



MODERN HUMAN ORIGINS

Yonatan Sahle, Hugo Reyes-Centeno, Christian Bentz





The Archaeology of modern humans

- Middle to Late Pleistocene archaeology: Africa
- Middle to Upper Paleolithic transition: Eurasia
- Complex technologies and behaviors:
Revolution of evolution?

McBrearty S, and Brooks AS. 2000. The revolution that wasn't: a new interpretation of the origin of modern human behavior. *Journal of Human Evolution* 39(5):453-563.

Roebroeks W. 2008. Time for the Middle to Upper Paleolithic transition in Europe. *Journal of Human Evolution* 55(5):918-926.

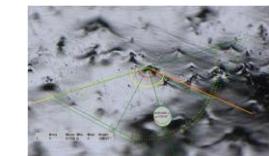
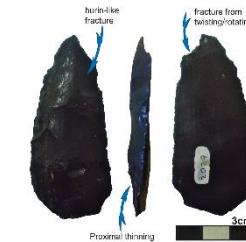
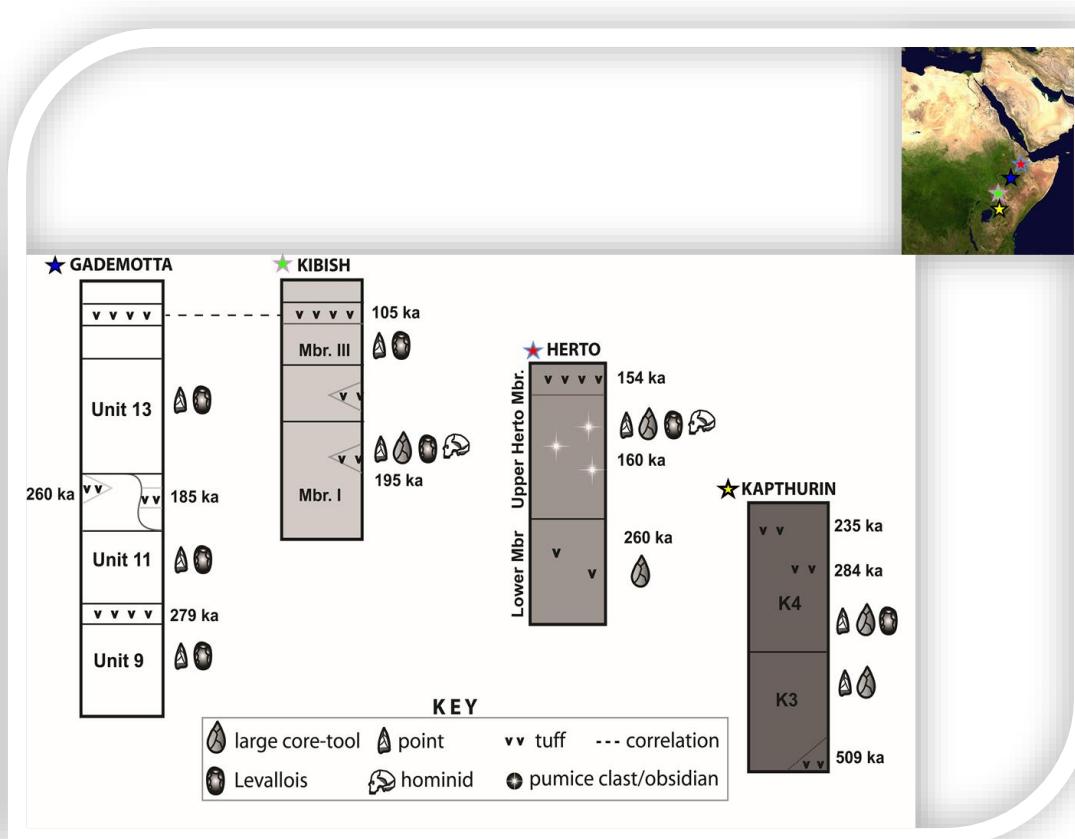
Wadley L. 2013. Recognizing Complex Cognition through Innovative Technology in Stone Age and Paleolithic sites. *Cambridge Archaeology Journal* 23: 163-183.

McBrearty S, Brooks AS (2000) The revolution that wasn't: A new interpretation of the origin of modern human behavior. *Journal of Human Evolution* 39(5): 453-463.

Conard NJ (2010) Cultural modernity: Consensus or conundrum? *Proceedings of the National Academy of Sciences USA* 107(17):7621-7622.



Transition to the MSA

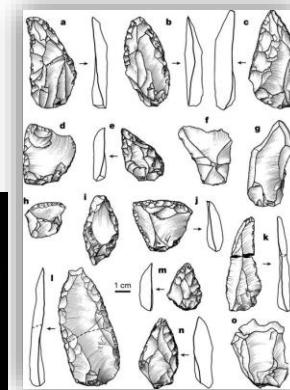
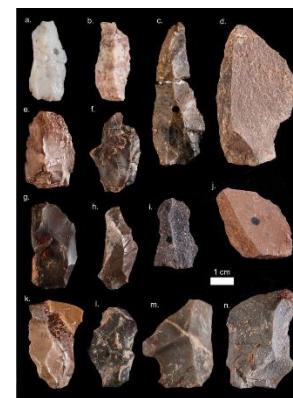
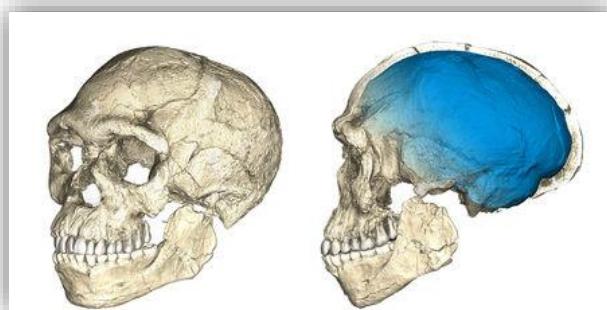


Sahle et al. 2013 *PLoS One*



Transition to the MSA

Jebel Irhoud (315 or 286 ka)

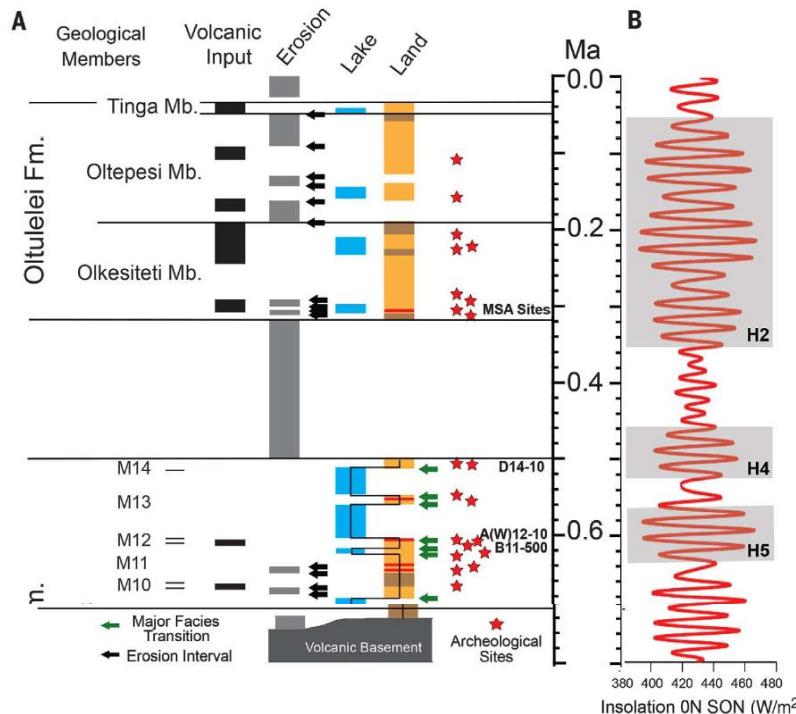


Richter et al. (2017) *Nature*; Hublin et al. (2017) *Nature*



Transition to the MSA

Olorgesailie(320-300 ka)



Taxonomic Group	Olorgesailie Basin Mammalian Fauna	Olorgesailie Fm Taxa (Acheulean-associated)	Olkesiteti Mbr Taxa (MSA-associated)
Bovidae	<i>Madoqua</i> sp. <i>Antidorcas marsupialis</i> <i>Gazella</i> sp. (<i>Gazella thomsoni</i>) <i>Asperenos</i> sp. <i>Megalotragus</i> sp. <i>Alcelaphus</i> size 3x cf. <i>Alcelaphus</i> <i>Connochaetes</i> sp. <i>Damaliscus hypoleucus</i>	x x x x x x x	x x x
Oryx parvirostris - Hippotragin oryx size			x
Hippotragin - reean size			x
Taurtragus sp./Taurtragus oryx		x	x
<i>Tragelaphus</i> sp./ <i>Tragelaphus strepsiceros</i>			x
<i>Tragelaphus</i> cf. <i>T. imberbis</i>			x
<i>Synclerus</i> (<i>Peloravis</i>) <i>s. antiquus</i>		x	x
<i>Kobus</i> sp.		x	x
<i>Redunca</i> sp.		x	x
Giraffidae	<i>Giraffa</i> sp.	x	
Suidae	<i>Metriderchoerus</i> cf. <i>M. haploodon</i> <i>Metriderchoerus</i> cf. <i>M. compactus</i> <i>Kolpochoerus</i> <i>magus</i> <i>Phacochoerus</i> sp.	x x x x	x
Hippopotamidae	<i>Hippopotamus</i> cf. <i>H. gorgops</i> <i>Hippopotamus</i> cf. <i>H. amphibius</i>	x	x
Equidae	<i>Equus</i> cf. <i>E. quagga</i> <i>Equus</i> cf. <i>E. grevyi</i> <i>Equus oldowayensis</i> <i>Eurygnatholippos</i> sp.	x x x x	x
Rhinocerotidae	<i>Ceratotherium simum</i> <i>Diceros bicornis</i>	x	x
Elephantidae	<i>Paleoloxodon</i> (<i>Elephas</i>) <i>reedi</i> <i>Elephantidae</i> cf. <i>Loxodonta africana</i>	x	x
Carnivora	<i>Crocuta</i> sp. nov. <i>Crocuta crocuta</i> cf. <i>Hyena</i> <i>Canis</i> cf. <i>mesomelas</i> <i>Canis</i> sp. - size 1b1c cf. <i>Panthera</i> sp. <i>Felis</i> sp. indet. <i>Genetta</i> sp. <i>Otocyon megalotis</i>	x x x x x x x	x x x x x x x
Primates	<i>Theropithecus oswaldi</i> <i>Homo</i> cf. <i>H. erectus</i> <i>Homo</i> sp. (MSA artifacts)	x x	x
Rodentia	<i>Hyrax</i> cf. <i>crassicauda</i> <i>Pedetes</i> sp. <i>Lepus</i> sp.	x x x	x

