

10-BE AND 26-AL AGE ESTIMATES FOR FIVE TECTONICALLY OFFSET FAN SURFACES, OWENS VALLEY, CA

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We estimated the age of 5 fan surfaces (see poster by Zehfuss et al.) using 34 paired analyses of in situ produced 10-Be and 26-Al. The fans surfaces are offset (os) varying amounts by the Fish Springs Fault, within the Owens Valley Fault Zone. Our measurements were made in quartz separated from 33 granite and granodiorite debris-flow transported boulders cropping out on fan surfaces and in boulder levees.

Measured 10-Be and 26-Al abundances and resulting age estimates are well correlated, generating r^2 values of 0.99. Regression analysis indicates 26-Al/10-Be for this data set ($n=34$) is 6.12 ± 0.11 (68% CI), consistent with prior estimates. Replicate samples from the top surface of boulder FSF-V have statistically inseparable 10-Be abundances (0.189 ± 0.009 and 0.181 ± 0.012 M atoms/g, standard deviation) and 26-Al abundances (1.241 ± 0.063 and 1.176 ± 0.057 M atoms/g, standard deviation) demonstrating the reproducibility of our analyses. Model ages are calculated using production rate estimates of Nishiizumi et al. (1989).

Four of the five fan surfaces have cosmogenically distinct ages. Eight boulders cropping out on the oldest fan surface ($os=31$ m), have an average model exposure age of 108.7 ± 11.8 ky. Three of four boulders on a fan surface offset >3 m have an average model exposure age of 14.4 ± 0.7 ky. Six boulders on a fan surface offset 3.3 m have an average model exposure age of 12.8 ± 1.0 ky and four boulders on a fan surface offset 1.1 m have an average model exposure age of 8.0 ± 1.8 ky.

Considered along with the Fish Springs cinder cone ($os=78$ m, Ar age = 314 ky), we calculate a long-term displacement rate of 0.25 mm/yr. The linearity of the age/displacement data ($r^2 = 0.997$) suggest that faulting rates have been constant, within the resolution of our method, over the last 300 ky.

keywords: cosmogenic, fan, fault, displacement rate