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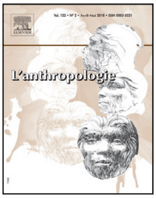

Original article

Early or Middle Stone Age? The lithic assemblage of Capangombe – Santo António, Namibe Province (Angola)

Âge de la Pierre ancien ou moyen ? L'ensemble lithique de Capangombe – Santo António, Province de Namibe (Angola)

Valter Piquete [a,*], Telmo Pereira [a,b,c,d],
João Pedro P.G. Cunha Ribeiro [a], Daniela de Matos [e,c]

[a] *UNIARQ, Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras, Universidade de Lisboa, Alameda da Universidade, 1600-214 Lisboa, Portugal*
[b] *Centro de Geociências da Universidade de Coimbra, Rua Sílvio Lima, Universidade de Coimbra, Pólo II, 3030-790 Coimbra, Portugal*
[c] *Instituto Politécnico de Tomar, Quinta do Contador, Estrada da Serra, 2300-313 Tomar, Portugal*
[d] *Universidade Autónoma de Lisboa, Palácio dos Condes do Redondo, R. de Santa Marta 56, 1169-023 Lisboa, Portugal*
[e] *Geoarchaeology Working Group, Department of Geosciences, University of Tübingen, Hölderlinstr. 12, 72074 Tübingen, Germany*

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ABSTRACT

Capangombe – Santo António is an open-air site located 596 m a.s.l. at the foothill of Morro Santo António, Namibe Province (southwest Angola). The inselberg of Santo António is associated to the Chela escarpment developing from the Marginal Mountain range parallel to the Atlantic Ocean, separating the Angolan inland plateau from the coastal semi-arid to arid plain. A dissected valley formed by the Leba-Capangombe stream exposed a conglomerate with abundant stone tools assigned to the Early Stone Age (ESA). The site was discovered in 1966 by Miguel Ramos, who collected a total of 1776 lithic artifacts, and further published a small report about the assemblage in 1971. In this preliminary analysis, Ramos

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* Corresponding author.
E-mail address: valterpiquete@hotmail.com (V. Piquete).

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focused on cleavers using the "French school" typology for the "hachereaux" in Northern Africa and concluded that there are several morphotypes identified in Capangombe-Santo António with specific features, suggesting the occurrence of a local tradition for the Late ESA/Middle Stone Age (MSA). The study presented here is a new analysis of the lithic assemblage curated at the University of Lisbon, Portugal. A sample of 1017 artefacts was analyzed for this project applying an extended descriptive methodology to characterize lithic raw material procurement, reduction sequences and typological classes. The chrono-cultural model initially proposed for the site is revised thanks to recent advances in Stone Age studies.

Mots clés :
Angola
l'Âge de la Pierre Ancien
l'Âge de la Pierre Moyen
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RÉSUMÉ

Capangombe – Santo António est un site de plein air situé à 596 m d'altitude au pied du Morro de Santo António, Province de Namibe, au sud-ouest de l'Angola. L'inselberg de Santo António est associé à l'escarpement de Chela qui se développe à partir de la chaîne de montagne marginale orientée parallèlement à l'océan Atlantique qui sépare le plateau intérieur d'Angola de la plaine désertique côtière. Une vallée asséchée par le ruisseau Leba-Capangombe a mis à nu un conglomérat avec de nombreux outils en pierre attribués à l'Âge de la Pierre Ancien. Le site a été découvert par Miguel Ramos en 1966, qui y a collecté un total de 1776 artefacts lithiques publiés dans un court rapport dans les actes d'une conférence tenue en 1971. Dans cette analyse préliminaire, Ramos s'est concentré sur les hachereaux en utilisant la typologie de l'« école française » définis par Tixier pour les hachereaux en Afrique du Nord. Miguel Ramos a identifié de nombreux morphotypes à Capangombe-Santo António qui présentent des caractéristiques spécifiques, suggérant l'occurrence d'un faciès local à l'Âge de la Pierre Ancien et Moyen. Cette étude présente une nouvelle analyse de l'assemblage lithique conservé à l'Université de Lisbonne (Portugal). Pour ce projet, un échantillon de 1017 outils a été analysé en appliquant une méthodologie descriptive pour caractériser l'approvisionnement en matières premières lithiques, les séquences de réduction et les principaux groupes typologiques. Le modèle chrono-culturel précédemment proposé pour le site est revu en fonction des avancées récentes de la recherche.

1. Introduction

In recent years, numerous efforts have been made by several researchers to overcome the geographical bias in Stone Age research of Africa, particularly focusing on the search for Early and Middle Stone Age records in areas historically understudied like in West and Central Africa. The state-of-the-art has transitioned from more general overviews (Alabi, 2016; Baluh, 2017; Basell, 2010; Casey, 2003; Clark, 1959; Cole, 1967; Ervedosa, 1980; McIntosh and McIntosh, 1983; Sandelowsky and Viereck, 1969; Wai-Ogosu, 1973; Wendt, 1972; White and Clark, 1965) to site-specific publications and case studies across almost all the countries between Morocco and South Africa, namely Senegal, Mali, Ghana, Burkina Faso, Guinea, Sierra Leone, Ivory Coast, Niger, Benin, Nigeria, Cameroon, Equatorial Guinea, Gabon, Congo basin, Angola, and Namibia (Alabi, 2016; Allsworth-Jones, 1981, 2019; Andah, 1979; Bagodo, 2004; Baluh, 2017; Cerasoni et al., 2022; Chevrier et al., 2018;

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Clist, 1989; Cruz-y-Cruz et al., 2022; Davies, 1964; Douze et al., 2021; Frank et al., 2001; Gutierrez and Benjamim, 2019; Kote, 2019; Lebrun et al., 2016; Lespez et al., 2011; Matos and Pereira, 2020; Mercader and Martí, 2003; Mesfin, 2018; Mesfin et al., 2020; N'Dah, 2009; Niang et al., 2018; Nicoll, 2009; Nicoll and Zerboni, 2019; Rasse et al., 2004, 2012, 2020; Scerri et al., 2016; Schmid et al., 2022; Shackley, 1986; Soriano, 2003; Soriano et al., 2010; Taylor, 2011; Watson, 2017).

Studies about the Early (ESA) and Middle Stone Age (MSA) of southwestern Angola were initiated in the context of scientific missions led by Portuguese or Portuguese descendant researchers during the colonial occupation until 1974. Museum collections in Portugal and Angola generated by these early expeditions were used to establish a cultural sequence following the conventional Three Age system (Clark, 1967, 1966; Ervedosa, 1980; Goodwin and Van Riet Lowe, 1929). While in the Congo and Zambezi zones, north and east in Angola, cultural affinities closely aligned with the Sangoan-Lupemban cultures of West and Central Africa (Clark, 1968, 1963), the southwest or coastal zone deposits presented more varied typologies frequently interpreted as transitional industries, ESA-MSA or MSA-LSA (Matos et al., 2021; Mesfin et al., 2023; Ramos, 1982).

