



MODERN HUMAN ORIGINS

Yonatan Sahle, Hugo Reyes-Centeno, Christian Bentz



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The Out-of-Africa Dispersal: An archaeological perspective

- ❑ Current views & appraisal of evidence in hand
- ❑ The role of technology & behavior:
Is modern as modern looks or does
- ❑ What archaeological evidence:
Future directions

Conard NJ (2010) Behavioral modernity: consensus or conundrum.
Proc Natl Acad Sci 107(17): 7621 – 7622.

Shea JJ (2011) *Homo sapiens* is as *Homo sapiens* was: Behavioral variability vs. “behavioral modernity” in paleolithic archaeology. *Curr Anthropol* 52(1): 1 – 35.

Groucutt H, et al. (2015) Rethinking the dispersal of *Homo sapiens* out of Africa. *Curr Anthropol* 2494): 149 – 164.



The Out-of-Africa Dispersal: An archaeological perspective

- ✓ Earliest technology at 2.5 mya: simple flake-core (*A. garhi/Homo*)
- ✓ By 1.7 mya, a new, more refined LCT techno called Acheulean (*H. erectus*)
- ✓ For much of the MP, the Acheulean was *the* technology (*H. heidelberg* appears)
- ✓ Ca. 100 kya before the appearance of *H. sapiens*, full-fledged MSA: Olorgesaille, Gademotta, Kapthurin Fm
- ✓ By the time early *H. sapiens* emerged (~200 ka), signs of complex cognition already in place:
 - Ochre use at Olorgesaille (>300 ka); Kapthurine (284 ka)
 - Early mortuary: Herto (160 kya); Qafzeh (90-115 ka); Border Cave (74 ka); Kebara Neanderthal (60 ka)
 - Long-distance procurement of raw material (Herto 290 km) => complex social network, memory
 - => intensified social networks => *H.s.* had techno advantage Neandertals?

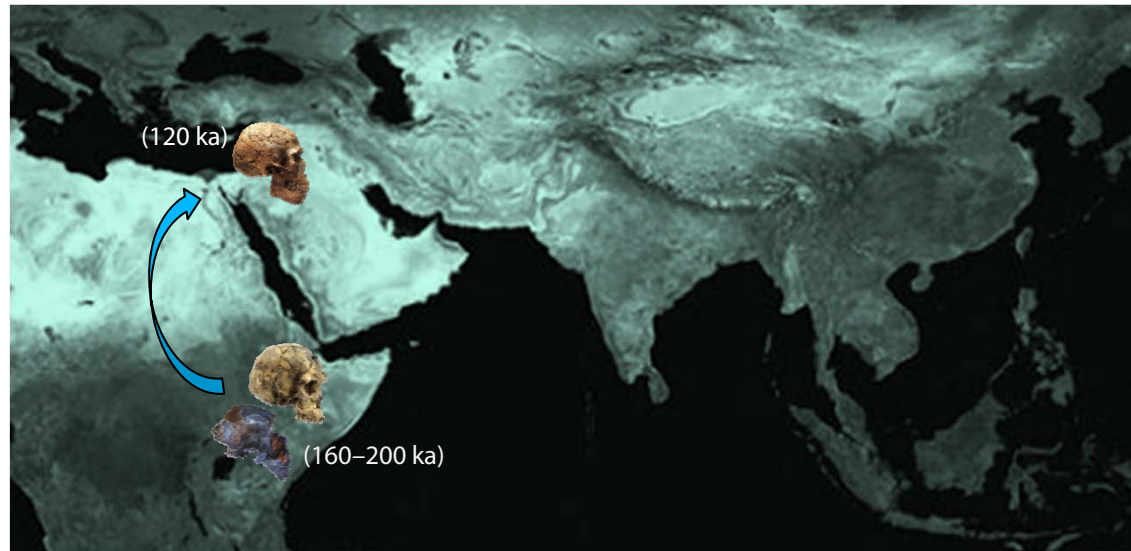
HOWEVER, all signs of behavioral “complexity” had a flickering pattern until well established after 70 ka (enigma!)

- ✓ ochre paint (100 kya Blombos; then ~70 ka at Blombos, Sibudu, etc; after 50 ka in E Africa: Porc-Epic, EKY)
- ✓ perforated shell/personal ornamentation (80 ka N Africa; 70 ka Blombos; 60 ka Sibudu; only <50 ka in E Africa)
- ✓ engraving (Blombos 75 kya; Sibudu, etc; Diepkloof at ~60 kya new level)
- ✓ more stylistic variation, increased diversification (Howieson’s Poort, Still Bay, Aterian, Nubian, etc.)
- ✓ compound adhesive [transformative] (Sibudu 70 ka,)
- ✓ complex projectiles (?80 ka Aduma; ?65 ka Sibudu)

By ~50 kya, indications of complex cognition are widespread; but *H.s.* already in Australia.



The Out-of-Africa Dispersal: An archaeological perspective

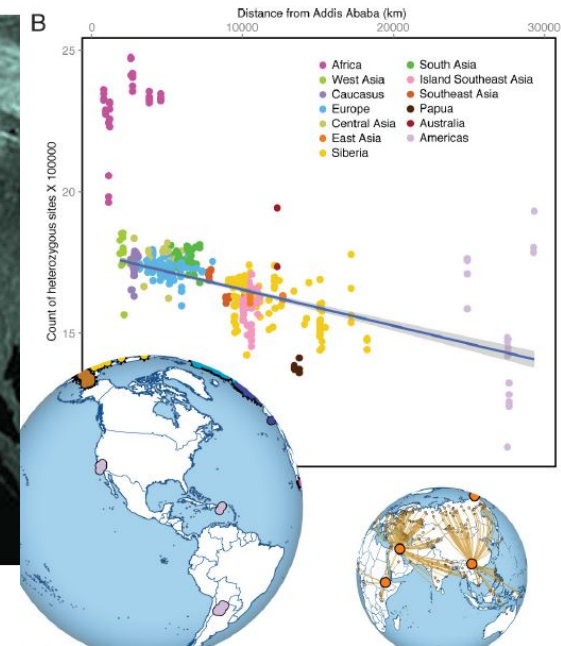
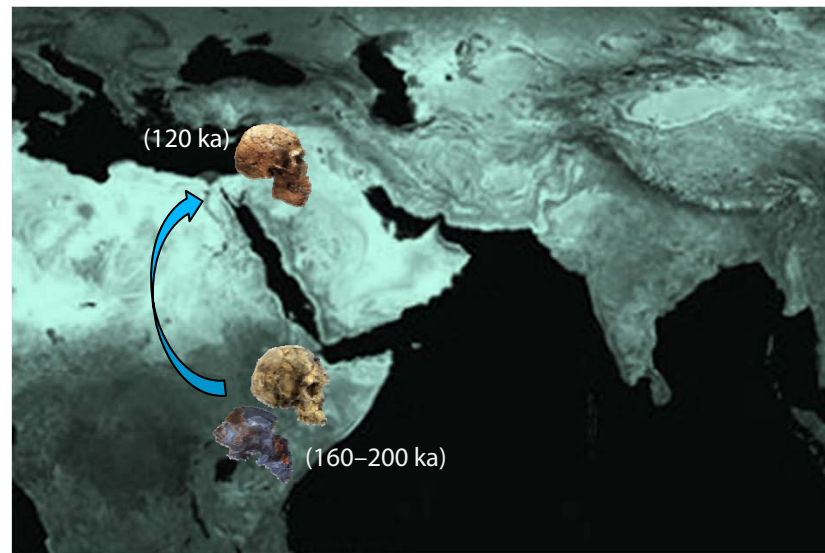


Dispersals of AMHs out of eastern Africa:

- reflected in the fossil record of northern Africa and the Levant (e.g., Skhul, Qafzeh early humans dating to 90–115 ka)



The Out-of-Africa Dispersal: An archaeological perspective



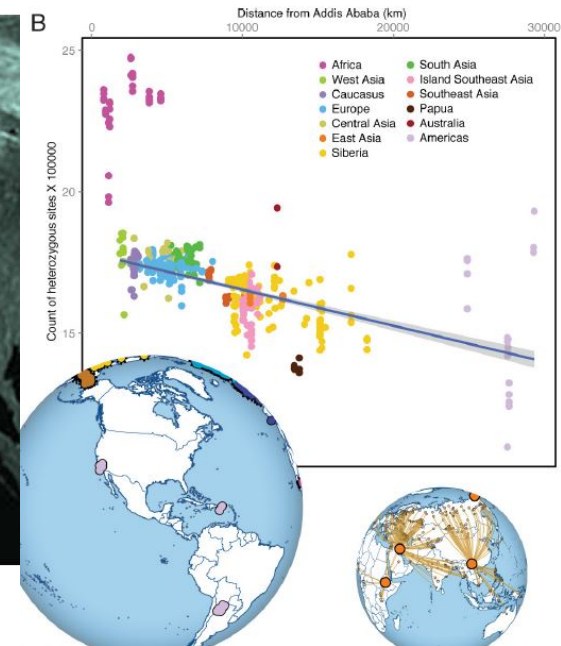
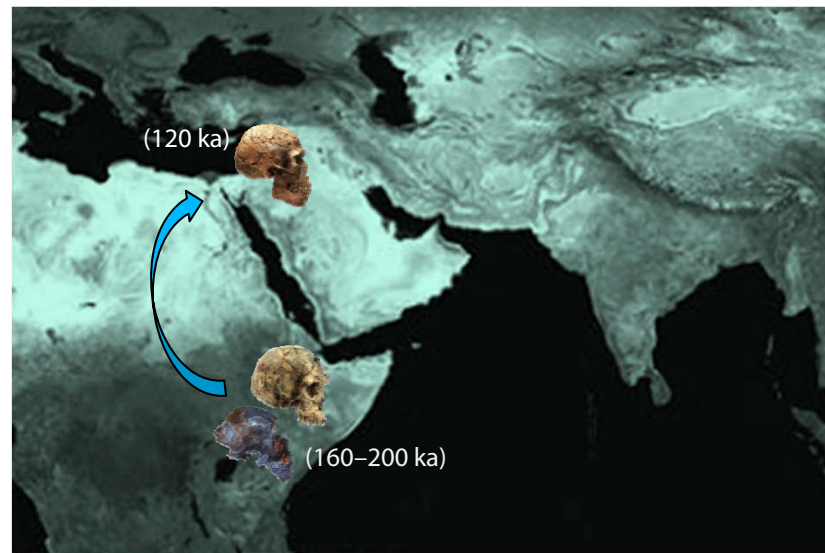
Pagani et al 2016 *Nature*

