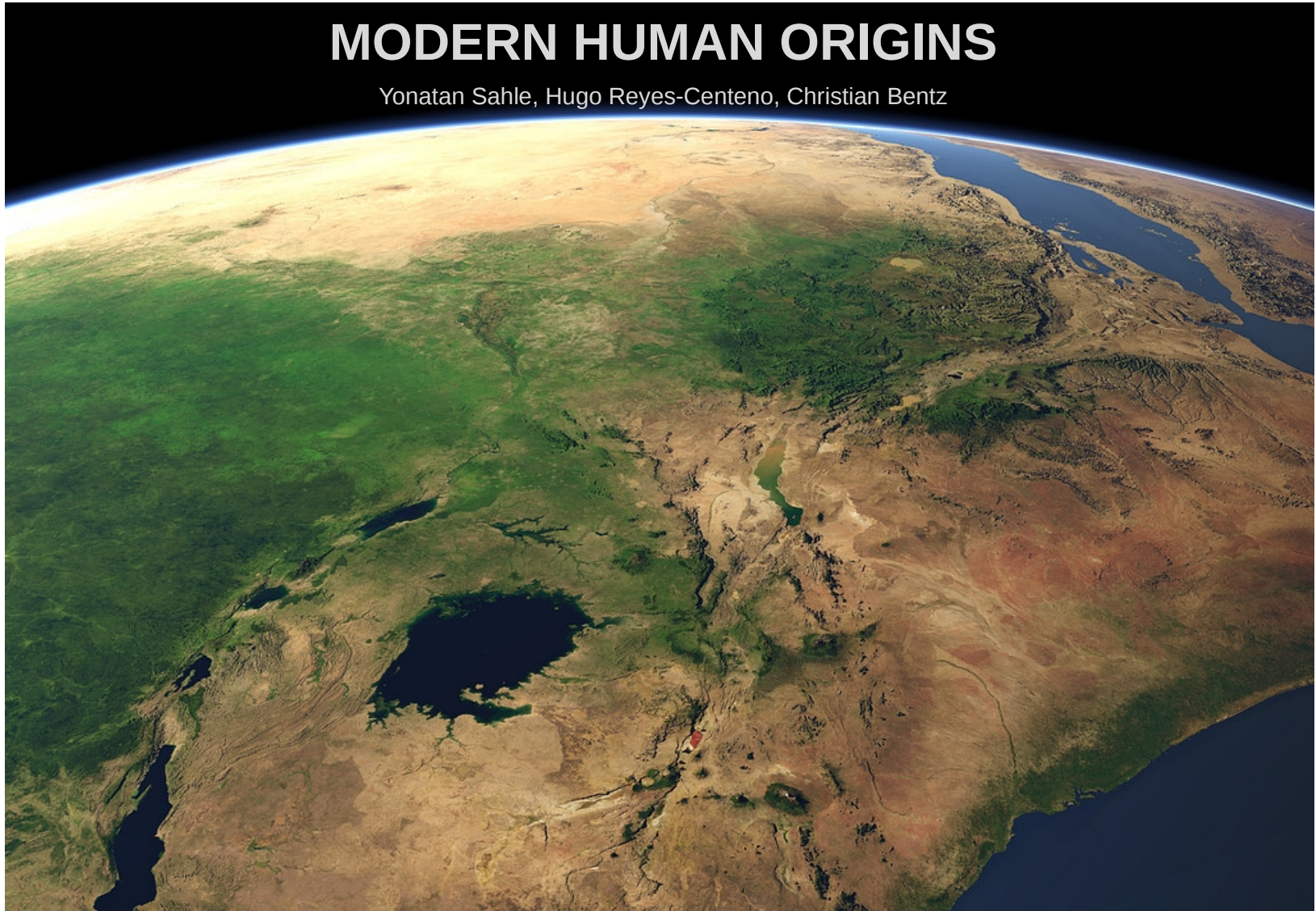




MODERN HUMAN ORIGINS

Yonatan Sahle, Hugo Reyes-Centeno, Christian Bentz





Archaeology at the dawn of modern humans

- ❑ Overview: Middle Pleistocene archaeology
- ❑ The Middle Stone Age (Africa)
- ❑ The Middle Paleolithic(Eurasia)
- ❑ BBC Human Universe (by Prof. Brian Cox)

Richter J. 2011. When did the Middle Paleolithic begin. In: NJ Conard, J Richter (eds.), Neanderthal Lifeways, Subsistence and Technology: One Hundred Fifty Years of Neanderthal Study, Vertebrate Paleobiology and Paleoanthropology series, p. 7-14.

Toth N, Schick K. 2015. Overview of Paleolithic Archaeology. In: W Henke, I Tattersall (eds.), Handbook of Paleoanthropology, Vol. 3, Heidelberg: Springer, p. 2441-2464.

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

Ambrose SH (2001) Paleolithic Technology and Human Evolution. *Science* 291:1748-1753:

Ferraro J (2012) A Primer on Paleolithic Technology. *Nature Education Knowledge* 4(2):9

<https://www.nature.com/scitable/knowledge/library/a-primer-on-paleolithic-technology-83034489>



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.

Tryon C, Bailey S (2013) Testing Models of Modern Human Origins with Archaeology and Anatomy. *Nature Education Knowledge* 4(3):4

<https://www.nature.com/scitable/knowledge/library/testing-models-of-modern-human-origins-with-96639156>

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



The Archaeology of modern humans

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Revolution of evolution?
- ❑ Middle to Late Pleistocene archaeology:
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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.