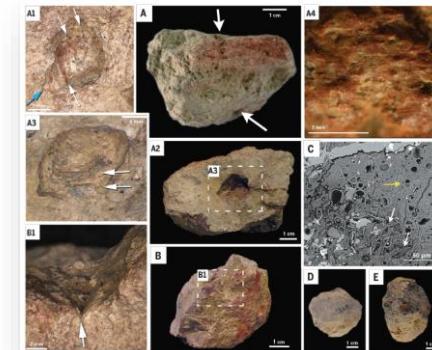
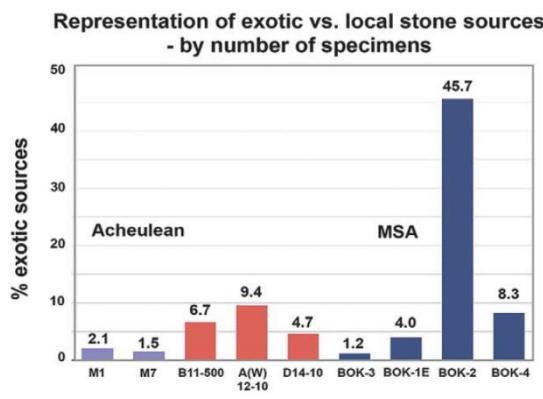
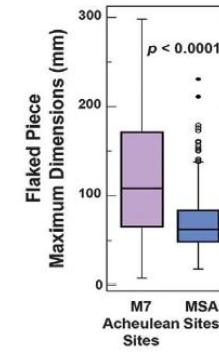
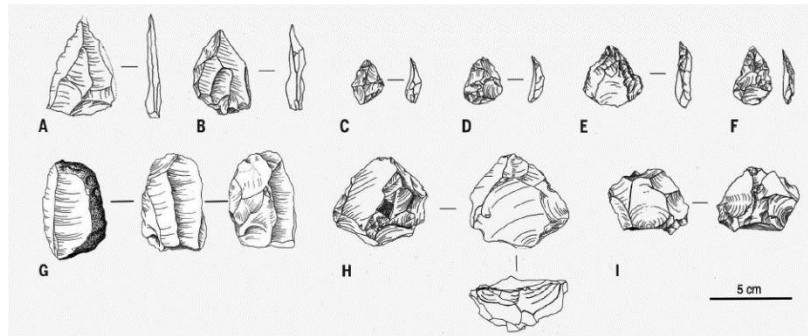
Of 30 unique taxa in the Olorgesailie Fm, 23% (7 taxa) are also recorded in the MSA-associated sites of the Olkesiteti Mbr.

Taxonomic turnover: 85%

Of 23 taxa recovered from the MSA sites, 70% (16 taxa) are not recorded previously in the Acheulean strata of the Olorgesailie Basin

Transition to the MSA

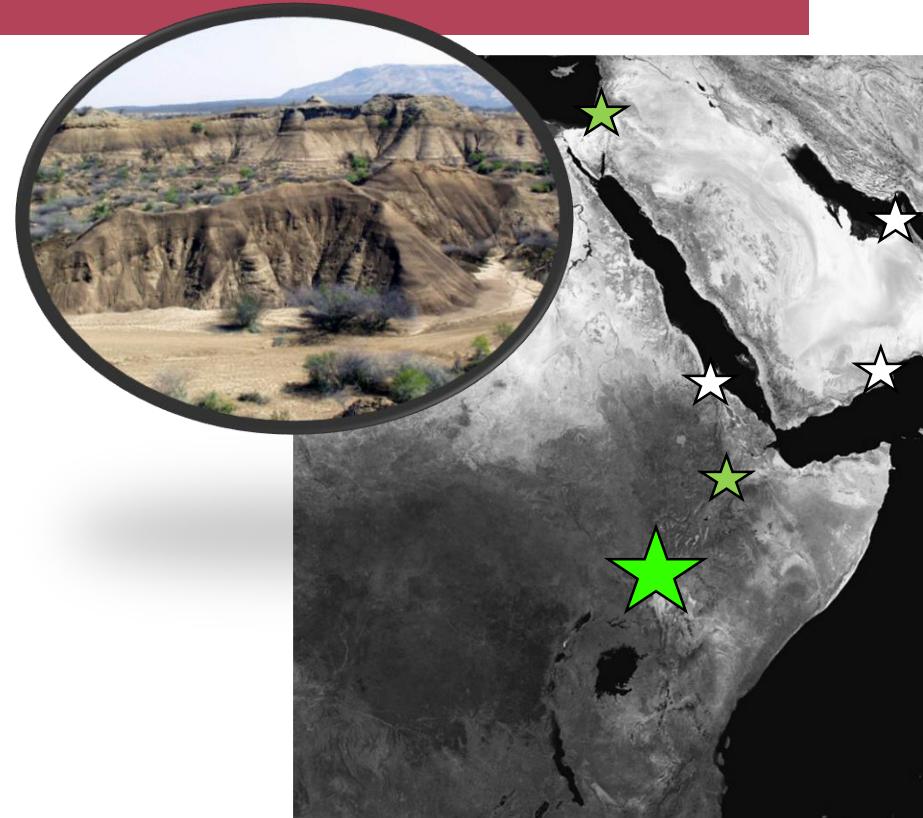
Olorgesailie(320-300 ka)





The Archaeology of modern humans

Omo Kibish(195–154 ka)



McDougall et al. (2005) *Nature*; Brown et al. (2012) *J Hum Evol*; Sahle et al. *forthcoming*

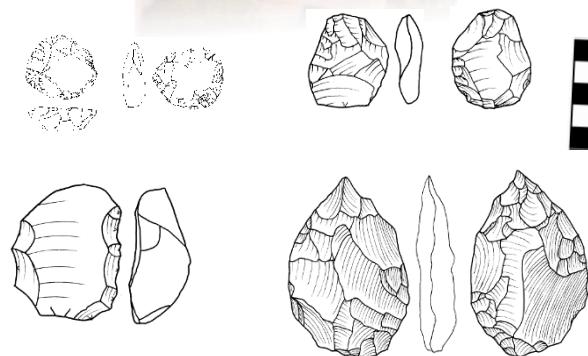


The Archaeology of modern humans

Omo Kibish(195–154 ka)



- unidirectional-parallel at initial stage
- then discoidal or rad/centripetal
- Biface foliate; other Acheulean LCTs