Dispersals of AMHs out of eastern Africa:

- supported by genetic data (that indigenous Africans have the highest genetic diversity; and this decreases with increasing distance from eastern Africa)



The Out-of-Africa Dispersal: An archaeological perspective



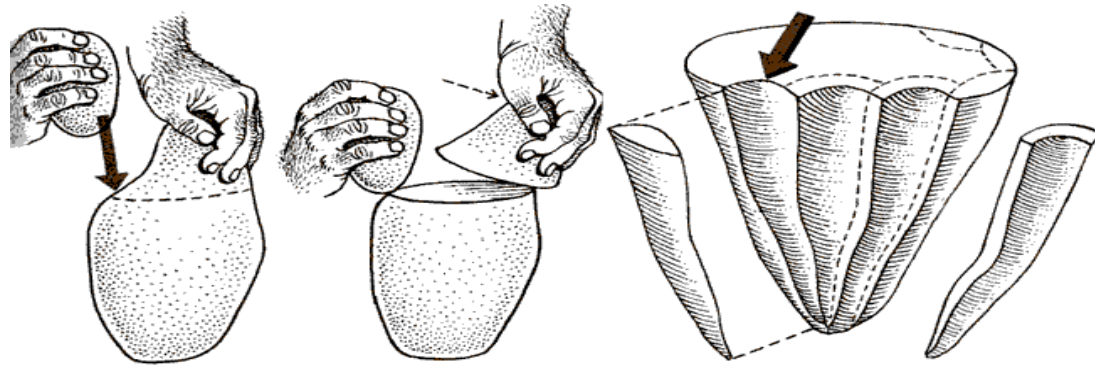
Dispersals of AMHs out of eastern Africa:

- reflected in the fossil record northern Africa and the Levant
- supported by genetic studies
- **Can archeology** be used to track AMHs movement?



The Out-of-Africa Dispersal: An archaeological perspective

Reading lithics



Striking platform



Retouch of edges
Dorsal scar patterns



Images ©Paleodirect



The Out-of-Africa Dispersal: An archaeological perspective

Population mov't difficult to detect in the archaeol record



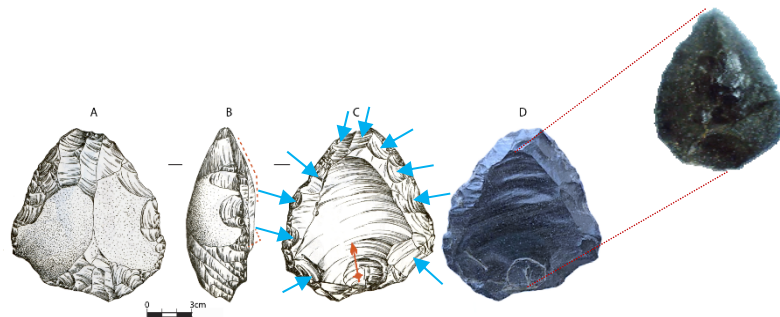
The Acheulean lasted for >1.5 Ma (from 1.76 to 0.12 Ma), and was the technology of *H. erectus*, *heidelbergensis*, and early *H. sapiens*

Image © Y Sahle

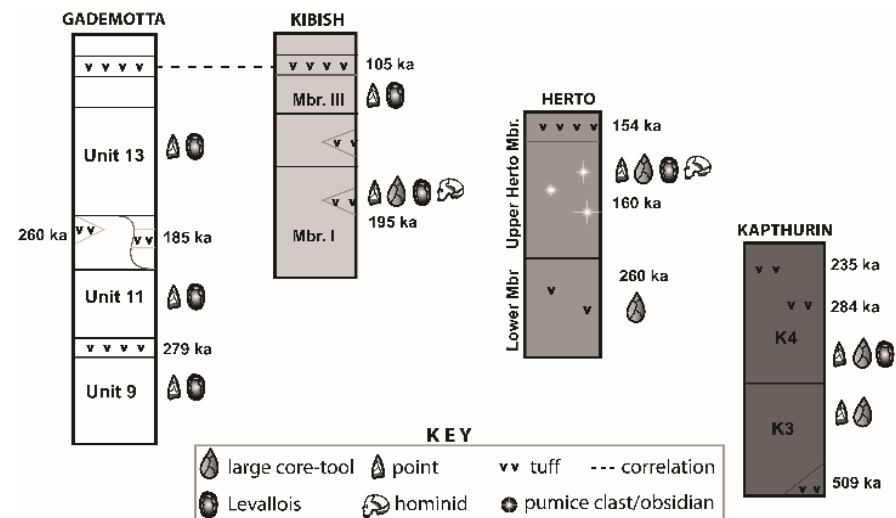


The Out-of-Africa Dispersal: An archaeological perspective

Population mov't difficult to detect in the archaeol record



MSA (350–40 ka)

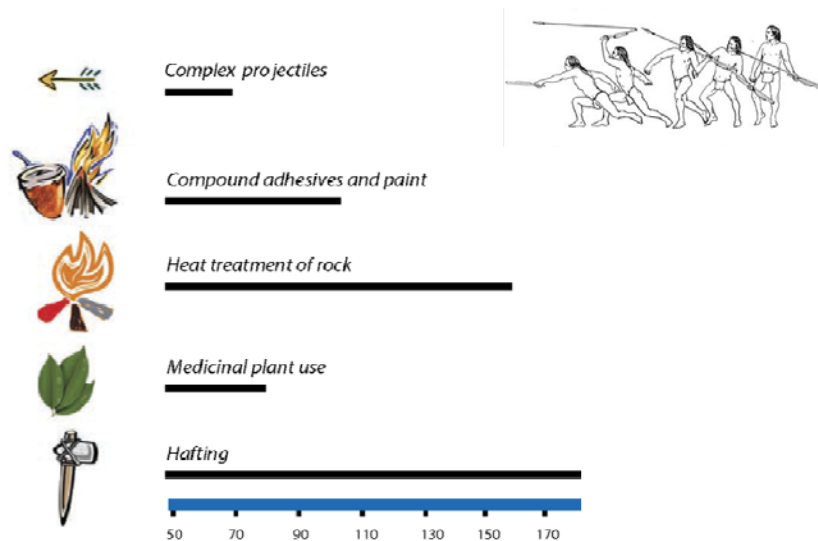


*Lithic Illustrations (Wendorf & Schild 1974);
Artifact images and schematic diagram ©Y Sahle*

The Out-of-Africa Dispersal: An archaeological perspective

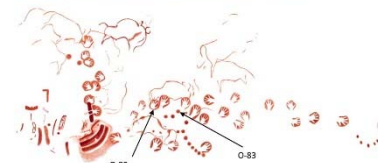
Population mov't difficult to detect in the archaeol record

Later MSA (126–40 ka)



Wadley (2013) *Cam J Archaeol*

Early UP (Aurignacian; ~40–30 ka)



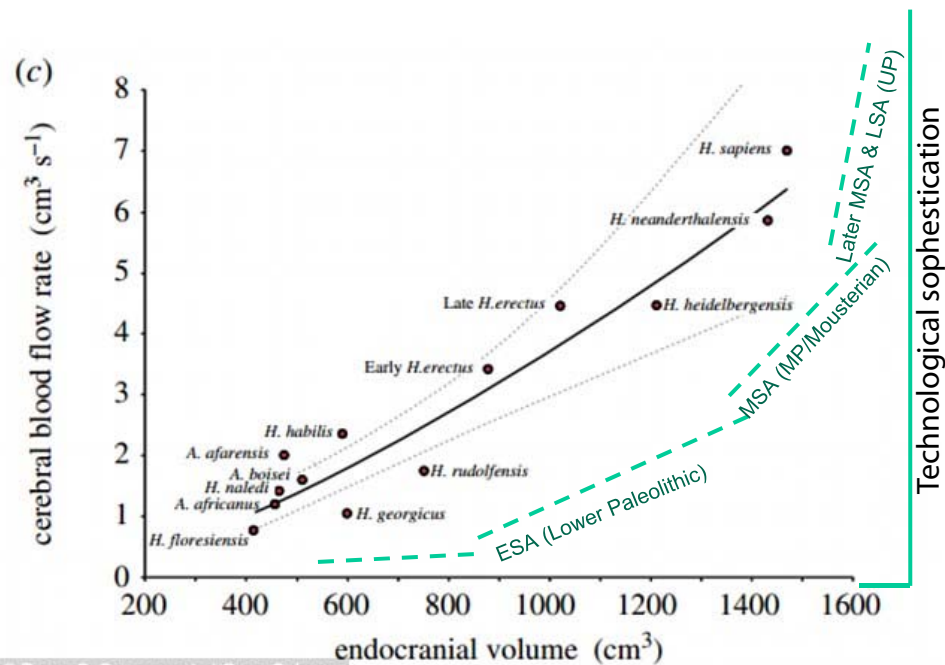
Pike et al. (2012) *Science*



Conard (2010) *PNAS*

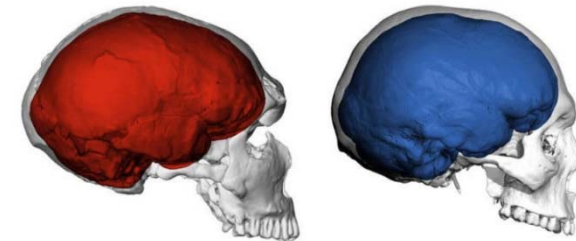
The Out-of-Africa Dispersal: An archaeological perspective

What changed?!



Neandethal

H. sapiens



©Philip Gunz

Differences in temporal lobes, olfactory bulbs, & cerebellum suggest a combined use of brain functions related to cognition.

Neanderthals and modern humans have independently evolved brains of roughly the same size but with differing shapes.

The Out-of-Africa Dispersal: An archaeological perspective

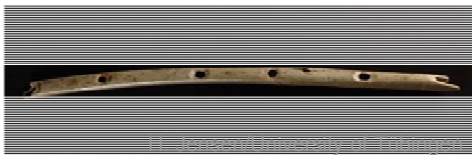
Toward the appearance of toolkits and behaviors that resemble ones evident among recent hunter-gatherers



© Musée Amédée Lemozi

In the Upper Paleolithic the emphasis was on specialized flakes called blades, which were in turn pressure flaked into a variety of different tools: perforators, scrapers, burins, points, crescents, etc.

