Evidence for Mode 1 hominin occupation in the Central Sahara

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Leverhulme Centre for Human Evolutionary Studies
University of Cambridge

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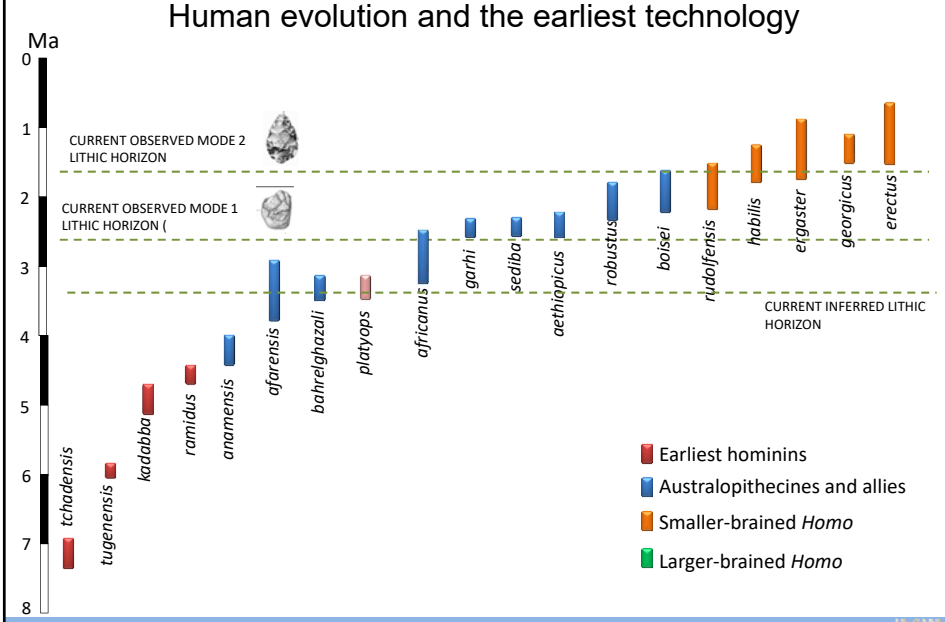
Human evolution and the earliest technology



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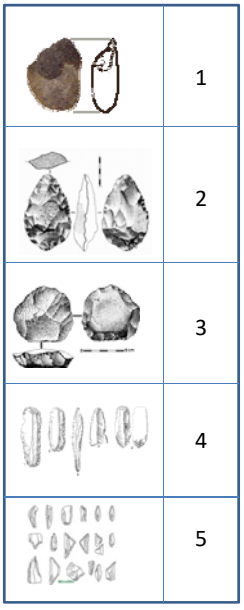
Mode 1 technology
Oldowan

TECHNOLGICAL MODES



JGD Clark 1968

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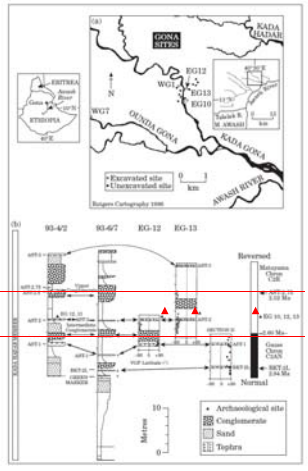
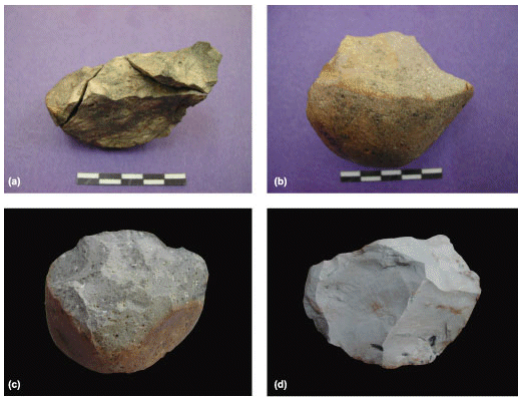
Earliest stone artefacts from Gona, Ethiopia