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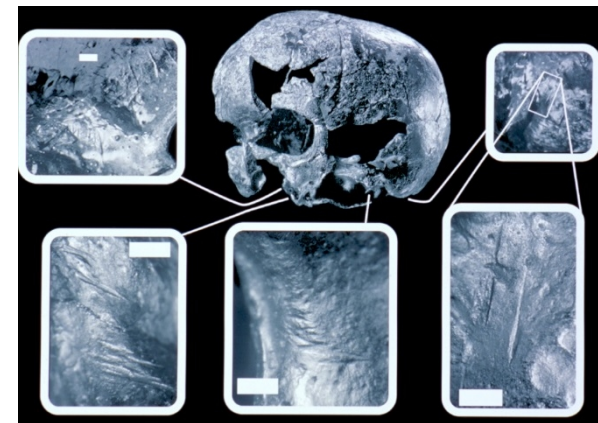
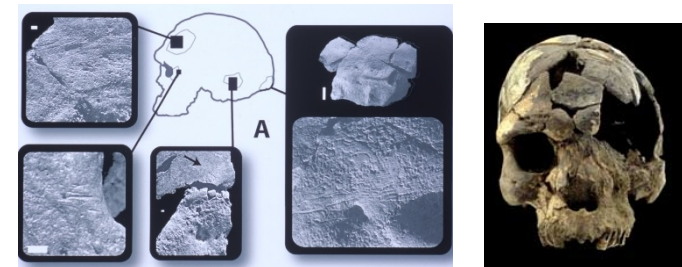
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Archeology of the first *H. sapiens* largely anomalous



Upper Herto (160–154 ka)

- Levallois flakes, retouched tools
- Acheulean Large Cutting Tools
- Blade technology rare
- Tools on hippo canine
- Hippo butchery at lake shore
- Possible mortuary practice
(consistent with ethnographic practices)



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



The Archaeology of modern humans

*But what was the technology, behavior, ... lifeways
of Late Pleistocene modern humans like?*



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The LATER Middle Stone Age (in Africa)

Middle to Upper Paleolithic Transition (in Eurasia)

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Examples of archaeological finds associated with modern humans



- (a) Still Bay point
- (b) Segment (proj)
- (c) Post-HP point
- (d) Bone harpoon
- (e,f) Bone projectile
- (g) Mousterian blade
- (h) Mousterian pts
- (i) Birch pitch
- (j,k) Bone awl
- (l-o) Pigment/ochre
- (p-v) Shell beads
- (w) Pigmentd pecten
- (x) Personal ornaments
- (y) Engraved ochre
- (z) Decorated shell

d'Errico & Stringer (2011)



The Archaeology of modern humans

The African Stone Age record: -

- Early Stone Age (Oldowan choppers, Acheulean handaxes)
- Late Stone Age (microliths, similar to ethnographic hunter-gatherers)
- “Middle Stone Age” defined for industries that lack both handaxes and microliths, but have formal tools on flakes and prepared cores
- Middle Stone Age (MSA)= Prepared core (e.g. Levallois), pointed pieces