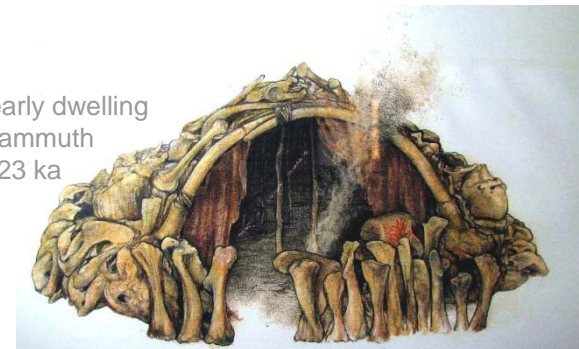
Art and music, housing structures, etc. also appear for the first time



H. Jansen/University of Tübingen



Artist's rendition of the early dwelling structures made from mammoth bones and tusks from ~23 ka thru to ~12 ka in sites in Ukraine, Czech, and Poland

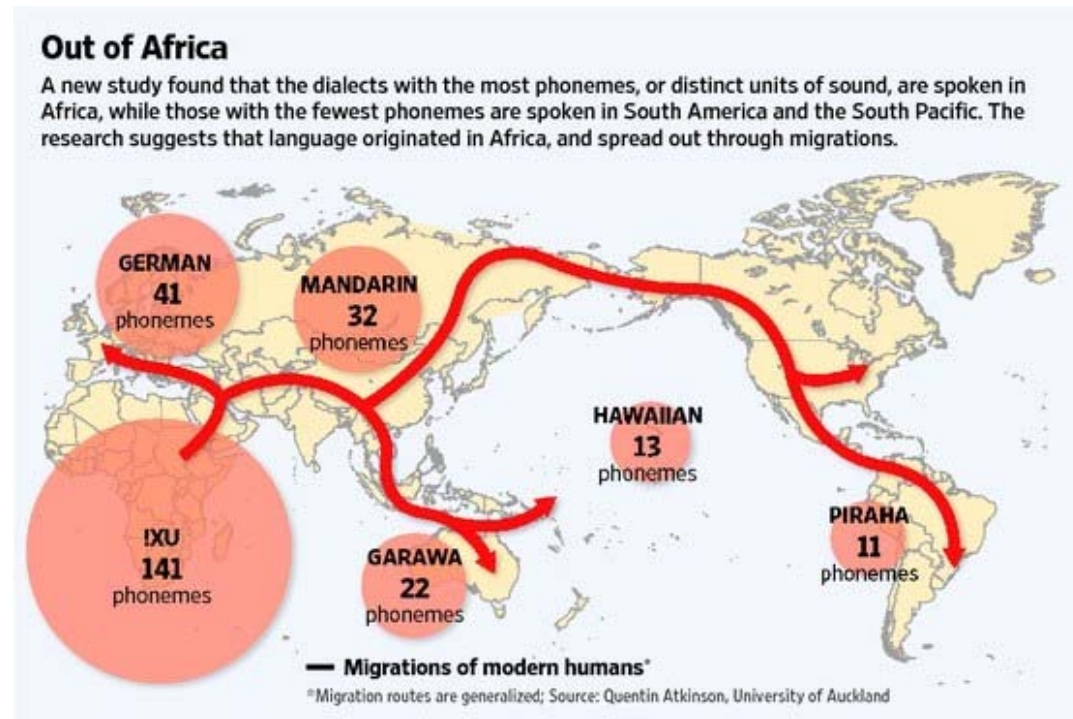


Source: Dolní Věstonice Museum



The Out-of-Africa Dispersal: An archaeological perspective

Culture travels faster and farther than genes do!

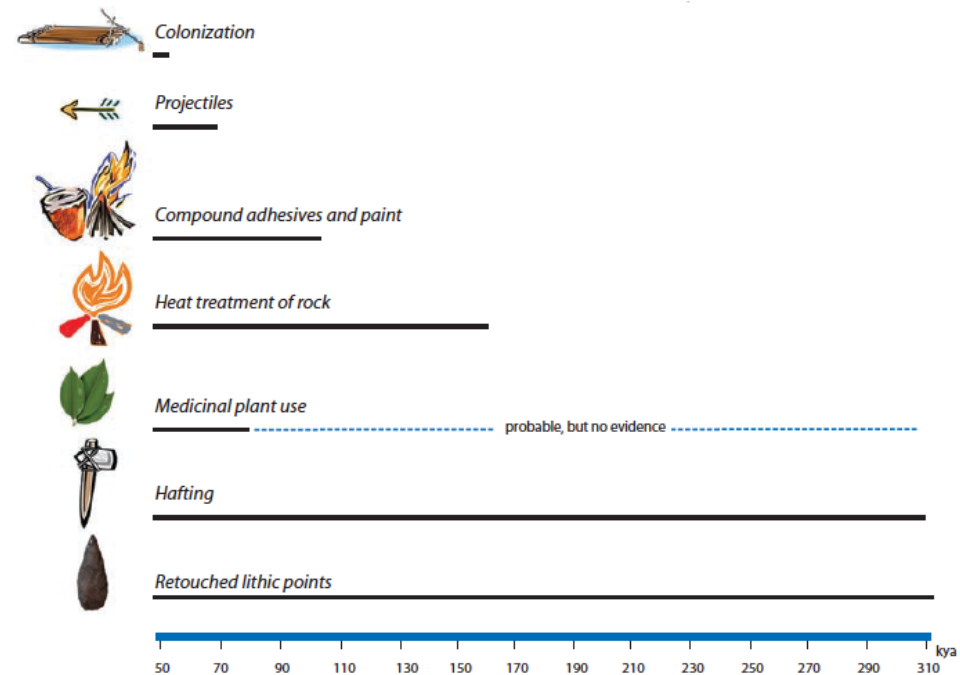


Genes travel faster and farther than cultures do!



Archaeology at the dawn of modern humans

How and when did it all start?

