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New radiocarbon dates for the earliest Later Stone Age microlithic technology in Northwest Africa

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ABSTRACT

A number of recent genetic studies have suggested competing hypotheses relating to the emergence and spread of populations in Northwest Africa during the Late Pleistocene. Until now is has been difficult to test models derived from genetic work against the archaeological record mainly due to the paucity of reliable dating evidence in the region. A major question relates to timing and nature of the emergence of microlithic LSA assemblages and whether these new technologies developed independently within the area or were related to movement of populations from adjacent regions. Here, we present a series of new AMS radiocarbon dates on bone from the LSA sequence at Tamar Hat (Algeria) and discuss these ages in relation to the existing radiocarbon chronology for the terminal Pleistocene microlithic LSA assemblages of the Maghreb. The radiocarbon ages date from ~25 ka cal BP and show an earlier appearance of this technology than previously thought. We examine the implications of these early dates for understanding the first appearance and spread of microlithic technology in the Maghreb and discuss further ramifications for understanding emergence of similar industries elsewhere in North Africa.

1. Introduction

In North Africa it has been assumed that a major population change occurred in the Late Pleistocene which coincided with the cultural transition from the Middle Stone Age (MSA/Aterian) to the Later Stone Age (LSA/Iberomaurusian) (Ferembach, 1985). The nature and timing of this cultural transition has however been the subject of long-term debate (Camps, 1974a; Debénath, 2000; Pennarun et al., 2012). According to recent phylogenetic studies an early dispersal of M1 and U6 lineages into North Africa occurred at ~40–45 ka (thousands of years ago) (Olivieri et al., 2006), which would support a potentially 'early' date for this transition. Conversely, other studies have suggested multiple events with a major expansion of the U6 lineages in North Africa at ~22 ka (Maca-Meyer et al., 2003; Pereira et al., 2010). The latter could imply a 'later' age for the beginning of the earliest LSA following a disappearance of the MSA.

Up until now it has been difficult to test such ideas directly against the archaeological record mainly because of the absence of reliable dating evidence for sites covering this timespan, and especially in relation to the first appearance of the LSA. A related issue is the lack of agreement over a common lithic artefact terminology for the terminal Pleistocene in North Africa (20,000–10,000 BP), which is further compounded by the use of different local terms that may or may not be synonymous. For example, in the Maghreb of NW Africa, these include the Iberomaurusian (Morocco, Algeria, Tunisia), Southern Tunisian bladelet industries (Tunisia), and the Eastern Oranian (Libya), amongst others. All of these industries possess in common the presence of small blade/lets (blades and bladelets) and microlithic tools that are made on diminutive blanks. However, there are subtle differences in some of the components making up these industries and this may reflect regional variation and/or slight differences in their chronology (Camps, 1974a; Lubell et al., 1984; Close and Wendorf, 1990; Garcea, 2010).

In this paper we review ideas concerning the emergence of microlithic industries in the Maghreb. We focus on a series of new radiocarbon dates from Tamar Hat in Algeria, currently the oldest known LSA microlithic industry in NW Africa, and compare them to those from Taforalt in Morocco for which a well-stratified sequence of radiocarbon dates has recently been published (Barton et al., 2013). Using these two dated sequences and observations on their early microlithic assemblages we then address the broader relationships of the other terminologically diverse groupings

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recognised in the Maghreb. Two major questions are also assessed: to what extent is the new dating evidence in agreement with recent phylogenetic models and are there any special factors which might have given rise to the emergence of LSA microlithic industries in this part of Africa?

2. Twin issues of terminology and chronology

Early work by European prehistorians has led to inconsistencies in the way in which lithic industries have been described in NW Africa in the period ~25–12 ka cal BP (~20,000–10,000 BP). Following excavations in the 19th century a number of local terms arose in this region, which led to the introduction of labels such as Iberomaurusian (Pallary, 1909), Mouillan (Goetz, 1941), Oranian (Gobert and Vaufrey, 1932), Eastern Oranian (McBurney, 1967) and Epipalaeolithic (Roche, 1963). Efforts to compare such groupings were partly hindered by a lack of uniformity in the way in which the artefacts were originally described, with no overall agreement in the use of region specific typo-technological terms (cf. Gobert, 1962; Roche, 1963; McBurney, 1967; Brahimi, 1972). In the following we suggest the use of the term 'LSA microlithic industries' for labelling terminal Pleistocene assemblages that share an abundance of backed and retouched bladelets. This does not overcome all of the terminological issues, but it does at least avoid the pitfalls of using some of the more traditional labels for lithic assemblages with their inferred regional correlations.

Apart from difficulties with terminology, one of the greatest challenges for archaeologists studying the LSA industries in the Maghreb has been the extreme dearth of reliable dating evidence. Amongst the recurrent problems has been that many sites were dug in artificial horizontal spits and most relied on conventional C^{14} methods, often on bulked material, and therefore susceptible to inaccuracy due to admixture of carbon from different sources. The situation has gradually begun to improve since the 2000s and there has been a steady increase in the availability of more consistent radiocarbon dates for LSA sites in this region. The distribution of sites with radiocarbon determinations using traditional C^{14} and AMS methods, as well as those identified as LSA on the basis of typo-technological characteristics, is shown in Fig. 1, while a list of published radiocarbon determinations is provided in the Appendix.