In reality, MSA more complicated. Both microliths and handaxes in MSA

➤ MSA represents behavioral context for the origins of our species



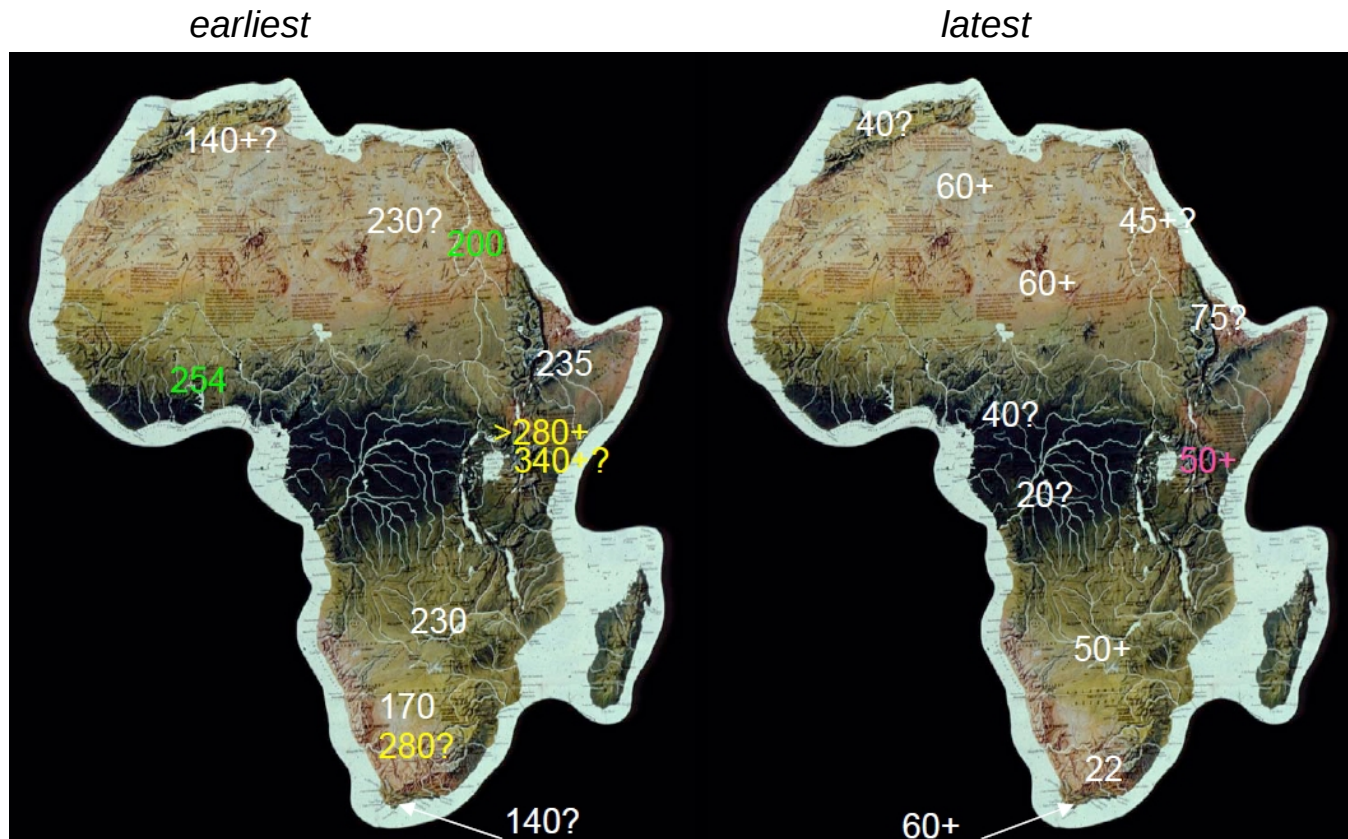
The Archaeology of modern humans

Change through time within the MSA

- Late MSA (after 130 ka) different from early MSA:
 - Target blank is small in many industries
 - Complex projectile technology appears
 - Intensified subsistence: fish, shellfish
 - More cave, long-term occupations
 - More diverse raw materials used
 - Long distance procurement and exchange
 - Greater use of ocher
 - More symbolic artifacts

The Archaeology of modern humans

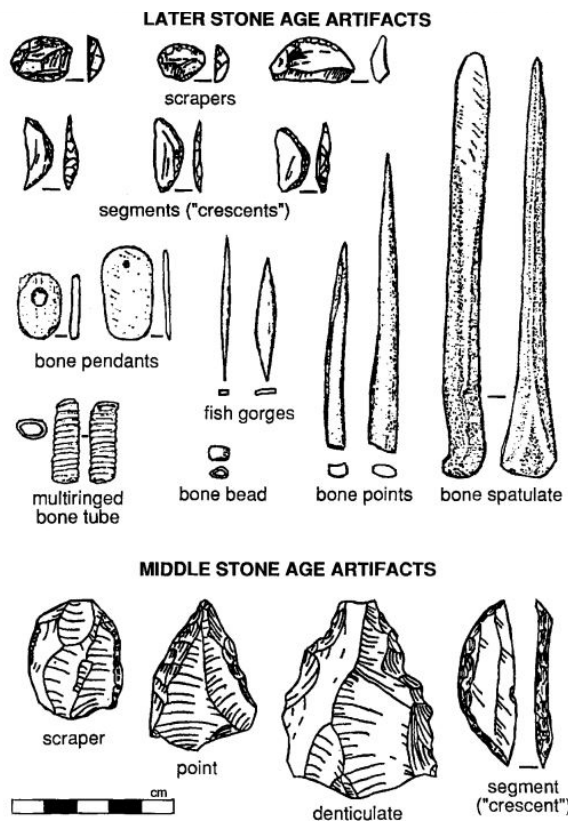
MSA sites in Africa (early MSA vs. Late MSA)