Similar contextual issues have been object of debate for sequences in other regions of Africa (Barham, 2012; Barham et al., 2015; Herries, 2011; Mehlman, 1991; Sheppard and Kleindienst, 1996). Particularly the topic of the early Middle Stone Age (EMSA), the "Fauresmith" cultures and its importance for our understanding of cultural and behavioral traits of early modern humans in southern Africa (Kuman et al., 2020; Underhill, 2011; Wilkins and Chazan, 2012).

Sites classified as Acheulean are widely known in the coastal formations of Baía Farta in Benguela. Specifically, the lithic tools (high frequency of pebble tools and low frequency of handaxes) from the site of Dungo were recently dated to about 700 ka years ago (Gutierrez et al., 2001; Gutierrez and Benjamim, 2019; Lebatard et al., 2019; Mesfin et al., 2023). Numerous Acheulean sites are known along the coast but also and the river incisions of the semi-desert plains and hilly country of Namibe province. For instance, at S. Nicolau/Bentiaba, Lucira, Moçamedes, and Ponta do Giraul assemblages with both ESA-MSA tool types reminiscent of Acheulean and "Fauresmith" were reported during the Anthrobiological Mission of Angola (MAA) (Allchin, 1964; Breuil and Almeida, 1964).

Further inland, in the escarped regions between the Namibe desert and the western edge of Huíla province, Miguel Ramos was the first researcher to develop a field project exclusively dedicated to the ESA and MSA transition in Southwestern Angola, as part of his doctoral research supervised by André Leroi-Gourhan, but never finished. Between 1966 and 1967, with the support of Institute for Scientific Research of Angola (IICA), Ramos revisited the sites surveyed by the MAA and discovered 11 other new locations around the village of Capangombe, where a fort was built by German and Portuguese slave traders in 1869. Around the fort and the German cemetery next to the fort, currently used as a middle school, lithic artifacts like points and scrapers can be observed scattered around floor. The assemblages were then shipped to Lisbon for study, where they remain until now.

Following the revolution of 25th April of 1974, which marked the end of the "New State" dictatorship and its colonial agency, the Board was converted in the Tropical Research Institute (IICT) and the archaeological collection of Angola was integrated in the Center of Prehistory and Archaeology created by Ramos in 1983. Ramos published several report papers about his fieldwork in Angola, but until Ramos passing in 1991, no dissertation was ever submitted to the university Sorbonne in France (or any other) integrating the data from excavations and survey work. No field diaries were ever recovered from Ramos' excavations at the site of Capangombe-Velho where more than 100,000 lithic pieces were excavated from two archaeological levels assigned to the "MSA of Acheulean tradition" and the generic MSA levels analogous to the Leba Cave sequence (Matos and Pereira, 2020; Ramos, 1970, 1981). From the 11 sites identified by Ramos at Capangombe, only the cleavers from the site of Capangombe-Santo-Antonio (355-11 in the IICT database) were object of more detailed analysis (Ramos, 1974) in order to test similarities with the Acheulean from Northern Africa published by Tixier (1956). This paper was later republished (Ramos, 1980), and followed by general publications about the Stone Age collection derived from the colonial offices (Ramos, 1981, 1982). Apart from Ramos preliminary study of the cleavers, no new information was ever published on the remaining assemblage. In this study, we aim to characterize the Capangombe-Santo António assemblage, raw material types, reduction sequences, and tool typology.

The assemblages gathered by the Portuguese Scientific Missions include hundreds of sites and hundreds of thousands of artifacts (Matos et al., 2021). They are currently being studied as part of an

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initiative led by the University of Lisbon's Center of Archaeology (Uniarq) in collaboration with the Natural History and Science Museum. The following questions prompted this study:

- what is the background or provenance of the assemblage?
- can we propose a chrono-cultural framework from the techno-typology observed from the assemblage?

2. Methods and materials

2.1. Background information

Capangombe-Santo António (CSA) is located in southwest Angola, Namibe province, municipality of Bibala, near the town of Capangombe, at 596 m a.s.l. (Lat. 15° 04’ 45” South; Long. 13° 09’ 35” E). The site was discovered during Ramos' expedition (Missão de Estudos do Sudoeste de Angola, MEASA) sometime between 1966 and 1967.

CSA is located on a peneplain between 500 and 1000 m a.s.l., west of the Serra da Leba mountain-chain, on the southern slope of a granite inselberg known as the Santo António hill (Fig. 1). The area is marked by arid climate and semi-desert landscape with a few streams running west. The main river in the region is the Cunene River and flows approximately 200 km south of CSA, draining of the surrounding area (Correia, 1976; e.g., Huntley et al., 2019; Lopes et al., 2016; Mpengo et al., 2011; Pereira et al., 2013).

The assemblage from the site of Capangombe Santo-Antonio derives only from a surface collection and not excavations. Excavations by Ramos during the MEASA targeted another site in the vicinity but still significantly far away to be sure that they have any relation, called Capangombe Velho. The background information presented here is faithful to the descriptions left by Ramos (Ramos, 1970, 1974). There is no more information on the context besides what is described here.

The surface where the assemblage was collected corresponds to a context resulting from the erosion of a fine sandy layer, initially considered to belong to the Kanjerian period 1 (900–100 ka) or to an early phase of the Kanjero-Gamblian Interpluvial 2 (60–55 ka). The artefacts were found on top of the fine sandy layer and were covered by the ferruginous crust attributed to the Gamblian pluvial (30–15 ka) (Ramos, 1980).

Although the primary context was not identified, Ramos states that: "*(…) si nous tenons compte qu'aucun reste de taille n'ait été trouvé, bien que le ou les ateliers, dont nous n'avons pas pu déterminer l'emplacement, ne devaient quand même pas se trouver bien loin car la matière première a été obtenue dans les cailloutis de la région.*" (Ramos, 1980, p. 15).

"*…if we take into account that no knapping debris were found, although the workshop or workshops, whose location we could not determine, should not have been very far because the raw material was obtained in the gravel of the region.*" (Ramos, 1980, p. 15).

2.2. Lithic analysis

This paper focuses on the assemblage from CSA housed at the School of Arts and Humanities of the University of Lisbon, with the reference 355-11 in the archive of the Tropical Research Institute/

Fig. 1. Capangombe – Santo António. Location of (a) in Southern Africa; (b) in Angola; (c) in relation to Leba Cave.
Capangombe – Santo António. Localisation (a) dans le sud de l'Afrique ; (b) en Angola ; (c) par rapport à la grotte de Leba.

