

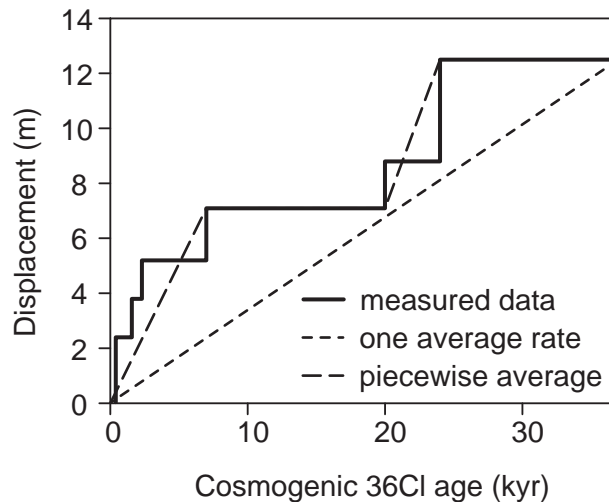
TIMING OF LATE QUATERNARY EARTHQUAKES ON THE HEBGEN LAKE FAULT BY COSMOGENIC CHLORINE-36 DATING OF BEDROCK FAULT SCARP

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Fault scarps along the Hebgen Lake fault, Montana, recorded multiple large paleoearthquakes, including the most recent earthquake in 1959. We used cosmogenic ^{36}Cl in bedrock scarp faces exposed at the surface due to recurring faulting to determine ages of paleoearthquakes at Hebgen Lake. The technique measures how long the different, episodically offset parts of the scarp have been exposed to cosmic radiation.

Twenty-seven samples collected every 0.5 m from the bottom (0 m) to the top (12 m) of the scarp yielded the following exposure ages: 0.4 (for the 1959 scarp), 1.7, 2.6, 7.0, 20, 24 and 37 kyr (maximum age).

The data indicate two periods of heightened earthquake activity during which the displacement occurred: from 0 to 7 kyr ago and from 20 to 24 kyr ago, and two periods of quiescence: from 7 to 20 kyr and from 24 to 37 kyr. This temporal pattern suggests that the Hebgen Lake fault may be cyclic, with period of 15-20 kyr, presently in its active state. The average displacement rate during the two active periods is about 1 m/kyr, twice as high as that calculated over the entire geological history of the fault recorded in the scarp.



cosmogenic- ^{36}Cl , exposure-dating, paleoearthquakes, fault-scarps, Hebgen-Lake

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