2.5

2.6



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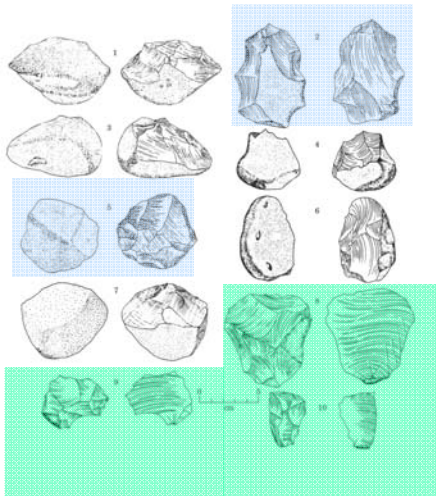
Gona artefacts - cores/choppers, discoids, and flakes



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Earliest dated stone tools in Africa

Site	Date
Gona Hadar, Ethiopia	2.6–2.5 Ma
Bouri Middle Awash, Ethiopia	c. 2.5 Ma
Shungura Formation (Members G and F), Omo River Valley,	2.4–2.34Ma
Lokalalei West Lake Turkana, Kenya	2.34 Mya
Fejej	~2.3 Ma
Senga 5Ab Semliki Valley, Democratic Republic of Congo*	c. 2.3 Ma
Kada Hadar Member Hadar, Ethiopia	c. 2.33 Ma
KS-1 and KS-2 Kanjera South, Kenya	c. 2.2 Ma

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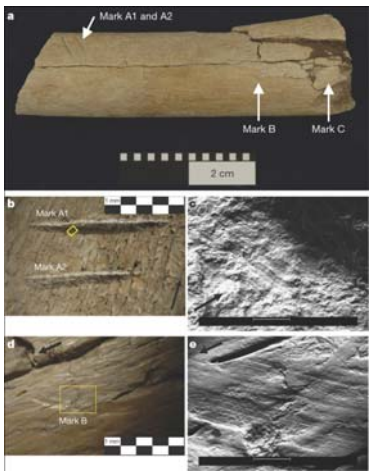
Indirect evidence for use of stone tools

Dikikka, Middle Awash
Ethiopia
3.4 Ma



SP McPherron *et al. Nature* (2010)

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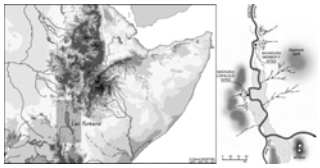
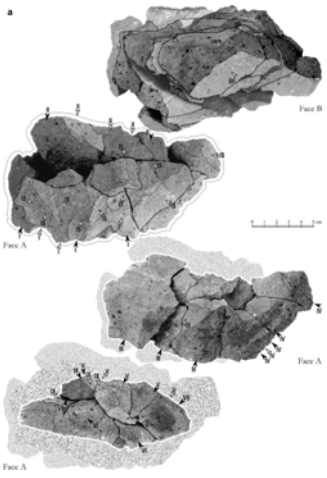
Oldowan complexity

Lokalilei 2c
West Turkana

2.34 Ma





Roche *et al* 2005

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Mode 1 technologies and the earliest dispersals

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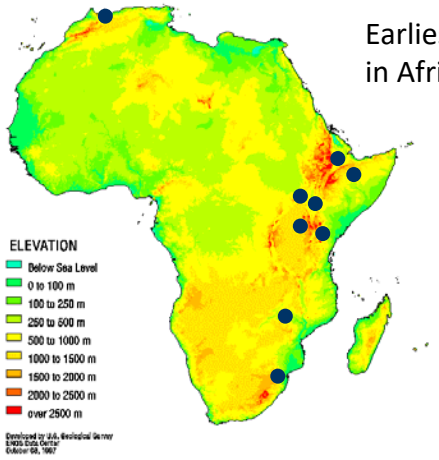
The problem of Mode 1 technologies and pan-African dispersals