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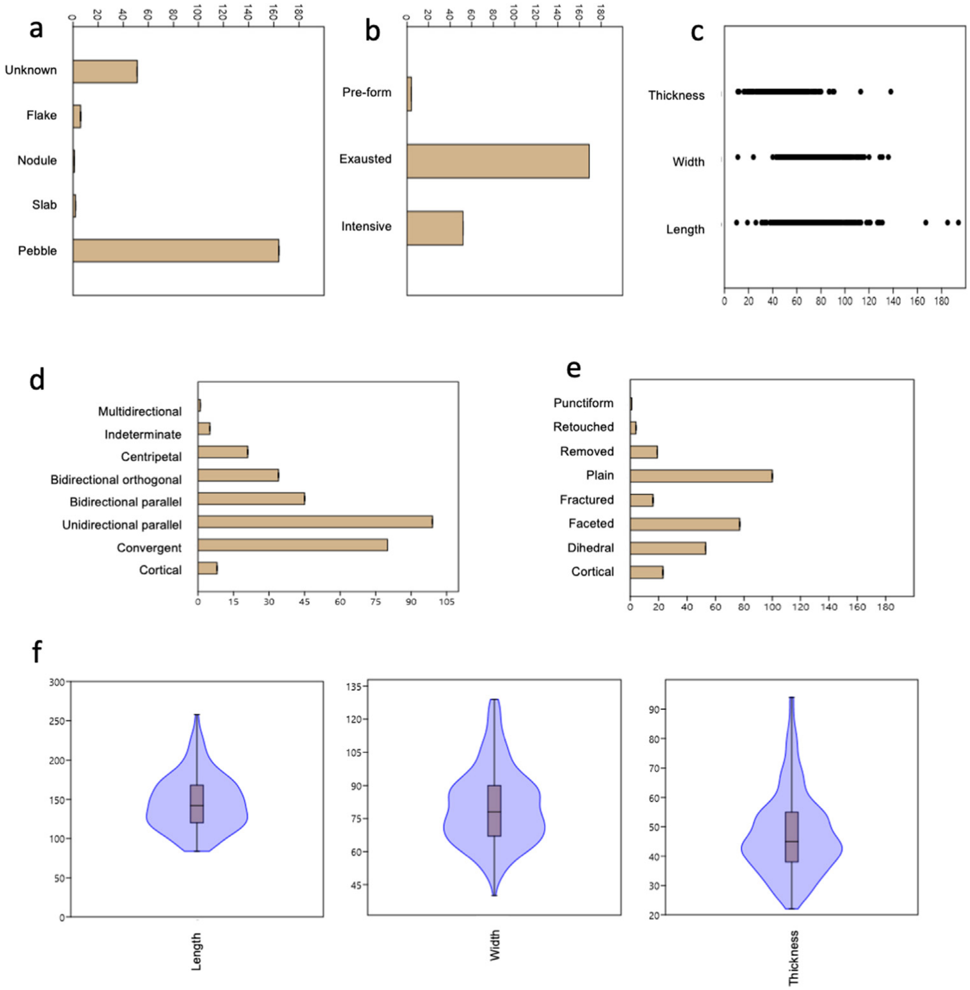

Fig. 2. Capangombe – Santo António. (a) Absolute frequency of blank types for cores; (b) Absolute frequency different types of core state when discarded; (c) Variation of core thickness, width and length in mm; (d) Blank dorsal patterns; (e) Morphology of blank butt; (f) Boxplots for bifaces length, width, and thickness (from left to right).

Capangombe – Santo António. (a) Support des nucleus ; (b) Nucleús exploités et abandonnés ; (c) Longueur, largeur et épaisseur des nucléus ; (d) Caractérisation de la face supérieure ; (e) Talon des supports ; (f) Longueur, largeur et épaisseur des bifaces.

Natural History and Science Museum of Portugal. The assemblage from CSA is composed of a total of 1776 implements but due to access constraints during the pandemic a sample of 1017 pieces was analyzed for this study.

The lithic analysis focused on identification and characterization of raw materials, reduction sequences and tool typology (Piquete, 2021). The methods followed standard literature on lithic technology (Bordes, 1961; Inizan et al., 1999; La Torre Sáinz, 2006; La Torre Sainz, 2011; Sonneville-Bordes and Perrot, 1954) and considering specific literature on the regional variability of stone tools of Angola and Southern Africa (Leader et al., 2023; Marks, 2015; Marks and McCall, 2014; Matos, 2013; Matos and Pereira, 2020; Shackley, 1980; Wilkins et al., 2010; Wilkins and Chazan, 2012; Wurz et al., 2003). The goal is to provide an overview of techno-typological patterns, metric variability, length, width and thickness using a caliper and following as reference the technological axis for the blanks

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and cores, and the morphological axis for the shaped tools and preferences which may provide a data set comparable with other chrono-cultural sequences in the region more recently established.

3. Results

Detailed information about the data is contained in Tables 1–8 and Fig. 2.

Table 1
Capangombe – Santo António. General inventory of the main technological classes per raw materials.
Capangombe – Santo António. Inventaire des principales catégories technologiques par matières premières.

Raw materials Technological classes	Quartzite	Chert	Flint	Basalt	Porphyry	Greywacke	Quartz	Indeterminate	*n*	%
Cores	199	16	3		1	1	5		**225**	**22.12**
Unretouched products										
Blades	5	1							**6**	**0.59**
Flakes	52	17	1		2				**72**	**7.08**
Points	4	2							**6**	**0.59**
Retouched products										
Blades	18	4	1						**23**	**2.26**
Flakes	142	24	5	1	1				**173**	**17.01**
Points	9	3	1						**13**	**1.28**
Configurated tools										
Bifaces	214	25	1	1	8			1	**250**	**24.58**
Partial bifaces	8	2							**10**	**0.98**
Unifaces	2								**2**	**0.20**
Cleavers	168	24		1	2				**195**	**19.17**
Picks	4	1							**5**	**0.49**
Core maintenance products	9	2							**11**	**1.08**
Undetermined products	21	4			1				**26**	**2.56**
Total	**855**	**125**	**12**	**3**	**15**	**1**	**5**	**1**	**1017**	**100.00**
%	**84.07**	**12.29**	**1.18**	**0.29**	**1.47**	**0.10**	**0.49**	**0.10**	**100**	

Grant total absolute (n) and relative (%) frequencies are presented in bold.

Table 2
Capangombe – Santo António. Detailed inventory of core types by raw materials
Capangombe – Santo António. Inventaire détaillé des nucléus par matières premières.

