



MODERN HUMAN ORIGINS

Yonatan Sahle, Hugo Reyes-Centeno, Christian Bentz





The Out-of-Africa Dispersal: An archaeological perspective

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

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. *Evol Anthropol* 24(4): 149 – 164.

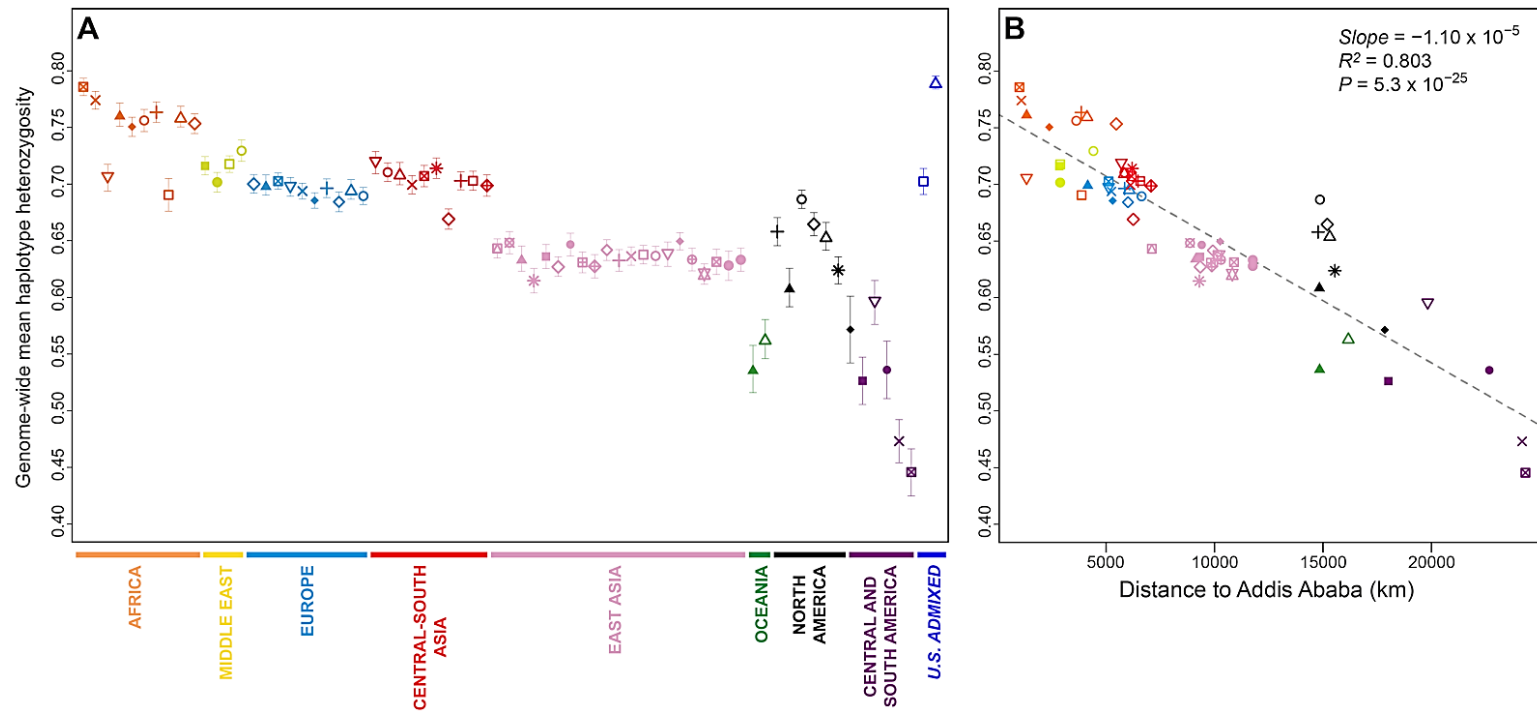
Out-of-Africa: *Current Views*



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



Out-of-Africa: Current Views

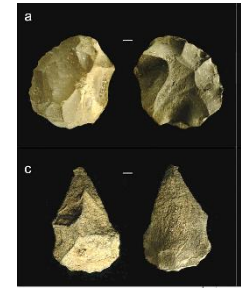


Martínez-Cruz et al. (2011). *Eur J Hum Genet*

Out-of-Africa: *Current Views*



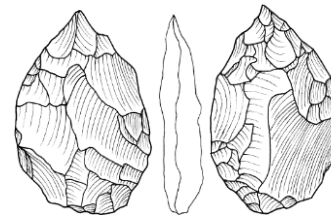
White et al (2003) *Nature*



Sahle et al. (*forthcoming*)