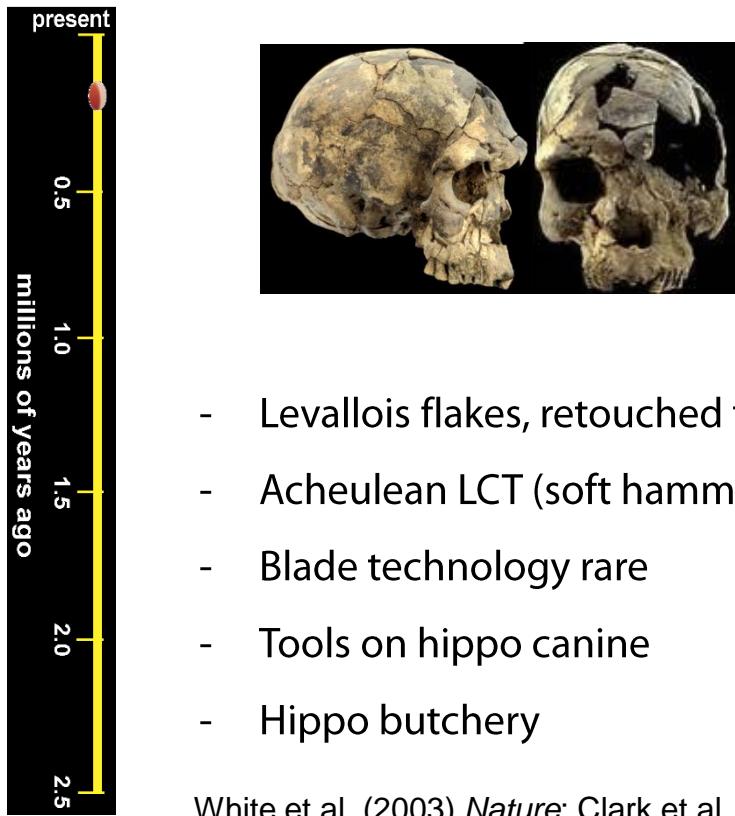


Shea(2008) *J Hum Evol*



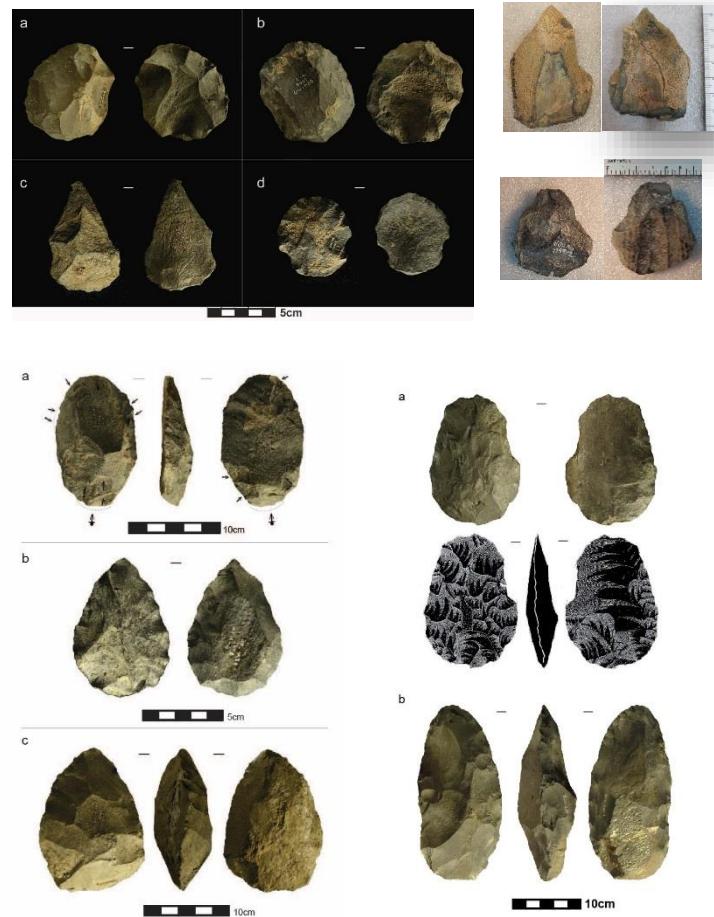
The Archaeology of modern humans

Upper Herto (160–154 ka)



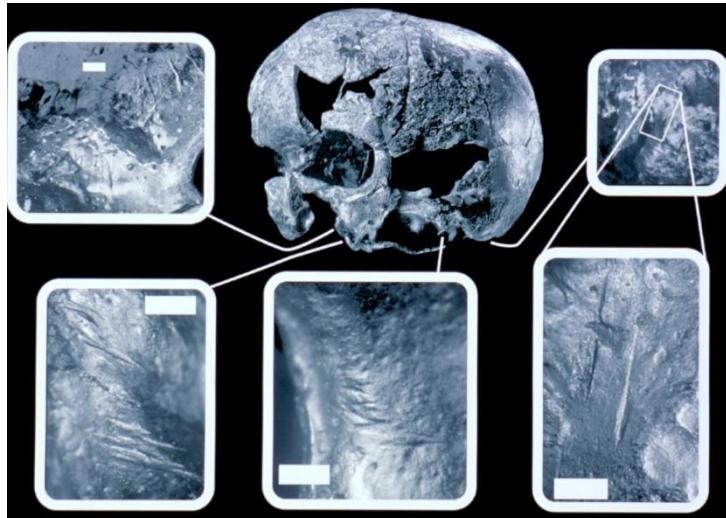
- Levallois flakes, retouched tools
- Acheulean LCT (soft hammer?)
- Blade technology rare
- Tools on hippo canine
- Hippo butchery

White et al. (2003) *Nature*; Clark et al. (2003) *Nature*





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Early mortuary?

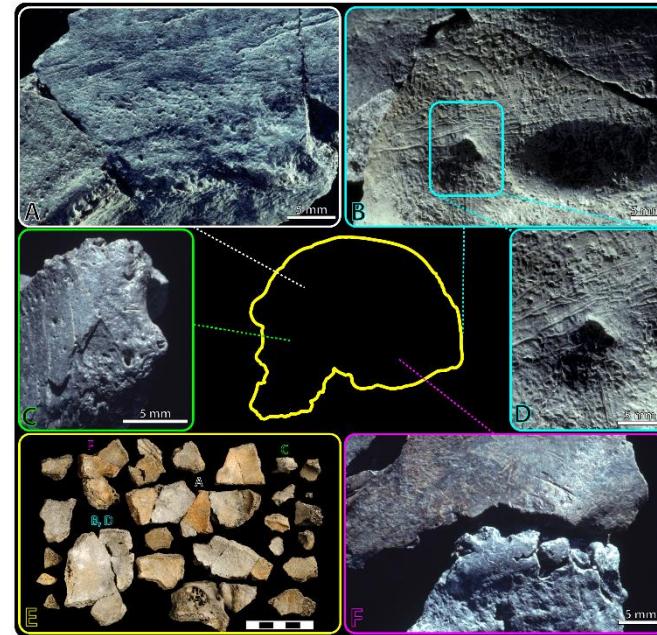


Image © Sahle

White et al. (2003) *Nature*; Clark et al. (2003) *Nature*; Sahle et al. *forthcoming*



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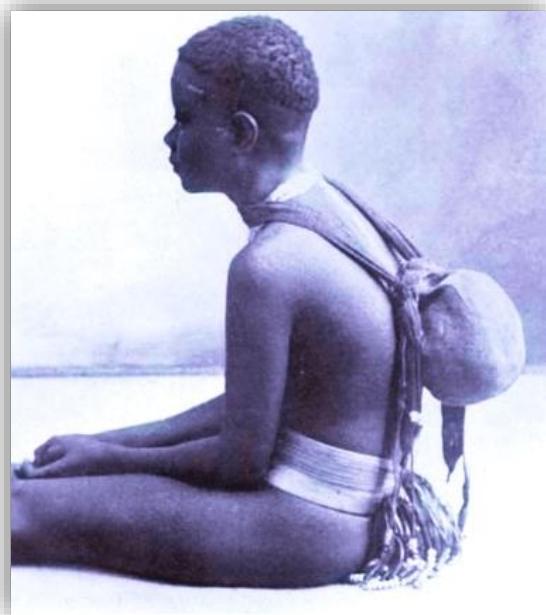
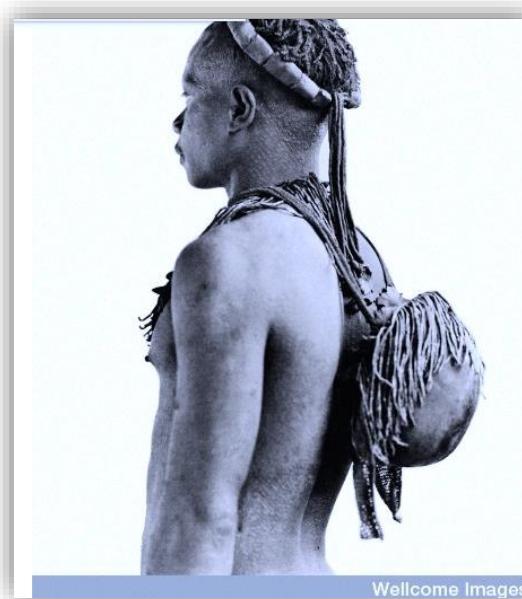


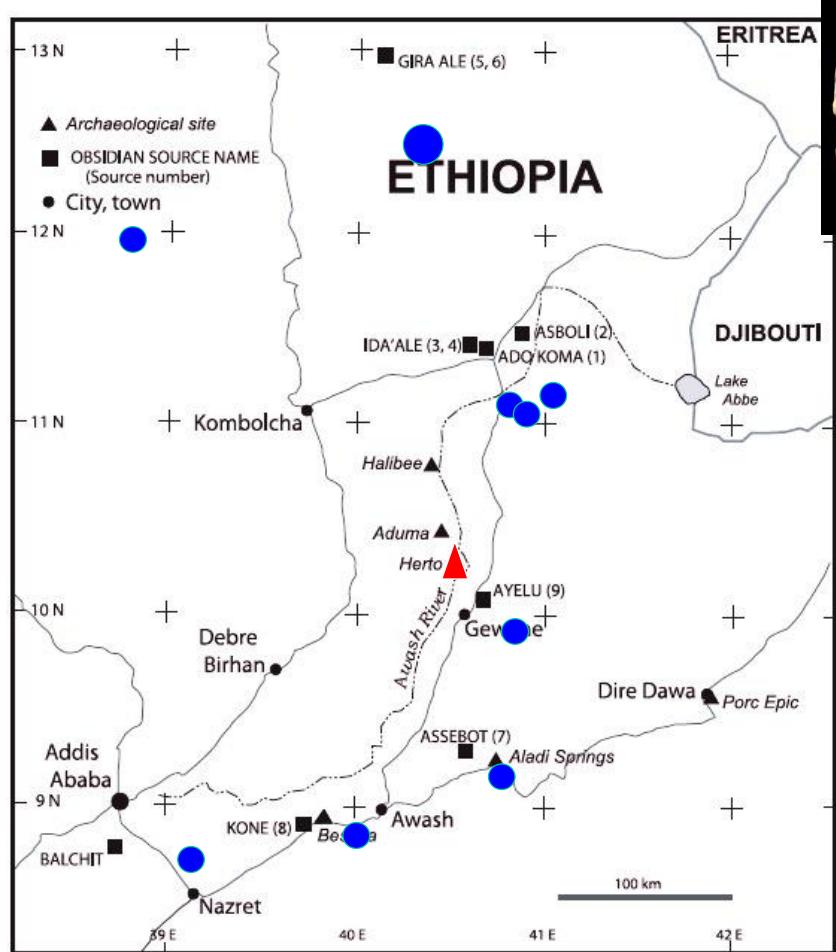
Image courtesy of Radcliffe-Brown (1922)



