The paleoseismology of the southern Steens fault zone is described in detail by Personius et al. (2006, 2007). The vertical offset of distinctive facies of the faulted lacustrine complex at the site is 4.4 ± 0.2 m (estimated 2σ uncertainties). A 9-km-long zone of west-facing, 0.5- to 2-m-high fault scarps is present along the southeastern margin of the Bog Hot Valley, but their short length, position adjacent to the mapped trace of the Steens fault zone, and scarps morphology indicate they likely represent triggered slip along a fault segment adjacent to the southern Steens fault zone. Based on the cross-sectional area of the colluvial wedges, the two older surface ruptures (ST3 and ST2) had surface offsets of ~1.1 m, and the youngest one (ST1) had a surface offset of ~2.2 m. Personius et al. (2007) used radiocarbon and luminescence dating to estimate the following times of occurrence of these events: the most recent earthquake (ST1) occurred 4.6 ± 1.0 ka, the penultimate earthquake (ST2) occurred 6.1 ± 0.5 ka, and the oldest earthquake (ST3) occurred 11.5 ± 2.0 ka. Herein we present a new OxCal model of the chronological data from Personius et al. (2007) that produces similar earthquake ages (Fig. B). Based on the stratigraphic offset from scarps profiles along the southern 10-15 km of the fault (Personius et al. 2006), we use the luminescence age from near the top of the lacustrine sequence in the trench (BT02−17,870 ± 1,140 yr) to calculate an average latest Quaternary slip rate of ~0.25 mm/yr. This rate is consistent with latest Quaternary interval rates based on the past three dated earthquakes at the Bog Hot Valley site, as well as from offset of Miocene bedrock at the northern end of the valley (Personius et al. 2007).

References Cited