Core	Quartzite	Chert	Flint	Porphyry	Quartz	Greywacke	*n*	%
Bifacial bidirectional abrupt	22	4			2		**28**	**12.44**
Bifacial bidirectional abrupt 2	2						**1**	**0.44**
Bifacial alternate partial	3						**3**	**1.33**
Bifacial alternate	4						**4**	**1.78**
Partial bifacial abrupt	19				1		**20**	**8.89**
Unidirectional bifacial abrupt	26	2			1		**29**	**12.89**
Bifacial hierarchical centripetal	39	4				1	**44**	**19.56**
Bifacial peripheric	3						**3**	**1.33**
Bifacial partial simple	9	1					**10**	**4.44**
Bifacial unidirectional simple	8						**8**	**3.56**
Discoidal	18				1		**17**	**7.56**
Multifacial	2	1	1				**4**	**1.78**
Polyhedric			1				**1**	**0.44**
Trifacial hierarchal perpendicular	9						**9**	**4.00**
Bifacial abrupt bidirectional	4						**4**	**1.78**
Bifacial abrupt unidirectional	17	1					**18**	**8.00**
Unifacial unidirectional total abrupt	3	1	1				**5**	**2.22**
Unifacial centripetal	2						**2**	**0.89**
Bifacial simple partial	12	2		1			**15**	**6.67**
Total	**202**	**13**	**3**	**1**	**5**	**1**	**225**	**100.00**
%	**89.78**	**5.78**	**1.33**	**0.44**	**2.22**	**0.44**	**100.00**	

Grant total absolute (n) and relative (%) frequencies are presented in bold.

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Table 3
Capangombe – Santo António. Absolute and relative frequency of core attributes for possible causes of abandonment, reduction methods and percussion platforms.
Capangombe – Santo António. Fréquence absolue et relative des attributs de nucléus pour les causes possibles d'abandon, les méthodes de réduction et les plateformes de percussion.

Possible causes of abandonment	*n*	%
Loss of angle	101	44.89
Fracture	3	1.33
Natural imperfections	19	8.44
Steps	54	24.00
No obvious reason	48	21.33
Total	***225***	***100.00***
Bifacial Hierarchical Centripetal		
Radial Centripetal	17	38.64
Levallois Convergent	2	4.55
Levallois Preferential	7	15.91
Levallois Recurrent bipolar	1	2.27
Levallois Recurrent unipolar	2	4.55
Levallois Recurrent centripetal	14	31.82
Victoria West	1	2.27
Total	***44***	***100.00***
Percussion platform		
Cortical	41	18.14
Dihedral	8	3.54
Faceted	17	7.52
Flat	128	56.64
Mixed	32	14.16
Total	***226***	***100.00***

Grant total absolute (n) and relative (%) frequencies are presented in bold.

Table 4
Capangombe – Santo António. Relative frequency of blank section, platform morphology and shape.
Capangombe – Santo António. Fréquence relative de caractéristiques morphologiques des supports : section, morphologie et forme de la plateforme.

Morphological	*n*	%
Transversal section		
Irregular	41	13.99
Trapezoidal	140	47.78
Triangular	112	38.23
Total	***293***	***100.00***
Butt morphology		
Biconvex	1	0.34
Circular	11	3.75
Moon shape	4	1.37
Fractured	15	5.12
Irregular	51	17.41
Oblong	55	18.77
Removed	20	6.83
Trapezoidal	96	32.76
Triangular	40	13.65
Total	***293***	***100.00***
Butt shape		
Concave	54	18.43
Convex	95	32.42
Fractured	15	5.12
Irregular	6	2.05
Plain	103	35.15
Removed	20	6.83
Total	***293***	***100.00***

Grant total absolute (n) and relative (%) frequencies are presented in bold.

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3.1. Site integrity

Considering the absence of field descriptions by the original collector, we can only assume the assemblage reflects the proportion of artefacts at the site. The vast majority of the lithic implements appear fresh and no surface alterations were reported. Some are complete and have sharp edges (Table 9). Some artifacts such as flakes show stepped edges, and cores show fractures due to raw material irregularity or a break during the knapping processes, making their knapping surface exhausted sometimes with trampling marks but very fresh suggesting damaging during transportation or curation. This could suggest the material was buried until relatively recent times (Schiffer, 1987). At the same time, some artefacts are eolised ("wind-polished"), partially eolised, patinated and with double patina, which may suggest different phases of exposure and degrees of weathering (Svoboda, 1984). On the other hand, the presence of some few heavily water-worn artefacts suggest some degree of transport from the upper stream.

Concerning the production, the assemblage is clearly marked by the high frequency of Large Cutting Tools (LCTs) and cores (67.55%) over the most frequent categories such as the blanks and debris resulting from the knapping and configuration processes. Again, the difference between these categories may also be associated to the selective strategy in surface collection intended to sample characterize an archaeological site for regional reference and further detailed investigation or testing.

3.2. Raw materials

The assemblage studied shows several types of raw materials including sedimentary, metamorphic and igneous rocks (Table 1). It includes several types of quartzites, claystones and graywackes

Table 5
Capangombe – Santo António. Absolute and relative frequency of tool types by raw materials.
Capangombe – Santo António. Fréquence absolue et relative des types d'outils par matières premières.

Tool types/raw materials	Quartzite	Chert	Flint	Porphyry	Basalt	*n*	%
Burin	1					**1**	**0.48**
Denticulate	11	3	1			**15**	**7.18**
Notch	7	4				**11**	**5.26**
Double notch	1					**1**	**0.48**
Rabot	2					**2**	**0.96**
Simple end-scraper	3	1				**4**	**1.91**
Atypical end-scraper on retouched flake	2					**2**	**0.96**
End-scraper on retouched flake or blade	3					**3**	**1.44**
Convex side-scraper	24	2				**26**	**12.44**
Straight side-scraper	16	4				**20**	**9.57**
Concave side-scraper	7					**7**	**3.35**
Concave-convex side-scraper	3		1			**4**	**1.91**
Convex side-scraper/Denticulate	1	1				**2**	**0.96**
Convex side-scraper/Notch	4	1				**5**	**2.39**
Straight side-scraper/Notch	3					**3**	**1.44**
Convergent side-scraper	10					**10**	**4.78**
Déjeté end-scraper	6	2				**8**	**3.83**
Altern side-scraper	1					**1**	**0.48**
Plain face side-scraper	3		1			**4**	**1.91**
Double straight side-scraper	7	3				**10**	**4.78**
Double convex side-scraper	18	5	1			**24**	**11.48**
Double concave-convex side-scraper	9	3	2		1	**15**	**7.18**
Double straight side-scraper-Concave	2			1		**3**	**1.44**
Double convex straight side-scraper	9	1				**10**	**4.78**
Double *déjeté* side-scraper	7					**7**	**3.35**
Transversal straight side-scraper	5					**5**	**2.39**
Transversal convex side-scraper	4		1			**5**	**2.39**
Transversal convex side-scraper		1				**1**	**0.48**
Total	**169**	**31**	**7**	**1**	**1**	**209**	**100.00**
%	**80.86**	**14.83**	**3.35**	**0.48**	**0.48**	**100.00**	

Grant total absolute (n) and relative (%) frequencies are presented in bold.

