First Australians may have been migrants rather than drifters

Indirect estimates based on carbon dating point to intentional settlement by a large population.

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At least 1,000 Aboriginal founders first arrived in Australia some 50,000 years ago, a reconstruction indicates — numbers that could be evidence of an intentional migration rather than the accidental stranding of a few individuals at a time. The study also finds that the population was devastated during the latest Ice Age, but later rebounded.

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The Aboriginal peoples descend from Asians who may have migrated from to Australia in larger numbers than previously thought — and later would create rock paintings such as these, from the hills of Guguyalanji in Queensland.

The prehistoric settlement of Australia has long been considered a simple story: a founding group of 150 people or fewer made it to the Australian mainland 50 millennia ago and grew to no more than 1.2 million by the time European settlers arrived in 1788. Debate focused on whether the founding population grew immediately after colonization or boomed later, in the past 5,000 years.

But a paper published today in *Proceedings of the Royal Society B*[1] uses radiocarbon dating to estimate prehistoric populations, and reveals a more complex plot.

Southern living

To tease out a demographic signal from the past, Alan Williams, an archaeologist at the Australian National University in Canberra, amassed the most comprehensive radiocarbon data set ever put together for the continent, from both published and unpublished sources. He analysed the dates of 4,575 artefacts from 1,750 archaeological sites.

Applying methods that others had developed to analyse a similar dataset from North American artifacts[2], Williams graphed the number of data points for each 200-year period, and made the assumption that for each given area, changes in the number of data points from one period to the next were a good indication of changes in population size — while correcting for the fact that some types of archaeological site can be lost over time owing to processes such as erosion. Assuming that the population would be between 750,000 and 1.2 million by the eighteenth century, he fit a smooth population curve to the data.

According to Williams' curve, 1,000–2,000 founders would be necessary to reach the population that was in place when the Europeans arrived. After the founders arrived, the population would have stabilized at low levels, but crashed during the most recent Ice Age, around 20,000 years ago. “To quantify the impacts of the last glacial maximum — and see a 60% reduction in population — is quite horrendous,” says Williams. After the Ice Age, population growth rates began to increase in pulses, starting 12,000 years ago.

A large founding population suggests the potentially controversial notion that the first settlers arrived through deliberate migration, rather than being accidentally stranded on the Australian mainland, as has been assumed, says Williams.

Demographic dating

The technique of using radiocarbon dates as a proxy for demographic numbers is gaining traction among researchers. “This is the first time an actual evidentiary data set has been used to construct continent-wide pre-European demographics, which is a significant step forward,” says Sean Ulm, an archaeologist and director of the Tropical Archaeology Research Laboratory at James Cook University in Cairns, Australia.

But not everyone has embraced it. “Using radiocarbon dates to reflect levels of human activity is not a method well-substantiated among archaeologists,” says Peter White, an archaeologist at the University of Sydney in Australia and editor of *Archaeology in Oceania*. The quantity and locations of radiocarbon dates measured by researchers at archaeological sites has little to do with past human activity, he says. For example, Williams' work shows more data points in the eastern half of Australia than in the west, not because more prehistoric peoples necessarily lived there, but because most of the country’s archaeologists live and work in the east.

Simon Holdaway, an anthropologist at the University of Auckland in New Zealand, agrees — but thinks that Williams adequately acknowledges these concerns. And Holdaway expects the trend towards analysing continent-wide data sets to continue, encouraging researchers to refine the data sets. “Any proxy measure brings with it a series of concerns that we need to understand,” he says.

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References

1. Williams, A. N. *Proc. R. Soc. B* http://dx.doi.org/10.1098/rspb.2013.0486 (2013).
2. Peros, M. C., Munoz, S. E., Gajewski, K. & Viau, A. E. *J. Archaeol. Sci.* **37**, 656–664 (2010).