Earliest stone tool occurrences in Africa

Gona
Bouri
Shungura
Lokalalei
Senga
Koobi Fora
Chiwondo
Sterkfontein
Ain Hanech

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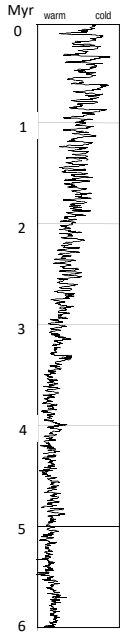
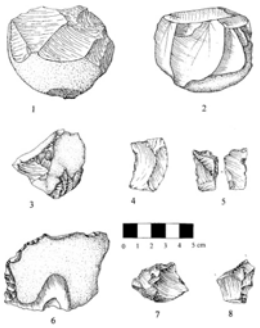


The first hominin dispersals to North Africa – Ain Hanech

Proto-Nile?

Earliest North African archaeological site

Onset of global Glaciation; evolution of East African grasslands



Late Pliocene - 2.5 Myr :

(1) establishment of the Saharo-Arabian desert belt ~ 2.5 Myr (DUST)
(2) Significant African faunal turnover
(3) Aïn Boucherit (~2.3 Myr) and Ahl al Oughlam (~2.4 Myr): rich palaeontological sites in the Maghreb – NO archaeology
(4) Palaeo-Nile (late Pliocene): sources within Egypt (the mini Nile!)
(5) Significant African faunal turnover ~1.8 Myr.

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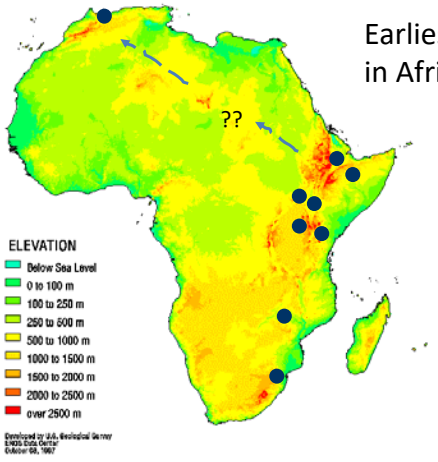
The Central Sahara route



Earliest stone tool occurrences in Africa

Gona
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Ain Hanech

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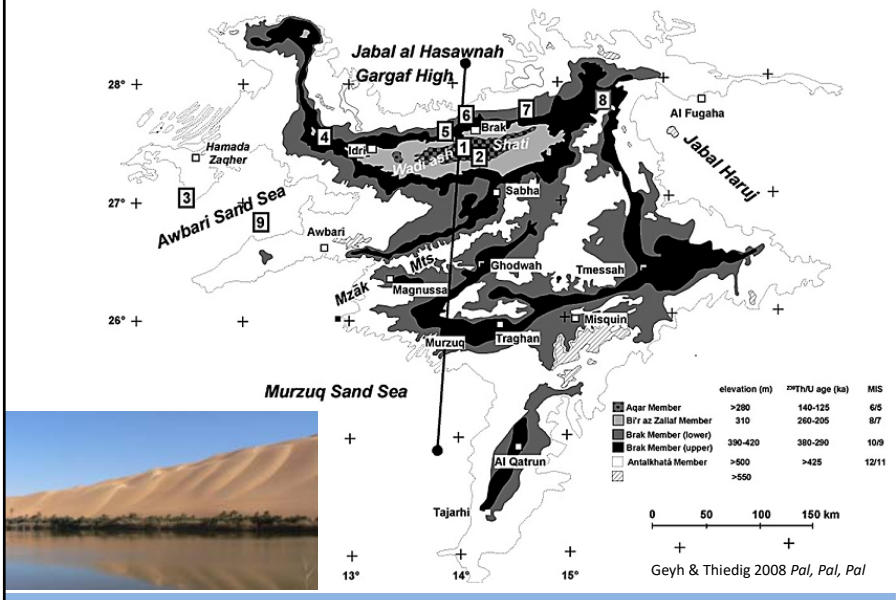
The wet(ter) Sahrara



Geyh & Thiedig 2008 *Pal, Pal, Pal*

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Desert Migrations Project 2007-2011