©Alison Brooks

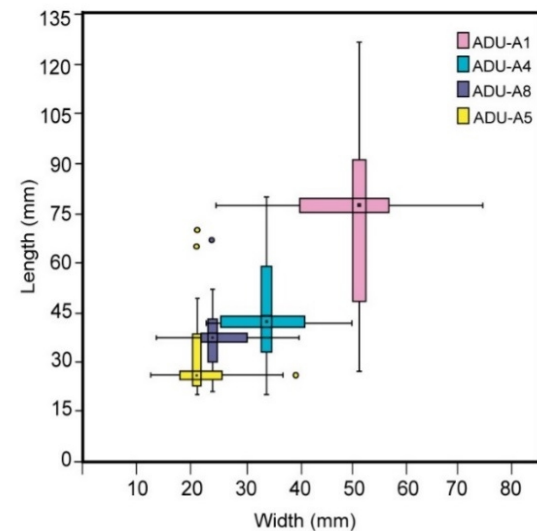
The Archaeology of modern humans

Progressive decrease in artifact size; bone tools, etc



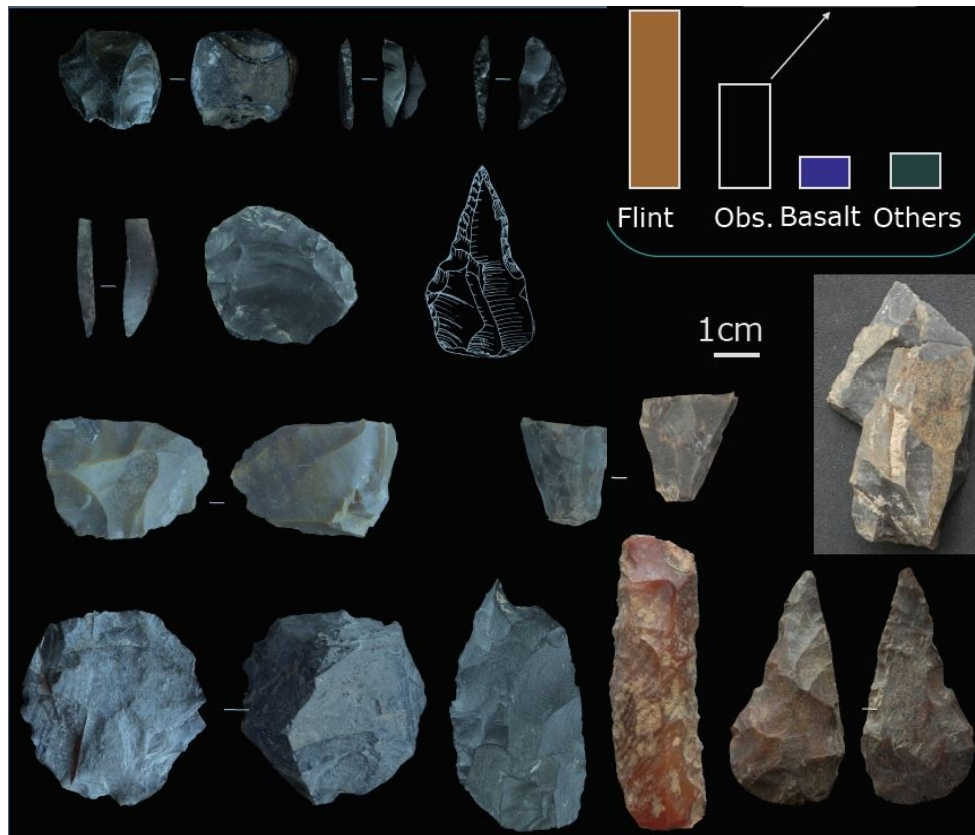
Klein 1992

Examples of pointed piece size change across time:
Aduma sites (80 to 100 ka): A1 is oldest with biggest tools,
A5 is youngest and has smallest tool dimensions



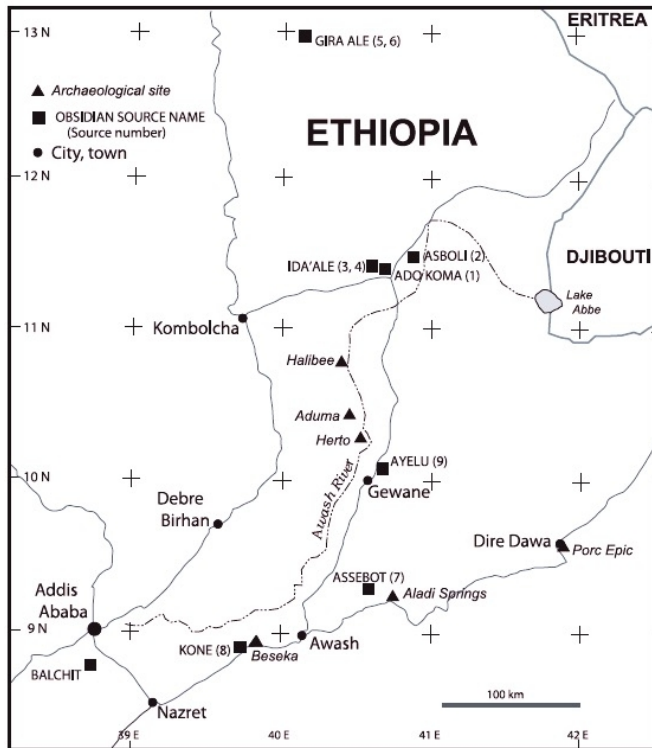
Sahle & Brooks: *forthcoming*

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



©Alice Leplongeon

Broader geographic range: Obsidian transport (Herto, Aduma, Halibee: 160 ka thru 60 ka)



Negash et al (2011) *Archaeometry*

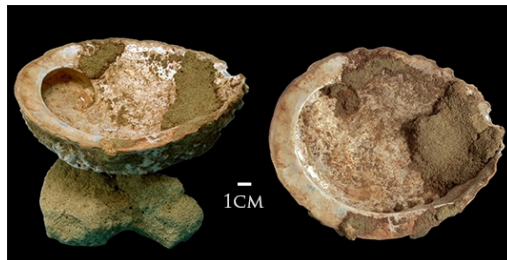
Earliest *homo sapiens* at herto used:

- 9 different sources
- one 290 km away

Possible implications:

- Knowledge/memory
- extensive social network

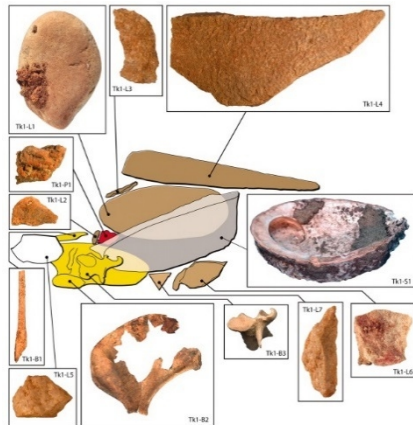
Symbolic behavior (100-65 ka)



Blombos Cave

(100 ka ochre in mixing kit)

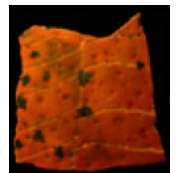
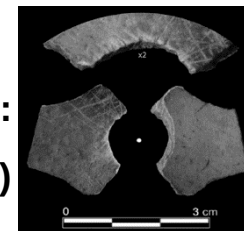
Value for beauty, art, ...?



Diepkloof Rockshelter:

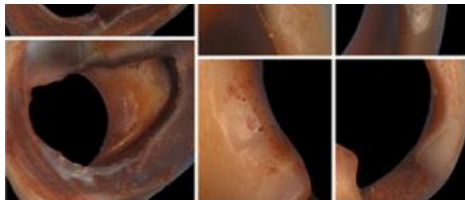
(60 ka decorated OES)

Social/group identity?

