

26 APRIL, 1981

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8 May 1981

Westmorland

CDMG #369

3 Chs

Station 33.037N-115.623W

SMA-T/2588

EQ 4/26/81 (0509 PDT) EQ 33.10N-115.64 W Mag 5.6 CIT

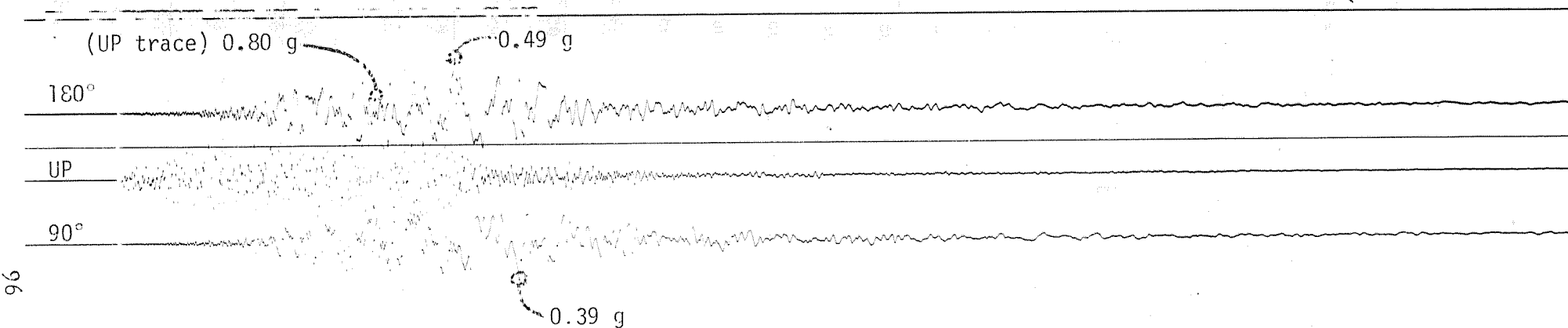
KOD...

A moderate-magnitude earthquake [$M_L=5.6$, California Institute of Technology, (CIT) Seismological Laboratory] occurred at 0509 PDT on 26 April 1981 approximately 9 km north-northwest of Westmorland, Imperial County, California (figure 1). The earthquake epicenter is located by CIT Seismological Laboratory at approximately 33.102°N and 115.637°W.

The main shock of 26 April was preceded by several days of micro- to small-magnitude events. Low-level activity started on 20 April and increased on 21 April in the vicinity of the main shock (Carl Johnson, CIT Seismological Laboratory, personal communication, 1981). From the evening of 24 April until the main shock, a total of 33 events of magnitude ≥ 3.0 occurred in this region (CIT Seismological Laboratory).

Copy Scale (1 cm)

Film Speed = 2 time marks/sec



GROUND EFFECTS

California Division of Mines and Geology

PRELIMINARY DATA

(Subject to Revision)

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Post-earthquake investigations by the California Division of Mines and Geology (CDMG) in the epicentral area indicate that seismically-induced ground cracks were common. All cracking observed in this region is attributed to lurching, slumping, seismic shaking and possibly lateral spreading (Richard Greenwood and James Kahle, CDMG Los Angeles, personal communication, 1981). No surface faulting was observed by CDMG or U.S. Geological Survey (USGS) investigators in the epicentral region which is devoid of mapped surface faults (Jennings, 1967, 1975). However, this area is on a northerly projection of the Imperial fault beyond limits of its mapped surface trace. Investigators did observe surface rupture along segments of the Superstition Hills and Imperial faults. The Imperial fault is probably the most active fault in the Salton Trough and has experienced several episodes of displacement in the last half century (see, for example, Richter, 1958; Sharp, 1976; Gouly and others, 1978; Real and others, 1979; Leivas and others, 1980).

Sympathetic ground rupture on the Superstition Hills fault (figure 1) occurred along approximately two-thirds of its mapped trace with the maximum offset 14 mm in a right-lateral sense coupled with a very slight (≤ 1 mm) vertical component (Robert Sharp, USGS Menlo Park, personal communication, 1981). Sympatietic right-lateral oblique-slip rupture on the Imperial fault (figure 1) was concentrated along 8 km to 9 km of the northernmost limit of its mapped trace. In this region, cracking occurred from just south of Wilsons Corner