McDougall et al (2005) *Nature*



Shea (2018) *J Hum Evol*

Out-of-Africa: *Current Views*

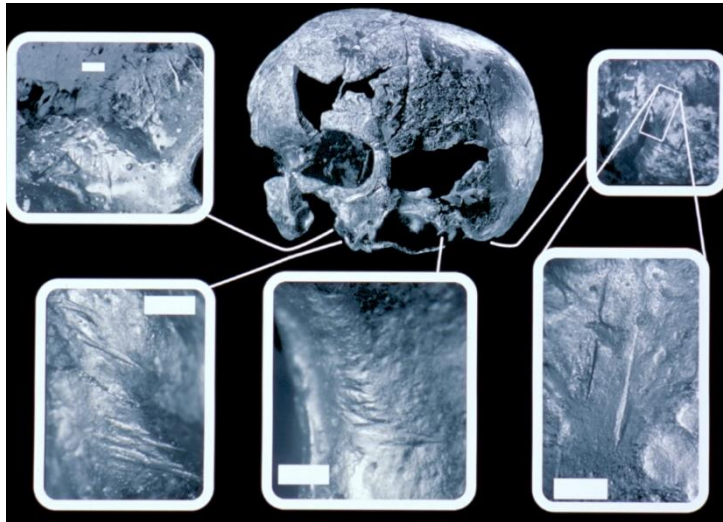


Image © Y Sahle; TD White; ARCCH

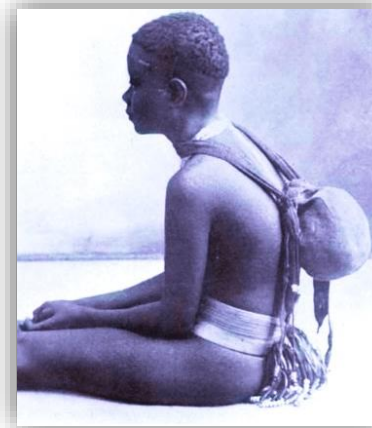
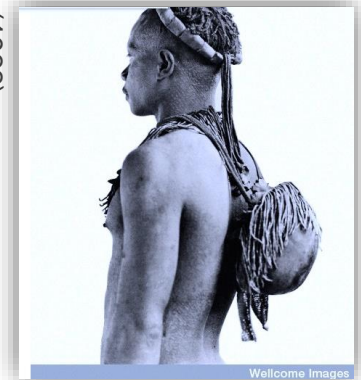
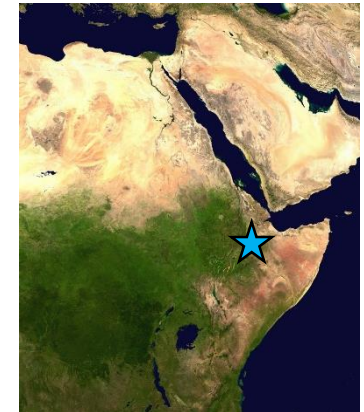
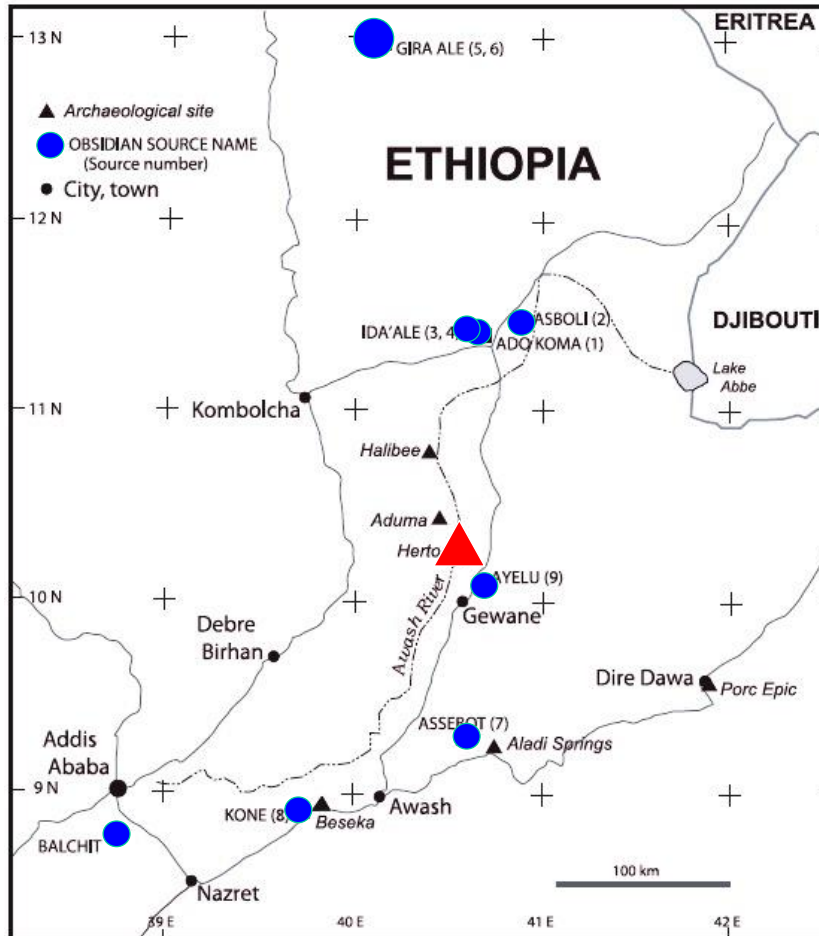


