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.

Sunset Bay-Cape Arago folds and faults (Class A) No. 888

Last Review Date: 2002-05-31

citation for this record: **Personius, S.F., compiler, 2002, Fault number 888, Sunset Bay-Cape Arago folds and faults, 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	Faults in the vicinity of Sunset Bay and Shore Acres are a group of steeply dipping, east-striking faults that offset Eocene bedrock, marine terrace sediments, and wave-cut platforms along the central Oregon coast. At least one of these faults is mapped as a right-lateral strike-slip fault. North-striking folds and associated high angle faults (not shown on map) deform Eocene bedrock and wave-cut platforms at Cape Arago. These fault and fold trends are consistent with the east-west orientation of compressive stress in this part of the forearc of the Cascadia subduction zone. The Sunset Bay-Cape Arago folds and faults appear to deform the approximately 80 ka Whisky Run and/or approximately 105 ka Pioneer marine terrace sediments and platforms, and thus have been active in the late Quaternary. 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 displacements are related to smaller earthquakes in the North American plate.
Name comments	The faults and folds in the vicinity of Sunset Bay, Shore Acres, and Cape Arago were mapped by Baldwin (1966 #4122), Ehlen (1967 #4123), Newton (1980 #4144), McInelly and Kelsey (1990 #4102), and Madin and others (1995 #4158). A prominent fault (not shown on map) and an anticline at Cape Arago were named the Cape Arago fault and Cape Arago anticline by Ehlen (1967 #4123).
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 fault traces are from 1:430,000-scale (approximate) figure 4 of Ehlen (1967 #4123) and from 1:115,000-scale (approximate) figure 2 of McInelly and Kelsey (1990 #4102). Some faults are mapped at 1:24,000-scale by Madin and others (1995 #4158).
Geologic setting	Faults in the vicinity of Sunset Bay and Shore Acres are a group of steeply dipping, east-striking faults that offset Miocene bedrock, marine terrace sediments, and wave-cut platforms along the central Oregon coast; at least one of these faults is mapped as a right-lateral strike-slip fault (Ehlen, 1967 #4123; McInelly and Kelsey, 1990 #4102). North-striking folds and associated high angle faults (not shown on map) deform Miocene bedrock and wave-cut platforms at Cape Arago (Ehlen, 1967 #4123; McInelly and Kelsey, 1990 #4102). These fault and fold trends are consistent with the east-west orientation of compressive stress in this part of the forearc of the Cascadia subduction zone (McInelly and Kelsey, 1990 #4102; Madin and others, 1995 #4158). 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 displacements are related to smaller earthquakes in the North American plate.

Length (km)	6 km.
Average strike	N52°W
Sense of movement	Right lateral, Normal, Anticline *Comments:* At least one of the east-striking Sunset Bay-Shore Acres faults are mapped as steeply dipping oblique slip, right-lateral/normal (?) faults (Ehlen, 1967 #4123; McInelly and Kelsey, 1990 #4102; Madin and others, 1995 #4158). The north-striking faults at Cape Arago are mapped as normal faults (Ehlen, 1967 #4123), but their orientation suggests that they may be bedding plane (flexural-slip) faults in the west limb of the Cape Arago anticline (Baldwin, 1966 #4122; McInelly and Kelsey, 1990 #4102).
Dip Direction	V *Comments:* Vertical dip on Sunset Bay-Shore Acres faults and east and west limbs on the anticline.
Paleoseismology studies	
Geomorphic expression	The Sunset Bay-Cape Arago faults and folds are mapped on the basis of offset and warped marine-terrace sediments and wavecut platforms (Ehlen, 1967 #4123; McInelly and Kelsey, 1990 #4102). The location and shape of Sunset Bay and coves near Shore Acres may be related to differential erosion along these and other faults (Ehlen, 1967 #4123). The faults are not marked by definitive scarps on marine terrace sediments east of Sunset Bay (Madin and others, 1995 #4158); this relationship may be caused by rapid decrease in displacement along strike east of Sunset Bay (Madin and others, 1995 #4158), or may reflect predominantly strike-slip faulting and lack of vertical displacement.
Age of faulted surficial deposits	There is some conflict in the interpreted age of offset deposits: Ehlen (1967 #4123) and Newton (1980 #4144) infer offset of marine-terrace platforms along some of the Sunset Bay-Shore Acres faults, Beaulieu and Hughes (1975 #4141) and Armentrout (1980 #4098) inferred late Quaternary displacement based on changes in height of the Whisky Run marine platform along Sunset Bay, and McInelly and Kelsey (1990 #4102) map these faults as offsetting the approximately 80 ka Whisky Run marine terrace and in some cases the approximately 105 ka Pioneer

	marine terrace. However, Madin and others (1995 #4158) map faults near Sunset Bay as pre-late Quaternary, and do not show them offsetting marine-terrace sediments. The Cape Arago anticline warps the Whisky Run marine platform at Cape Arago (McInelly and Kelsey, 1990 #4102).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* If the faulted and warped marine terrace sediments and platforms mapped by McInelly and Kelsey (1990 #4102) are correlative with 80 ka and 105 ka marine highstands, then these faults and folds have displacements in the late Quaternary. Pezzopane (1993 #3544) and Goldfinger and others (1992 #464) show faults and folds near Sunset Bay, Shore Acres, and Cape Arago as active in the Holocene or latest Pleistocene (<20 ka); Geomatrix Consultants, Inc. (1995 #3593), and Madin and Mabey (1996 #3575) do not include these faults and folds in their compilations of Quaternary faults in Oregon.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* McInelly and Kelsey (1990 #4102) calculated an uplift rate of approximately 0.6–0.8 mm/yr for the 80 ka Whisky Run marine-terrace platform along the mapped axis of the Cape Arago anticline. The short mapped length and horizontal (105 m) and vertical (few tens of meters) offsets in Eocene bedrock (Madin and others, 1995 #4158) indicate low long-term rates of slip on the east trending faults at Sunset Bay and Shore Acres.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#4098 Armentrout, J.M., 1980, Cenozoic stratigraphy of Coos Bay and Cape Blanco, southwestern Oregon, Field trip No. 9, *in* Oles, K.F., Johnson, G., Niem, A.R., and Niem, W.A., eds., Geologic field trips in western Oregon and southwestern Washington: State of Oregon, Department of Geology and Mineral Industries Bulletin101, p. 175-216. #4122 Baldwin, E.M., 1966, Some revisions of the geology of the Coos Bay Area, Oregon: The ORE BIN, v. 28, no. 11, p. 189-203.

#4141 Beaulieu, J.D., 1975, Environmental geology of western Coos and Douglas Counties, Oregon: State of Oregon, Department of Geology and Mineral Industries Bulletin 87, 148 p., 16 pls., scale 1:62,500.

#4123 Ehlen, J., 1967, Geology of state parks near Cape Arago, Coos County, Oregon: The ORE BIN, v. 29, no. 4, p. 61-83.

#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.

#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.

#4158 Madin, I.P., McInelly, G.W., and Kelsey, H.M., 1995, Geologic map of the Charleston quadrangle, Coos County, Oregon: State of Oregon Geological Map Series GMS-94, scale 1:24,000.

#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.

#4144 Newton, V.C., Jr., 1980, Prospects for oil and gas in the Coos Basin, western Coos, Douglas, and Lane Counties, Oregon: State of Oregon, Department of Geology and Mineral Industries Oil and Gas Investigation 6, 74 p., 3 pls.

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