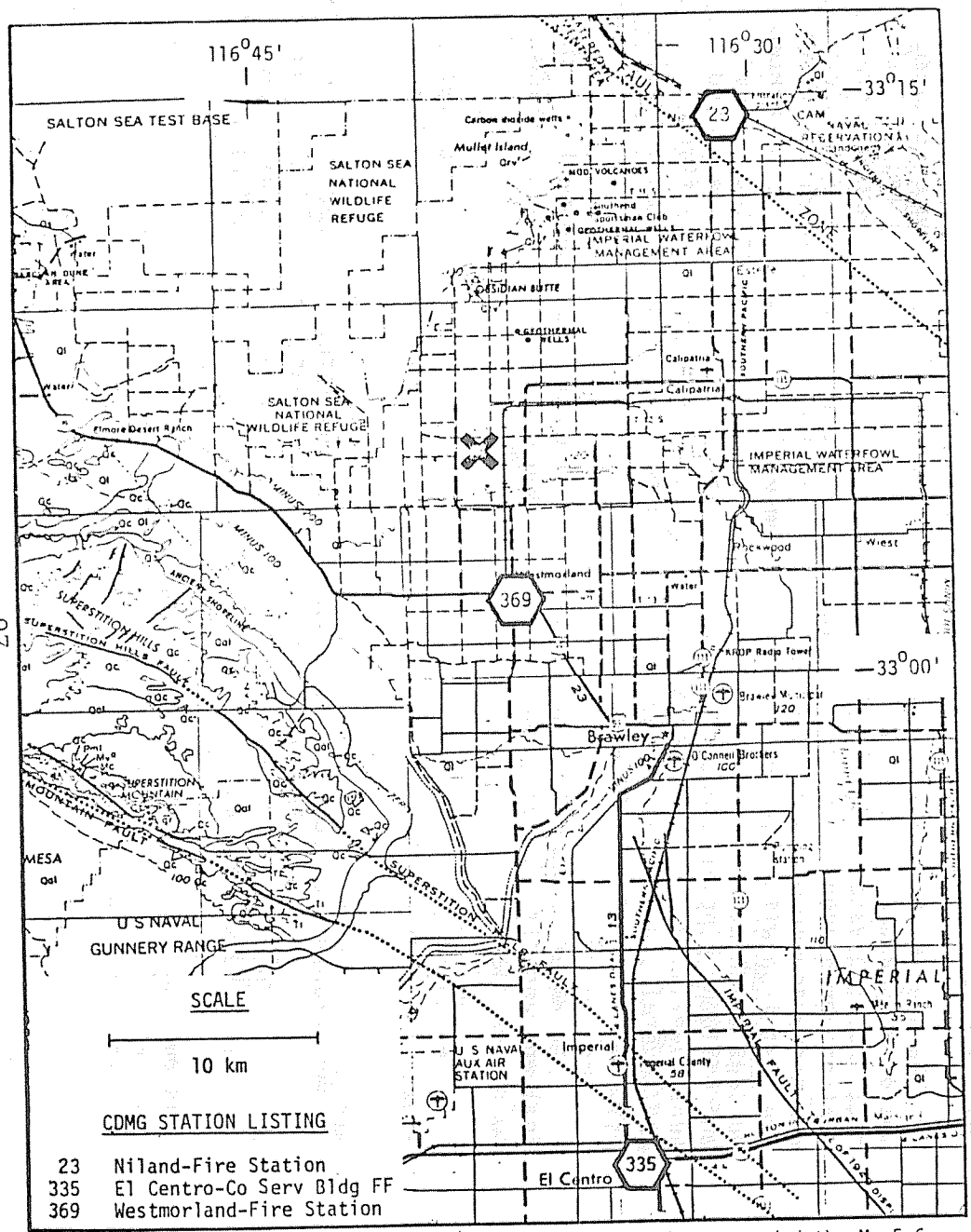


Figure 1. Locations of CDMG strong-motion stations that recorded the $M_L=5.6$ Westmorland earthquake of 26 April 1981. The main shock epicenter, after CIT Seismological Laboratory, is noted by cross symbol. Map base and data after Strand (1962) and Jennings (1967).

to an area between Harris and Keystone Roads on the north with maximum displacements of 5 mm vertically (west side up) and very slight (≤ 1 mm) right-slip indicated by left-stepping en echelon cracks (James Kahle, personal communication 1981).

Sympathetic movement of several faults in the Salton Trough during local earthquakes is not unique to this event. This phenomenon has occurred several times in the recent past (see, for example, Allen and others, 1972; Johnson and Hadley, 1976; Sharp, 1976; Real and others, 1979).

STRONG-MOTION DATA

Instruments at three CDMG Strong Motion Instrumentation Program (SMIP) stations were triggered by the 26 April 1981 Westmorland earthquake (table 1). The CDMG-SMIP station at Westmorland was closest to epicenter of the main event (7 km) and recorded the highest accelerations (table 2). This station recorded a peak vertical acceleration (spike) of 0.80 g and peak horizontal accelerations of 0.49 g and 0.39 g. In addition, numerous foreshocks and aftershocks were also recorded at the Westmorland station, however, most of these earthquakes generated accelerations less than 0.05 g; only one aftershock at this station generated accelerations (horizontal) in excess of 0.05 g.

The strong-motion accelerograph at Niland, the second closest CDMG-SMIP station to the earthquake (19 km), recorded peak horizontal accelerations of 0.19 g and 0.11 g and a peak vertical component of 0.13 g. The other CDMG station at El Centro, recorded accelerations that were less than 0.05 g.

No.	Station Name	Coordinates	Site Geology	Structure Type/Size	Instrument Location(s)
335	El Centro (Co Serv Bldg FF)	32.793°N 115.564°W	alluvium >1000 m	T-hut	ground level
23	Niland (Fire Station)	33.239°N 115.512°W	alluvium >1000 m	1-story bldg	ground level
369	Westmorland (Fire Station)	33.037°N 115.623°W	alluvium >1000 m	1-story bldg	ground level

Station (Instrument; Serial No.)	Acceleration Data	
	Azimuth ¹	Peak Acc. (g)
El Centro Co Serv Bldg FF (SMA-1T; #2761)	92	*
	UP	*
	2	*
Niland Fire Station (SMA-1T; #2550)	90	0.19
	UP	0.13
	360	0.11
Westmorland Fire Station (SMA-1T; #2588)	180	0.49
	UP	0.80
	90	0.39

¹Azimuthal direction for upward (positive) trace deflection on accelerogram.