Wellcome Images



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Broader geographic range

- 9 different sources
 - one 290 km away
-
- Knowledge/memory
 - extensive social network

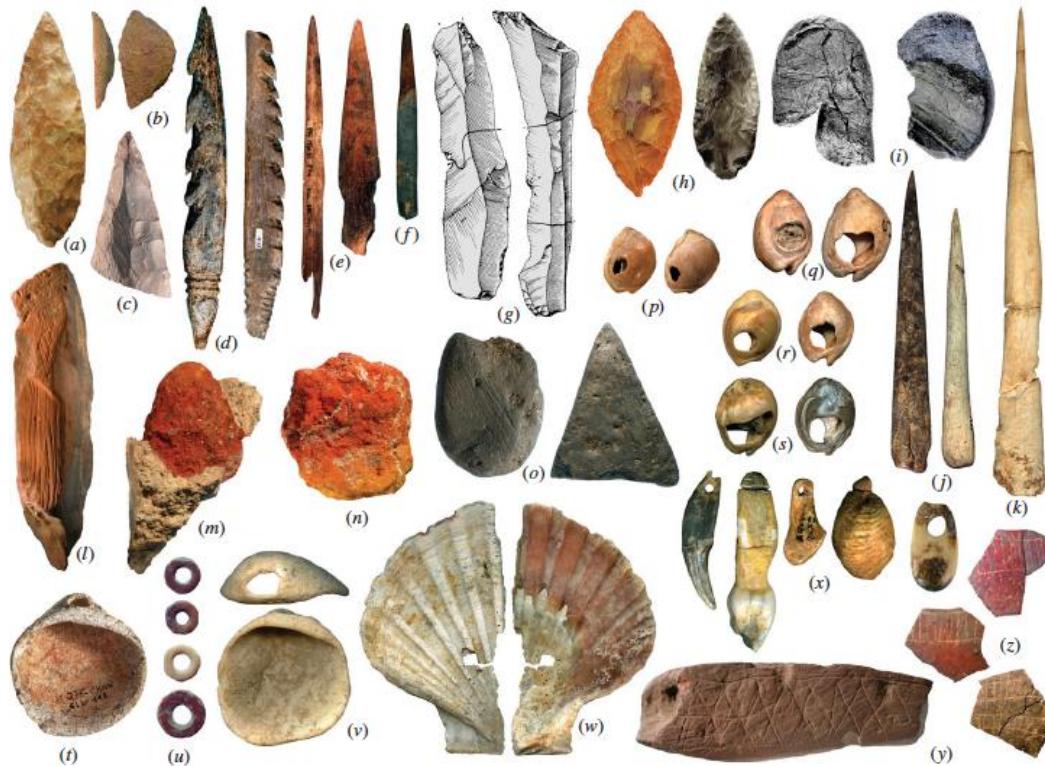


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*Into the Late Pleistocene:
technology, behavior, ... lifeways*



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d'Errico & Stringer 2011 *Trans R Soc B*



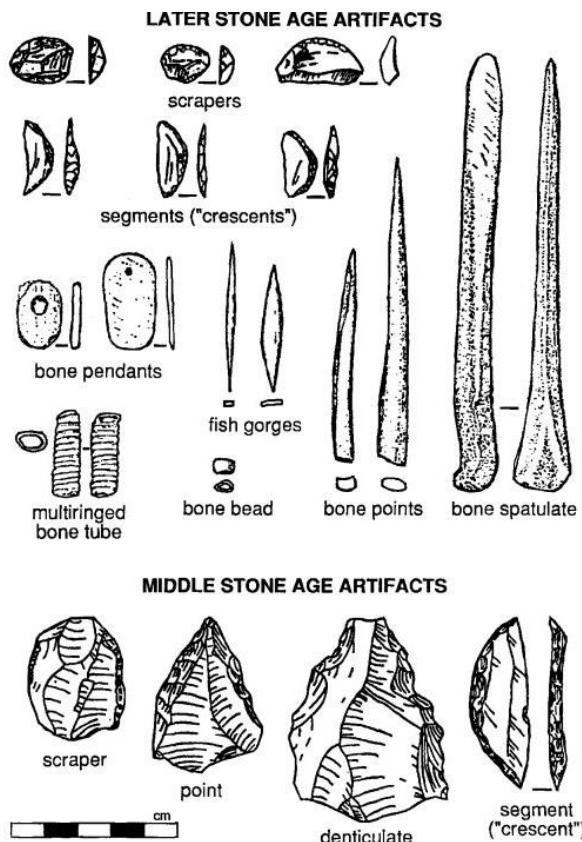
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Change through time in MSA

- Target blank small in many industries
- Complex of projectile technology
- Intensified subsistence: fish, shellfish
- More cave, long-term occupations
- More diverse raw materials
- Long distance exchange
- Greater use of ochre
- More symbolic artifacts

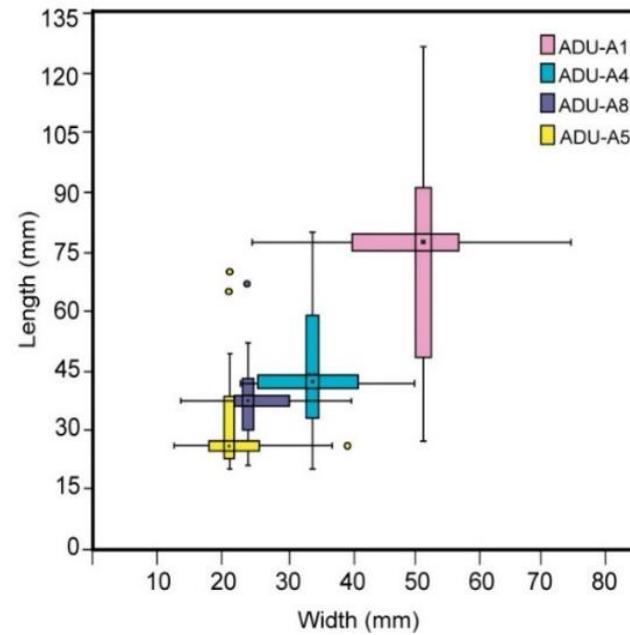


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Klein 1992

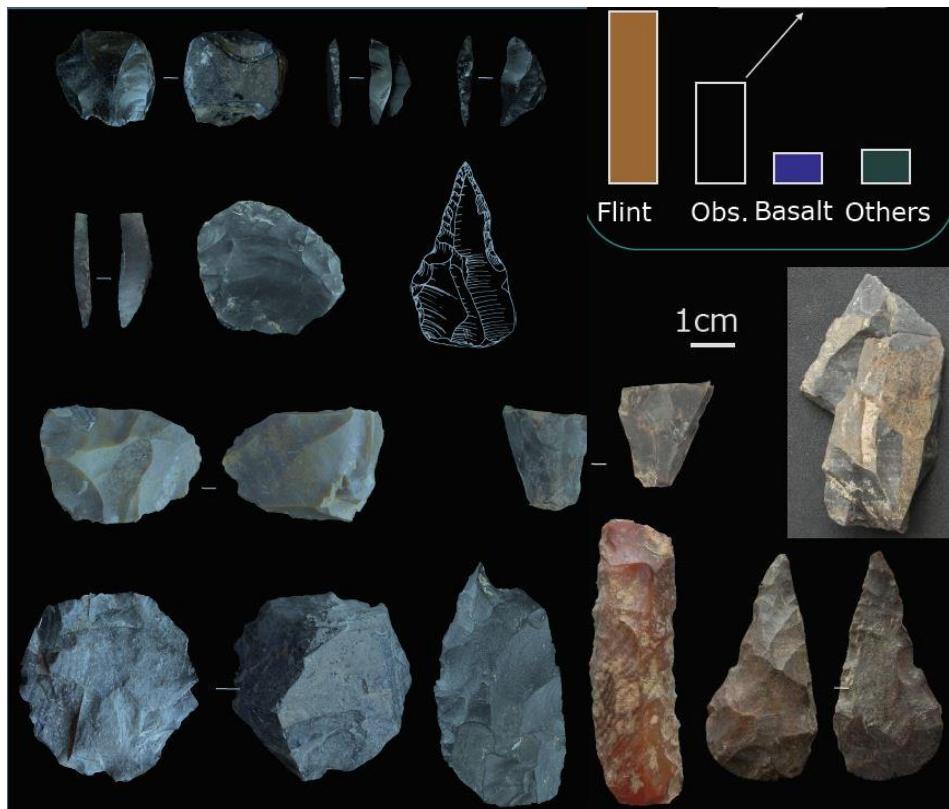
**Progressive decrease in artifact size
(Aduma: 100 ka thru 70 ka)**



Sahle & Brooks (2018) *J Archaeol Sci*

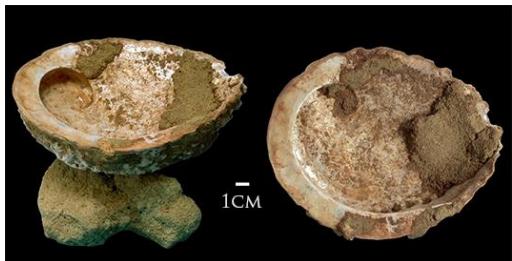


Diversity of raw material increases
(e.g., Porc-Epic: ~50 ka)