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Table 6
Capangombe – Santo António. Absolute and relative frequency of the biface types by raw materials.
Capangombe – Santo António. Fréquence absolue et relative des types de bifaces par matières premières.

Bifaces	Quartzite	Chert	Flint	Porphyry	Basalt	Indeterminate	*n*	%
Amygdaloid biface with butt	18	3		3			**24**	**9.20**
Short amygdaloid biface with butt	7	1				1	**9**	**3.45**
Typical short amygdaloid biface	1						**1**	**0.38**
Typical amygdaloid biface	35	3	1	2			**41**	**15.71**
Long typical cordiform biface	5						**5**	**1.92**
Typical cordiform biface	1						**1**	**0.38**
Thick discoidal biface with butt	2						**2**	**0.77**
Typical thick discoidal biface	1						**1**	**0.38**
Lanceolate fricon biface	10	2					**12**	**4.60**
Micoquian fricon biface	8						**8**	**3.07**
Lanceolate biface with butt	1						**1**	**0.38**
Double lanceolate biface	4						**4**	**1.53**
Typical lanceolate biface	8	1					**8**	**3.45**
Typical lageniform biface	5						**5**	**1.92**
Limande biface with butt	3						**3**	**1.15**
Typical limande biface	2						**2**	**0.77**
Typical micoquian biface	2	2					**4**	**1.53**
Thick naviform biface with butt	2						**1**	**0.76**
Naviform biface with butt	2	1					**3**	**1.15**
Typical naviform biface	2						**2**	**0.77**
Typical ogivo-triangular biface		1					**1**	**0.38**
Oval biface with butt	1						**1**	**0.38**
Thick oval biface with butt	11	2					**13**	**4.9**
Typical thick oval biface	10	1					**11**	**4.21**
Typical oval biface	1						**1**	**0.38**
Typical thick oval biface	8						**8**	**3.07**
Partial cordiform biface	2						**2**	**0.77**
Partial oval biface	2	1					**3**	**1.15**
Partial subtriangular biface	1						**1**	**0.38**
Partial triangular biface	1						**1**	**0.38**
Typical peleciform biface	1			1			**2**	**0.77**
Proto-limande biface with butt	16	1		1			**18**	**6.90**
Thick typical proto-limande biface	3						**3**	**1.15**
Typical proto-limande biface	31	3		1	1		**36**	**13.79**
Elogate subcordiforme biface with butt		1					**1**	**0.38**
Typical elongate triangular biface	1						**1**	**0.38**
Triangular biface with butt	1						**1**	**0.38**
Partial limande	2						**2**	**0.77**
Foliated tool partially bifacial		1					**1**	**0.38**
Amigdaloide proto-biface with butt		1					**1**	**0.38**
Typical proto-limande uniface	2						**2**	**0.77**
Biface fragment	10	2					**12**	**4.60**
Total	**223**	**27**	**1**	**8**	**1**	**1**	**261**	**100.00**
%	**85.44**	**10.34**	**0.38**	**3.07**	**0.38**	**0.38**	**100.00**	

Grant total absolute (n) and relative (%) frequencies are presented in bold.

(84.27%), cherts and quartz (13.47%), and porphyries and basalts (1.76%) (Table 1). These are widely availablein the hydrographic basin that collects streams from a vast area deriving from the Humpata plateau where the Chela group series rocks outcrop (Kroner and Correia, 1980; Pereira et al., 2011). These raw materials are the same or related to those found in the MSA assemblages of Leba Cave which is located few kilometers northwest in strait line upstream this basin and at the edge of the Humpata plateau.

3.3. *Debitage*

The debitage is dominated by artefacts frequently associated to the MSA, namely prepared and predeterminate cores, flakes, blades and points (Boëda, 1995; Inizan et al., 1999; Sheppard and

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Table 7
Capangombe – Santo António. Absolute and relative frequency of biface silhouette and section morphology.
Capangombe – Santo António. Fréquence absolue et relative de la morphologie de la silhouette et de la section des bifaces.

Silhouette	*n*	%
Asymmetrical	44	16.79
Unbalanced	79	30.15
Balanced symmetry	130	49.62
Fragment	9	3.44
Total	***262***	***100.00***
Section		
Biconvex asymmetrical	119	45.42
Biconvex symmetrical	99	37.79
Fragmented	8	3.05
Plano-Convex	18	6.87
Tabular	18	6.87
Total	***262***	***100.00***

Grant total absolute (n) and relative (%) frequencies are presented in bold.

Table 8
Capangombe – Santo António. Absolute and relative frequency of cleaver types per raw materials . Types adapted from Tixier (1956) and Ramos (1974).
Capangombe – Santo António. Fréquence absolue et relative des types de hachereau par matière première, type adaptés du Tixier (1956) et du Ramos (1974).

Cleaver type/raw material	Quartzite	Chert	Flint	Porphyry	Basalt	Total	%
Type 0	24	3		1		**28**	**14.36**
Type 0.1	10	2				**12**	**6.15**
Type 1.1	3					**3**	**1.54**
Type I	2					**2**	**1.03**
Type II	86	12				**98**	**50.26**
Type III	15	2		1		**18**	**9.23**
Type V	3					**3**	**1.54**
Type VI	3	1				**4**	**2.05**
Type Victoria West	5	3				**8**	**4.10**
Indeterminate types	17	1			1	**19**	**9.74**
Total	**168**	**24**	**0**	**2**	**1**	**195**	**100.00**
%	**86.15**	**12.31**	**0.00**	**1.03**	**0.51**	**100.00**	

Grant total absolute (n) and relative (%) frequencies are presented in bold.

Table 9
Capangombe – Santo António. Surface alterations and weathering.
Capangombe – Santo António. Surface d'alterátion et ***météorisation****.*

Surface alterations	Total	%
Unsharped edge	166	16.23
Double patine	28	2.74
Wind alteration	57	5.57
Very unsharped edge	26	2.54
Partial Wind alteration	35	3.42
Sharp edge	711	69.50
Total	**1023**	**100.00**

Kleindienst, 1996; Wurz et al., 2003) (Table 1, Figs. 3 and 4). In the case of cores, most are exhausted (75.11%), but it is possible to see pebble natural surface on 73% of them. The flaking surfaces are coherent with the scars we observed on the flakes (95.58%), the points (2.65%) and the blades (1.77%). Among the wide variety of cores (Table 2, Fig. 4), the dominant ones are, from far, those with bifacial extractions (78.67%), although those with one (13,8%) and 3 our more (6.2%) are also present.