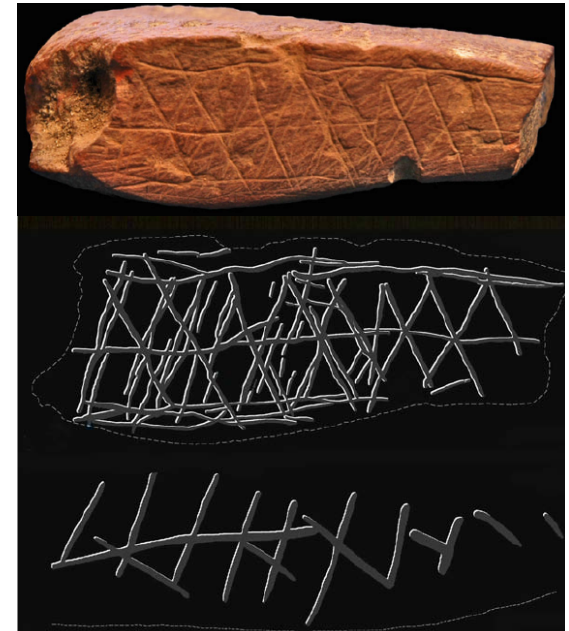


Personal ornamentation; engraving (75–82 ka)

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



d'Errico et al (2005); Bouzouggar et al (2007)

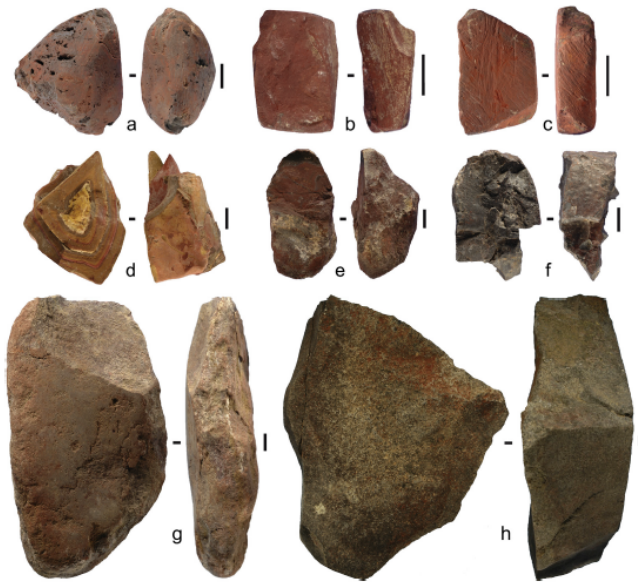


Henshilwood et al. (2004)

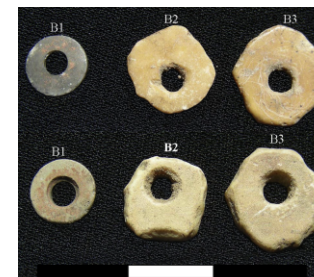
Blombos cave
(75 ka engraved ochre)

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Increased ochre and ornament use (Porc-Epic Cave: 50 ka)



Rosso et al. (2014) *PLoS ONE*



Assefa et al. (2008) *Curr Anthropol*

The Archaeology of modern humans

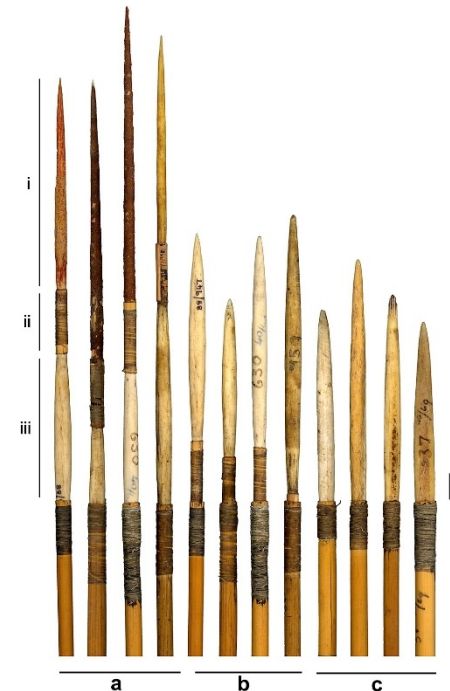
Bone points (60 ka Blombos Cave)

Projectiles?



Henshilwood et al. (2001) *J Hum Evol*

Ethnographic examples of bone projectiles used by the San people



Complex projectiles



© allposters



© Martin Harvey/Corbis

Suggested as:

- enabling technology
- indication of complex cognition

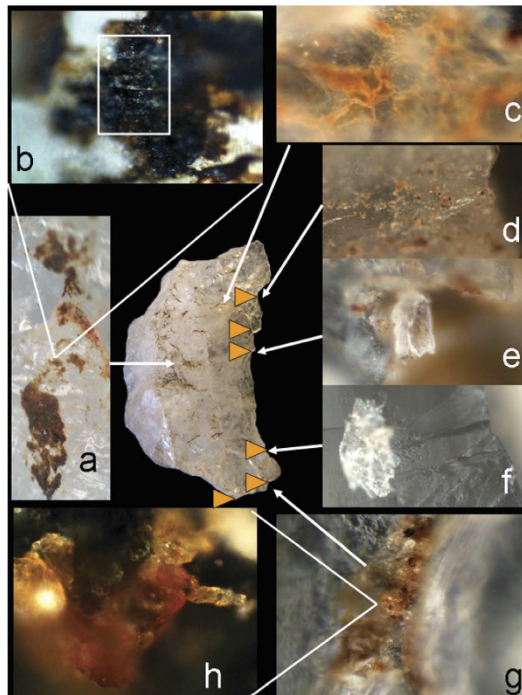
(Shea & Sisk 2010; Lombard & Haidle 2012)



