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The Middle Stone Age of the Central Sahara: Biogeographical opportunities and technological strategies in later human evolution

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ABSTRACT

The Central Sahara is an area of great interest in human evolution partly because it currently exhibits some of the most extreme desert conditions in the world, and partly because of its geographical location – in a nexus of relationships with sub-Saharan Africa, Mediterranean Africa, and Western Asia. Fieldwork in the Ubari sand sea and the Messak (Fazzan, Libya) through the Desert Migrations Project has identified numerous Middle Stone Age (MSA) sites both along the shores of interdunal palaeolakes and on the mountainous plateaus of the area, such as the Messak Settafet. In this paper, we describe some of the evidence for the MSA in Fazzan, and discuss it in the context of the African MSA more generally. We show that this MSA record exhibits considerable typological and technological variation, and discuss the implications for hypotheses relating to the colonization of desert environment and the expansion of hominins out of sub-Saharan Africa.

1. Introduction

The Sahara is the largest hot desert in the world, covering 9 million square kilometres (km^2), and nearly one third of the African continent. It is not only the largest, but also one of the most challenging to human occupation. This environment alone makes the Sahara prehistorically significant. There is, however, a further reason that makes the Sahara relevant for human evolution – it is the first desert likely to have been encountered by either early hominins or modern humans (and their immediate ancestors) as they dispersed from their regions of endemism. As the latter were almost certainly the makers of Middle Stone Age/Mode 3 technologies, the Sahara would also have been the point at which extreme aridity might have tested MSA lithic adaptations. From the Omo Kibish, the site of the earliest known anatomically modern humans, to the southeastern margins of the Sahara in Kordofan (Sudan) is approximately 1000 km, less than a quarter of the distance from the Omo River to Pinnacle Point on the South African coast, where some of the earliest evidence for many modern human behaviours have been found. The Sahara, as either a biogeographical region or a habitat, is close to the heart of hominin endemism, and therefore to any issues relating to dispersals within and beyond Africa.

In this paper, we will consider the evolutionary and environmental context for the African Middle Stone Age (MSA) in the Sahara and the broader African context of these industries. We will then present some preliminary observations from the Palaeo programme of the Desert Migrations Project (DMP-Palaeo), which has been investigating the Pleistocene prehistory and palaeoenvironments of Fazzan in Libya. This research has provided new information about the MSA in the Central Sahara, which we will use to consider the technological traditions and strategies of MSA-making hominins, their broader MSA context, hominin adaptation and evolutionary history.

2. Evolutionary and environmental context for the MSA in the Sahara

2.1. The African MSA and the evolution of modern humans

The African MSA was originally considered as a phase between the Early Stone Age and the Later Stone Age with few defining traits; today, the name is used to refer to prepared core technologies, similar to those of the Middle Palaeolithic (MP) in Europe. Clark (1968) referred to these entitites together as Mode 3 industries in his global 5-Mode classificatory system, characterized by the systematic preparation of the core prior to systematic flaking representing a distinctive way of producing stone tools.

The distinction between the MP and the MSA is partly a historical artefact originating from different scholarly traditions in Europe and Africa. North Africa is the area where this distinction

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can cause the greatest confusion. Mediterranean North Africa was largely explored by archaeologists specialising in the European Palaeolithic, and so they applied the term MP not just to the littoral regions, but also deep into the Sahara. In addition, archaic hominins in North Africa, such as the remains from Djebel Irhoud (Ennouchi, 1962) and the Haua Fteah (McBurney, 1967) were originally labeled 'neanderthal', creating a further fallacious link with Europe. There is, however, no evidential basis for assuming a stronger link between North Africa/Sahara and Europe than between North Africa/Sahara and sub-Saharan Africa – and many reasons for thinking the opposite. As the context of this paper is Africa, we will refer to Saharan Mode 3 industries as MSA.

Beyond the issue of differentiation between the MSA and the MP, other sub-divisions within Mode 3 industries are both technological and typological. Technologically, there are a number of variants within the prepared core production system – Levallois, Nubian, Discoid. Typologically, there are characteristic assemblages, based on presence/absence and type of bifacial points and tanged elements, variations in shaped points and scrapers, or microlithisation. Indeed, one of the striking points about Mode 3 technologies is that they show regional and chronological techno-typological variation to a much greater extent than the preceding Mode 2 (Early Stone Age) industries (Fig. 1) (Clark, 1992).

The origins of the MSA in Africa are controversial. The problem lies partly in making the distinction between the end of the Acheulean (a negative origin), and the genuine appearance of new traits that define the MSA. For example, the Victoria West industry shows a number of characteristics reminiscent of Mode 3 technologies, but is more likely to be a variant of an ESA industry with convergent aspects towards later technologies. More challenging is the current debate on the technological affinities of the southern African Fauresmith tradition, recently re-dated to >460 ka (Porat et al., 2010), and which contains key elements of Mode 3 industries, such as prepared cores and Levallois points (Beaumont and Vogel, 2006). Although the nature of the Fauresmith and its relation with other industries remain debated (Underhill, 2011), it is evident that the terminal Acheulean did indeed see increased variation in both technology and typology, some of which is likely to be related to the development of the genuine MSA. However, the lack of spatio-temporal resolution at present makes it difficult to tease the various innovative trajectories apart from those which remained rooted in the classic hand-axe, Mode 2, tradition.

The earliest undisputed MSA has been dated to between 250 and 300 ka – Gademotta and Kulkuletti in Ethiopia (~280 ka; Morgan and Renne, 2008), Kapthurin (>284 ka; Deino and McBrearty, 2002) and Malewa Gorge (~240 ka; Evernden and Curtis, 1965) in Kenya, and Twin Rivers (>265 ka; Barham and Smart, 1996) in Zambia. In South Africa, two sites have early MSA industries – Kathu Pan (KP-1 Stratum 3, 291 ± 45 ka; Porat et al., 2010) and Florisbad (~280 ka; Grün et al., 1996; Kuman et al., 1999).

There is an equally small number of sites that date to between 200 and 130 ka (i.e., to MIS6), but which indicate widespread and persistent presence of MSA throughout Africa – Omo Kibish and Herto in Ethiopia (Clark et al., 2003; McDougall et al., 2005), Sai Island in Sudan (Van Peer et al., 2003), Djebel Irhoud in Morocco (Grün and Stringer, 1991; Smith et al., 2007), and Wonderwerk Cave and the earliest level at Pinnacle Point in South Africa (Grün and

Fig. 1. Regional variation in the African MSA (from Clark, 1992).