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Quaternary Fault and Fold Database of the United States

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Damascus-Tickle Creek fault zone (Class A) No. 879

Last Review Date: 2002-05-24

citation for this record: **Personius, S.F., compiler, 2002, Fault number 879, Damascus-Tickle Creek fault zone, 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 03:14 PM.**

Synopsis	The Damascus-Tickle Creek fault zone consists of numerous short northeast- and northwest-trending faults that form a broad, northeast-trending fault zone; these f fold and offset rocks of the Pliocene Troutdale Formation, Plio-Pleistocene Springwater Formation, and Pleistocene Boring Lava. The area is on the southern margin of the Portland basin, and is the location of numerous eruptive vents of th Boring Lava, some of which may have been localized along faults in the zone. M faults in the zone are buried by latest Pleistocene Missoula flood deposits, but at l one fault strand may have deformed these deposits. Most of these faults are thoug be near-vertical reverse faults with a significant component of right-lateral strike-
Name comments	The Damascus-Tickle Creek fault zone is not shown on early geologic maps of th region (Piper, 1942 #4064; Trimble, 1963 #4062; Swanson and others, 1993 #403 Schlicker and Finlayson (1979 #4166) showed some of these faults as lineaments Most of these faults are shown on maps of Madin (1990 #4067; 1994 #4046) and

	(1992 #3947), and are named after the town of Damascus and fault exposures nea Tickle Creek (Geomatrix Consultants Inc., 1995 #3593). **Fault ID:** These faults are part of fault number 24 of Geomatrix Consultants, Inc (1995 #3593).
County(s) and State(s)	CLACKAMAS COUNTY, OREGON MULTNOMAH COUNTY, OREGON
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Location of fault from ORActiveFaults (http://www.oregongeology.org/arcgis/rest/services/Public/ORActiveFaults/MapS downloaded 06/02/2016) attributed to 1:50,000-scale mapping of Madin (2004 #7 and 1:24,000-scale mapping of Madin (2009 #7780).
Geologic setting	The Damascus-Tickle Creek fault zone consists of numerous short northeast- and northwest-trending faults that form a broad, northeast-tending fault zone; these fa fold and offset rocks of the Pliocene Troutdale Formation, Plio-Pleistocene Springwater Formation, and Pleistocene Boring Lava (Madin, 1990 #4067; Lite, #3947; 1994 #4046). The area is on the southern margin of the Portland basin, an the location of numerous eruptive vents of the Boring Lava. Some fault strands in Damascus-Tickle Creek fault zone may have controlled the locations of eruptive (Madin, 1994 #4046).
Length (km)	16 km.
Average strike	N0°E
Sense of movement	Right lateral, Left lateral, Reverse *Comments:* In cross section, Madin (1994 #4046) shows many of these faults as v high angle reverse faults; the fault patterns, changes in dip direction along strike, one exposure of a fault plane with horizontal slickensides suggest strike-slip displacement on many of these faults (Lite, 1992 #3947; Madin, 1994 #4046). Li (1992 #3947) described an exposure of one left-lateral northeast-striking fault in northwest-striking Tickle Creek fault zone, and interpreted the zone as a right-late wrench fault system with right-lateral slip on northwest-striking faults and left-la slip on northeast-striking faults.
Dip	60–90°

	Comments: In cross section, Madin (1994 #4046) shows some of these faults as v high angle to vertical, and describes one fault exposure with a dip of 60°. Lite (19 #3947) described an exposure of one left-lateral northeast-striking fault with a dip 85° southeast. Wong and others (1999 #4073; 2000 #5137) model faults in this zo vertical faults.
Paleoseismology studies	A fault trench was excavated across a northwest-trending fault strand about 3.5 k southwest of Damascus by the Oregon Department of Geology and Mineral Indus the Oregon Department of Transportation, and the University of Oregon in 1990. logs or detailed descriptions of this excavation were published, but Madin (1994 #4046) briefly described the results of this study. Site 879-1. The trench was excavated in latest Pleistocene silt deposited by catastrophic outburst floods from glacial Lake Missoula, across a northwest-trend fault strand in the SE quarter of section 12, T. 2 S., R. 2 E. The exposure revealed conclusive evidence of young faulting, but the flood deposits were tilted 2–3° to t northeast and cut by numerous liquefaction dikes (Madin, 1994 #4046).
Geomorphic expression	No fault scarps on Quaternary surficial deposits have been described, but much o area was aggressively scoured and buried by gravel from the Missoula floods (I.P Madin, pers. commun., 2001).
Age of faulted surficial deposits	These faults fold and offset rocks of the Pliocene Troutdale Formation, Pliocene-Pleistocene Springwater Formation, and Pleistocene Boring Lava (Madin, 1990 # Lite, 1992 #3947; 1994 #4046). K-Ar analyses on three samples of Boring Lava i area yield ages of about 0.5, 1.3, and 1.6 Ma (Madin, 1994 #4046; Conrey and ot 1996 #4025). However, preliminary results of $^{40}Ar/^{39}Ar$ dating of Boring Lava i Portland basin have yield much younger ages of 100–125 ka (Fleck and others, 2 #5149), so these rocks may be younger than previously believed. No fault scarps Quaternary surficial deposits have been described; the fault is everywhere shown buried by latest Pleistocene Missoula flood deposits (Madin, 1990 #4067; 1994 #4046). However, a trench excavated across a northwest-trending fault strand in t quarter of section 12, T. 2 S., R. 2 E., exposed possible deformation in catastroph flood deposits.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Fault strands in the Damascus-Tickle Creek fault zone displaces 0.5–Ma rocks of the Boring Lava (Madin, 1990 #4067; Lite, 1992 #3947; 1994 #404 Conrey and others, 1996 #4025), so the fault has been active in the middle and la Quaternary. Most faults in the zone are buried by latest Pleistocene Missoula floo

	deposits, but at least one fault strand may have deformed these deposits (Madin, 1 #4046). Pezzopane (1993 #3544) does not show these faults on his map of Quate faults; Geomatrix Consultants, Inc. (1995 #3593), and Madin and Mabey (1996 # mapped the fault zone as active in the late Quaternary (<780 ka). Unruh and othe (1994 #3597)] concluded that the fault zone is potentially active, and Wong and c (1999 #4073; 2000 #5137) mapped it as a probable seismogenic fault zone.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* A cross section across several fault strands in the Damascus quadrang (Madin, 1994 #4046) show vertical offsets of about 30 m of the early to middle Pleistocene Boring Lava. No estimates of strike-slip displacement have been desc but Geomatrix Consultants, Inc. (1995 #3593) and Wong and others (1999 #4073 2000 #5137) calculated preferred slip rates of 0.01–0.1 mm/yr in their analyses o earthquake hazards associated with the combined Grant Butte-Damascus Creek-T Creek fault zones.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
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