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

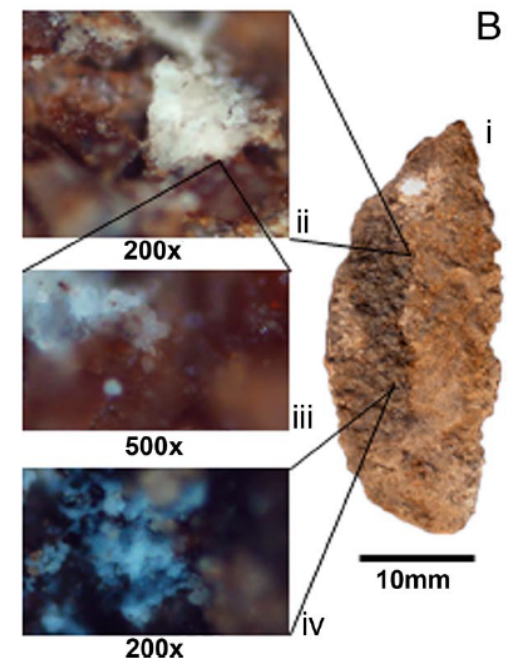


- adhesive
- residue



Complex Projectiles?

Possible hafting arrangements

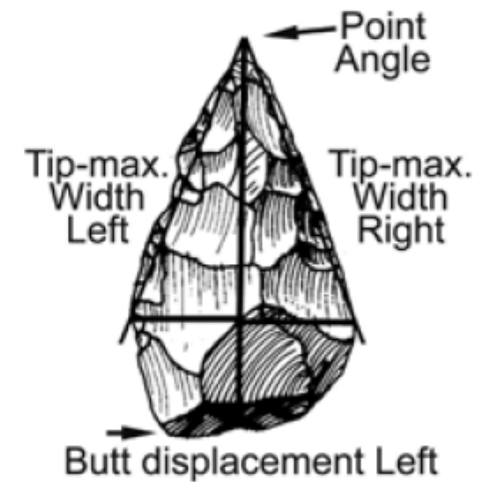


Lombard & Phillipson (2010) *Antiquity*



Complex projectiles even older than thought?

Points from Aduma in Ethiopia (80–100 ka)
(hafted? damaged points)

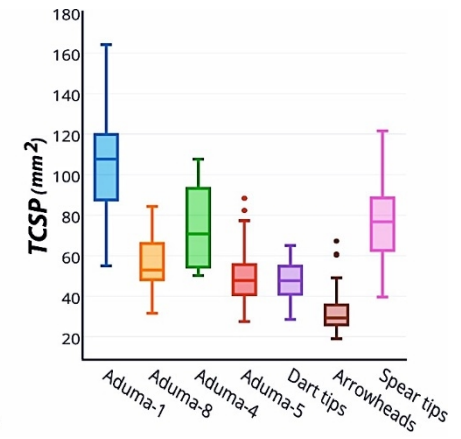
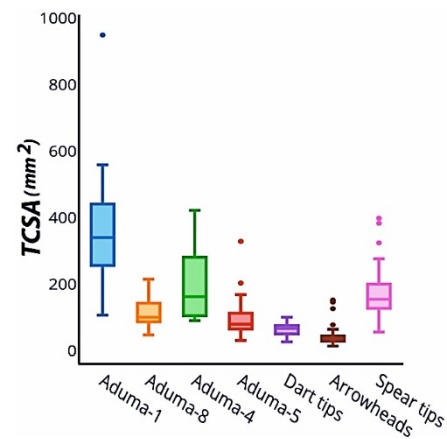




Aduma points (80 ka) are suggested as even older candidates complex projectiles based on:



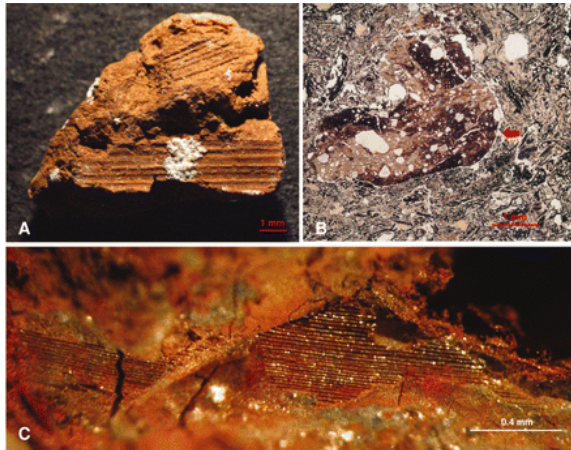
- Small size
- Consistent tip angle
- Modified base
- Tip cross-sectional area (TCSA)
and –perimeter (TCSP)



More evidence of 'complex' behaviors

Sibudu, S. Africa (bedding 77 ka)

based on microtraces of sedges, etc.



Wadley et al. (2011)



Apolo 11 Cave, Namibia (Art mobilier 27 ka)

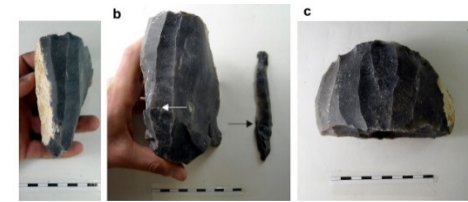


Wendt (1997)