The Garamantes and the trans-Saharan links – culture, biology and environment
(Mattingly)

Palaeolakes and hydrology of the Fezzan
(Drake, White, Armitage)

Human evolution and dispersals through the Quaternary
(Mirazon Lahr & Foley)

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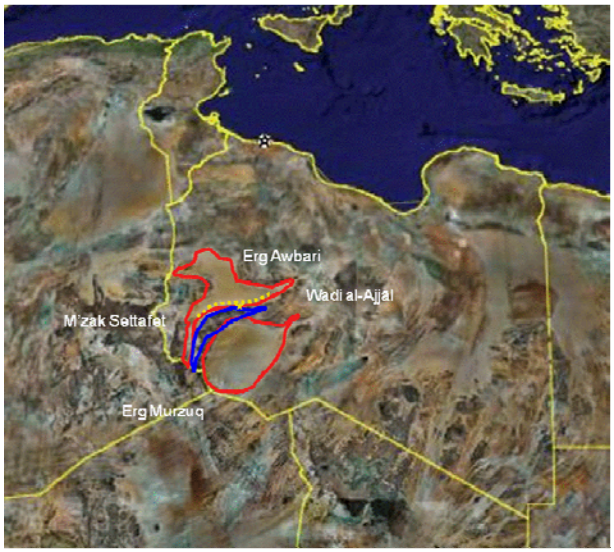
DMP in Fezzan



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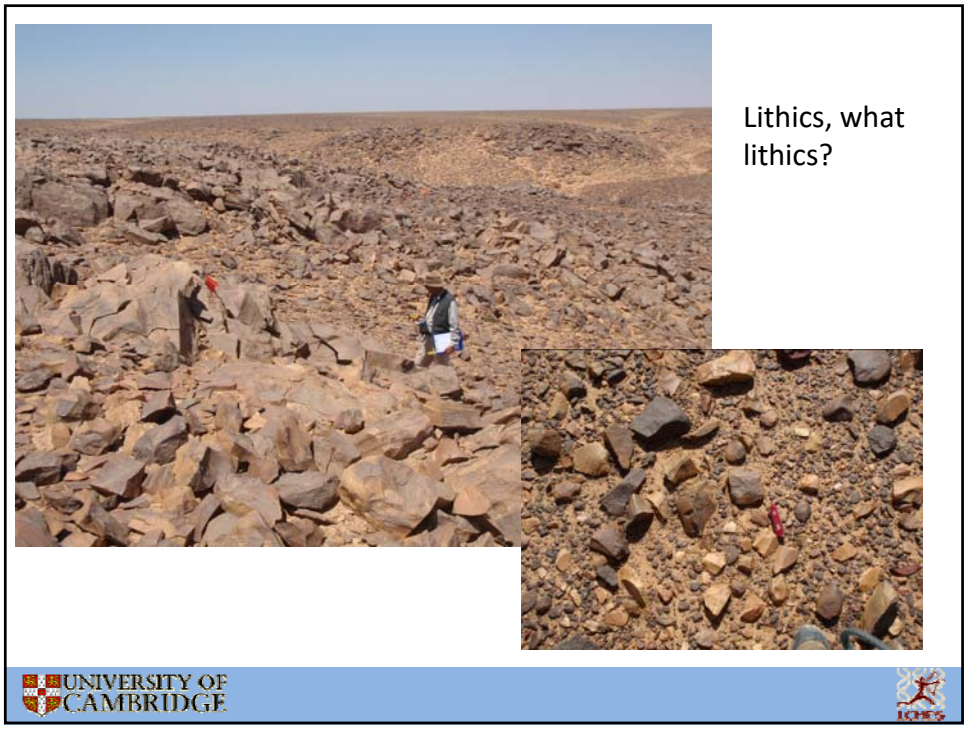
Lithics, what lithics?
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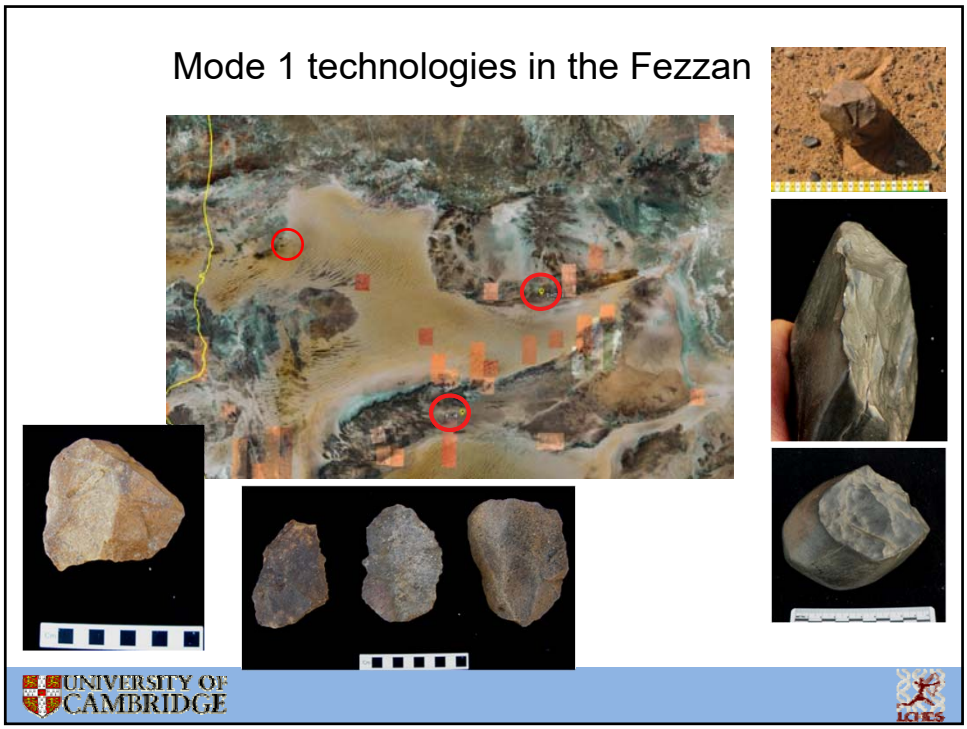
Mode 1 technologies in the Fezzan
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Wadi as Shatti

