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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.

Cascadia fold and fault belt (Class A) No. 784

Last Review Date: 2002-04-19

citation for this record: **Personius, S.F., compiler, 2002, Fault number 784, Cascadia fold and fault belt, 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 03:17 PM.**

Synopsis	This group of north-striking folds and faults form a broad fold and thrust belt that deforms sediments underlying the continental shelf and slope in the forearc of the Cascadia subduction zone [781]. The fold and thrust belt consists of two primary domains differentiated on the basis of fold wavelength: a continental slope domain underlain by a thick sequence of accretionary wedge sediments deformed by closely spaced thrust faults and short-wavelength folds, and a continental shelf domain underlain by a rigid basement of Siletz River Volcanics (Siletzia terrane) deformed by more broadly spaced folds and thrusts. As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic displacements on these structures are always related to great megathrust earthquakes on the subduction zone or whether some independent displacements are related to smaller earthquakes in the overriding North American Plate.

Name comments	**Fault ID:** Some of these folds and faults are included in fault number 21 of Pezzopane (1993 #3544).
County(s) and State(s)	CLATSOP COUNTY, OREGON (offshore) COOS COUNTY, OREGON (offshore) CURRY COUNTY, OREGON (offshore) DOUGLAS COUNTY, OREGON (offshore) LANE COUNTY, OREGON (offshore) LINCOLN COUNTY, OREGON (offshore) TILLAMOOK COUNTY, OREGON (offshore)
Physiographic province(s)	PACIFIC BORDER (offshore)
Reliability of location	Poor Compiled at 1:500,000 scale. *Comments:* The fault traces are from 1:500,000-scale mapping of Goldfinger and others (1992 #464); location of folds mapped by Goldfinger and others (1992 #464) are not shown.
Geologic setting	This group of north-striking folds and faults form a fold and thrust belt that deforms sediments underlying the continental shelf and slope in the forearc of the Cascadia subduction zone [781] (Goldfinger and others, 1992 #464; MacKay and others, 1992 #4299; Goldfinger, 1994 #3972; MacKay, 1995 #4235; Goldfinger and others, 1997 #4090; McNeill and others, 2000 #5060). The fold and thrust belt consists of two primary domains differentiated on the basis of fold wavelength: a continental slope domain underlain by a thick sequence of accretionary wedge sediments deformed by closely spaced thrust faults and short-wavelength folds, and a continental shelf domain underlain by a rigid basement of Siletz River Volcanics (Siletzia terrane) deformed by more broadly spaced folds and thrusts (Trehu and others, 1994 #4234; Yeats and others, 1998 #4085; Fleming and Trehu, 1999 #4237; McNeill and others, 2000 #5060). As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic displacements on these structures are always related to great megathrust earthquakes on the subduction zone, or whether some independent displacements are related to smaller earthquakes in the overriding North American Plate (Goldfinger and others, 1992 #446; Goldfinger and others, 1992 #464; Goldfinger and others, 1997 #4090; Yeats and others, 1998 #4085; McNeill and others, 1998 #4089).

Length (km)	484 km.
Average strike	N30°W
Sense of movement	Thrust *Comments:* These faults are mapped as east and west-verging thrust faults, and synclines and anticlines (Goldfinger and others, 1992 #464; MacKay and others, 1992 #4299; Goldfinger, 1994 #3972; MacKay, 1995 #4235; Goldfinger and others, 1997 #4090; McNeill and others, 2000 #5060).
Dip Direction	W; E *Comments:* Seismic-reflection data and sinuous fault traces indicate moderate fault dips (Goldfinger and others, 1992 #464; MacKay and others, 1992 #4299; Goldfinger, 1994 #3972; MacKay, 1995 #4235; McNeill and others, 2000 #5060).
Paleoseismology studies	
Geomorphic expression	No detailed information is available on the geomorphic expression of most individual structures, but side-scan sonar, bathymetric, and seismic-reflection data show that most of these structures form elongate, en echelon anticlinal ridges in the sea floor (Snavely, 1987 #4086; Goldfinger and others, 1992 #464; MacKay and others, 1992 #4299; MacKay, 1995 #4235; Snavely and Wells, 1996 #4290; McNeill and others, 2000 #5060).
Age of faulted surficial deposits	
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* No detailed information on the ages of most recent movement on these structures has been published, but many offshore structures offset late Pleistocene and Holocene sediments and thus have been active in the latest Quaternary (Goldfinger and others, 1992 #464; Goldfinger, 1994 #3972; Goldfinger and others, 1997 #4090). Most of these folds and faults are mapped as active in the Holocene or late Pleistocene, but some are mapped

	as active in the middle and late Quaternary (<700-780 ka) or as Plio-Pleistocene (Goldfinger and others, 1992 #464; Pezzopane, 1993 #3544; Geomatrix Consultants Inc., 1995 #3593; Madin and Mabey, 1996 #3575; McNeill and others, 2000 #5060).
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* No detailed information on the slip rates associated with these structures has been published, but similar offshore structures such as the Stonewall anticline [786] have slip rates of 1-5 mm/yr (Yeats and others, 1998 #4085).
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#4237 Fleming, S.W., and Trehu, A.M., 1999, Crustal structure beneath the central Oregon convergent margin from potential-field modeling—Evidence for a buried basement ridge in local contact with a seaward dipping backstop: Journal of Geophysical Research, v. 104, no. B9, p. 20,431-20,447. #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. #3972 Goldfinger, C., 1994, Active deformation of the Cascadia Forearc—Implications for great earthquake potential in Oregon and Washington: Oregon State University, unpublished Ph.D. dissertation, 246 p., http://hdl.handle.net/1957/36664. #446 Goldfinger, C., Kulm, L.D., Yeats, R.S., Appelgate, B., MacKay, M.E., and Moore, G.F., 1992, Transverse structural trends along the Oregon convergent margin—Implications for Cascadia earthquake potential and crustal rotations: Geology, v. 20, p. 141-144. #4090 Goldfinger, C., Kulm, L.D., Yeats, R.S., McNeill, L., and Hummon, C., 1997, Oblique strike-slip faulting of the central Cascadia submarine forearc: Journal of Geophysical Research, v. 102, no. B4, p. 8217-8243.

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#4086 Snavely, P.D., Jr., 1987, Chapter 14-Tertiary geologic framework, neotectonics, and petroleum potential of the Oregon-Washington continental margin, *in* Scholl, D.W., Grantz, A., and Vedder, J.G., eds., Geology and resource potential of the continental margin of Western North America and adjacent ocean basins—Beaufort Sea to Baja, California: Circum-Pacific Council for Energy and Mineral Resources Earth Science Series, v. 6, p. 305-335.

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