In considering the spread of dates as a whole, it is clear that the pattern is artificially skewed by the fact that a large proportion of them come from sites in Morocco. This picture is certainly more apparent than real and reflects the proliferation of recent field research in this country and in particular work over the last 10 years at Grotte des Pigeons (Taforalt). This site has a long sequence of LSA layers with rich artefact collections that have recently been re-studied by one of the authors (Hogue, 2014; Hogue et al., in prep). According to conventional radiocarbon dating the oldest claimed ages for the LSA in this cave were 21,100 ± 400 BP (Gif-2586) and 21,900 ± 400 BP (Gif-2587) (Delibrias and Roche, 1976; Roche, 1976). These once stood as the oldest accepted ages for the LSA in Northwest Africa, but a re-evaluation of the same sequence using AMS radiocarbon methods on single charcoals has shown consistently younger ages with determinations ranging from between 18,185 ± 75 BP (OxA-16240) and 10,860 ± 45 BP (OxA-24111) (Bouzouggar et al., 2008; Barton et al., 2013). Together, the new AMS dating record and the analysis of the lithic collections makes it one of the key sites for studying the development of the LSA in this region of Africa.

In contrast, much less attention has been given to the chronology of LSA sites in Algeria or Tunisia. This is due almost entirely to the lack of recent fieldwork in both countries brought about by civil unrest as well as other factors. Both areas have enormously rich archaeological records and indeed one of the first LSA sites to be comprehensively dated using conventional radiocarbon methods was that of Tamar Hat. The original work provided yet another very old set of ages for the microlithic LSA dating back to 20,600 ± 500 BP (MC-822) (Saxon et al., 1974), although all the age determinations came from bulked charcoals and therefore were potentially suspect for the same reasons as the early dates from Taforalt where traditional C^{14} methods were used. Furthermore, they were at odds with the next earliest C^{14} dates of 16,100 ± 1400 BP (Gif-6800) from Taza I (Medig et al., 1996) and 14,910 ± 180 BP (Gif-9736) from the upper levels of Afalou Bou Rhummel (Hachi et al., 2002) for LSA sites in the same region. In Tunisia the situation is very similar. A number of sites have been identified that share clear typo-technological similarities with LSA sites in Morocco and Algeria (cf. Gobert, 1962; Gragueb, 1983). However, only a handful of conventional radiocarbon dates are available, which come from assemblages that have not been fully described and/or have been deemed controversial (Delibrias et al., 1986; Vernet and Aumassip, 1992; Aouadi-Abdeljaouad and Belhouchet, 2008).

In order to address the lack of clarity over the dating of the oldest microlithic LSA and to see whether sites in the west of the Maghreb (Taforalt) were any older than the sites in the east, we decided to re-examine the dating of the sequence of deposits at Tamar Hat. The site was a good candidate for study since it had been well excavated and the previously obtained ages, although on bulked samples, were in stratigraphic order and there appeared to be no major bioturbation or other disturbance features recorded by the excavators.

3. Tamar Hat

Tamar Hat (36°38.344′ N, 5°21.787′E) is a rockshelter directly overlooking the Mediterranean. It is located at 20 m above mean sea level at the edge of the Jebel Babor mountain range (Fig. 2) and is ~2 km from the mouth of the Arioun River and ~30 km east of the regional capital Béjaïa. Today the site has a 'Mediterranean' or dry-summer sub-tropical climate (Köppen-Geiger Classification – Csa) consisting warm average temperatures and less than 30 mm of precipitation in the driest summer month (Rubel and Kottek, 2010).

Major excavations first took place in 1928–30 (Arambourg et al., 1934), with the site being revisited in the 1950s (Balout, 1955) and further more extensive investigations being undertaken in the late 1960s (Brahimi, 1969; Couvert, 1969) and early 1970s (Saxon et al., 1974; Saxon, 1975; Close, 1981). Brahimi collected the first radiocarbon determinations at the site during excavations in 1967. He published a single radiocarbon determination on bulked charcoal of 12,450 ± 450 BP (Alg-4) in his report on the lithic assemblages (Brahimi, 1969). However, another age of 10,350 ± 375 BP (Alg-5) was noted in a subsequent publication by the radiocarbon laboratory who conducted the original analysis (Rahmouni et al., 1970). There is no mention of artefacts having been found in association with this younger radiocarbon age, although subsequent authors have cited this age in relation to the age of the Iberomaurusian (e.g. Camps, 1974b). There have been few details given as to the nature of the excavations, although it has been argued that the sediments might include disturbed material from the 1928–30 excavations (Saxon et al., 1974, p.53). Brahimi (1969) provided a brief description of the assemblages recovered during these excavations, although his study was restricted primarily to type-counts of retouched tools.

In 1973, Saxon revisited the site with the aim of controlled sampling of the standing sections retained from the 1928–30 excavations. From the samples collected five radiocarbon

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