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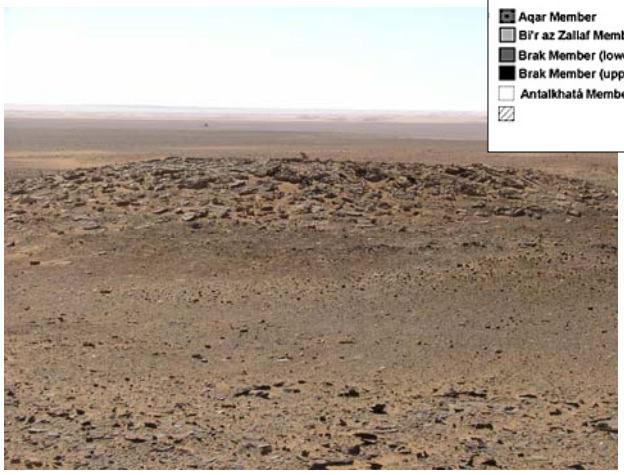
Sedimentary context



	elevation (m)	^{230}Th/U age (ka)	MIS
Aqar Member	>280	140-125	6/5
Bi'r az Zallaf Member	310	260-205	8/7
Brak Member (lower)	390-420	380-290	10/9
Brak Member (upper)			
Antalkhatâ Member	>500	>425	12/11
	>550		

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Mode 1 lithics

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Wadi as Shatti Mode 1 lithics

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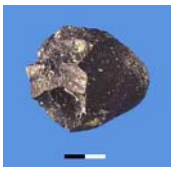
Mode 1 lithics from Wadi as Shatti – comparison with other assemblages

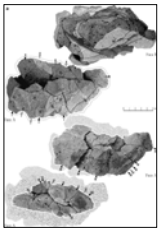
Wadi as Shatti



Olduvai

Gona

Dmanisi



Lokalalei

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The broader implications of Central Saharan Mode 1 industries