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Fig. 3. Capangombe – Santo António. Left: MSA points, including retouched; Middle: MSA blades, including crested blade (left); Right: Pre-determinate flakes (top and middle row) and MSA points (lower row). University of Lisbon/Tropical Scientific Research Institute, Archaeology collection, 355-11, Santo António, Capangombe (photo T. Pereira, courtesy University of Lisbon)
Capangombe – Santo António. À gauche : pointes, y compris pointes retouchées; Au milieu : lames MSA, y compris une lame à crête (à gauche) ; À droite : éclats prédéterminés (en haut et au milieu) et pointes MSA (en bas). Université de Lisbonne/Institut de recherche scientifique tropicale, collection d'archéologie, 355-11, Santo António, Capangombe (photo T. Pereira, avec l'aimable autorisation de l'Université de Lisbonne)

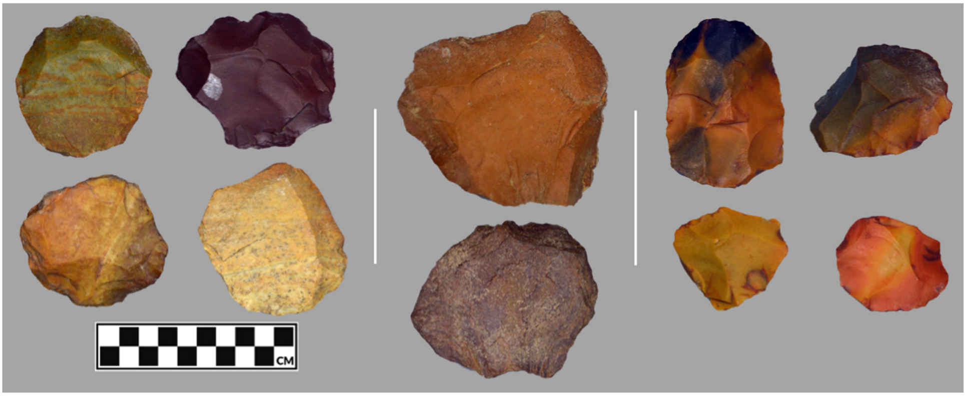

Fig. 4. Capangombe – Santo António. Left: Medium size configurated preferential cores; Middle: Large size configurated preferential cores; Right: Medium size recurrent cores. University of Lisbon/Tropical Scientific Research Institute, Archaeology collection, 355-11, Santo António, Capangombe (photo T. Pereira, courtesy University of Lisbon)
Capangombe – Santo António. À gauche : nucleus préférentiels de taille moyenne ; Au milieu : nucleus préférentiels de grande taille ; À droite : nucleus récurrents de taille moyenne. Université de Lisbonne/Institut de recherche scientifique tropicale, collection d'archéologie, 355-11, Santo António, Capangombe (photo T. Pereira, avec l'aimable autorisation de l'Université de Lisbonne)

Nevertheless, there is no evidence for the production of bladelets or maintenance products related to bladelet production or retouched tools on bladelets – suggested a limited intrusion of post-MSA typological elements.

Considering the blanks, despite the reduced number, they encompass flakes, blades, points, but not bladelets. It is worth noted that the total amount of blanks (20.55%) is like that of the total of

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cores (22.12%) which, if any other clue existed, confirms the natural bias of an assemblages such as this.

In the class of blanks (Table 4; Fig. 3), there are a considerable number of flakes (17.01%), some with lengths between 40 to 100 mm. Interestingly, among the blades (2.26%) and points (1.28%), some that are quite large, sometimes with > 150 mm in length. These blanks have very regular edges and dorsal patterns that, together, show not only the recurrence of debitage of similar blanks from the cores under reduction but, most of all, strongly suggests the robustness of the *savoir-faire* of the knapper extracting such elongated blanks, regardless which the raw material in use at the site (Roux and Bril, 2005). The presence of MSA points, prepared cores, blades and Levallois flakes is similar to the MSA (horizon IV) from Leba Cave estimated to have a minimum age of 75,000 years (Camarate-França, 1964; Ervedosa, 1980; Matos et al., 2014; Matos and Pereira, 2020).

Despite the abundance of prepared cores and prepared blanks at CSA, the frequency of maintenance products (1.08%) and fragments (2.56%) is very low (Table 1). This could have been explained by human transport and discard of finished pieces. However, considering the overall characteristics of the assemblage, it is more likely that it results from the selection made on the field by the team when picking the artefacts that could better characterize the timeframe and culture of the Pleistocene human occupation(s). This would also explain the complete absence of chips, as they would not make any significant contribution to this objective neither would be probably observed on the ground without excavation and sieving.

3.4. Retouched blanks

The retouched tools (Table 5, Fig. 3)account for 20.55% of the sample, mostly in quartzite and chert, with an overall width between 50 and 75 mm and length between 60 and 95 mm. Average thickness of the retouched pieces is 25 mm (Piquete, 2021). This is an unusually high number for presumed MSA context. Different typologies are listed among burins, denticulates, notches, and scrapers, but scrapers are from far the most frequent (end scrapers, side scrapers; typical and atypical; simple and double; straight, convex, concave and with scaled, stepped parallel, sub-parallel retouch according to Bordes, 1961 typology) many with two retouched edges combined, suggesting a possible higher curation of the blanks and of the tools (Table 5). This information is extensively presented at the **supplementary information**. For now, with the available data, it is impossible to understand if this results from a high number of these tools at the site or from bias during the surface collection.

3.5. Shaping strategies

LCTs account for almost half of the assemblage (45.43%) (Tables 6–8, Fig. 5) and include a diversity of complete handaxes (24.58%), partial handaxes (0.98%) (tools in which the shaping extends to both surfaces but does not encompass 50% or more of the total perimeter of the tool), unifaces (0.20%), cleavers (19.17%) and picks (0.49%). Among the bifaces, some are clearly handaxes. Among these, 48.37% are very thin and 32.52% are thin, 49.62% have silhouette with balanced symmetry and 30.15% unbalanced, but only 16.79% are asymmetrical and, at the same time, they also have biconvex asymmetrical (45.42%) and biconvex symmetrical (37.79%) sections. Overall, this indicated the handaxes (at least those that were collected) were specially refined, which seem to have demanded a higher degree of expertise.

Along with the handaxes, there are also cleavers (Table 8) which correspond to 42.2% of the configured products and the analyses show that most of the cleavers match Tixier's (1956) type II (50.26%). Type II refers to any blank showing detachments negatives on its dorsal surface from previous extractions, in addition to the predetermined distal edge. It is retouched at the lateral ends for a better grip. In turn, picks are very few (0.49%). Together, the LCTs (Isaac, 1977) propose that Acheulean-tool makers used the site. Despite the few that is known in the region, similar artefacts occur in the basal unit of Leba Cave (Matos and Pereira, 2020) that does not have them in the layers above, which seems to corroborate the ESA or late ESA/early MSA occupation of Capangombe. It is possible that the largest flakes of the assemblage may also be related to this early occupation of the site.

