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COSMOGENIC ISOTOPE EXPOSURE AGE ESTIMATES FOR LONE PINE CREEK DEBRIS-FLOW FAN BOULDERS, SOUTHEASTERN SIERRA NEVADA

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In order to test the ability of cosmogenic ^{36}Cl to resolve the ages of debris-flow fans, we sampled four distinct geomorphic surfaces along Lone Pine Creek, which drains a glaciated valley of the southeastern Sierra Nevada. The relative ages of three of these surfaces are well constrained by cross-cutting relationships and weathering intensity. Sediment-supply arguments suggest that deposition on these fans is correlative with glaciation in the Sierra Nevada.

Our data show that the oldest surface, Qg1, has the highest mean (210 ±97 ka, 1σ) and median (208 ka) ^{36}Cl model ages (n = 7). The middle-age surface, Qg3, has lower mean (82 ±44 ka) and median (78 ka) ^{36}Cl model ages (n = 9). The youngest surface (Qg4), presumably latest Pleistocene, has the lowest mean (42 ±42 ka) and median (24 ka) ^{36}Cl model ages (n = 5). Although populations of fan-surface boulders appear to preserve the expected relative time signal, the wide variance of boulder ages on each surface precludes simple or confident assignment of a surface age. The source of this variability could be: 1. Exposure of buried boulders during fan-surface erosion; 2. Loss of mass from boulder surfaces; 3. Isotope inheritance from prior exposure; 4. Uncertainty in the systematics of the $^{35}Cl(n,\gamma)^{36}Cl$ pathway that we isolated to make these measurements. Measurements of ^{10}Be and ^{26}Al, now in progress, may more clearly define fan surface history.