1. Extension of the African Mode 1 distribution and link between E and NW Africa
2. Central Sahara as a major dispersal vector, independent of 'out of Africa'
3. Distribution not as extensive as Mode 2 which is ubiquitous in the Sahara

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Conclusions and questions

- Which hominins?
  - Dates – early or late
  - Repeated events?
- Mode 1 in Central Sahara, then:
  - Dispersal route or refugium?
- Variation in Oldowan

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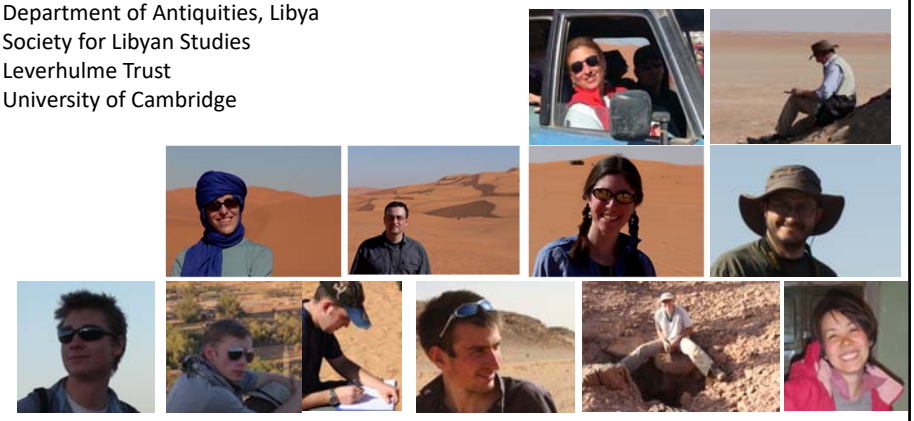
Acknowledgements
The Department of Antiquities, Libya
The Society for Libyan Studies
The Leverhulme Trust
The University of Cambridge

DMP Palaeo team



Federica Crivellaro, Jay Stock, Lisa Maher, Jose Maillo Fernandes, Cornelius Halladay-Garrett, Adam Purdon, Alex Wilshaw, Tom Davies, Djuke Veldhuis, Mercedes Okumura

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Lokalalei 2C lithic assemblage components (the final figures in this table differ slightly from those published in the preliminary study by Roche et al., 1999)

Category	Excavation	Surface	Total	% of assemblage	Refitted	% of category
Whole flakes	366	134	500	*19.1*	98	*19.6*
Broken flakes	517	242	759	*29.0*	123	*16.2*
Small flakes (< 1 cm)	692	30	722	*27.6*	0	*0*
Fragment indet.	329	51	380	*14.5*	19	*5.0*
Retouched pieces	13	8	21	*0.8*	6	*28.6*
Whole cores	52	18	70	*2.7*	27	*38.6*
Broken cores	12	3	15	*0.6*	8	*53.3*
Hammerstones	18	0	18	*0.7*	0	*0*
Worked cobbles	20	1	21	*0.8*	1	*4.8*
Broken cobbles	49	5	54	*2.1*	3	*5.6*
Unmodified cobbles	54	0	54	*2.1*	0	*0*
Total	2122	492	2614	*100.0*	285	*10.9*

	Length (cm)		Width (cm)		Thickness (cm)		Weight (gr.)	
	Manup.	Hamm.	Manup.	Hamm.	Manup.	Hamm.	Manup.	Hamm.
Mean	7.6	9.5	5.4	7.0	4.2	5.8	266	486
Max.	12.3	11.7	10.2	9.3	7.5	8.2	925	850
Min.	3.4	6.9	2.2	4.7	1.4	4.1	18	211
S.D.	24.28	14.24	18.52	14.21	14.53	13.02	225.36	211

Comparison between the dimensions and weight of hammerstones and those of unmodified cobbles ("manuports")

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Erg Awbari
Wadi al-Ajjāl
M'zak Settafet
Erg Murzuq
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