Image © Radcliffe-Brown (1922)



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

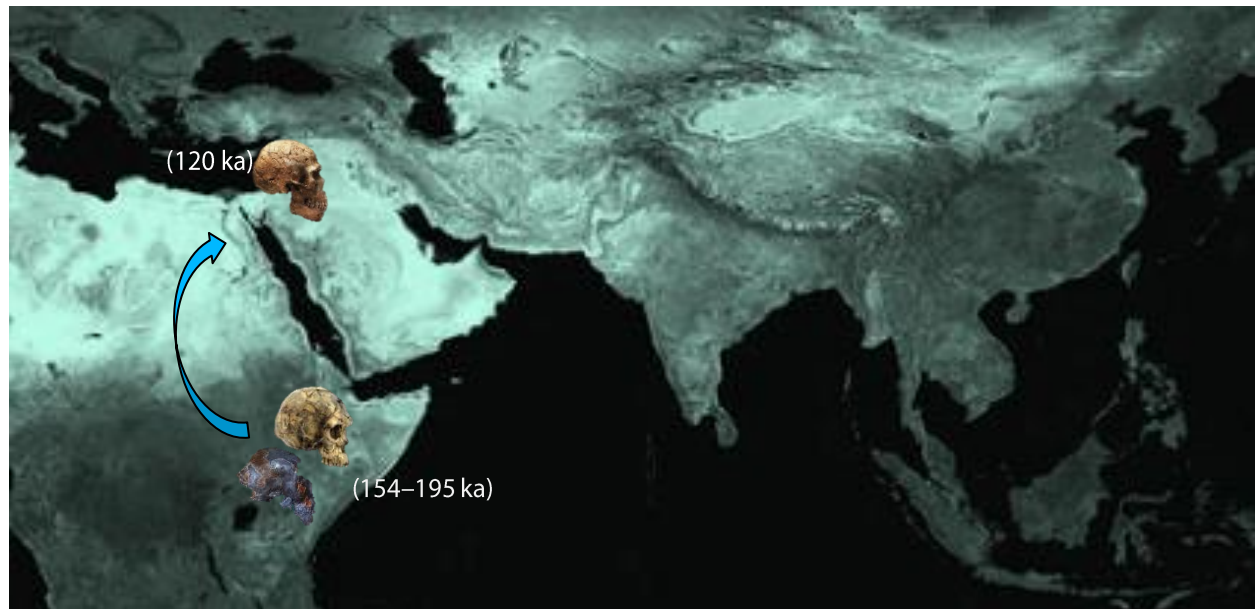
Out-of-Africa: Current Views



Negash et al. (2011) *Archaeometry*



Out-of-Africa: *Current Views*



Out-of-Africa: *Current Views*



RESEARCH

PALEOANTHROPOLOGY

The earliest modern humans outside Africa

Hershkovitz *et al.*, *Science* **359**, 456–459 (2018)