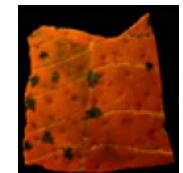
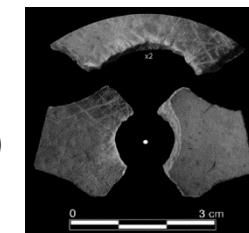
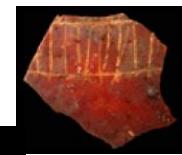
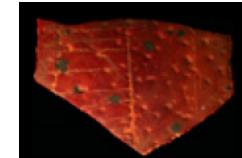
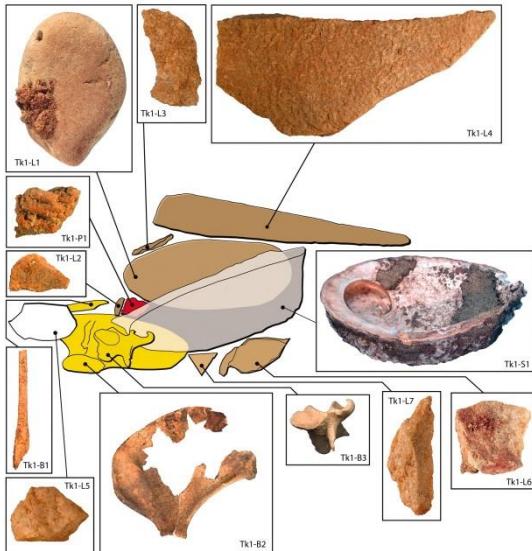
Symbolic behavior (100-65 ka)



Blombos Cave
(100 ka ochre in mixing kit)



Value for beauty, art, ...?



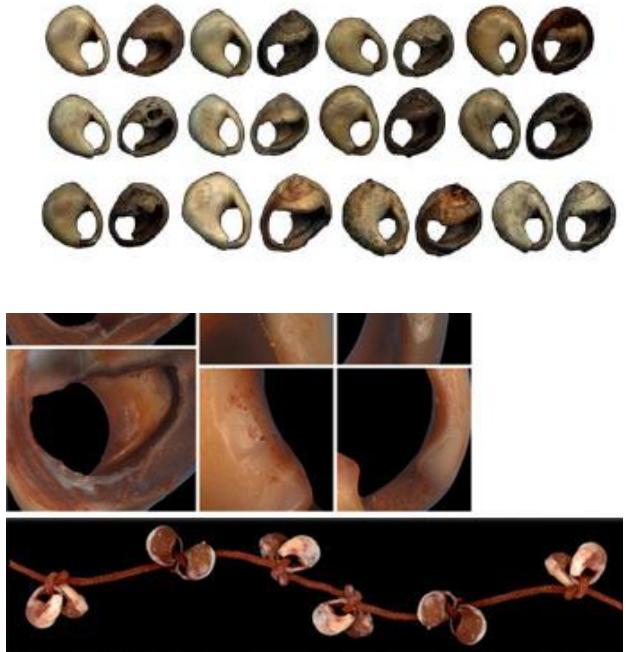
Diepkloof Rockshelter:
(60 ka decorated OES)

Social/group identity?

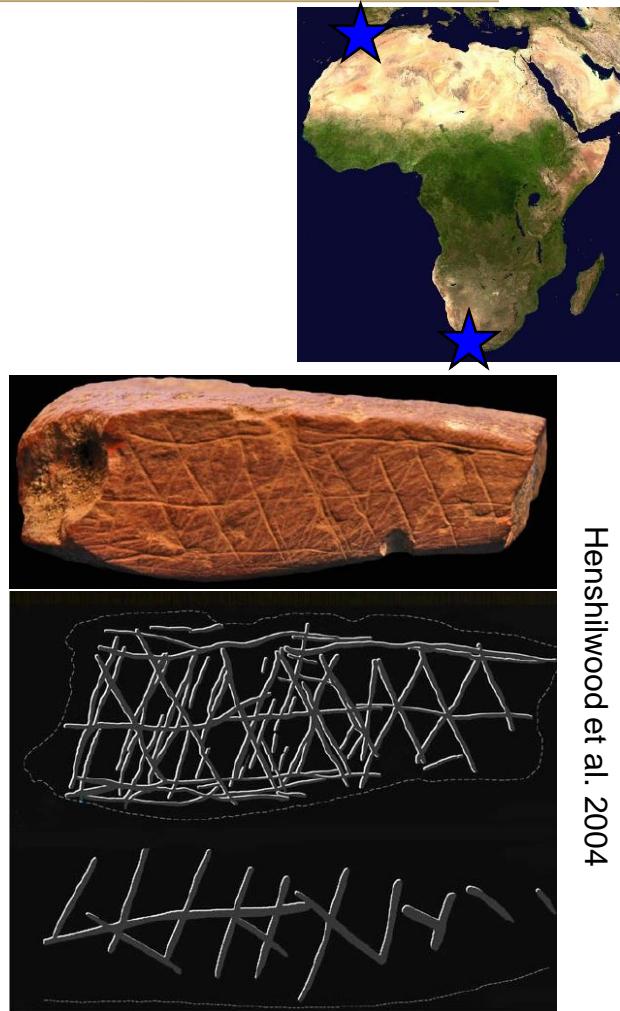


Personal ornamentation

- Grotte des pigeons, Morocco (82 ka beads)
- Blombos Cave, S. Africa (77 ka beads)



d'Errico et al 2005; Bouzougar et al 2007

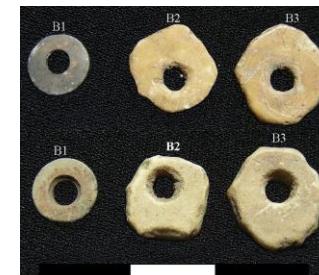
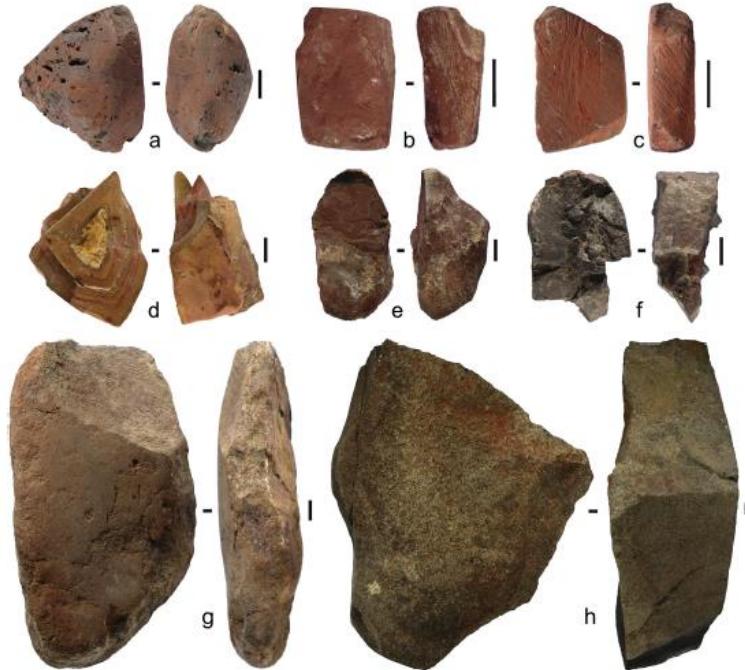


Blombos cave
(75 ka engraved ochre)



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Increased ochre, Ornament use (e.g., Porc-Epic 50 ka)



Assefa et al. 2008

Rosso et al. 2014

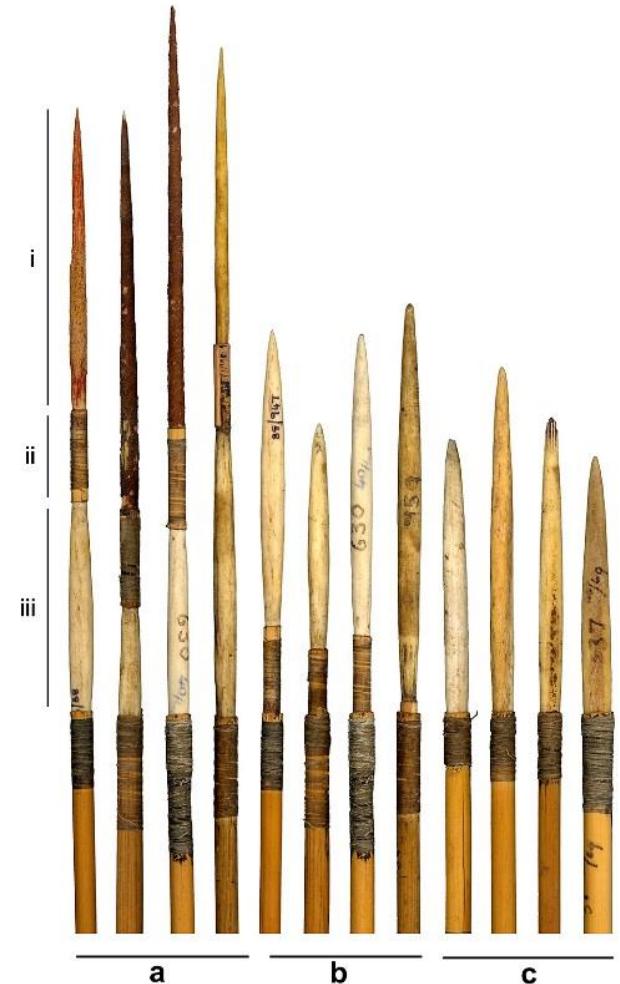




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Bone points (60 ka Blombos cave)

Projectiles?





