

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](#).

Abert Rim fault, northern section (Class A) No. 829b

Last Review Date: 2016-03-28

citation for this record: Personius, S.F., compiler, 2002, Fault number 829b, Abert Rim fault, northern 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 03:15 PM.

Synopsis

General: This north-northeast-trending normal fault forms the eastern margin of a half graben that confines the Lake Abert basin. The fault has produced escarpments up to 0.8 km high in Pliocene and Miocene volcanic rocks. The Abert Rim fault is divided into two sections herein, primarily based on recency of movement.

Sections: This fault has 2 sections. The Abert Rim fault is divided into sections herein, primarily based on recency of movement—the southern section, the Lake Abert section, most of which exhibits evidence of Holocene displacement, and the northern section, which exhibits no evidence of latest Pleistocene or Holocene displacement. Scarberry and others (2010 #7374) define three segments based on change in general strike of the fault, cross cutting relations between the fault and NW-striking faults,

	and overall topographic relief; because their study does not address the nature of Quaternary faulting, we do not further subdivide the northern, older section of the fault [829b].
Name comments	General: The Abert Rim fault was originally mapped by Walker (1963 #3565), Walker and Repenning (1965 #3559), Greene and others (1972 #3560), and Madin and others (1996 #3479); the fault was named by Pezzopane (1993 #3544) after the associated, prominent topographic escarpment, the Abert Rim.
County(s) and State(s)	LAKE COUNTY, OREGON HARNEY COUNTY, OREGON
Physiographic province(s)	BASIN AND RANGE COLUMBIA PLATEAU
Reliability of location	Good Compiled at 1:100,000 scale. <i>Comments:</i> Fault traces are from 1:100,000-scale mapping of Weldon and others (2002 #5648), based on 1:250,000-scale mapping of Walker (1963 #3565), Walker and Repenning (1965 #3559), Greene and others (1972 #3560), and 1:500,000-scale mapping of Walker and MacLeod (1991 #3646) and Pezzopane (1993 #3544).
Geologic setting	This north-northeast-trending normal fault forms the eastern margin of a half graben that confines the Lake Abert basin in the Basin and Range province of southeastern Oregon. The fault has produced escarpments up to 0.8 km high (Trench and others, 2012 #7373) in Pliocene to Miocene to Oligocene volcanic rocks (Walker, 1963 #3565; Walker and Repenning, 1965 #3559; Greene and others, 1972 #3560; Walker and MacLeod, 1991 #3646).
Length (km)	This section is 36 km of a total fault length of 77 km.
Average strike	N17°E (for section) versus N15°E (for whole fault)
Sense of movement	Normal, Left lateral <i>Comments:</i> This section is mapped as a normal or high-angle fault by Walker (1963 #3565), Walker and Repenning (1965 #3559), Greene and others (1972 #3560), and Walker and MacLeod (1991 #3646). Pezzopane (1993 #3544) and Pezzopane and Weldon (1993 #149) note fault patterns that suggest a small component of left-lateral displacement.

<p>Dip</p>	<p>70° NW.</p> <p><i>Comments:</i> No structural data on fault dip have been published, but Geomatrix Consultants, Inc. (1995 #3593) used an estimated dip of 70° in their modeling of earthquake potential of the Abert Rim fault.</p>
<p>Paleoseismology studies</p>	
<p>Geomorphic expression</p>	<p>The range-bounding Abert Rim fault is coincident with a prominent 200- to 300-m-high escarpment (Abert Rim) on Pliocene and Miocene bedrock along its length. No fault scarps on Quaternary deposits have been described along the northern section, although Weldon and others (2002 #5648) describe lineaments across Quaternary deposits on some of the fault traces on 1:100,000-scale DEMs.</p>
<p>Age of faulted surficial deposits</p>	<p>The northern section of the Abert Rim fault forms a prominent escarpment on Pliocene and Miocene bedrock, but no fault scarps on Quaternary deposits have been reported along its trace. Offset bedrock is primarily ash-flow tuff with radiometric ages of 4–10 Ma (Walker and MacLeod, 1991 #3646).</p>
<p>Historic earthquake</p>	
<p>Most recent prehistoric deformation</p>	<p>undifferentiated Quaternary (<1.6 Ma)</p> <p><i>Comments:</i> Pezzopane (1993 #3544) used airphoto analysis to infer Quaternary (<1.6 Ma) displacement, and subsequent compilations (Geomatrix Consultants Inc., 1995 #3593; Madin and Mabey, 1996 #3575; Weldon and others, 2002 #5648) also infer Quaternary (<1.6–1.8 Ma) displacement on this section.</p>
<p>Recurrence interval</p>	
<p>Slip-rate category</p>	<p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> No published slip rates are available for the northern section of the Abert Rim fault. However, the fault is marked by a 200- to 300-m-high escarpment on 4–10 Ma volcanic rocks. Such slip data indicate low rates of long-term slip.</p>

Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	<p>#3593 Geomatrix Consultants, Inc., 1995, Seismic design mapping, State of Oregon: Technical report to Oregon Department of Transportation, Salem, Oregon, under Contract 11688, January 1995, unpaginated, 5 pls., scale 1:1,250,000.</p> <p>#3560 Greene, R.C., Walker, G.W., and Corcoran, R.E., 1972, Geologic map of the Burns quadrangle, Oregon: U.S. Geological Survey Miscellaneous Geologic Investigations I-680, 2 sheet, scale 1:250,000.</p> <p>#3575 Madin, I.P., and Mabey, M.A., 1996, Earthquake hazard maps for Oregon: State of Oregon, Department of Geology and Mineral Industries Geological Map Series GMS-100, 1 sheet.</p> <p>#3479 Madin, I.P., Ferns, M.F., Langridge, R., Jellinek, A.M., and Priebe, K., 1996, Final report to Bonneville Power Administration U.S. Department of Energy Portland General Electric Company— Geothermal resources of southeast Oregon: State of Oregon, Department of Geology and Mineral Industries Open-File Report OFR-0-96-4, 41 p., 6 pls.</p> <p>#3544 Pezzopane, S.K., 1993, Active faults and earthquake ground motions in Oregon: Eugene, Oregon, University of Oregon, unpublished Ph.D. dissertation, 208 p.</p> <p>#149 Pezzopane, S.K., and Weldon, R.J., II, 1993, Tectonic role of active faulting in central Oregon: <i>Tectonics</i>, v. 12, p. 1140-1169.</p> <p>#3565 Walker, G.W., 1963, Reconnaissance geologic map of the eastern half of the Klamath Falls (AMS) quadrangle, Lake and Klamath Counties, Oregon: U.S. Geological Survey Mineral Investigations Field Studies Map MF-260, 1 sheet, scale 1:250,000.</p> <p>#3646 Walker, G.W., and MacLeod, N.S., 1991, Geologic map of Oregon: U.S. Geological Survey, Special Geologic Map, 2 sheets, scale 1:500,000.</p> <p>#3559 Walker, G.W., and Repenning, C.A., 1965, Reconnaissance geologic map of the Adel quadrangle, Lake, Harney, and Malheur</p>

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#5648 Weldon, R.J., Fletcher, D.K., Weldon, E.M., Scharer, K.M.,
and McCrory, P.A., 2002, An update of Quaternary faults of
central and eastern Oregon: U.S. Geological Survey Open-File
Report 02-301 (CD-ROM), 26 sheets, scale 1:100,000.

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