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FIELD TRIP GUIDEBOOK #44

CADMAN HIGH ROCK QUARRY

November 16, 2013

Bruce Stoker, Earth Systems
High Rock Quarry Personnel

NWGS FIELD TRIP GUIDEBOOK SERIES

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I. FIELD TRIP INFORMATION

What is Tz, SP, and SWIF? Where did the bedrock landslide go? The Cadman Quarry is a large rock and sand quarry with outstanding exposures of the Volcanic Rocks of Mt. Persis and 107 ka river deposits of the Whidbey Formation with a glacial till below it. We will observe

striking evidence of sub-glacial flow and the full range of Vashon glacial units, and look at faults and liquefaction related to the Southern Whidbey Island Fault (SWIF). *Many thanks to Cadman, Inc. for access, the safety class, and their time on the tour.*

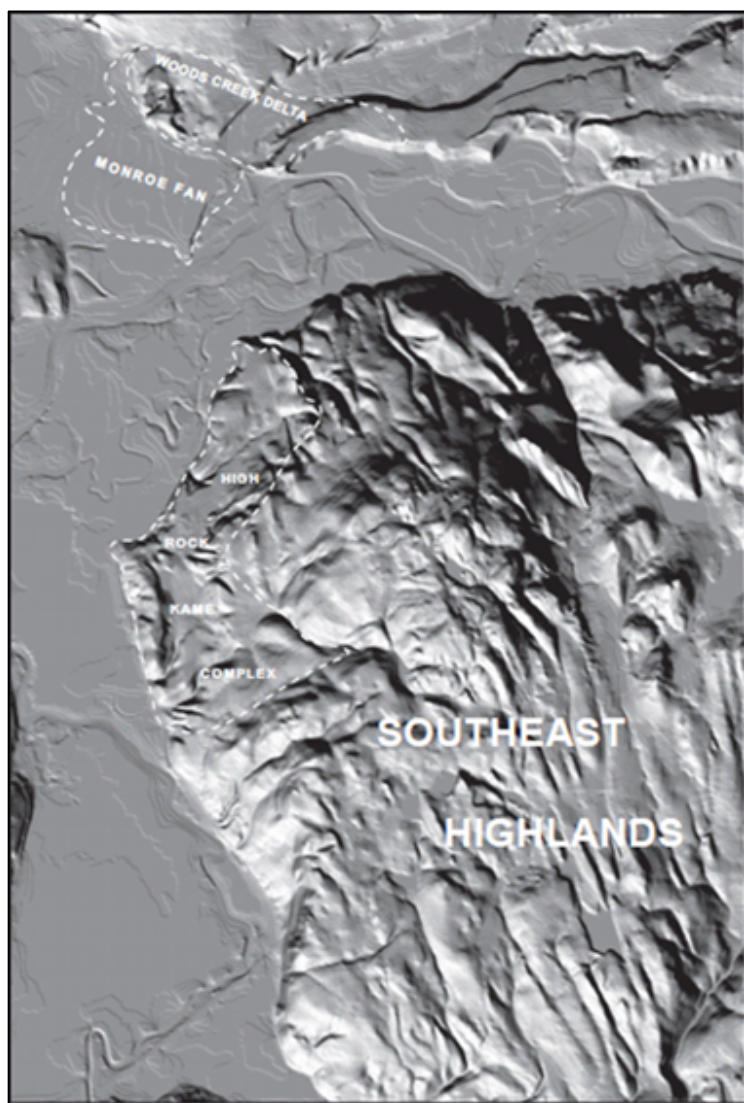


Figure 1. Lidar hill shade image of the area, Skykomish river enters from the east at top of image. Snoqualmie River is along the left. Monroe is in the top left (NW) corner on the Woods Creek Fan, quarry is center left where the highlands start.



Figure 2. Radiocarbon Age Site 22A, Photo 1632. Whidbey Formation (unit Q_{cws}), ancient Snoqualmie River–provenance alluvium, in the Cadman Quarry south of Monroe and just north of the Snohomish/King county line. Strata here consist of nonglacial sands and pebbly sands with disseminated organic material including plant debris. These cross bedded fluvial sediments are exposed along a 50-ft-high active quarry wall, where they are overlain by younger Vashon advance outwash and Vashon till. (Photo shows a shorter pit wall.) Petrographically, sediments directly to the south of this site contain grains of plagioclase, quartz, biotite, and lithic fragments of greenstone, volcanics, and minor granite; presence of a gravel-rich dike suggests liquefaction. Low content of monocrystalline quartz with high content of polycrystalline quartz and lithics including serpentine and volcanics suggest incorporation of local detritus (Dragovich and others, 2011). OSL-dated sands near the photo have a distinct ancient Snoqualmie provenance, indicating mixing of local and ancient Snoqualmie detritus in these old fluvial deposits. This exposure is elevated (410 ft or 125 m amsl) and has possibly been uplifted by offset along the Cherry Valley and (or) Monroe faults. The finite radiocarbon age (40,000 yr B.P.) is interpreted to be erroneous and the result of contamination by modern organics, because of ages obtained for nearby OSL samples 10-25A and 10-25B from the same active quarry wall (101 ± 4.47 ka and 107 ± 9.87 ka at age sites 25A and 25B) and an infinite radiocarbon age at site 25A. (See radiocarbon age sample 10-22A in Appendix 1 and OSL/IRSL age sample 10-22A in Table 2.) Geologist for scale. (See map sheet in Dragovich and others, 2011.) (From Dragovich and others, 2011).



Figure 3. River polished surface from sub-glacial flow at the bottom of the pit formerly beneath several hundred feet of glacial deposits.



Figure 4. Fault contact. The highly jointed hanging wall and the face of the footwall are completely covered in slickensides of this near vertical fault exposure in the Volcanic Rocks of Mt Persis.



Figure 5. Bedrock landslide on the east wall. This pressure mound is about 4 ft high on the north portion of the slide.

REFERENCES CITED

Dragovich, J. D.; Anderson, M. L.; Mahan, S. A.; Koger, C. J.; Saltonstall, J. H.; MacDonald, J. H., Jr.; Wessel, G. R.; **Stoker, B. A.**; Bethel, J. P.; Labadie, J. E.; Cakir, Recep; Bowman, J. D.; DuFrane, S. A., 2011, Geologic map of the **Monroe 7.5-minute quadrangle**, King and Snohomish Counties, Washington: Washington Division of

Geology and Earth Resources, Open File Report 2011-1, 1 sheet, scale 1:24,000, with 24 p. text.

Also see:

Carnation and Lake Joy Quadrangle geologic maps. All these are available at http://www.dnr.wa.gov/Publications/ger_24k_mapping_status.pdf