent thrust faults.
Dip	20° *Comments:* Average dip below the surface based on oil well data (Davis, 1983 #5933). Hall (1984 #5935) reported dips based on trench and surface exposures that range from 15–32°. Strike of fault is variable, but averages N. 70° E. to E-W (Hall, 1984 #5935).
Paleoseismology studies	76-1 by Hall (1984 #5935) involved the excavation of 12 trenches across traces of the Eastern Pleito section, 2 boreholes, and 4 topographic profiles. Hall (1984 #5935) obtained 25 radiocarbon samples from alluvial deposits for control of timing of slip and correlation with other dated alluvial sequences. Trenches showed evidence of late Holocene offset of Hall's alluvial unit Q6(O).
Geomorphic expression	Hall (1984 #5935) reported that traces of Eastern Pleito section are delineated by a nearly continuous north-facing scarp that coincides in most places with the northern front of the San Emigdio Mountains. In Grapevine Canyon, the vertical separation across the latest Pleistocene to early Holocene Q4 alluvial fan surface is about 5.5 m. East of Grapevine Canyon the Eastern Pleito section is concealed by a massive landslide complex or the fault coincides with the toe of the landslide (Smith, 1984 #5941). Hall (1984 #5935) stated that the surface expression of the strands of the Eastern Pleito section does not exhibit geomorphic features indicative of strike-slip displacement.
Age of faulted surficial deposits	The youngest deposit offset by strands of the Eastern Pleito section is Q6o alluvial unit (Hall, 1984 #5935), which is about 1.4–1.625 ka, based on radiocarbon dating of the stratigraphically youngest units underlying the Q6o terrace surface. The oldest alluvial unit not offset along the Eastern Pleito section is Q7 alluvial unit (Hall, 1984 #5935), which is 175–415 14C yr BP.
Historic	

earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Hall (1984 #5935) reported that 1 and possibly 2 events have occurred between 500 AD and 1600 AD. This is based on radiocarbon ages of unfaulted alluvial unit Q7 (between 175 14C yr BP and 415 14C yr BP) and faulted alluvial unit Q6(O) (between 855 14C yr BP and 1,500 14C yr BP).
Recurrence interval	500–600 yr *Comments:* Hall (1984 #5935) estimated the recurrence interval for the Eastern Pleito section to be between 500 yr and 600 yr, based on the his preferred slip rate of 1.3–1.4 mm/yr and an average slip per event of 0.77 m.
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Hall (1984 #5935) reported a late Quaternary slip rate of 0.3–2.0 mm/yr for the Eastern Pleito section, based on vertical separations of three 14C-dated alluvial fan surfaces and the assumption that the average dip of the Eastern Pleito section is 20°. Hall's (1984 #5935) preferred late Holocene slip rate is 1.3–1.4 mm/yr, which is based on the 1.34 m to 1.75 m vertical offset of the 855 14C yr BP to 1,500 14C yr BP Q6(O) alluvial surface. Hall (1984 #5935) concluded that the late Holocene slip rate for the Eastern Pleito section is insufficient to account for the geomorphic relief of the San Emigdio Mountains that has been produced during the past 2.5–3.0 Ma (Davis, 1983 #5933). Hall (1984 #5935) suggested that a significant portion of range-front thrusting may occur on the Wheeler Ridge fault [75]. Slip rates reported by Clark and others (1984 #2876), based on preliminary data from Hall (1984 #5935, cited as Hall, 1983 oral communication in Clark and others, 1984 #2876) range from a low of 0.2 mm/yr to a high value of 14 mm/yr. The slip rate value of 14 mm/yr is based on the maximum offset of the fluvial terrace surface of 4 m and the youngest age of 280 14C yr BP for the terrace surface. The subsequent publication by Hall (1984 #5935) discounted this high slip rate value due to uncertainties in the youngest age date. Slip rate assigned 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.
Date and	2000

Compiler(s)	William A. Bryant, California Geological Survey
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