Jump to Navigation

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.

Coquille anticline (Class A) No. 893

Last Review Date: 2002-05-31

citation for this record: **Personius, S.F., compiler, 2002, Fault number 893, Coquille anticline, 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 northwest-striking Coquille anticline was formed during ongoing east-west compression in the forearc of the Cascadia subduction zone [781], and is part of a broad fold and thrust belt that is actively deforming the accretionary wedge offshore. Some parts of the structure have been variously mapped as an anticline, thrust fault, left- or right-stepping right-lateral strike slip fault, and a down-northeast normal or reverse fault, but onshore, the structure is inferred as a fault-propagation fold that overlies a blind, southwest-dipping reverse fault. Offshore, the fault offsets the sea floor and shows evidence of active folding or slumping of Miocene bedrock that post-date erosion associated with the latest Pleistocene sea level lowstand. Onshore, the fault apparently offsets the 80 ka Whisky Run and perhaps older marine terraces near Coquille Point, but evidence for Holocene displacement is equivocal. As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic displacements on this structure

	are always related to great megathrust earthquakes on the subduction zone, or whether some displacements are related to smaller earthquakes in the North American plate.
Name comments	The Coquille anticline was originally mapped as a fault offshore by Clark and others (1985 #4192) and informally named the Coquille fault by McInelly and Kelsey (1990 #4102). Witter and others (1997 #4193) and Witter (1999 #4194) correlate this structure with the Fulmar fault offshore, and reinterpret deformation data to infer that the structure is an anticline (Coquille anticline [893]) that overlies a blind, southwest-dipping reverse fault. **Fault ID:** This structure is included in fault number 39 of Pezzopane (1993 #3544), and fault number 16 of Geomatrix Consultants, Inc. (1995 #3593).
County(s) and State(s)	COOS COUNTY, OREGON
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* The axial trace of the fold onshore is from 1:50,000-scale (approximate) figure of Witter (1999 #4194); offshore trace is from 1:670,000-scale (approximate) figure of McNeill and others (1998 #4089).
Geologic setting	The northwest-striking Coquille anticline was formed during ongoing east-west compression in the forearc of the Cascadia subduction zone, and is part of a broad fold and thrust belt that is actively deforming the accretionary wedge offshore (Clarke and others, 1985 #4192; McInelly and Kelsey, 1990 #4102; Goldfinger and others, 1992 #464; McNeill and others, 1998 #4089). Some parts of the fold have been variously mapped as an anticline, thrust fault, left- or right-stepping right-lateral strike slip fault, and a down-northeast normal or reverse fault (Clarke and others, 1985 #4192; McInelly and Kelsey, 1990 #4102; Goldfinger and others, 1992 #464; Goldfinger, 1994 #3972; Witter and others, 1997 #4193; McNeill and others, 1998 #4089; Witter, 1999 #4194). Witter and others (1997 #4193) and Witter (Witter, 1999 #4194) reinterpret deformation data to infer that the

	structure is a fault-propagation fold that overlies a blind, southwest-dipping reverse fault. As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic displacements on this structure are always related to great megathrust earthquakes on the subduction zone, or whether some displacements are related to smaller earthquakes in the North American Plate.
Length (km)	27 km.
Average strike	N30°W
Sense of movement	Anticline, Reverse *Comments:* Some parts of the fault has been variously mapped as an anticline, thrust fault, right stepping right-lateral strike slip fault, and a down-northeast normal or reverse fault (Clarke and others, 1985 #4192; McInelly and Kelsey, 1990 #4102; Goldfinger and others, 1992 #464; Goldfinger, 1994 #3972; McNeill and others, 1998 #4089). Witter and others (1997 #4193) and Witter (1999 #4194) infer that the structure is a fault-propagation fold that overlies a blind, southwest-dipping reverse fault.
Dip Direction	NE; SW
Paleoseismology studies	
Geomorphic expression	Offshore, the Coquille anticline or fault appears to offset the sea floor (Clarke and others, 1985 #4192), and has been imaged in several seismic reflection lines (Clarke and others, 1985 #4192; Goldfinger and others, 1992 #464; Goldfinger, 1994 #3972). No evidence of folding and faulting in Quaternary deposits was observed during submersible dives to the structure, but evidence of active folding or slumping of Miocene bedrock in folds on the sea floor that post-date erosion associated with the latest Pleistocene sea level lowstand suggest young movement (Goldfinger, 1994 #3972). Onshore, the fold causes changes in the height of the Whisky Run and perhaps older marine terraces near Coquille Point (McInelly and Kelsey, 1990 #4102; Witter and others, 1997 #4193; Witter, 1999 #4194).
Age of faulted surficial	Goldfinger (1994 #3972) noted the presence of active folding or slumping of Miocene bedrock in folds on the sea floor that post-

