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Selected samples: The nature of silcrete adzes in the formation of Australian stone artefact assemblages

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ABSTRACT

Silcrete flakes and cores are abundant in the surface assemblages from western New South Wales, Australia but retouched tools made from silcrete are much less frequent, especially the heavily retouched forms like flake adzes. The distribution and abundance of these forms together with other silcrete retouched tools is investigated. While heavily retouched forms are present, forms thought to represent the intermediate stages of rejuvenation reduction are largely absent. This absence is used to consider how archaeological sites from the region should be interpreted. It is concluded that sites should not be interpreted as though they represent a material record of activities that occurred only at the place where archaeological sites are identified.

1. Introduction

During World War II, the mathematician Abraham Wald produced a novel solution to the question of where to locate armor on allied bomber aircraft. Because armor is heavy, only the most vulnerable places could be protected. Data on the location of bullet holes in returning bombers were gathered and overlain on an aircraft template to illustrate where enemy bullets had struck. The obvious solution was to place armor on locations that had the most bullet holes. But Wald's solution was to place armor on places where bullet holes were absent. This counter-intuitive solution was based on the observation that the pattern of bullet holes was made from data collected from bombers that had returned – that is, those that had survived. Aircraft with bullet holes in the most vulnerable places had not returned, and therefore were not represented in the sample for which data were recorded (Wald, 1980).

Wald was able to solve the dilemma of bomber armor largely because he recognized that a selection effect was at work within his sample: he was able to study only those aircraft that had survived previous bombing runs (Wainer, 1999). He recognized how the missing data in his sample could inform on the conditions affecting the total population of bombers, rather than just those that had survived. In this paper we take a similar approach to that of Wald by exploring how sampling effects can influence the assemblages archaeologists define for study and how this recognition can inform on the larger whole – the broader record itself. By considering this approach we investigate missing data points in the distribution of retouched tools (specifically focusing on tula adzes and their exhausted counterpart heavily retouched tula slugs) and cortex proportions amongst stone artefacts made of silcrete. Based on analyses of stone artefact assemblages from our Rutherfords Creek study location, we show a unique pattern in the distribution of adze flake reduction, where parts of the resharpening reduction continuum that led to the creation of adze slugs are missing. A similar pattern can be found in the underrepresentation of cortical surface area found amongst all flaked artefacts, where cortex proportions are approximately 60% of what they should be based on the underlying geometry of the stone from which they were produced. Other retouched tool forms show the opposite pattern to flaked adzes where there are more numerous early stage retouched examples but few artefacts with abundant retouch. Since silcrete raw material is abundant in western NSW, is relatively easy to flake, is produced from water worn cobbles, and retouched tools are easy to identify, it seems unlikely that the missing tools and cortex proportions are a result of misidentification. Instead, these results imply that the 'gaps' in retouched tools and cortex noted amongst the assemblages we have studied exist because they reflect missing data points. These observations suggest that, like the Wald bullet holes analogy, selection effects are at work on stone artefact assemblages and therefore the assemblages do not represent complete records of activities. If so, this has implications for the way stone artefact assemblages found located together should be interpreted.

