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Quaternary Fault and Fold Database of the United States

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Denali fault, east Muldrow-Alsek section (also known as Shakwak fault) (Class A) No. 5000h

Last Review Date: 2012-07-01

Compiled in cooperation with the Alaska Department of Natural Resources

citation for this record: **(Craw) Burns, P.A., and Koehler, R.D., compilers, 2012, Fault number 5000h, Denali fault, east Muldrow-Alsek section (also known as Shakwak fault), 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 03:08 PM.**

Synopsis	**General:** The Denali fault is a major structural element in south-central Alaska, and accommodates a significant amount of the on-land deformation caused by the convergence between the northwestward-moving Pacific plate and the overriding North American plate. Underthrusting and subduction along the Aleutian Trench accommodates most of the plate convergence, but part of the motion is transferred inland to the North American plate and produces dextral transpressive faulting in southern and south-central Alaska. The Denali fault system extends more than

	2,000 km across Alaska and the Yukon Territory of Canada in a large, northward convex arc. The sense of motion on the Denali fault is predominately right-lateral, but some parts of the fault are predominately thrust faults. Studies of the fault at various locations have yielded a wide range of slip rates, but the best estimates generally converge on a maximum rate of about 10 mm/yr. Surface rupture associated with the 1912 M_W 7.2–7.4 Delta River earthquake (Carver and others., 2004 #7724) and the 2002 M_W7.9 Denali earthquake occurred on the central part of the fault. The 2002 Denali earthquake produced 341 km of surface rupture on three faults, the central Denali, the Totschunda [5230], and the Susitna Glacier [5501] faults.The earthquake began with rupture on the previously unknown Susitna Glacier fault. Rupture then propagated eastward onto the main Denali fault, and diverted southeastward onto the Totschunda fault. The 2002 earthquake showed that surface ruptures from large events are not restricted to a single fault within the system and demonstrated the complex interaction between faults. **Sections:** This fault has 11 sections. Various authors have subdivided the fault system into sections or segments that have differing names and lengths. We use the subdivisions of Plafker and others (1994 #AK327) for the purposes of this compilation. Following this precedent, we divide the main Denali fault into ten sections and discuss the characteristics of each section.
Name comments	**General:** In some publications, the Denali fault is treated as a single tectonic structure, but it actually consists on several interconnected and inter-related faults. St. Amand (1957 #AK807) first applied the name “Denali fault” to this system of faults that extends from southeastern Alaska, across the southern Yukon Territory of Canada, through the Alaska Range, and extending to Goodnews Bay on the Bering Sea in southwestern Alaska.
County(s) and State(s)	YUKON TERRITORY, CANADA
Physiographic province(s)	WESTERN CORDILLERA
Reliability of location	Compiled at 1:63,000 scale. *Comments:*
Geologic setting	

Length (km)	This section is 285 km of a total fault length of 4254 km.
Average strike	S. 63° E. (for section) versus S. 84° E. (for whole fault)
Sense of movement	Right lateral, Thrust *Comments:* Bostock (1952 #AK551), Grantz (1966 #AK31), St. Amand (1957 #AK807)
Dip Direction	V *Comments:* Muller (1967 #7748)
Paleoseismology studies	
Geomorphic expression	
Age of faulted surficial deposits	
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Bostock (1952 #AK551), Clague (1979 #AK490)
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* There is no information that permits an evaluation of the fault's slip rate so the slip rate is classified as unknown.
Date and Compiler(s)	2012 Patricia A. (Craw) Burns, Alaska Division of Geological and Geophysical Surveys Richard D. Koehler, Alaska Division of Geological and Geophysical Surveys
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Questions or comments?