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Complex projectiles



© Martin Harvey/Corbis

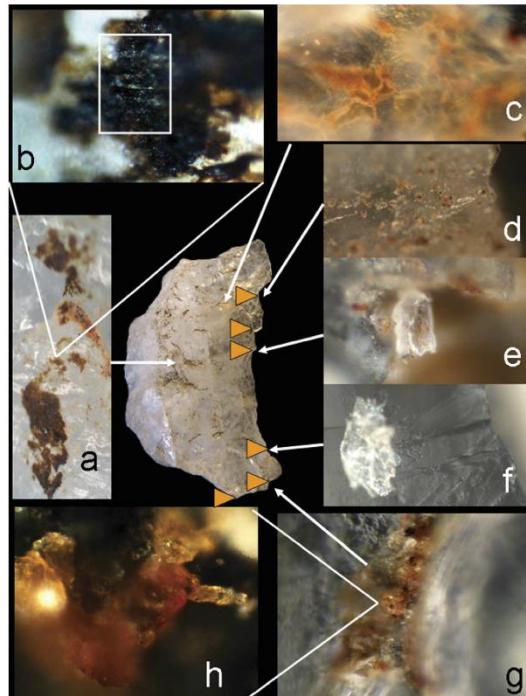
- **enabling technology**
- **indication of complex cognition**

(Shea & Sisk 2010; Lombard & haidle 2012; Sahle & Brooks 2018)



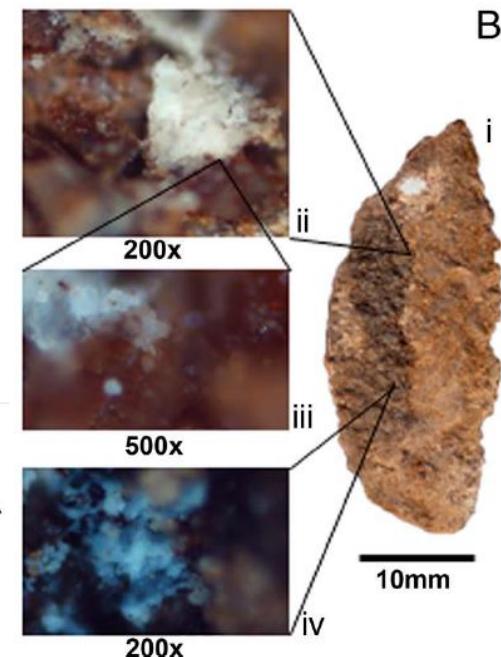
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Sibudu, S. Africa (hafted backed pieces 65 ka)



- adhesive
- residue

Complex Projectiles?

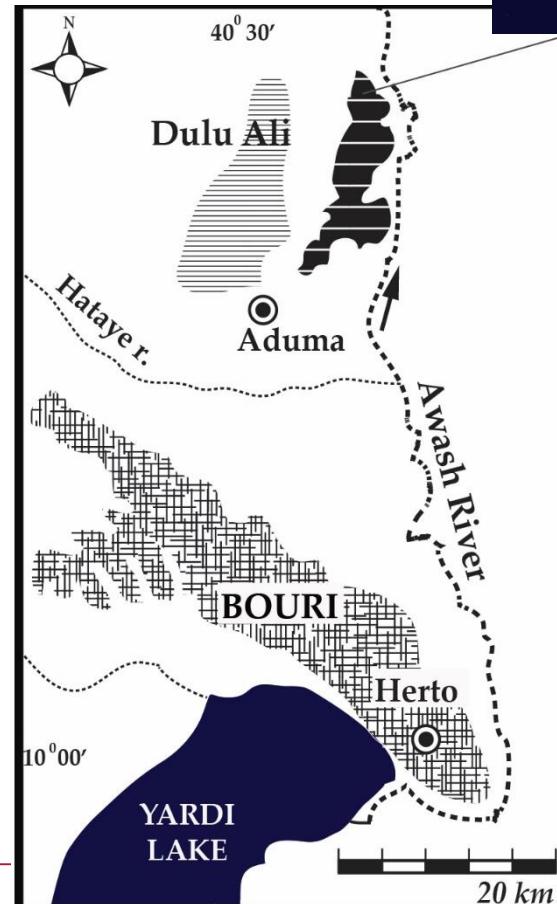


Lombard & Phillipson (2010)



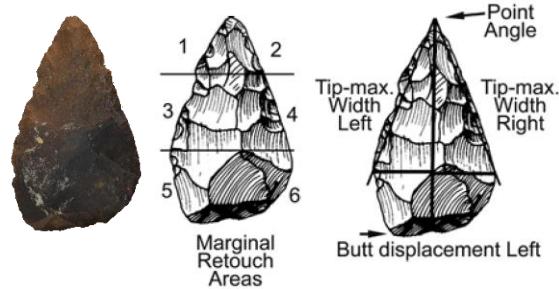
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Aduma, Ethiopia (spearthrower at ~80 ka?)

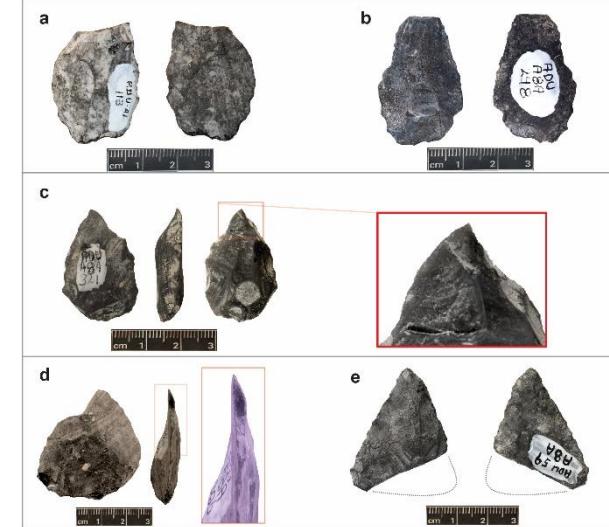
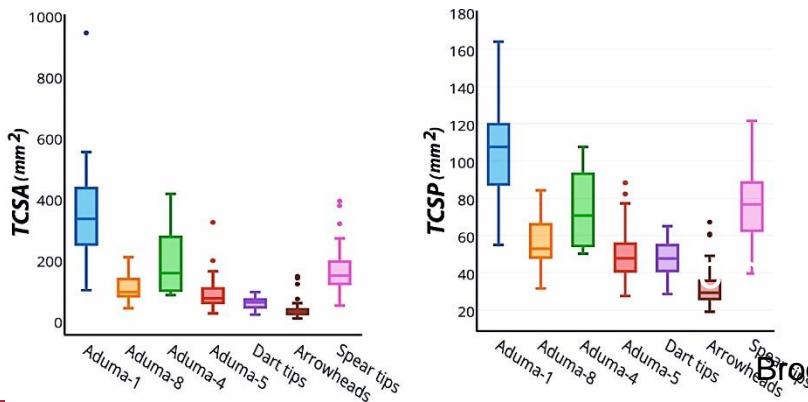




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- Small size
- Consistent tip angle
- Modified base



Brooks et al. (2006); Sahle & Brooks (2018) J Archaeol Sci



The Archaeology of modern humans

Sibudu, S. Africa (bedding 77 ka)



Wadley et al. (2011) *Science*



Apolo 11 Cave, Namibia
(Art mobilier 27 ka)



Wendt (1997)



The Archaeology of modern humans

Middle to Upper Paleolithic transition

- MP (Mousterian) lasted ~200 ka thru 40 ka



BY 40 ka:

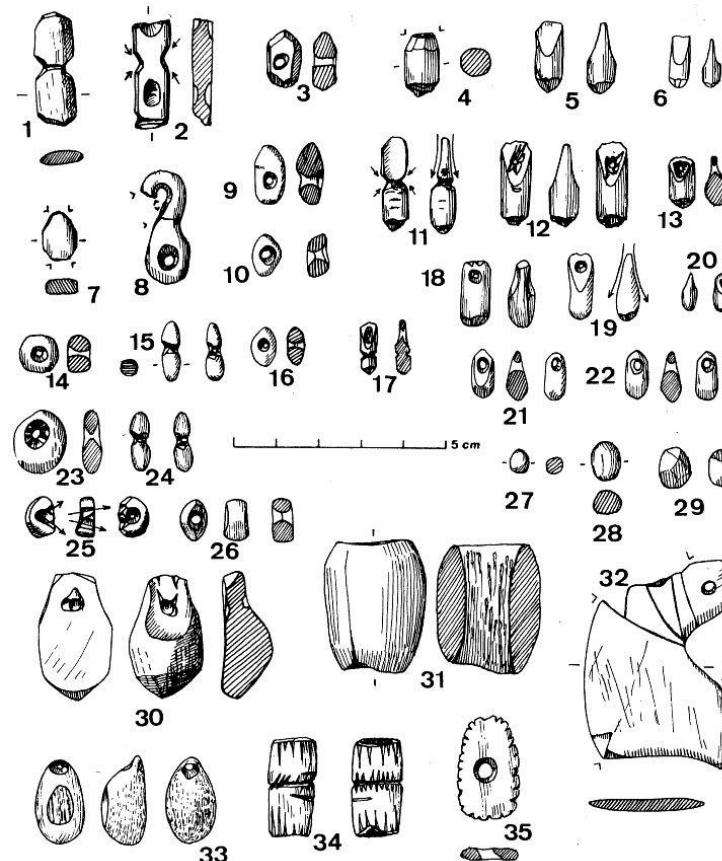
Eren et al. (2008)

- General shift to blade/bladelet based forms
- Intensified 'style' or 'imposed form'
- Extensively worked bone tools (projectiles?)
- Long distance exchange
- Symbolic artifacts
- Remarkably sophisticated representational art, music,...



