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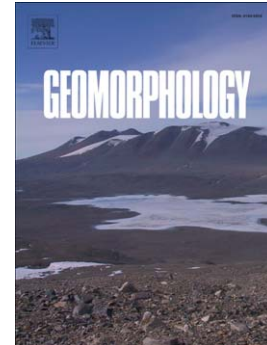
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Terrestrial cosmogenic surface exposure dating of moraines at Lake Tahoe in the Sierra Nevada of California and slip rate estimate for the West Tahoe Fault

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ABSTRACT

Two sets of Pleistocene moraines (Tioga and Tahoe) are preserved at Cascade Lake along the west side of Lake Tahoe. The ¹⁰Be terrestrial cosmogenic nuclide surface exposure ages for two younger Tioga moraines yield an average age of 22.3 ± 1.2 ka, coincident with the global Last Glacial Maximum. The ages suggest that the Tioga glaciation may have reached its maximum several thousand years earlier in the Lake Tahoe basin than to the south along the east flank of the Sierra Nevada. The oldest ¹⁰Be age (120 ± 8 ka) determined for an additional suite of 10 boulders exhibiting significant scatter in ¹⁰Be ages is interpreted to be the minimum age of formation for older Tahoe moraines in the Tahoe basin, suggesting they were deposited during marine oxygen isotope stage 6. The moraines at Cascade Lake are displaced by the West Tahoe Fault that strikes northward for 45 km along the western edge of the Lake Tahoe basin. Vertical displacements of the crests of the Tahoe and Tioga moraines are 59 ± 10 and 32 ± 12 m respectively. Averaged over the time since the formation of the Tahoe and Tioga moraines, the average vertical separation rates are $<0.5 \pm 0.1$ and $\sim 1.4 \pm 0.7$ mm/y respectively. The measured vertical separation across the broad graben on the

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