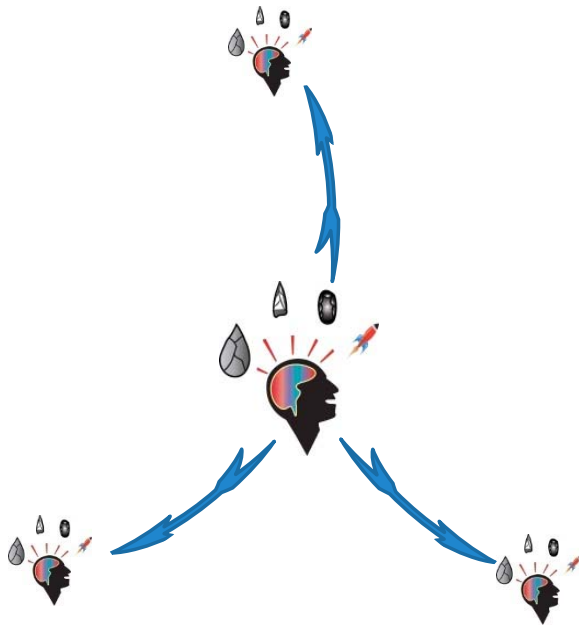


Wadley (2013) Cam J Archaeol

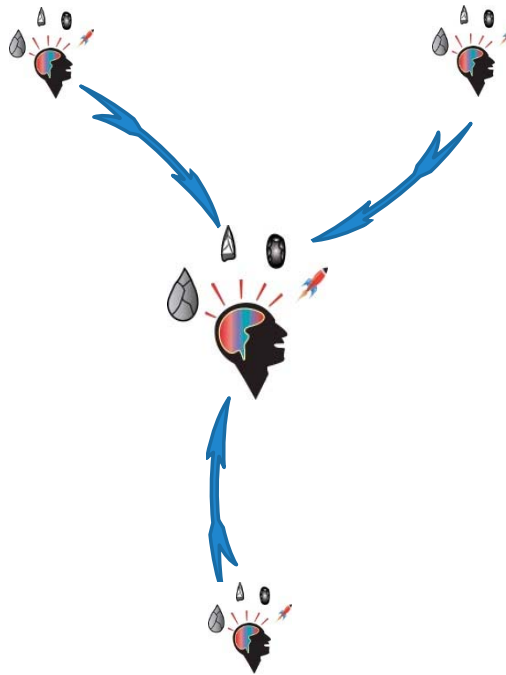


Archaeology at the dawn of modern humans

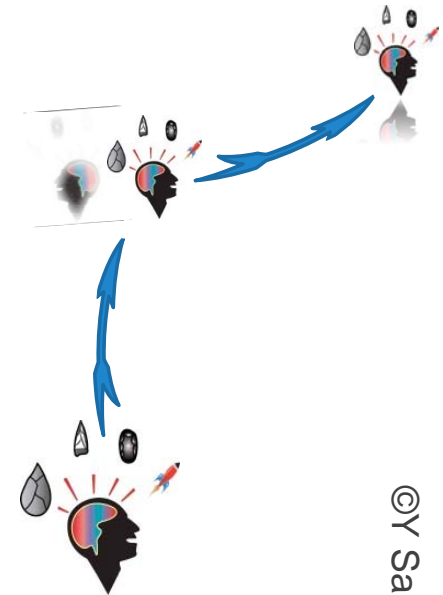
Diffusion



Convergence



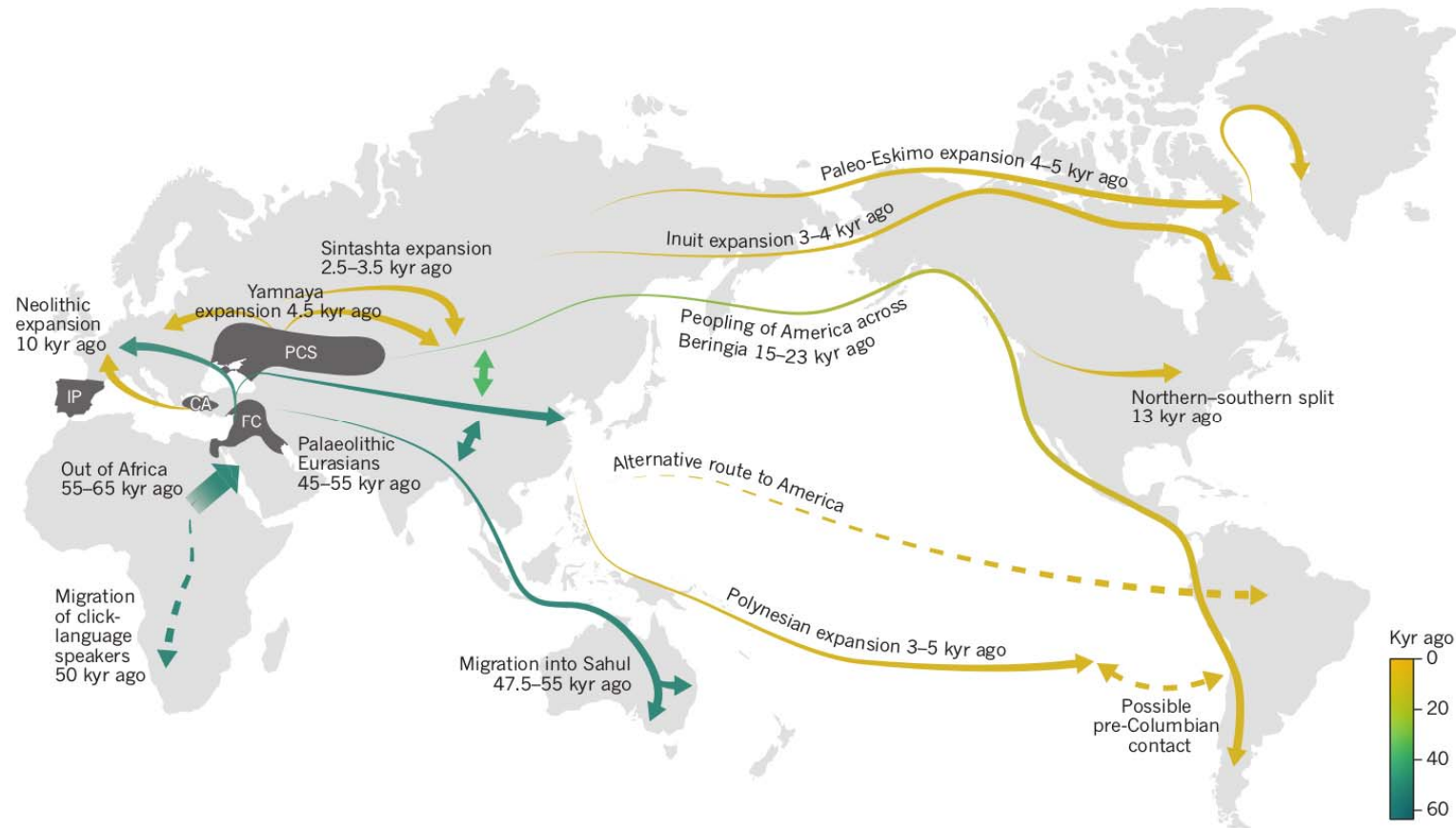
Idiosyncrasy



©Y Sahle



Archaeology at the dawn of modern humans



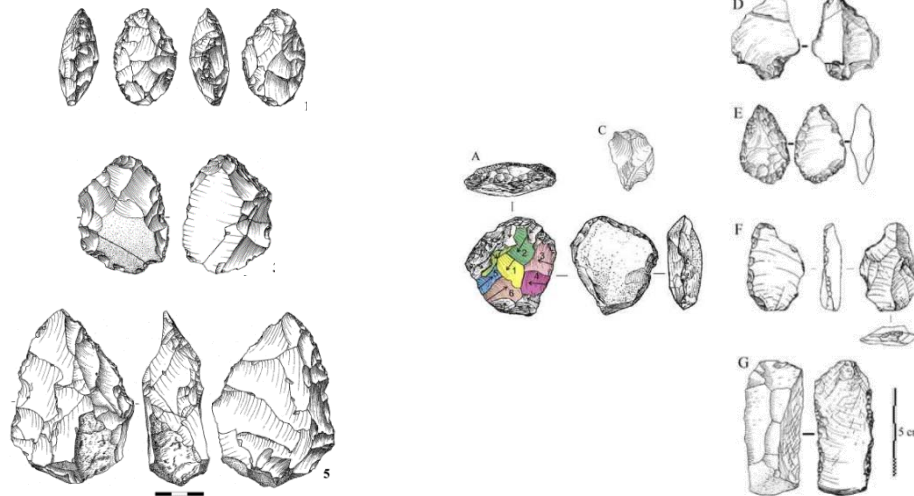
Nielsen et al. (2017) *Nature*.

Archaeology at the dawn of modern humans

In search of similarities/differences:
Reduction strategies & *Fossiles directeurs*

Jebel Faya (UAE, ~125 ka)

façonnage technique yet to be
documented in W Arabia



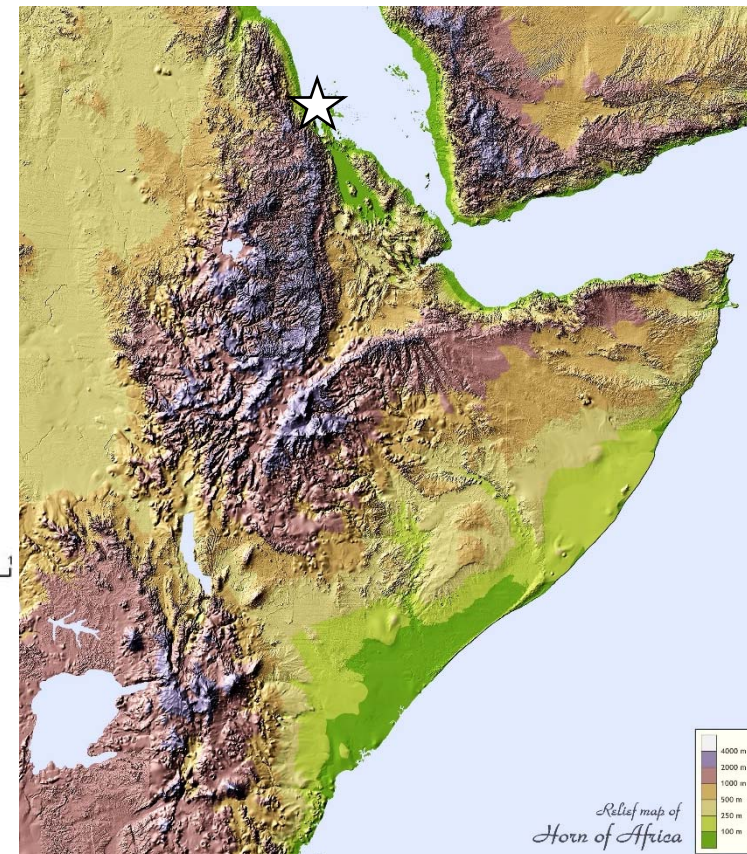
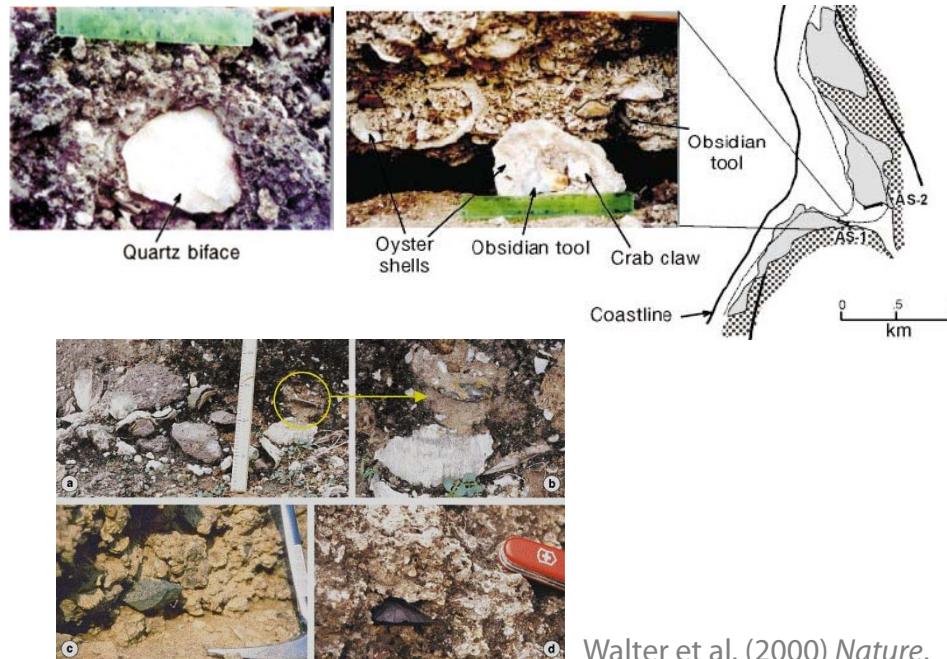
Armitage et al. (2011) *Science*

Groucutt et al. (2015) *Quat Int*

Archaeology at the dawn of modern humans

Costal occupation/marine resource use:

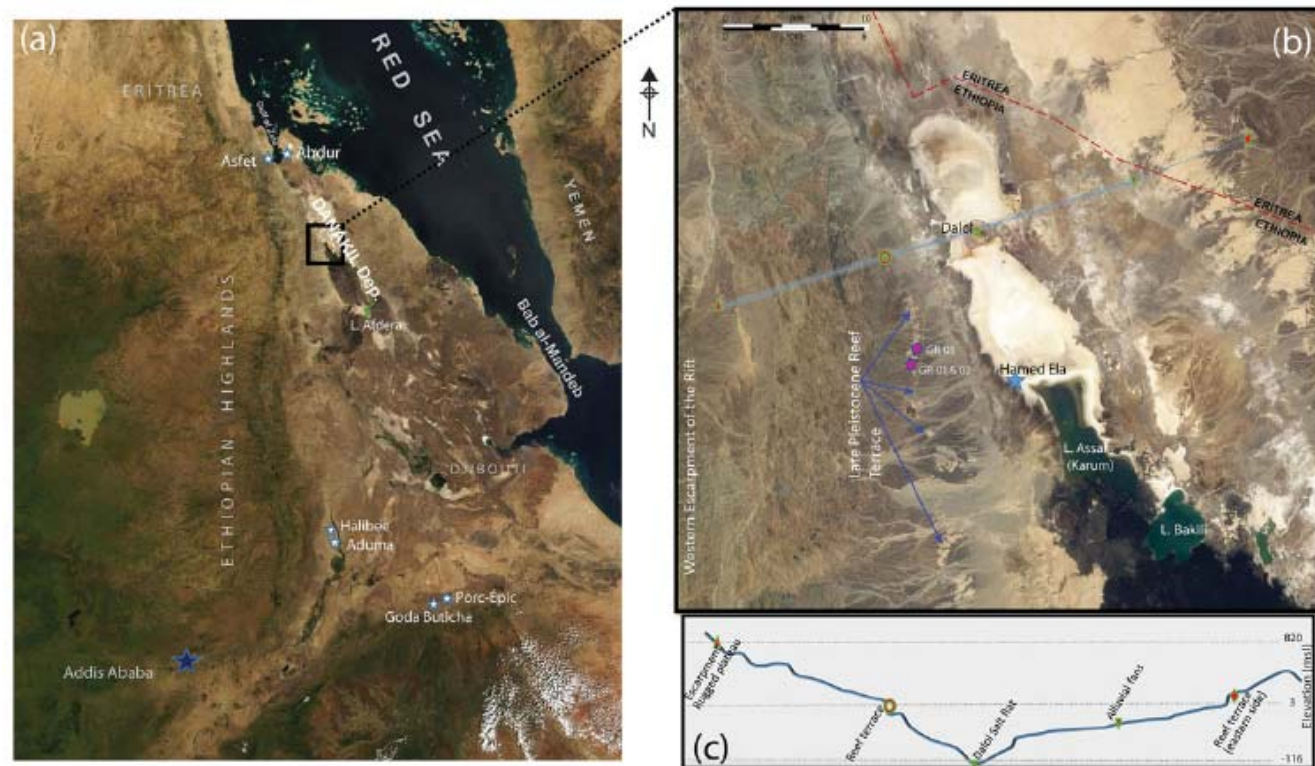
Abdur (Eritrea, ~125 ka)



Walter et al. (2000) *Nature*.

Archaeology at the dawn of modern humans

Costal occupation/marine resource exploitation along ancient Red Sea? Danakil Depression (Afar, Ethiopia)



Sahle & Beyin 2017 *Antiquity*



Archaeology at the dawn of modern humans

Costal occupation/marine resource exploitation along ancient Red Sea?

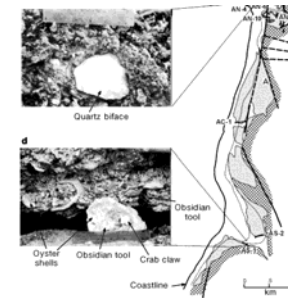
Danakil Depression (Afar, Ethiopia)



Sahle & Beyin 2017 *Antiquity*

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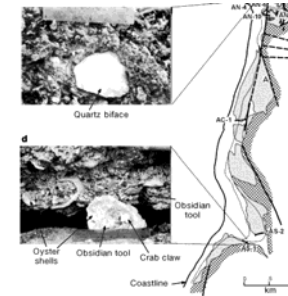
Costal occupation/marine resource exploitation along ancient Red Sea? Danakil Depression (Afar, Ethiopia)



Sahle & Beyin 2017 *Antiquity*

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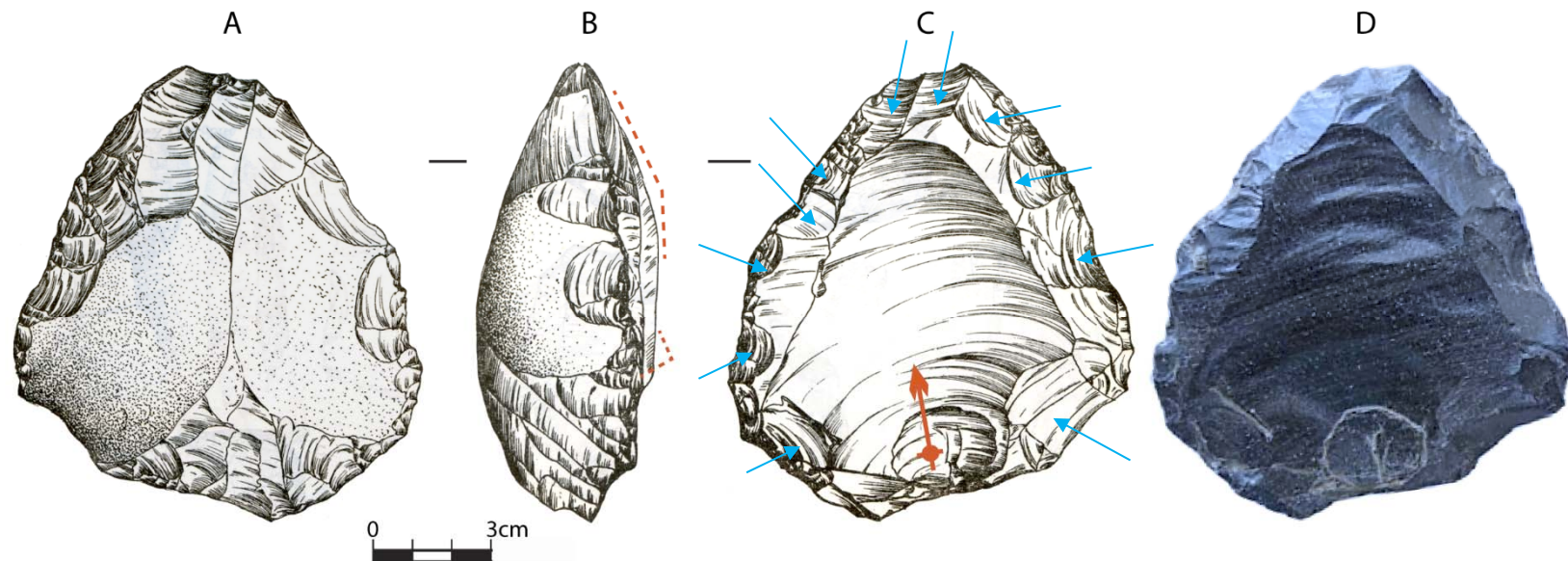
Costal occupation/marine resource exploitation along ancient Red Sea? Danakil Depression (Afar, Ethiopia)



Sahle & Beyin 2017 *Antiquity*

The Out-of-Africa Dispersal: An archaeological perspective

Using “region-specific” technology as a clue



(Wendorf & Schild 1974)

Artifact image © Y Sahle

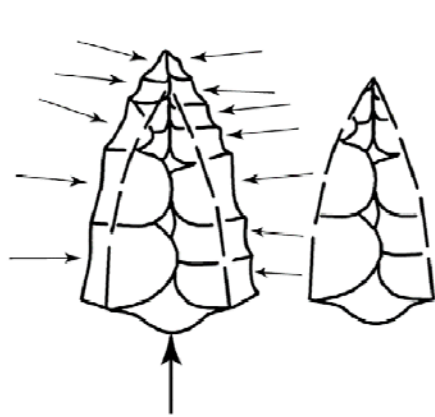


The Out-of-Africa Dispersal: An archaeological perspective

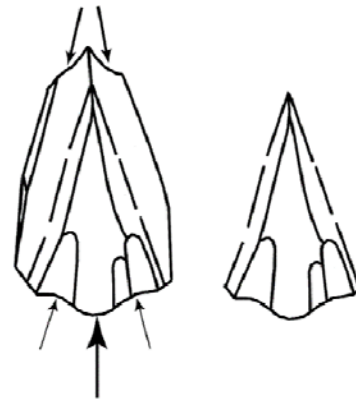
Nubian techno-complex

A Levallois (prep. Core) technology:

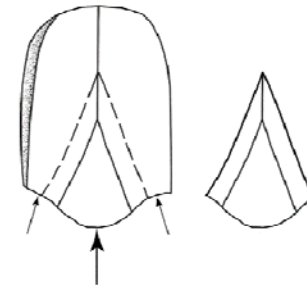
Preferential flake with convergent lateral edges