The Archaeology of modern humans

BEADS AND OTHER PENDANTS (Spy cave Belgium 40 ka)



Mellars 2002



The Archaeology of modern humans



H. JENSEN, UNIVERSITY OF TÜBINGEN

Venus of Hohle Fels (35-40 ka)



DAGMAR HOLLMAN



Grotte Chauvet (32 ka)



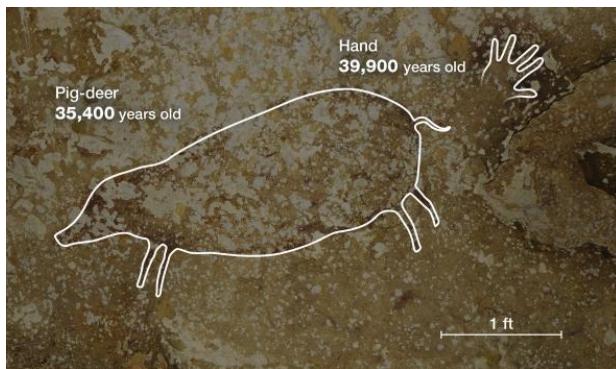
Cave lion head, Vogelherd (~40 ka)





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Aubert et al 2014 *Nature*



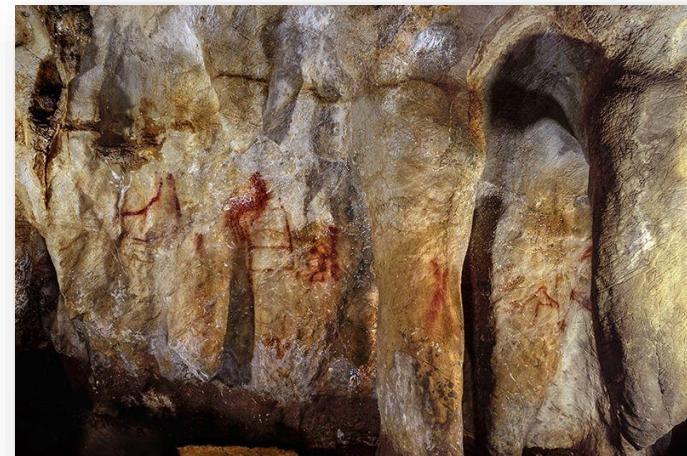
Sulawesi cave art (~40 ka)



El Castillo Cave (40.8 ka)



The Archaeology of modern humans



U-Th dating of carbonate crusts reveals Neandertal origin of Iberian cave art

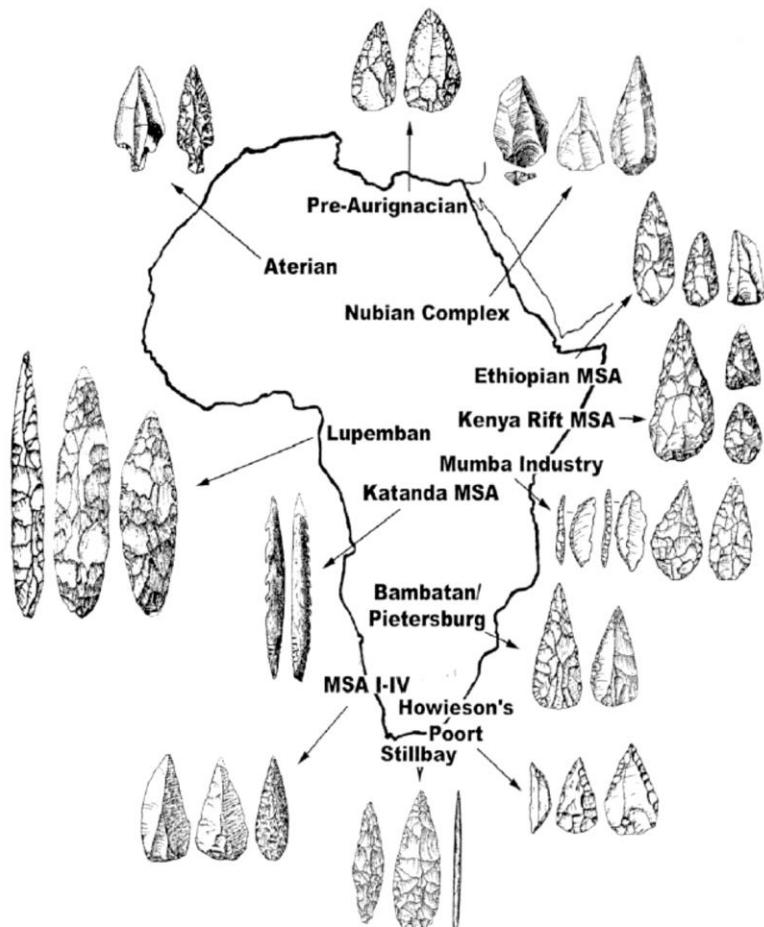
D. L. Hoffmann^{1,*}, C. D. Standish^{2,*}, M. García-Diez³, P. B. Pettitt⁴, J. A. Milton⁵, J. Zilhão^{6,7,8}, J. J. Alcolea-González⁹, P. C...

* See all authors and affiliations

Science 23 Feb 2018:
Vol. 359, Issue 6378, pp. 912-915
DOI: 10.1126/science.aap7778



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Style (group identity)

Or

Adaptive zones?



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Emergence of Modern Human Behavior: Middle Stone Age Engravings from South Africa
Christopher S. Henshilwood, *et al.*
Science **295**, 1278 (2002);
DOI: 10.1126/science.1067575



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Vol 449 | 18 October 2007 | doi:10.1038/nature06204

nature

LETTERS

Early human use of marine resources and pigment in South Africa during the Middle Pleistocene

Curtis W. Marean¹, Miryam Bar-Matthews³, Jocelyn Bernatchez², Erich Fisher⁴, Paul Goldberg⁵, Andy I. R. Herries⁶, Zenobia Jacobs⁷, Antonieta Jerardino⁸, Panagiotis Karkanas⁹, Tom Minichillo¹⁰, Peter J. Nilssen¹¹, Erin Thompson¹, Ian Watts¹² & Hope M. Williams²



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Fire As an Engineering Tool of Early Modern Humans

Kyle S. Brown, *et al.*

Science **325**, 859 (2009);

DOI: 10.1126/science.1175028



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A 100,000-Year-Old Ochre-Processing Workshop at Blombos Cave,
South Africa

Christopher S. Henshilwood, *et al.*
Science **334**, 219 (2011);
DOI: 10.1126/science.1211535



The Archaeology of modern humans



Middle Stone Age Bedding Construction and Settlement Patterns at Sibudu, South Africa

Lyn Wadley, et al.

Science **334**, 1388 (2011);

DOI: 10.1126/science.1213317



The Archaeology of modern humans

LETTER

doi:10.1038/nature

An early and enduring advanced technology originating 71,000 years ago in South Africa

Kyle S. Brown^{1,2}, Curtis W. Marean², Zenobia Jacobs³, Benjamin J. Schoville², Simen Oestmo², Erich C. Fisher², Jocelyn Bernatchez², Panagiotis Karkanas⁴ & Thalassa Matthews⁵





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journal homepage: www.elsevier.com/locate/jhevol

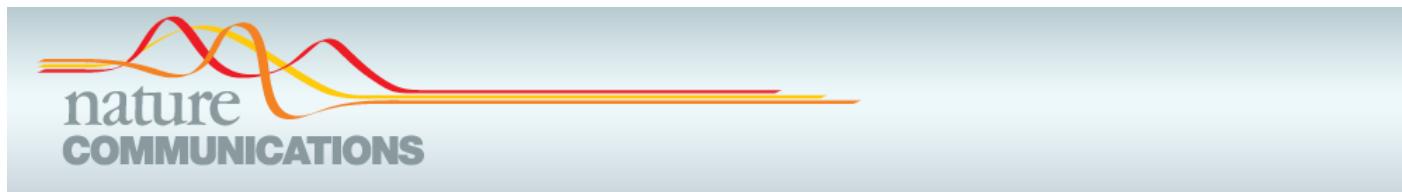


Pinnacle Point Cave 13B (Western Cape Province, South Africa) in context:
The Cape Floral kingdom, shellfish, and modern human origins[☆]