EVOLUTION

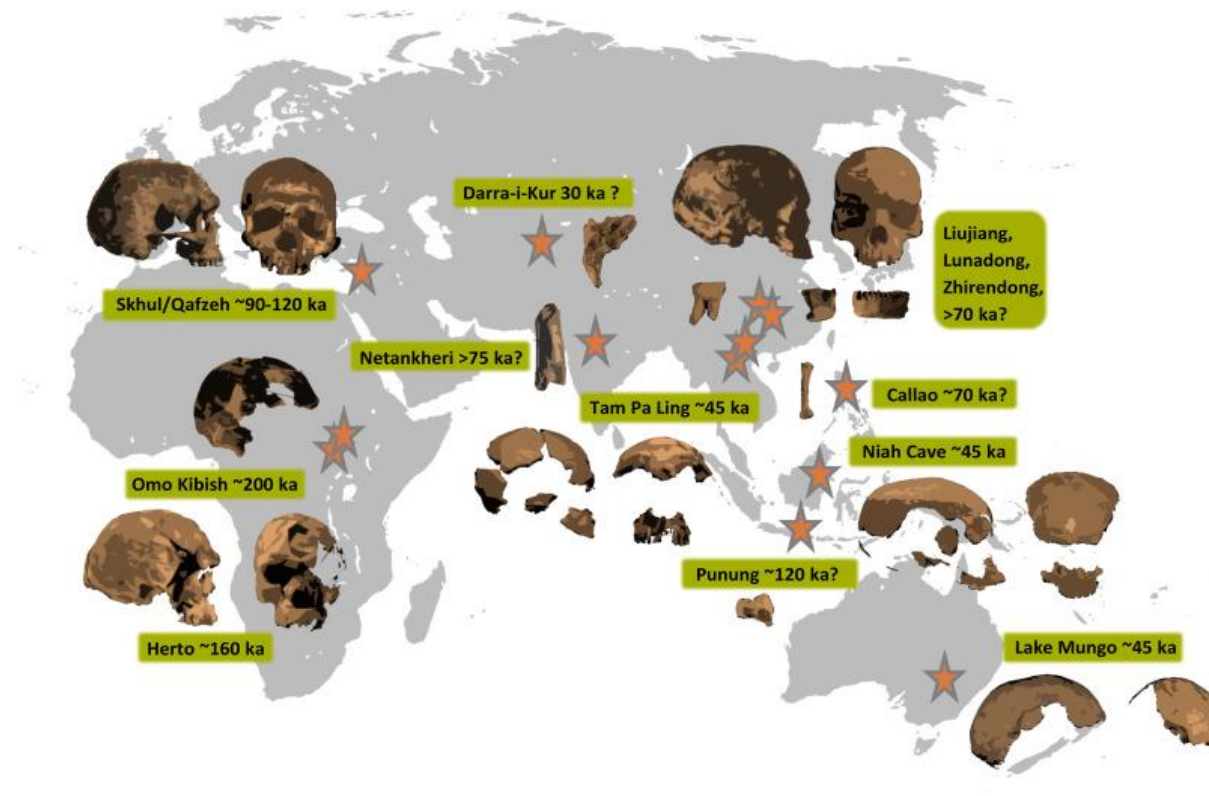
Controversial Fossil Hints *Homo sapiens* Blazed a Trail Out of Africa Earlier Than Thought

The jaw fragment suggests our species began traveling abroad 50,000 years earlier than previously thought