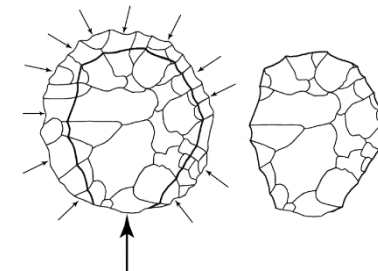
Nubian Type II



Nubian Type I



Preferential
Unidirectional convergent

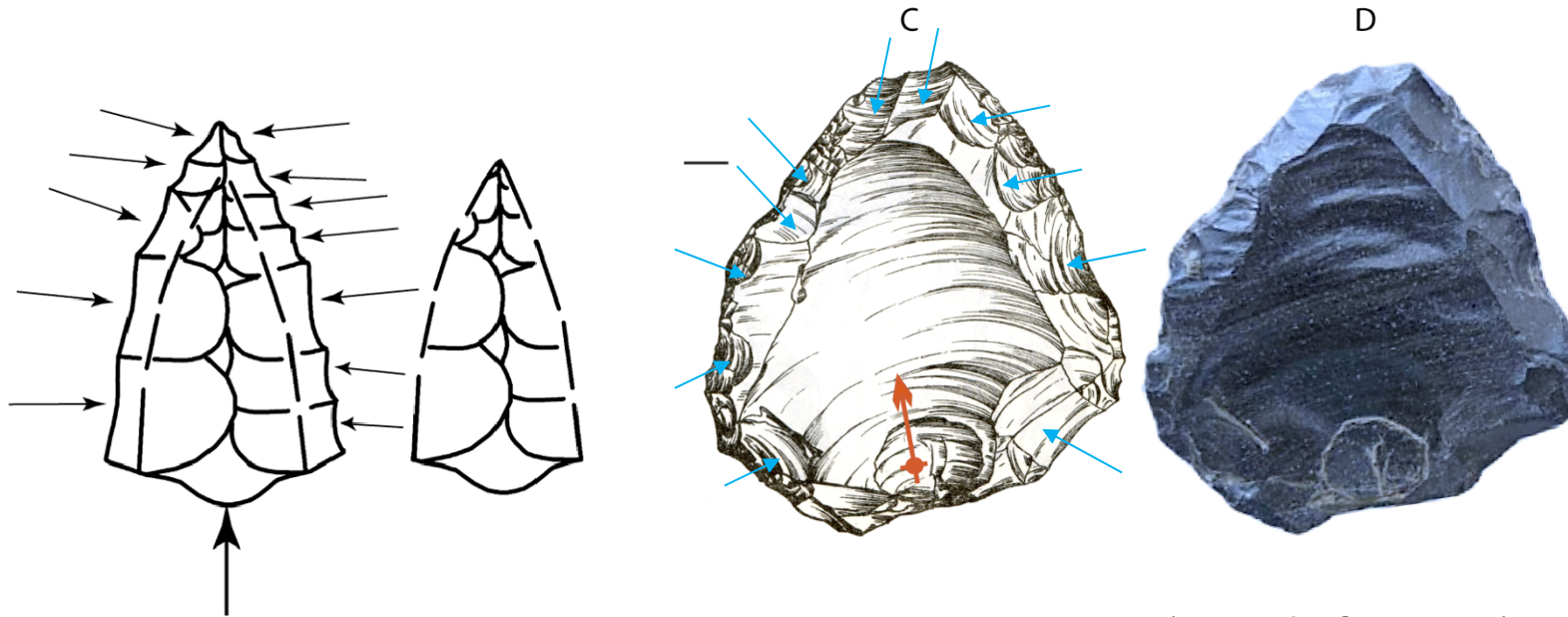


Preferential
centripital

Rose et al (2011) *PLoS ONE*

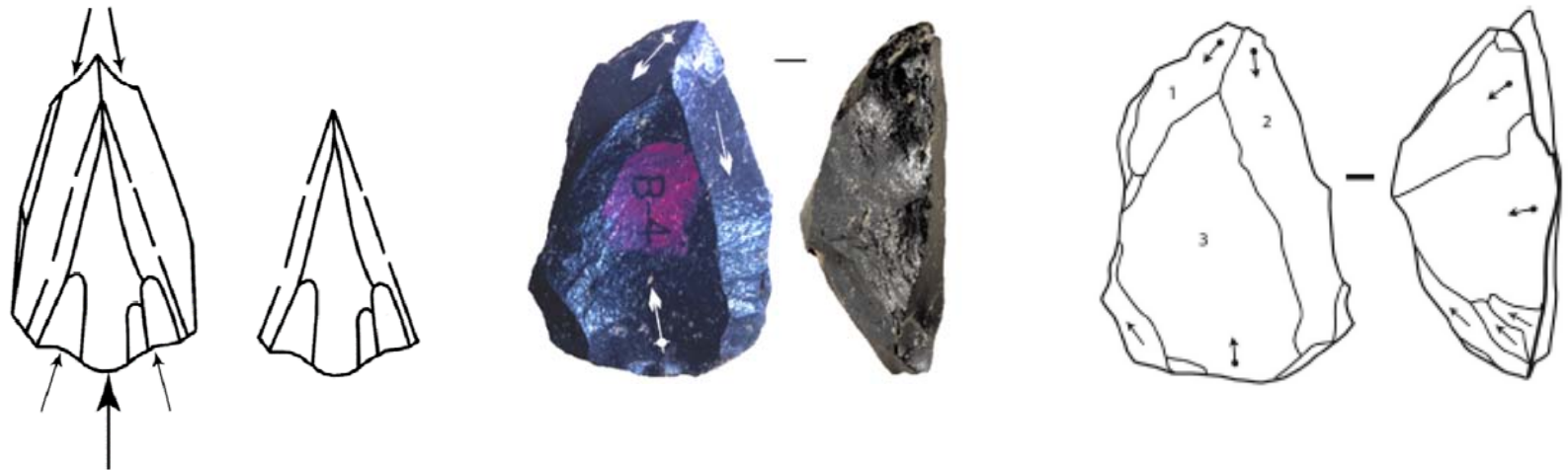


The Out-of-Africa Dispersal: An archaeological perspective



(Wendorf & Schild 1974)

The Out-of-Africa Dispersal: An archaeological perspective



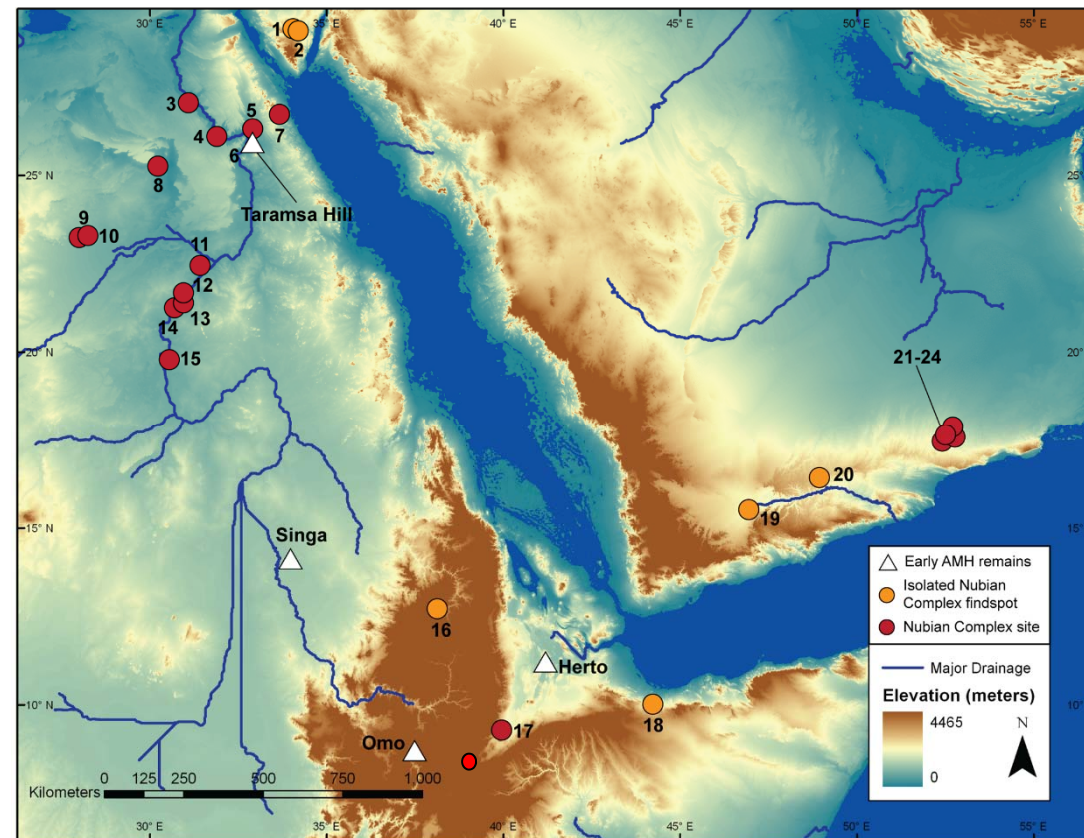
Levallois preferential (distal divergent bidirectional) core
(Nubian type I). Gademotta Fm. (Ethiopia, >105 ka)

Sahle (2013) *Doc Diss Univ. Cape Town*



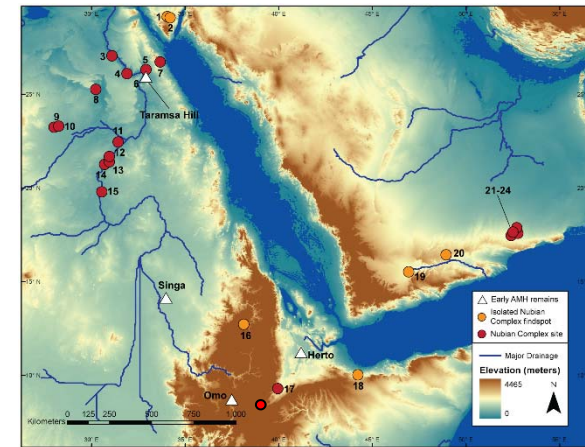
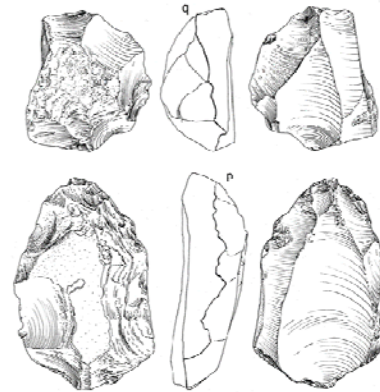
The Out-of-Africa Dispersal: An archaeological perspective

Sites with **Nubian** Techno-complex





The Out-of-Africa Dispersal: An archaeological perspective



OPEN ACCESS Freely available online

PLOS one

The Nubian Complex of Dhofar, Oman: An African Middle Stone Age Industry in Southern Arabia

Jeffrey I. Rose^{1*}, Vitaly I. Usik², Anthony E. Marks³, Yamandu H. Hilbert¹, Christopher S. Galletti⁴, Ash Parton⁵, Jean Marie Gelling⁶, Viktor Černý⁷, Mike W. Morley⁵, Richard G. Roberts⁸

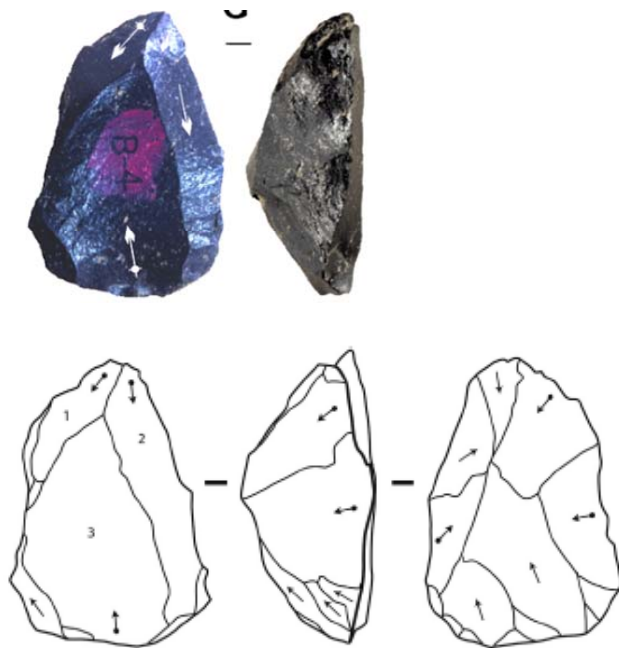
1 Institute of Archaeology and Antiquity, University of Birmingham, Birmingham, United Kingdom, **2** Archaeological Museum, Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev, Ukraine, **3** Department of Anthropology, Southern Methodist University, Dallas, Texas, United States of America, **4** School of Geographical Science and Urban Planning, Arizona State University, Tempe, Arizona, United States of America, **5** Department of Anthropology and Geography, Oxford Brookes University, Oxford, United Kingdom, **6** Institut für Naturwissenschaftliche Archäologie, University of Tübingen, Tübingen, Germany, **7** Institute of Archaeology of the Academy of Science, Prague, Czech Republic, **8** Centre for Archaeological Science, School of Earth and Environmental Sciences, University of Wollongong, Wollongong, Australia

