Jump to Navigation

Quaternary Fault and Fold Database of the United States

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Ash Meadows fault zone (Class A) No. 1077

Last Review Date: 1998-05-14

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Synopsis	The Ash Meadows fault zone is a broad, 40-km-long, north-trending zone comprised of discontinuous short (<4 km) lineaments and sparse scarps in the eastern part of the Amargosa Desert. Highlighting the discontinuous aspect are lineament-free bands 2-5 km wide that cross and divide the zone into patches of lineaments and scarps (Anderson and others, 1995 #898). One such band occurs where the Ash Meadows and Rock Valley [1065] fault zones cross. Geophysical data suggest that the faults are in the footwall of a buried basin-margin fault with as much as 1.4 km of throw. Their diffuse distribution, lack of coincidence, and highly discontinuous nature suggests that they do not represent displacement on that large continuous(?) buried fault. Instead, some of the diffuse lineaments and scarps could be related to major groundwater discharge in the zone, possibly as collapse features. Short (<3 km) scarps adjacent to bedrock areas near the northern and southern ends of the Ash Meadows fault

	zone are apparently late Quaternary fault scarps, but they are located more than 15 km from the main trend of the Ash Meadows fault zone.
Name comments	Modified from Piety (1995 #915) who used the name Ash Meadows fault for this broad, diffuse zone of faulting. As described herein, the fault zone extends from near the junction of U.S. Highway 95 and Nevada Highway 373 (at Amargosa Valley), south through Ash Meadows and along the Amargosa River to the vicinity of Eagle Mountain. **Fault ID:** Fault referred to as AM by Piety (1995 #915) and as faults DV8 and DV9 by dePolo (1998 #2845).
County(s) and State(s)	INYO COUNTY, CALIFORNIA NYE COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Location of traces taken from Anderson and others (1995 #898) who modified earlier fault compilations (McKittrick, 1988 #1197; Donovan, 1991 #1498; Piety, 1995 #915) on the basis of inspection of aerial photos and field studies. Trace recompiled herein at 1:100,000 scale for digitization.
Geologic setting	The north-trending Ash Meadows fault zone is located in the eastern part of the Amargosa Desert where there is no well-defined pattern to the trend of ranges and basins. Gravity data, however, define a major north-trending, west-facing gradient (Healey and others, 1987 #3176) interpreted as an expression of a buried fault (Winograd and Thordarson, 1975 #3856) that marks the eastern margin of the Amargosa Desert rift zone of Wright (1989 #1696). A structural basis for this fault was imaged in the western part of a seismic-reflection profile showing east-truncated reflections interpreted as basin-fill sedimentary beds. Total down-to-the-west throw is estimated to be 1.0-1.4 km (Brocher and others, 1993 #3849). The lineaments and scarps of the Ash Meadows fault zone are mainly east of the projected surface trace of this buried fault (Anderson and others, 1995 #898) and thus do not suggest Quaternary displacement on it. High-discharge springs are within and directly east of the Ash Meadows fault

	zone, and some are aligned along north trends similar to the lineaments and scarps of the fault zone, suggesting structural control of the discharge (Winograd and Thordarson, 1975 #3856). The possibility exists that some of the diffuse and highly discontinuous lineaments and scarps of the Ash Meadows fault zone reflect collapse and/or constructional features related to dissolution and/or groundwater discharge instead of paleoearthquakes.
Length (km)	42 km.
Average strike	N4°E
Sense of movement	Normal *Comments:* Slickenlines in trenches (Donovan, 1991 #1498) and other evidence summarized by Piety (1995 #915) indicate normal slip, as do antithetic scarps and graben features (Anderson and others, 1995 #898).
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	The south and north parts of the Ash Meadows fault zone are defined by west-facing, north-northeast-striking scarps; the southern scarp is a 1.5-km-long feature with a surface offset of as much as 3.4 m at the northwest extreme of the Resting Spring Range. The northern scarps are 2 to 3 km long with as much as 1.4 m surface offset north of Rock Valley Wash, west of the Skeleton Hills (Anderson and others, 1995 #898). These scarps are separated by as much as 40 km and, if projected to a common line, are misaligned by more than 15 km. Between these extremes, the Ash Meadows fault zone is expressed as discontinuous short distributed lineaments and sparse, low (<1 m), gentley degraded scarps, many of which have a questionable association with faulting (Anderson and others, 1995 #898).
Age of faulted surficial deposits	Some scarps are formed on late Pleistocene alluvium (10-130 ka) according to Donovan (1991 #1498). In addition, some lineaments and scarps mark the boundary between Quaternary alluvium and older lacustrine deposits (Donovan, 1991 #1498). For these scarps, correlative deposits are not present on both sides, precluding use of bedding to determine displacement.

Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Although timing of most recent event is not well constrained, a late Quaternary time is suggested based on the presence of scarps on late Pleistocene alluvium (10-130 ka) (Donovan, 1991 #1498).
Recurrence interval	*Comments:* The rate of Quaternary deformation on the Ash Meadows fault zone is very slow, and the recurrence of surface ruptures is probably in the range of several tens of thousands of years (Anderson and others, 1995 #898).
Slip-rate category	Less than 0.2 mm/yr *Comments:* Using scarp-profile data from single-event and multiple-event scarps along the northwest margin of the Resting Springs Range, and poorly constrained ages for the faulted deposits, the slip rate for that part of the fault zone is estimated between 0.1 and 0.01 mm/yr (Anderson and others, 1995 #898). dePolo (1998 #2845) assigned a preferred reconnaissance vertical slip rate of 0.01 mm/yr for the fault based on the presence of scarps on alluvium and the absence of basal facets. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) support a low slip rate. No data available on offset amounts or height or shape of scarps to guide slip-rate estimate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	1998 R. Ernest Anderson, U.S. Geological Survey, Emeritus
References	#898 Anderson, R.E., Crone, A.J., Machette, M.N., Bradley, L.-A., and Diehl, S.F., 1995, Characterization of Quaternary and suspected Quaternary faults, Amargosa area, Nevada and California: U.S. Geological Survey Open-File Report 95-613, 44 p., 4 sheets. #3849 Brocher, T.M., Carr, M.D., Fox, K.F., Jr., and Hart, P.E., 1993, Seismic reflection profiling across Tertiary extensional structures in the eastern Amargosa Desert, southern Nevada,

Basin and Range Province: Geological Society of America Bulletin, v. 105, p. 30-46.

#2845 dePolo, C.M., 1998, A reconnaissance technique for estimating the slip rate of normal-slip faults in the Great Basin, and application to faults in Nevada, U.S.A.: Reno, University of Nevada, unpublished Ph.D. dissertation, 199 p.

#1498 Donovan, D.E., 1991, Neotectonics of the southern Amargosa Desert, Nye County, Nevada, and Inyo County, California: Reno, University of Nevada, unpublished M.S. thesis, 151 p., 1 pl., scale 1:48,000.

#3176 Healey, D.L., Harris, R.N., Ponce, D.A., and Oliver, H.W., 1987, Complete Bouguer gravity map of the Nevada Test Site and vicinity, Nevada: U.S. Geological Survey Open-File Report 87-506, scale 1:100,000.

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#915 Piety, L.A., 1995, Compilation of known and suspected Quaternary faults within 100 km of Yucca Mountain, Nevada and California: U.S. Geological Survey Open-File Report 94-112, 404 p., 2 pls., scale 1:250,000.

#3856 Winograd, I.J., and Thordarson, W., 1975, Hydrogeologic and hydrochemical framework, south-central Great Basin, Nevada-California, with special reference to the Nevada Test Site: U.S. Geological Survey Professional Paper 712-C, 125 p.

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