Fig. 5. Capangombe – Santo António. Configurated tools. First row: Cleavers; Second row: Axes; Third row: Bifaces; Forth row: Simetrical bifacial configurated tools. University of Lisbon/Tropical Scientific Research Institute, Archaeology collection, 355-11, Santo António, Capangombe (photo T. Pereira, courtesy of the University of Lisbon).

Capangombe – Santo António. Outils configures. En haut: hachereaux ; Deuxième ligne: haches ; Troisième ligne: bifaces ; En bas: outils bifaces symétriques. Université de Lisbonne/Institut de recherche scientifique tropicale, collection d'archéologie, 355-11, Santo António, Capangombe (photo T. Pereira, avec l'aimable autorisation de l'Université de Lisbonne).

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4. Discussion

The goal of this study was to highlight the main characteristics of the CSA assemblage considering raw material preferences, reduction sequences and typology of the CSA sample. The assemblage prevenient from the colonial collection housed by the University of Lisbon has three main problems:

- it results from superficial collection;
- the exact provenance is not certain since geographic coordinates recorded by the collector can have an error between 2 to 5 km;
- the assemblage may be selective.

4.1. Nature of the collection

The selective nature of the assemblage is clear by the convergency of different proxies, each one often considered as enough to classify a collection as biased. First, no chips or small implements, including small flakes were found. Second, there is a low frequency of debris in general terms, including large but particularly small ones. Third, the blank to core ratio is abnormally low, particularly when considered the number of detachments in the knapping surface and the preparation of the cores. Fourth, the ratio between tools and the total amount of artefacts is also abnormally high, and remains high regardless if one considers only the retouched blanks, only the shaped tools or the two combined. Alternatively, post-depositional processes like bioturbation, deflation, stretching or translocation are common phenomena recognized in similar open-air contexts (Cahen, 1976; Cahen and Moeyersons, 1977; Jouquet et al., 2016; Kuman et al., 2020; Marks, 2015; Marks and McCall, 2014; Matmon et al., 2015; McBrearty, 1990; McBrearty et al., 1998; Moeyersons, 1978; Shackley, 1986, 1980; Whitford and Eldridge, 2013) and these could have been the cause of such bias. Nonetheless, the absence of extensive edge and ridge damage, the aesthetical appealing of many of the artefacts and how they provide a relatively reliable overview of the site for further investigation suggests the lithics were not translocated at high distance, but rather selected in order to sample it under the light of the state-of-the-art of the scientific campaign.

4.2. Comparative assessment with nearest sites

Despite the reasons for proportionality, each of the categories show remarkable homogeneity regarding raw material, surface alterations and tool-configuration, allowing further discussions about the cultural affinities and chronology. In "Le Paléolithique du Sud-Ouest de l'Angola – Vue d'ensemble" (Ramos, 1982), Ramos considered the CSA site as "Upper Acheulean" (*Acheuléen Supérieur*) and analogous to some of the sites of Baía Farta and other coastal locations in Benguela Province (Ponta das Vacas) and Namibe Province (Ponta do Giraúl, Porto Alexandre), or further inland in Huíla Province, such as Matala and Providencia (Ramos, 1982, p. 46). Many sites that were first approached by colonial missions are yet to be tested and studied in detail. In the case of Baía Farta, the fieldwork promoted by the National Archaeology Museum of Benguela since the 1980s showed how this region is incredibly rich in Stone age Archaeology. For instance, Pais Pinto detected thirteen locations with lithic materials at Dungo (e.g., Matos et al., 2021; Pais Pinto, 1988), and further the study of Dungo IV showed that these assemblages are older than previously thought, with no traces of "Fauresmith" tools (Gutierrez et al., 2001; Gutierrez and Benjamim, 2019; Mesfin et al., 2023).

A chronostratigraphic relationship between other sites in the vicinity such as Capangombe Velho and the Leba Cave was proposed by Ramos (1982). Capangombe Velho is located about 4 km west from the CSA, near the fort. The site is positioned in the same river stream as CSA around the inselberg of Morro Santo-António and was excavated by Ramos sometime between 1966 and 1967. However, the exact location of his excavations is unknown, and Ramos' field diaries or any information regarding sieving or sorting was not found.

Ramos collected more than a hundred thousand pieces from two horizons at Capangombe Velho that he described as "Fauresmith" (lower) and MSA (top), but never published his discoveries in detail.

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It could be tempting to highlight the "Fauresmith" in Angola as it was so often called by Ramos (1982, 1974, 1970), but:

- many assemblages are from surface collections;
- when they are not such as in Capangombe Velho, there are no field diaries;
- since the "Fauresmith" has been detected through a time span over 100,000 years, the likelihood of these assemblages resulting from palimpsest is incredibly high;
- refinement of the lithic analysis is yet to be accomplished to compare these locations with the "Fauresmith" sites of southern Africa.

In the few publications signed by Ramos, a link between the upper unit of the Capangombe-Velho and the lower unit of the MSA of Leba Cave sequence (horizon VI), also called "MSA of Acheulean tradition", was suggested (Ramos, 1981, 1982), a term that carries a putative historical idea of technocultural continuities prevalent in the European taxonomies of the 1950s to 1980s (Bordes, 1961).

Leba Cave is located about 70 km from the Capangombe village, at 1757 m a.sl. (Fig. 1). Comparisons between the CSA and Leba Cave shows analogous raw material types and sources, although chert is predominantly used at Leba Cave (42.91%), where it is also more widely present either in primary or secondary deposits (Matos and Pereira, 2020). At CSA chert represents only (12.29%), whereas quartzites dominate the assemblage (84.07%). Quartzite is only relatively more frequent at Leba for the production of flakes (58.00%). Similar rock types and preferences are inevitably associated to variation in the stream beds. Future studies focusing on the sorting and geochemical data of the pebble/cobble assemblages can provide more comparative evidence. The similarity between horizon VI and CSA lies on the tool typologies, with the occurrence of cleaver and biface preforms suggesting an Acheulean affinity (Matos and Pereira, 2020). The dimensions of the axes at CSA (Length: 30–140 mm; Width: 30–120 mm; Thickness: < 60 mm), are similar to those of horizon VI from Leba Cave (Length: 116 mm; Width: 135 mm; Thickness: 50 mm). On the other hand, Ramos indicated during the study of the CSA assemblage, there were difficulties in classifying, under the strict typological point of view (Ramos, 1974), 19 cleavers with the methodology used (Balout et al., 1967; Tixier, 1956) as they do not entirely fit on the proposed typologies, which may suggest a possible regional feature.

The flake butts from horizon VI of Leba Cave are predominantly cortical, the section is trapezoidal and the dorsal pattern unidirectional, the same happens at CSA. The cores from horizon VI of Leba Cave do not show any preparation of the striking platforms, contrasting with the prepared platforms of the cores from CSA and the production of flakes, blades and points. In turn, the points and blades from the sites in Angola have affinities with other assemblages in Southern Africa. Morphological similarities were found for instance with Kathu Pan, particularly in size and shaping of blades and points for hafting (Matos, 2013; Matos and Pereira, 2020; Wilkins and Chazan, 2012).