Abstract

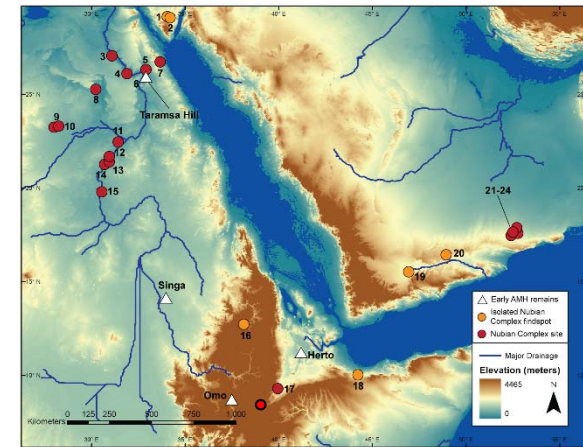
Despite the numerous studies proposing early human population expansions from Africa into Arabia during the Late Pleistocene, no archaeological sites have yet been discovered in Arabia that resemble a specific African industry, which would indicate demographic exchange across the Red Sea. Here we report the discovery of a buried site and more than 100 new surface scatters in the Dhofar region of Oman belonging to a regionally-specific African lithic industry - the late Nubian Complex - known previously only from the northeast and Horn of Africa during Marine Isotope Stage 5, ~128,000 to 74,000 years ago. Two optically stimulated luminescence age estimates from the open-air site of Aybut Al Auwal in Oman place the Arabian Nubian Complex at ~106,000 years ago, providing archaeological evidence for the presence of a distinct northeast African Middle Stone Age technocomplex in southern Arabia sometime in the first half of Marine Isotope Stage 5.

Citation: Rose JI, Usik VI, Marks AE, Hilbert YH, Galletti CS, et al. (2011) The Nubian Complex of Dhofar, Oman: An African Middle Stone Age Industry in Southern Arabia. PLOS ONE 6(11): e28239. doi:10.1371/journal.pone.0028239

The Out-of-Africa Dispersal: An archaeological perspective

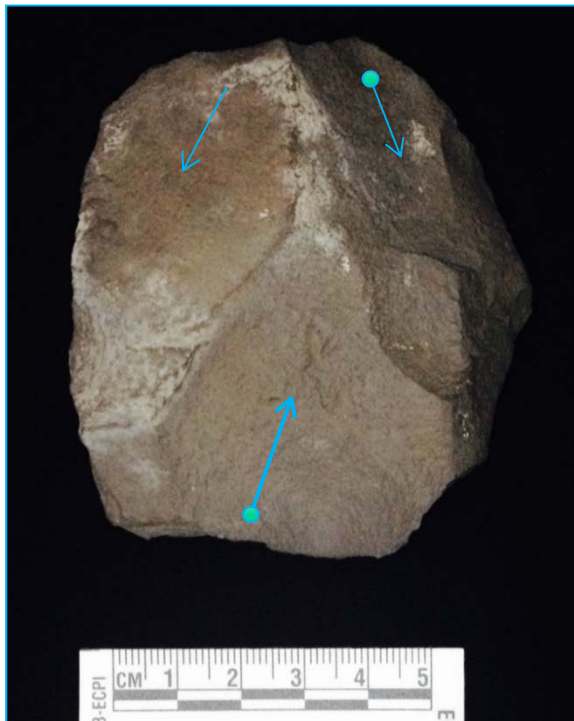


Levallois core (Nubian type I preferential)
Sahle (2013) *Doc Diss Univ. Cape Town*



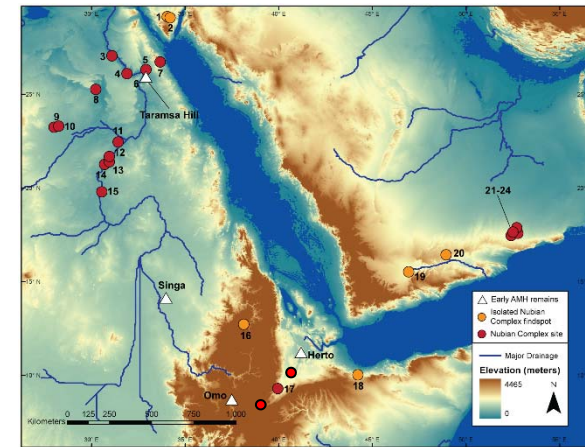
Rose et al (2011) *PLOS ONE*

The Out-of-Africa Dispersal: An archaeological perspective



Preferential Levallois core (Nubian Type I)
Halibee, Afar (60 – 100 ka)

image©Y Sahle



Rose et al (2011) PLOS ONE

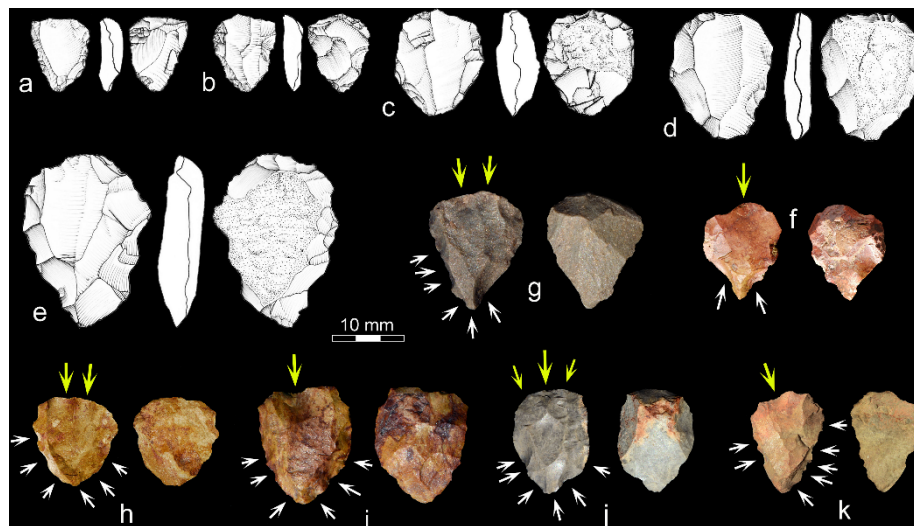
The Out-of-Africa Dispersal: An archaeological perspective

Strength: Could indicate a group, network, culture

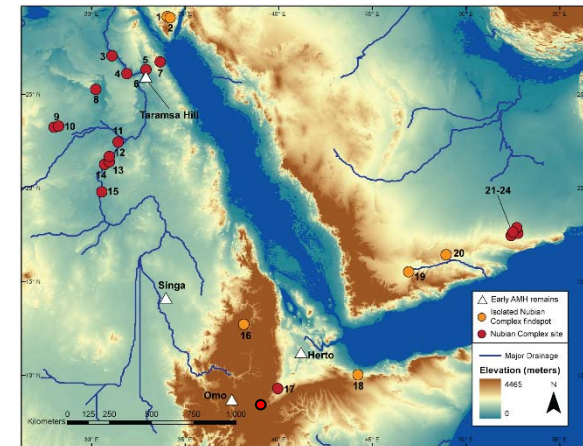
Weakness: Dating, convulsion of types, scarce knowledge

- Any Preferential Levallois core will have Nubian Type II
- Most sites with Nubian tradition not dated well
- More importantly, no Nubian from western Arabia

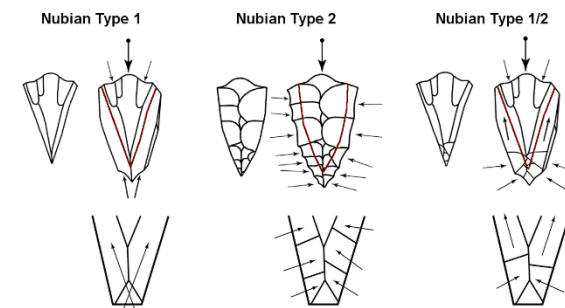
Nubian-like cores (Types II and I/II) also in South Africa



Will et al (2013) *PLoS ONE*



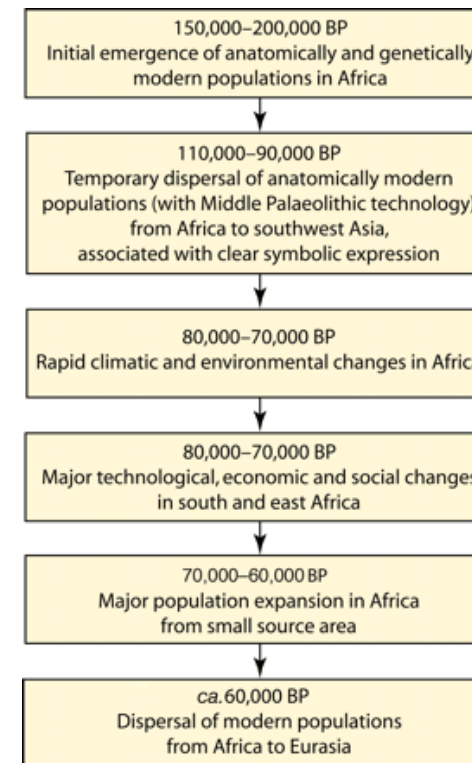
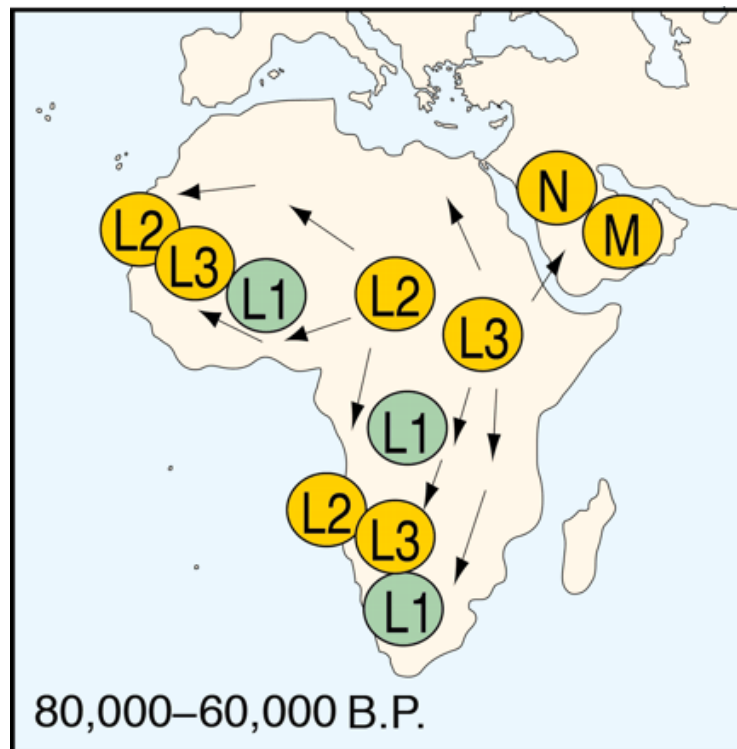
Rose et al (2011) *PLoS ONE*