Curtis W. Marean



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ARTICLE

Received 28 Sep 2012 | Accepted 16 Apr 2013 | Published 21 May 2013

DOI: 10.1038/ncomms2897

OPEN

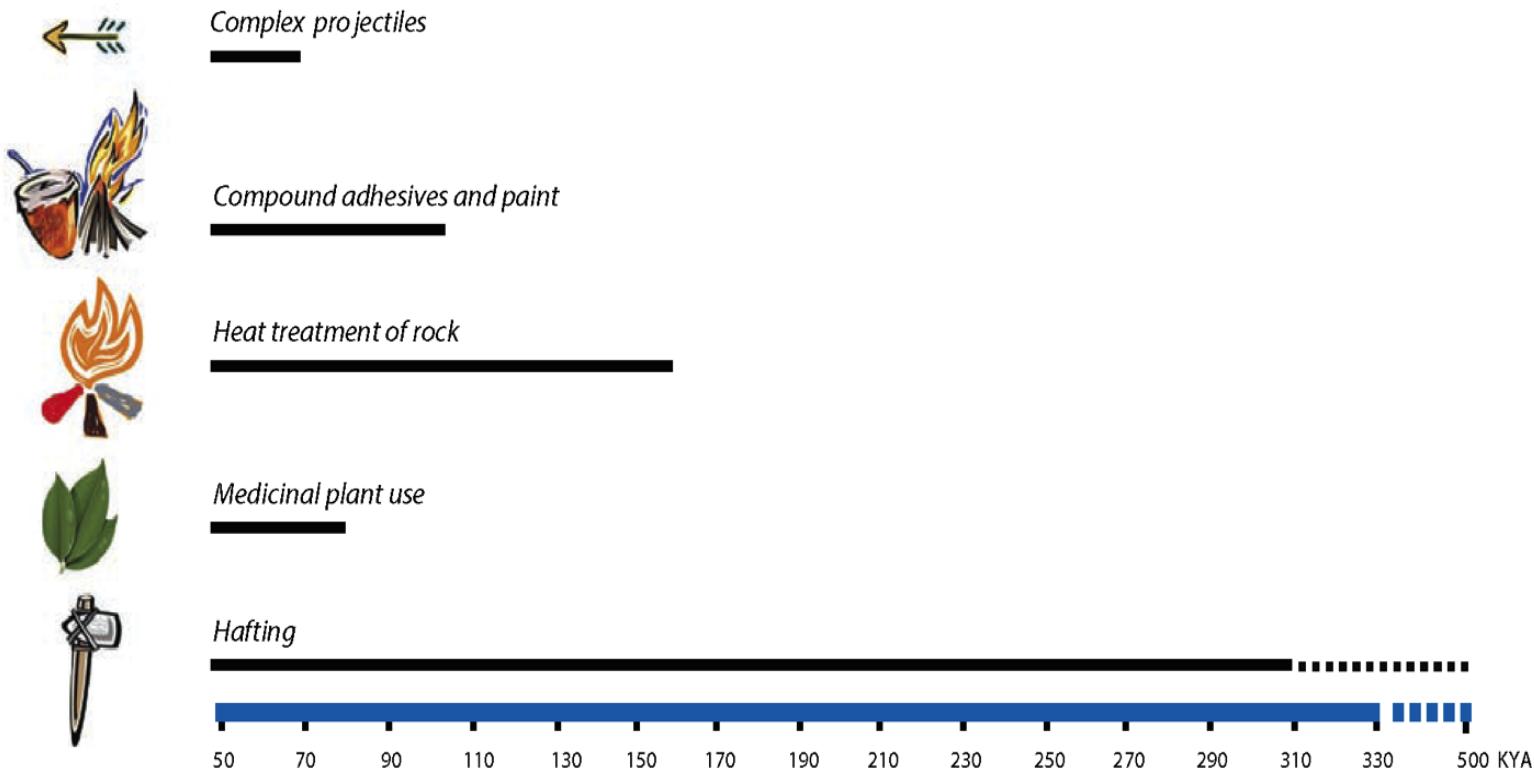
Development of Middle Stone Age innovation linked to rapid climate change

Martin Ziegler^{1,†}, Margit H. Simon¹, Ian R. Hall¹, Stephen Barker¹, Chris Stringer² & Rainer Zahn^{3,4}



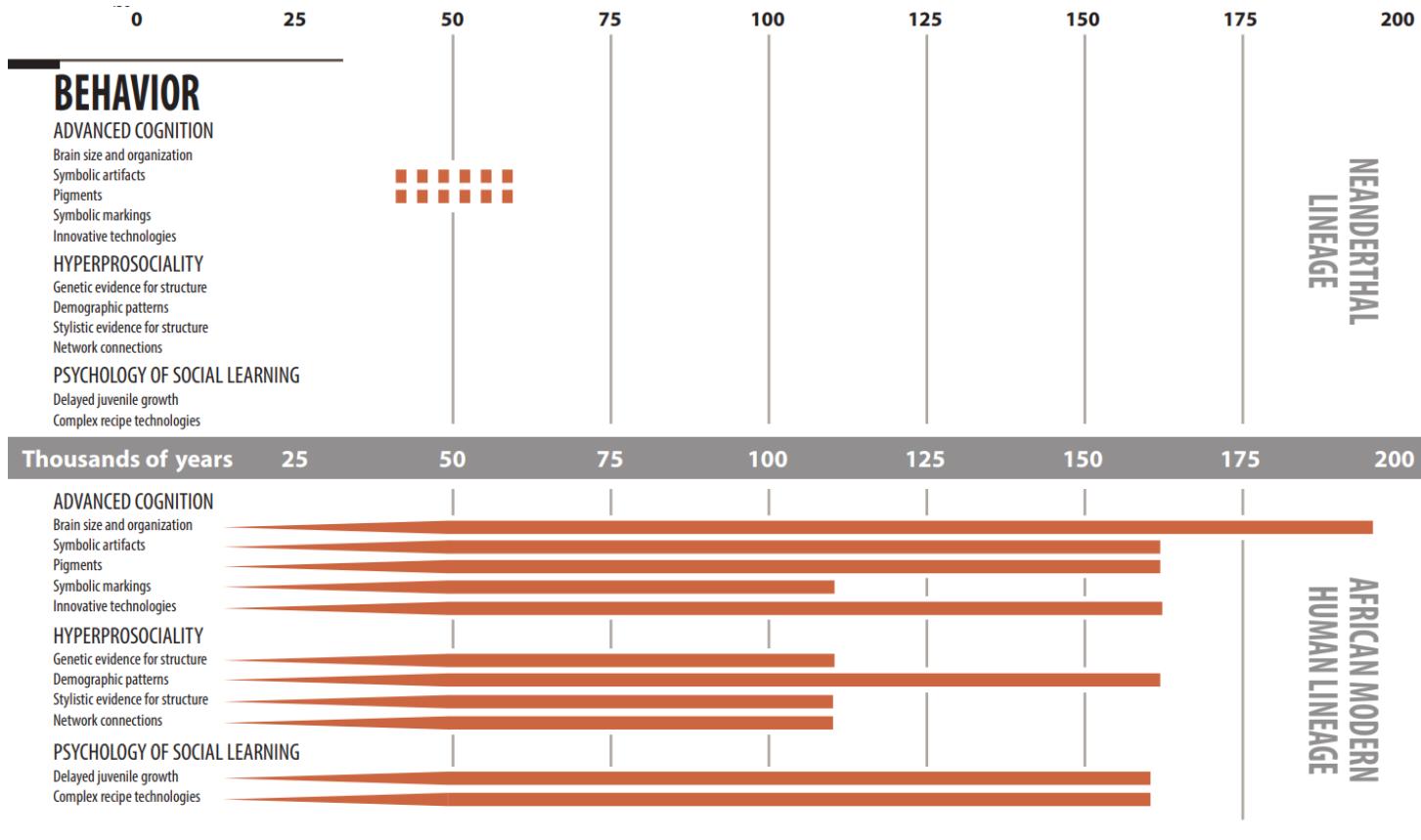
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Stone Age innovations



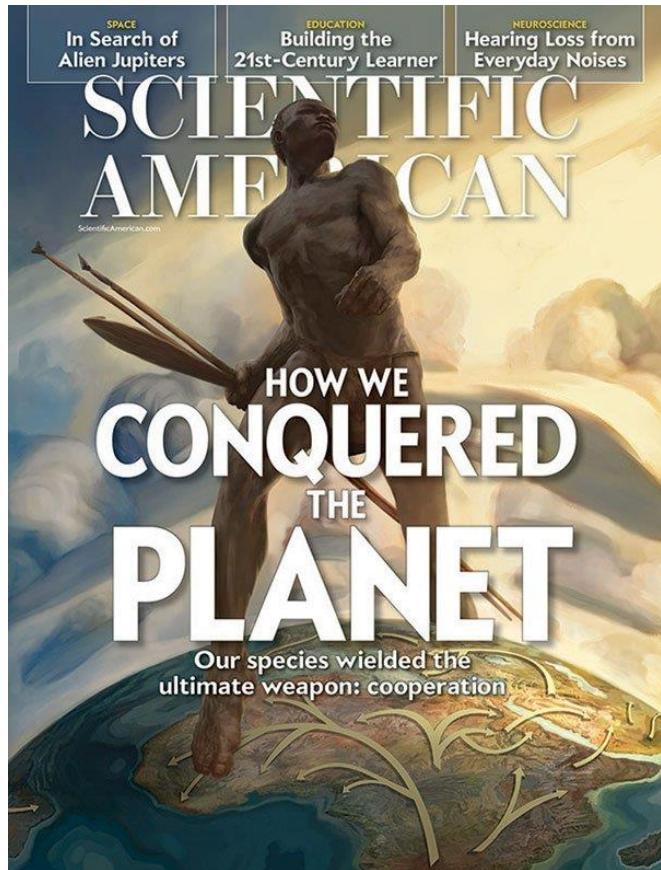


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What does this shift in behavioral patterns correlate with: climate, demographics, genetics...?



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Q:

Increasing innovations a response to climate/
population stress ~90 ka?

Caution:

Use of term “Middle Stone Age” obscures behavioral
variability through time and complexity in space



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Evolution or Revolution?

MP to UP transition indicates a relatively abrupt case

Early to late MSA behaviors show more complex pattern.

Short- vs. Long-chronology to “behavioral modernity“

Klein (2000): Neural reorganization ~50 ka drove “modernity”
vs.

McBrearty & Brooks (2000): Gradual accumulation of change



DFG Center for Advanced Studies
“Words, Bones, Genes, Tools”
Rümelinstraße 23
72070 Tübingen · Germany
Phone: +49 7071 29-76548
monika.doll@ifu.uni-tuebingen.de