Another site in the region is the Munhino Mission of Huíla (Gibson and Yellen, 1978), located about 32 km northeast of Leba Cave, 1800 m a.s.l. The Munhino-Huíla Mission assemblage is characterized by prepared cores and two bifacial pieces classified as "core-axes" along with a large variety of retouched flakes.

Considering the available material, it seems possible that lithic remains from CSA may be associated with a transitional phase between the ESA and MSA even if its chronological placement between the two Stone Age periods of sub-Saharan Africa is yet to be more precisely established. The typology observed in the CSA assemblage shows similarities with the Acheulean industries, due to the presence of handaxes and cleavers, or using flakes as blanks to produce LCTs. However, the association with Levallois cores, scrapers, denticulates, retouched point and blades are characteristics that bring it closer to the "Fauresmith". These may as well derive from site formation processes, such as river incision and erosion linked to the local seasonal climate regime (Huntley, 2019) or trampling (Schoville, 2019) . The "Fauresmith" is a long-debated term for the either late ESA or early MSA assemblages frequently observed in open-air sites of the interior drylands of southern Africa and recognized by finely retouched bifaces, scrapers, Levallois points, prepared cores and blades (Kuman et al., 2020; Tryon and McBrearty, 2002; Underhill, 2011). The oldest dated "Fauresmith" tools are from Kathu Pan 1, to ca. 511–435 ka in a sequence of LCTs and flake-blades (Porat et al., 2010; Wilkins and Chazan, 2012).

In some sites with long stratigraphic sequences, the "Fauresmith" overlaps the association of Victoria West technology with large cleavers (including with cores presenting negatives with cleaver features), and the combination of these three elements only occurs in areas of the site where the layers with "Fauresmith" cover the layers with Victoria West and cleavers (Li et al., 2017; Shadrach, 2018). In this sense, the presence of a single Victoria West core at CSA may be the result of either selective collection or by equifinality, since no record of such technology has been found in the vicinity or within the blanks of CSA. This remains an open question for future research.

The assemblage analyzed shows tool-types commonly associated to the Acheulean, but the refinement and configuration of these LCTs, along with the considerable number of predetermined cores, blades and points, bring it closer to the MSA. These characteristics suggest a Late Acheulean phase or the so-called transitional ESA/MSA technocomplexe of Southern Africa, namely the "Fauresmith".

Such antiquity is corroborated by the levels with blades and LCTs from the under and within the Kapthurin Formation sequence, Kenya (~548–500 ka) (Tryon and McBrearty, 2002). Other dates for other sequences of South Africa, such as Wonderwerk Cave (at 315– < 195 ka), Bandu Farm (> 394–~200 ka), Florisbad (327–208 ka), and Rooidam (209–139 ka) (Herries, 2011). The co-existence of blades, LCTs and small retouched tools at CSA analogous to those sites, suggests a similar chronology.

At Kalambo Falls, in Zambia, the Bwalya Industry displays similarities with the "Fauresmith" too (Herries, 2011). This industry is composed of blades, retouched points, prepared cores, small scrapers, and retouched convergent-edged tools (flakes and points) and a large percentage of small LCTs of lanceolate morphology (e.g., Clark and Brown, 2001). The prepared cores, blades and points and the existence of bifaces with a lanceolate morphology also allow us to correlate the similarity of the CSA with this "Fauresmith" sequences. On the other hand, the "Sangoan" series of Kalambo Falls, called the Chipeta Industry, has a larger quantity of scrapers than the industry that preceded it (Clark et al., 2001; Davies, 1976; Sheppard and Kleindienst, 1996). Some authors noted there is a general trend towards specialization in the production of blades and concomitant disappearance of Acheulean handaxes and apparent replacement by small axes and picks (Herries, 2011).

Evidently, the absence of organic material or sediments in the museum assemblage does not allow to explore absolute dating proxies at this stage, which certainly emphasizes the need for further analytical and comparative work. Nonetheless, other research developed in the southwest of Angola provides a possible timeframe. The burial of the lithic tools from Dungo IV was estimated between 614.5 ± 9.5 ka and 662.05 ± 10.24 ka (Gutierrez and Benjamim, 2019; Lebatard et al., 2019). Further south, on the margins of the Cunene River, at the border between Angola and Namibia, a small lithic assemblage including flakes, cores and Levallois points from a river terrace at the site of Cafema, was dated to 220 ka by Optical Stimulated Luminescence (OSL) – single-aliquot regenerative-dose (SAR) – was classified as "generic" MSA (Nicoll, 2010). If we consider the interpretation of Ramos as true, then the CSA is likely younger than 700 ka.

5. Conclusion

The increasing availability of archaeological data from the different sub-regions of Africa provides valuable new insights into the diversity and tempo of human lifeways and environments (e.g., Jones and Stewart, 2016; Roberts and Stewart, 2018), and has called for revision of the paradigms guiding paleoanthropological research about human evolution (Scerri and Will, 2023). In this context, material culture plays a significant role in the assessment of human cognition and adaptation, and lithic taxonomies remain useful in shaping regional identities and sequences in southern Africa (Lombard et al., 2022). Numerous challenges arise when trying to integrate museum assemblages in these sequences, particularly those deriving from colonial surveys. Unfortunately, this is the case for most of the archaeological sites known in Angola (e.g., Matos et al., 2021), and also for the assemblage from the site Capangombe-Santo António (CSA) .

As demonstrated in this study, the CSA assemblage exhibits formal and technological variations that can be broadly associated with the late ESA or early MSA sequences of southwest Angola and

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Southern Africa. These cultural stages span for a significant timeframe of environmental changes during the second half of the Middle Pleistocene. Glacial cycles of approximately 100,000 years started around 600,000 years ago, and the magnitude of changes between glacial and interglacial periods created adaptive challenges, especially in drier areas of Africa (Elderfield et al., 2012; McNabb, 2005). The rising aridity and limited resources likely drove humans to adapt to the changing environment, resulting in technological innovations and increased mobility. The lithic assemblages from this period reflect this adaptation through the use of finer and sharper stone tools, the emergence of prepared technology, as well as retouched blades and points. These technological innovations are often relayed to the behavioral complexity of populations, leading to the emergence and dispersal of *Homo sapiens* in Africa (Kuman et al., 2020; Wilkins et al., 2021, 2010; Wilkins and Chazan, 2012). In sum, locations with both Early and Middle Stone Age traits like Capangombe-Santo António are essential in the discussion. Future research will be focused on testing, site formation processes and radiometric ages which is key to characterize local distribution of Pleistocene populations and cultures in Angola.

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