The Archaeology of modern humans

Middle to Upper Paleolithic transition

- Middle Paleolithic (aka. Mousterian)
lasted ~200 ka thru 40 ka

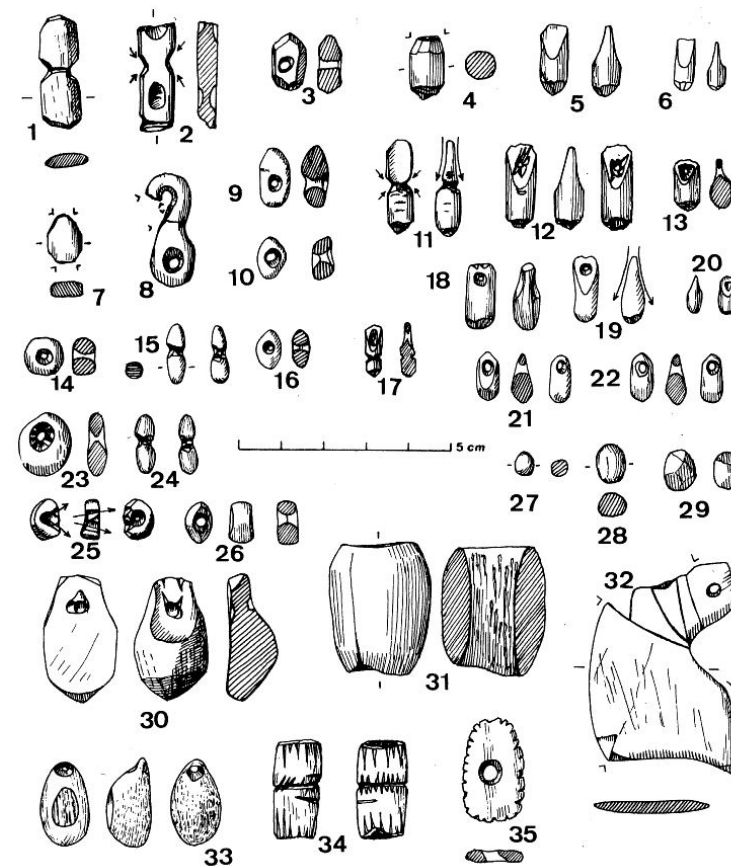


Eren et al. (2008)

- BY 40 ka:
- General shift to blade/bladelet based forms
 - Intensified 'style' or 'imposed form'
 - Extensively worked bone tools (projectiles?)
 - Long distance exchange
 - Symbolic artifacts
 - Ritualized burial (with grave goods)
 - Remarkably sophisticated representational art, music,...

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BEADS AND OTHER PENDANTS (Spy Cave Belgium 40 ka)



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Art: figurines, paintings, etc. (Europe: 35–42 ka)



Symbolic artifacts first documented outside Africa. Examples from the Swabian Jura dating to ~35,000 years ago.

- (A) Mythical images: “Lionman”, Hohlenstein-Stadel, (©UlmerMuseum).
- (B) Musical instruments; bone flute, Geißenklösterle (© Uni-Tü)
- (C) Ornaments in 3D: carved beads, Hohle Fels (© Uni-Tü)
- (D) Figurative art: mammoth, Vogelherd (© Uni-Tü)



(© MCC/DRAC)

Grotte Chauvet (32 ka)



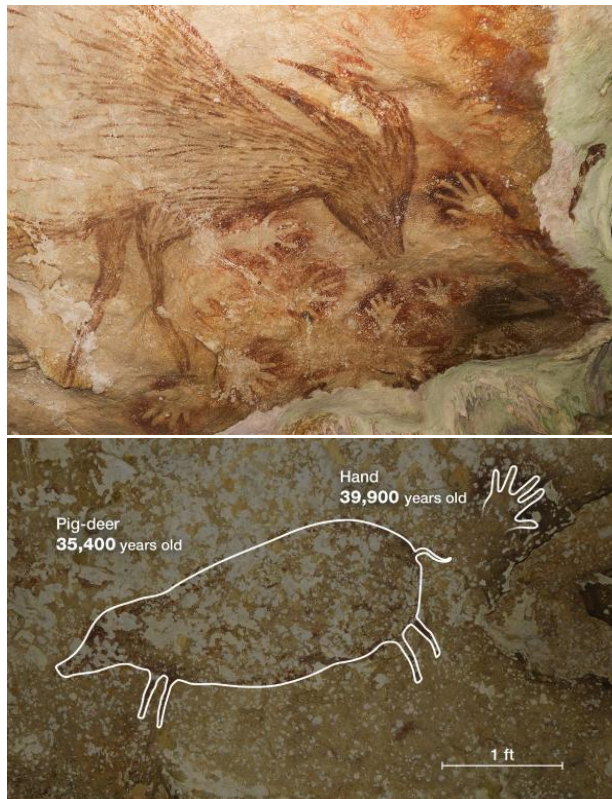
(© Uni-Tü)

Cave lion head, Vogelherd (~40 ka)

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Earliest rock art: paintings in Indonesia and Spain (~40 ka)

Aubert et al 2014 *Nature*



Sulawesi cave art (~40 ka)



ICREA/UNIVERSITY OF BARCELONA

El Castillo Cave (40.8 ka)

Did modern humans already have the capacity for art by the time they dispersed out of Africa, and into Eurasia? Unfortunately, no rock art of such antiquity ever found in Africa

