

Crude demographic proxy reveals nothing about Paleoindian population

Buchanan *et al.* (1) produced a population proxy for prehistoric North America from summed ^{14}C probability distributions, a recently popular approach in archaeology (e.g., ref. 2). The nearly featureless curve from ≈ 15.0 – 9.0 calibrated ka BP showed gradual demographic increase but no evidence for a human population bottleneck at 12.9 ± 0.1 calibrated ka BP attributable to an extraterrestrial impact (3) or any effect of abrupt climate reversals at the beginning and end of the Younger Dryas, the extinction of 35 mammalian genera, or cultural transitions from Clovis to Folsom and later diversification of Paleoindian adaptations. In fact, the nondescript summed-probability distribution is a corrupt demographic proxy. Their smooth curve is due to a low-precision ^{14}C database (52% of dates have measurement errors greater than ± 100 ^{14}Cyr , 25% $> \pm 200$ ^{14}Cyr), which spreads metaphorical “population” over several calibrated centuries, filling gaps and dampening variability. Further, a priori archaeological information in a Bayesian framework (4) that could constrain these dates (e.g., stratigraphic relationships, diagnostic artifacts) are disregarded, and therefore Clovis dates contribute

to Folsom population and vice versa. Furthermore, CalPal (5) applies a smoothing algorithm to the summed-probability distribution which levels out several sharp peaks in the true distribution. The result is an insensitive, low-fidelity population proxy incapable of detecting demographic change. Testing predictions of prehistoric population change requires high-precision ^{14}C dates, understood in their stratigraphic and cultural contexts, critically evaluated within an explicit Bayesian model. The authors (1) brought none of these to bear on the problem.

Brendan J. Culleton¹

Department of Anthropology, University of Oregon, Eugene, OR 97403

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Author contributions: B.J.C. wrote the paper.

The author declares no conflict of interest.

¹E-mail: bculleto@uoregon.edu.

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