The Out-of-Africa Dispersal: An archaeological perspective

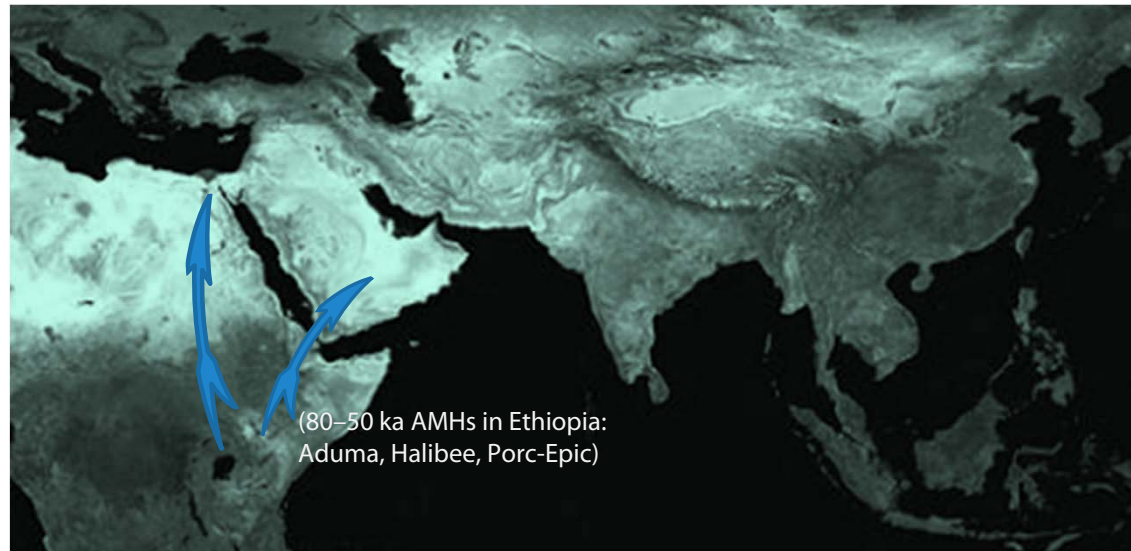
Later Dispersal (60–80 ka)



Mellars (2006) PNAS

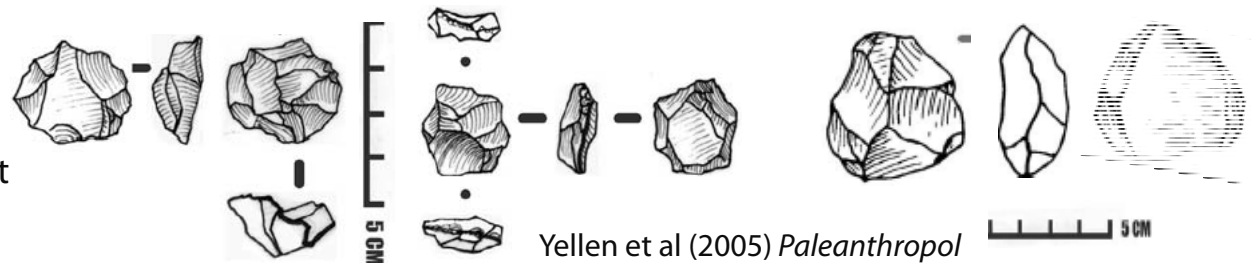


The Out-of-Africa Dispersal: An archaeological perspective



Untimately successful dispersal of AMHs

AMHs were in Ethiopia's Rift
by 80 ka (e.g.,

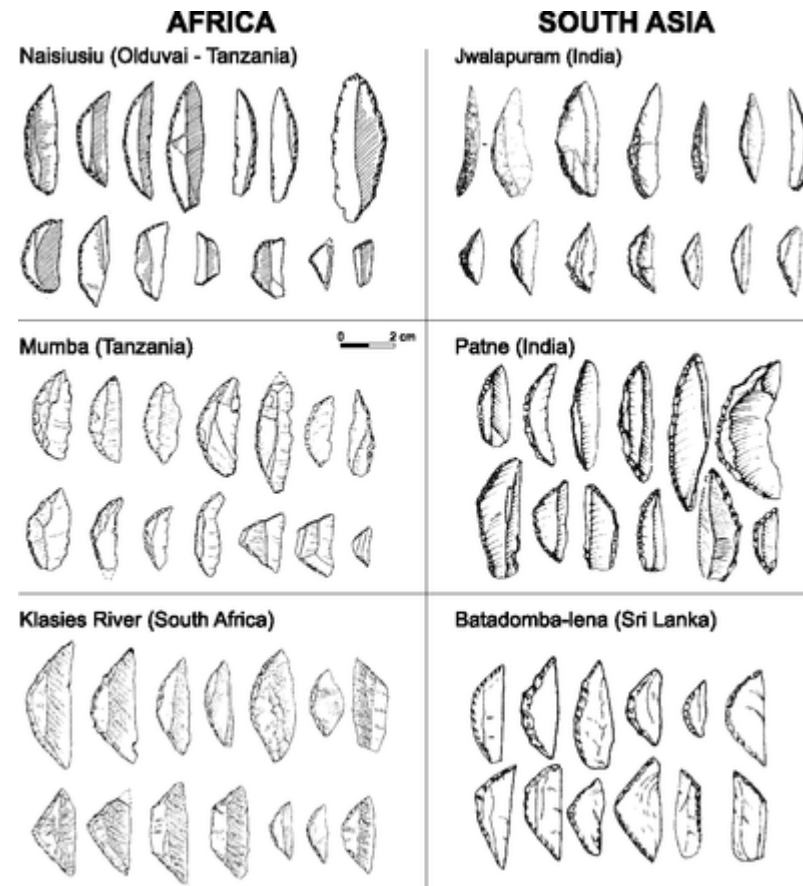


Yellen et al (2005) *Paleanthropol*



The Out-of-Africa Dispersal: An archaeological perspective

Later Dispersal (60–80 ka)



Mellars (2006) *PNAS*



The Out-of-Africa Dispersal: An archaeological perspective

Later Dispersal (60–80 ka)

What caused radical changes in the technology, economy, and social patterns of African groups 80–60 ka?

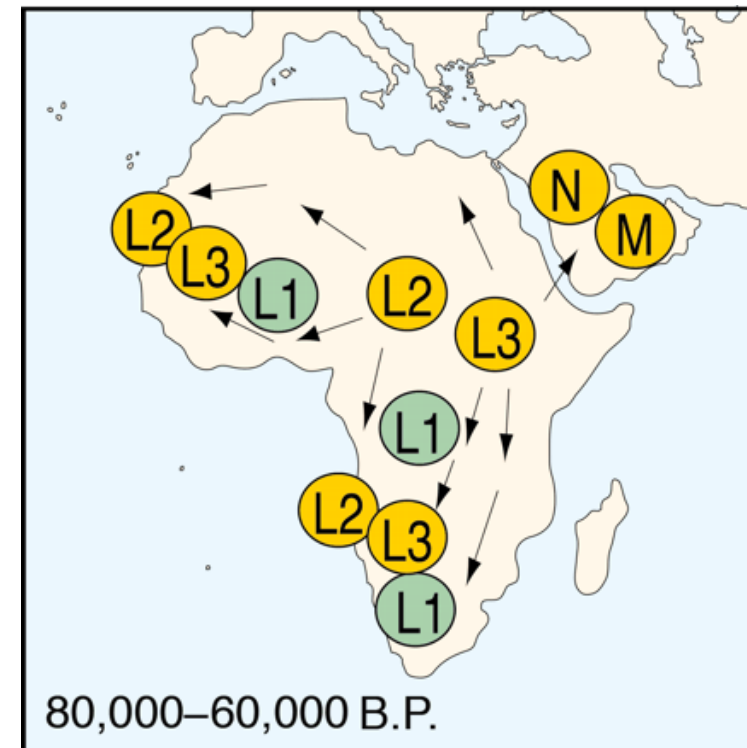
Neurological shift (similar to Klein 2000)?

Rapid climatic change (Ziegler et al 2013)?

Demographic shift (Powell et al 2009)?

Volcanic winter (Ambrose 1998)?

OR a complex set of factors (push & pull) causing adaptive, demographic,...shifts



Mellars (2006) *PNAS*



Archaeology at the dawn of modern humans

“Sapient paradox” (*after P Renfrew*)

Some of the complex behaviors now associated with humans took a long time to develop, even after the emergence in Africa of humans who were fully modern in the anatomical and genetic senses.

In other words, how do we formulate plausible archaeological tests for the emergence of new behavioral capacities, as opposed to the gradual elaboration and increasing complexity of technological and other behavioral patterns for which the necessary cognitive potentials had already long existed

This is difficult territory; archaeologists have not even reached consensus about when language first arose or when self-consciousness developed



Archaeology at the dawn of modern humans

“It is only through carefully excavating sites and establishing high-resolution regional signatures of the events and processes...that a reliable picture of the spread of modern humans... will come into focus.”

Conard & Bolus (2015) *Science* p. 756



Thank you!



Contact:

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“Words, Bones, Genes, Tools”

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