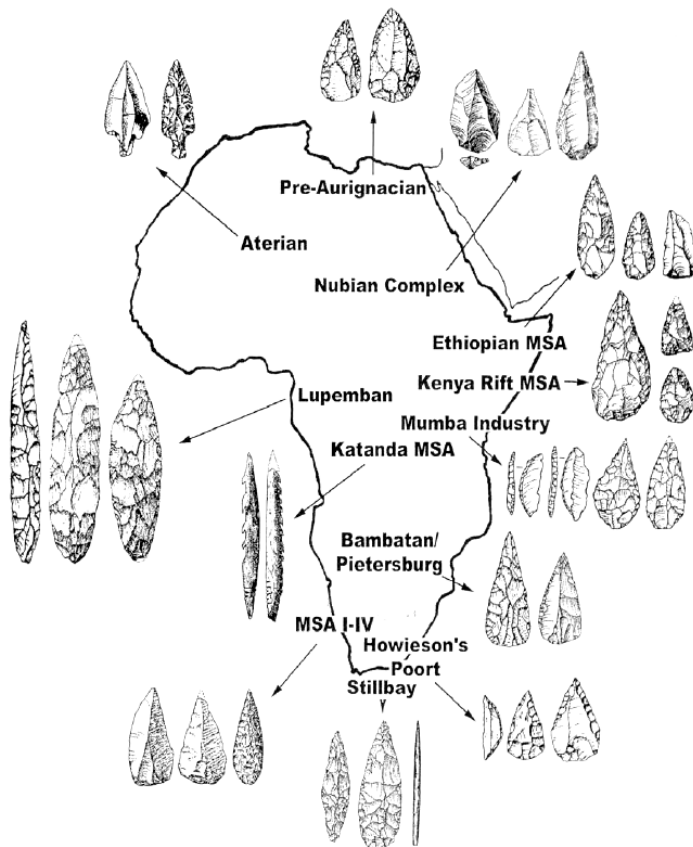


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What does this shift in behavioral patterns correlate with:
climate, demographics, anatomy...?

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Variability in MSA pointed artifact shape, size, and other attributes



Style (group identity)

Or

Adaptive zones?



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Q:

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

Caution:

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



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Increasing innovations witnessed particularly across the southern coast of South Africa ca. 60 to 100 ka. But why there & then?



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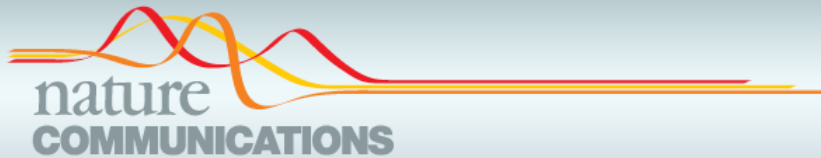


Pinnacle Point Cave 13B (Western Cape Province, South Africa) in context:
The Cape Floral kingdom, shellfish, and modern human origins[☆]

Curtis W. Marean



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

DOI: 10.1038/ncomms2897

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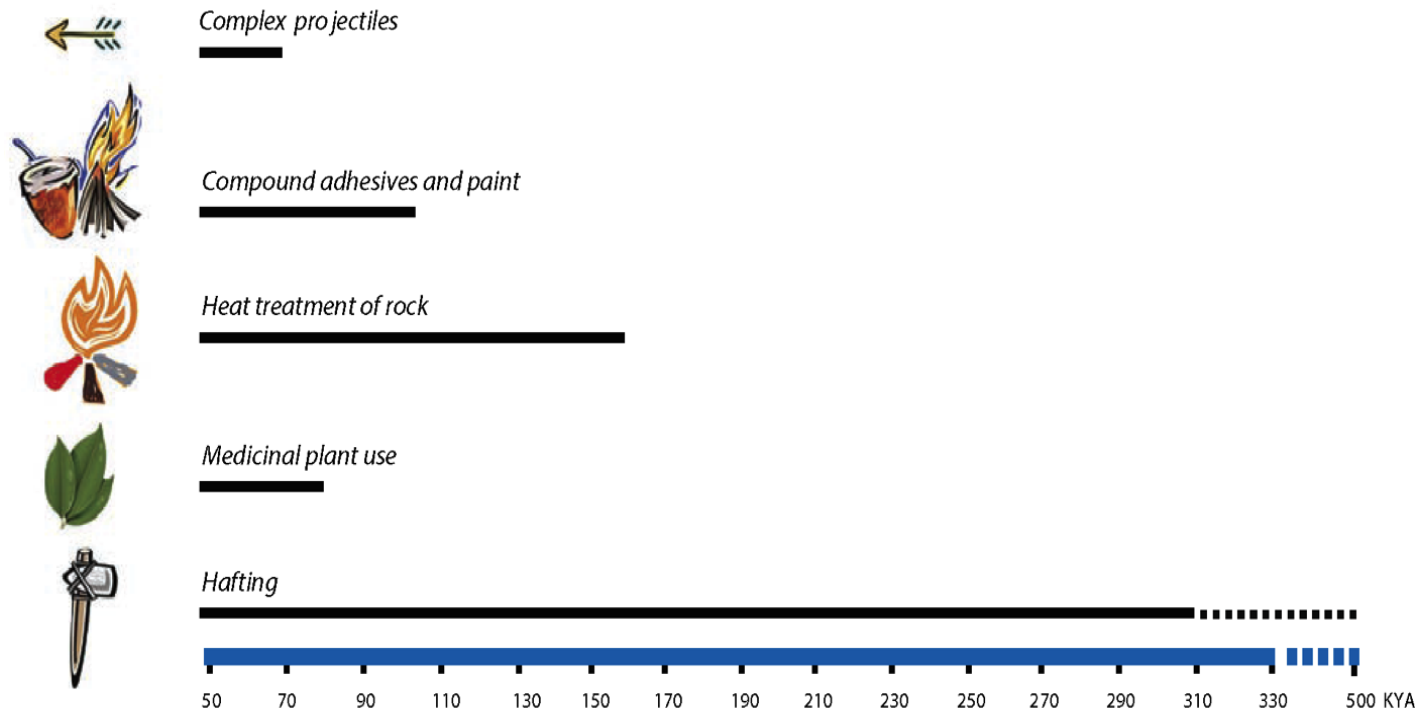
Development of Middle Stone Age innovation linked to rapid climate change

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



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Stone Age innovations



Wadley (2013) *Cam J Archaeol*



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Behavioral „modernity“

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”

McBrearty & Brooks (2000): Gradual accumulation of change



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