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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.

Valley Mountains monocline (Class B) No. 2449

Last Review Date: 2000-10-01

Compiled in cooperation with the Utah Geological Survey

citation for this record: **Hecker, S., and Christenson, G.E., compilers, 2000, Fault number 2449, Valley Mountains monocline, 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 02:56 PM.**

Synopsis	Poorly understood Tertiary to Quaternary(?) fold that forms the eastern flank of the Valley Mountains in central Utah. The Valley Mountains monocline and its eastern counterpart, the Wasatch monocline [2450], may have formed largely in response to differential subsidence associated with salt dissolution, and thus are both considered to be Class B structures. Hecker (1993 #642) believes that the associated Japanese Valley graben [fault 2447] may have formed in response to movement on the Valley Mountains monocline.
Name	**Fault ID:** Refers to fault number 13-26 of Hecker (1993 #642)

comments	**Fault ID:** Refers to fault number 13-26 of Hecker (1993 #642).
County(s) and State(s)	SANPETE COUNTY, UTAH SEVIER COUNTY, UTAH
Physiographic province(s)	COLORADO PLATEAUS BASIN AND RANGE
Reliability of location	Poor Compiled at 1:750,000 scale. *Comments:* Mapped or discussed by Witkind and Page (1984 #5022) and Willis (1991 #4549). Fold trace from Witkind and Page (1984; figure 1, scale 1:750,000).
Geologic setting	The Valley Mountains lie at the western edge of the transition zone between the Colorado Plateaus and Basin and Range physiographic provinces. The Valley Mountains are an eastward-tilted fault block composed chiefly of Cretaceous and Tertiary strata (Witkind, 1984 #5022). Along the eastern margin of the range, strata are folded down to the east beneath Sanpete-Sevier Valley, which is underlain at depth by the evaporite-bearing Arapien Shale. Witkind and Page (1984 #5022), as well as other workers, attribute deformation of the Tertiary strata along the margins of Sanpete-Sevier Valley to episodic growth and collapse of salt diapirs. However, Lawton and Weiss (1999 #4995) highlight several structural features that are not satisfactorily explained by the salt-diapirism model, and believe that the importance of diapirism in the structural evolution of the area has been overestimated.
Length (km)	39 km.
Average strike	N6°W
Sense of movement	Monocline
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	The strata that form the crest of the Valley Mountains are flat-lying, but gradually flex downward to the east, forming the east-facing Valley Mountains monocline. The Flagstaff limestone forms much of the monoclinal slope, and younger strata (Colton, Green River, and Crazy Hollow) have been almost completely

	removed except near the base of the monocline (Witkind, 1984 #5022). Most of the structural relief may be due to differential subsidence associated with salt dissolution. However, the linearity, trend, and some of the structural relief of the fold may be rooted in underlying Tertiary and Quaternary basin-and-range block faults (Witkind, 1984 #5022). Hecker (1993 #642) believes that the Japanese Valley graben [2447], in flat-lying beds at the crest of the Valley Mountains, may have formed in response to movement on the monocline. Owing to the questionable nature of the origin of the Valley Mountains monocline, we consider it to be Class B structure.
Age of faulted surficial deposits	Middle and late Quaternary deposits are displaced in the Japanese Valley graben at the crest of the Valley Mountains, perhaps associated with uplift across the subjacent monocline. Two small parallel faults just east of the Valley Mountains (not shown on map) cut Quaternary pediment deposits, but may be the result of non-tectonic processes (Willis, 1991 #4549). Evidence for deformed Quaternary sediments along the monocline has not been reported.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:*
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr
Date and Compiler(s)	2000 Suzanne Hecker, U.S. Geological Survey Gary E. Christenson, Utah Geological Survey
References	#642 Hecker, S., 1993, Quaternary tectonics of Utah with emphasis on earthquake-hazard characterization: Utah Geological Survey Bulletin 127, 157 p., 6 pls., scale 1:500,000. #4995 Lawton, T.F., and Weiss, M.P., 1999, Geologic map of the Wales quadrangle, Juab and Sanpete Counties, Utah: Utah Geological Survey Miscellaneous Publication 99-2, 28 p. pamphlet, 2 sheets, scale 1:24,000.

	#4549 Willis, G.C., 1991, Geologic map of the Redmond Canyon quadrangle, Sanpete and Sevier Counties, Utah: Utah Geological Survey Map 138, 17 p. pamphlet, scale 1:24,000. #5022 Witkind, I.J., and Page, W.R., 1984, Origin and significance of the Wasatch and Valley Mountains monoclines, Sanpete-Sevier Valley area, central Utah: The Mountain Geologist, v. 21, no. 4, p. 143-156.