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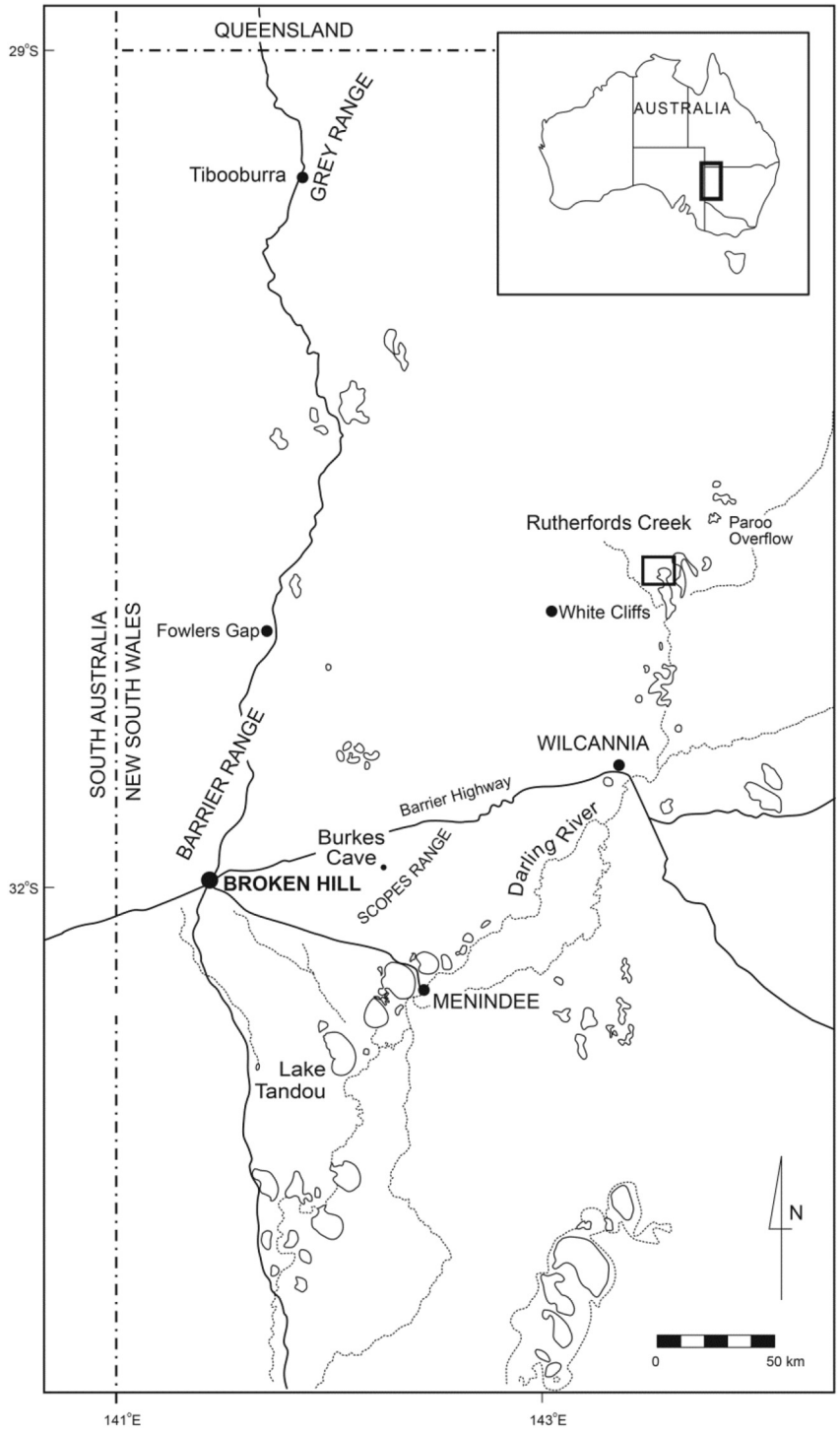

Fig. 1. Map showing the location of the Rutherfords Creek study area near Peery Lake in western New South Wales, Australia.

2. Lithic technology in the Australian archaeological record

The lithic landscape in our western NSW study region is dominated by quartz and silcrete, with some smaller quantities of quartzite and other lithologies. The focus in this paper is on the silcrete artefacts (see Douglass et al., 2016, and Holdaway and Douglass, 2015, for discussion of quartz artefacts). Silcretes come in different varieties reflecting different levels of homogeneity. Doelman et al. (2001) suggest that the majority occur in two groupings: those with visible inclusions, mainly quartz grains, and those without. These silcretes do not require heat treatment before flaking and are found in abundance as fist-sized cobbles in creek beds and boulder-mantled outcrops in the uplands (Douglass and Holdaway, 2011; Holdaway and Douglass, 2015; Douglass et al., 2017). The finer grained silcretes from these locations have a low sheen, are renowned for their knappability, and thus place no limitation on the reduction strategies that could be utilised (Webb and Domanski, 2008). However, while these fine-grained silcretes are locally abundant, retouched artefacts are limited to around 5% of assemblage counts. Cores and unretouched flakes dominate numerically, with small quantities of marginally retouched notches and scrapers the most abundant retouched tools.

There is, however, a small subset of distinct retouched tools found in