deposits	date erosion associated with the latest Pleistocene sea level lowstand. Onshore, the fault apparently causes abrupt changes in the height of the 80 ka Whisky Run and perhaps older marine terraces near Coquille Point (McInelly and Kelsey, 1990 #4102; Witter and others, 1997 #4193; Witter, 1999 #4194). Witter and others (1997 #4193) and Witter (1999 #4194) found no conclusive evidence of Holocene deformation in relative sea level curves constructed at sites across the Coquille anticline.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Evidence from submersible dives on the offshore projection of the anticline indicates post latest Pleistocene movement (Goldfinger, 1994 #3972). Onshore, the fold appears to offset the 80 ka Whisky Run marine terrace (McInelly and Kelsey, 1990 #4102), but Witter and others (1997 #4193) and Witter (1999 #4194) found no conclusive evidence of Holocene deformation in relative sea level curves constructed at sites across the projected axis of the anticline. Pezzopane (1993 #3544), Goldfinger and others (1992 #464), Geomatrix Consultants, Inc. (1995 #3593), and Madin and Mabey (1996 #3575) may have used data on the offshore portion of the structure to infer Holocene or latest Pleistocene (<20 ka).displacement on the Coquille anticline.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* McInelly and Kelsey, (1990 #4102), Witter and others (1997 #4193) and Witter (1999 #4194) measured vertical offset of 18–20 m of the 80 ka Whisky Run marine terrace at Coquille Point. Geomatrix Consultants, Inc. (1995 #3593) used this data to estimate slip rates of 0.2–3.0 mm/yr, and a preferred rate of 1.0 mm/yr for the Coquille fault.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#4192 Clarke, S.H., Jr., Field, M., E., and Hirozawa, C.A., 1985, Reconnaissance geology and geologic hazards of the offshore Coos Bay Basin, Oregon: U.S. Geological Survey Bulletin 1645, 41 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.

#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.

#464 Goldfinger, C., Kulm, L.D., Yeats, R.S., Mitchell, C., Weldon, R., II, Peterson, C., Darienzo, M., Grant, W., and Priest, G.R., 1992, Neotectonic map of the Oregon continental margin and adjacent abyssal plain: State of Oregon, Department of Geology and Mineral Industries Open-File Report 0-92-4, 17 p., 2 pls.

#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.

#4102 McInelly, G.W., and Kelsey, H.M., 1990, Late Quaternary tectonic deformation in the Cape Arago-Bandon region of coastal Oregon as deduced from wave-cut platforms: Journal of Geophysical Research, v. 95, no. B5, p. 6699-6713.

#4089 McNeill, L.C., Goldfinger, C., Yeats, R.S., and Kulm, L.D., 1998, The effects of upper pl. deformation on records of prehistoric Cascadia subduction zone earthquakes, *in* Stewart, I.S., and Vita-Finzi, C., eds., Coastal tectonics: Geological Society Special Publication No. 146, p. 321-342.

#3544 Pezzopane, S.K., 1993, Active faults and earthquake ground motions in Oregon: Eugene, Oregon, University of Oregon, unpublished Ph.D. dissertation, 208 p.

#4194 Witter, R.C., 1999, Late Holocene paleoseismicity, tsunamis and relative sea-level changes along the south-central Cascadia subduction zone, southern Oregon: University of Oregon, unpublished Ph.D. dissertation, 178 p.

#4193 Witter, R.C., Kelsey, H.M., and Hemphill-Haley, E., 1997, A paleoseismic history of the south-central Cascadia subduction

	zone—Assessing earthquake recurrence intervals and upper-pl. deformation over the past 6600 years at the Coquille River Estuary, southern Oregon: Technical report to U.S. Geological Survey, under Contract 1434-HQ-97-GR-03036, 54 p. #6298 Witter, R.C., Kelsey, H.M., and Hemphill-Haley, E., 2003, Great Cascadia earthquakes and tsunamis of the past 6,700 years, Coquille River estuary, southern coastal Oregon: Geological Society of America Bulletin, v. 115, p. 1289-1306.