Wong (2018)- *Scientific American*



Out-of-Africa: *Current Views*

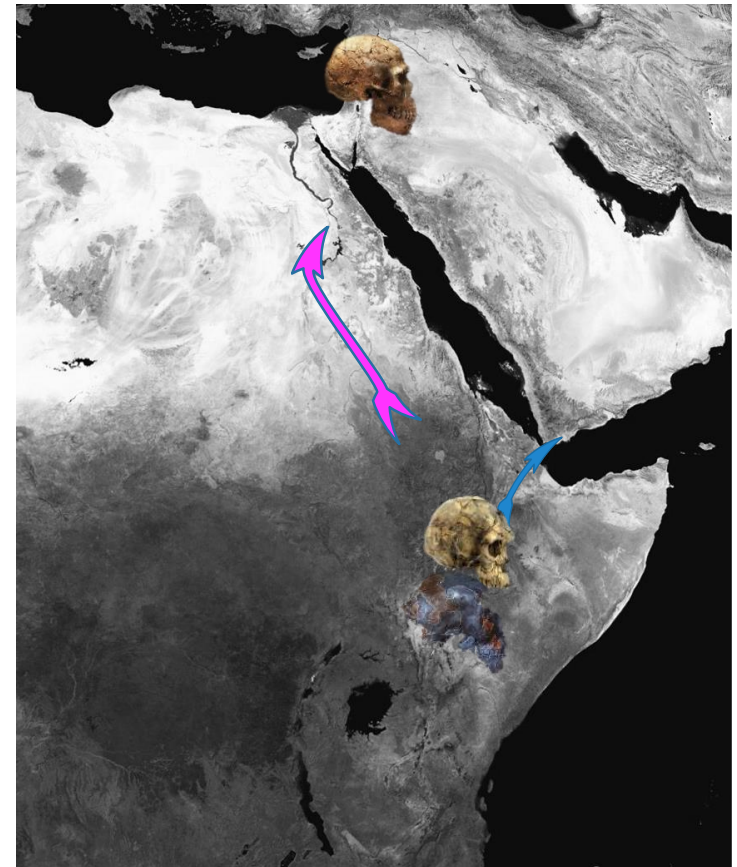


Reyes-Centeno (2014). *Quat Intl*

Out-of-Africa: *Current Views*

Dispersals out of eastern Africa:

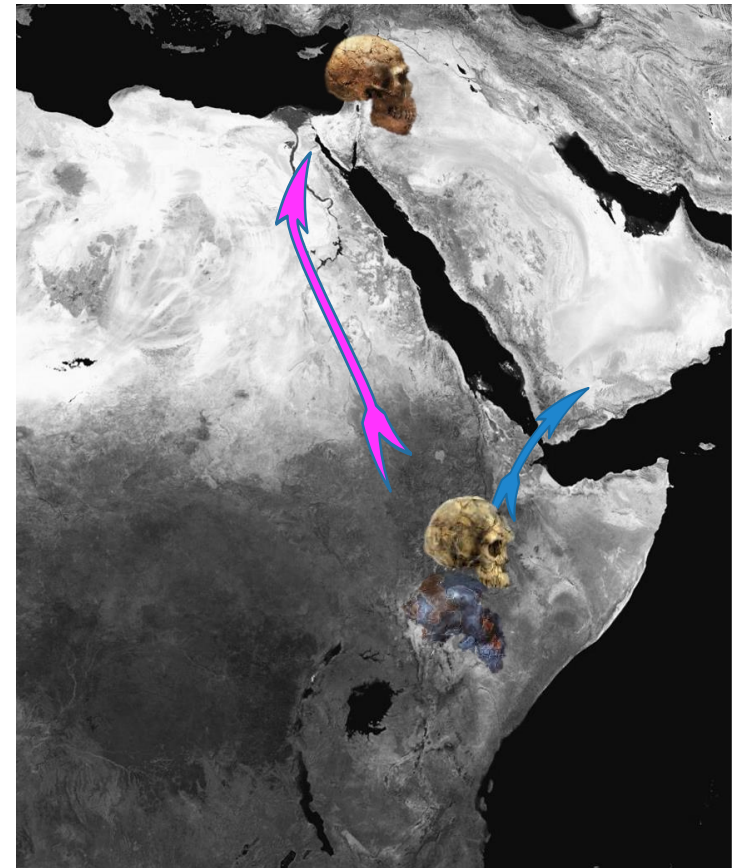
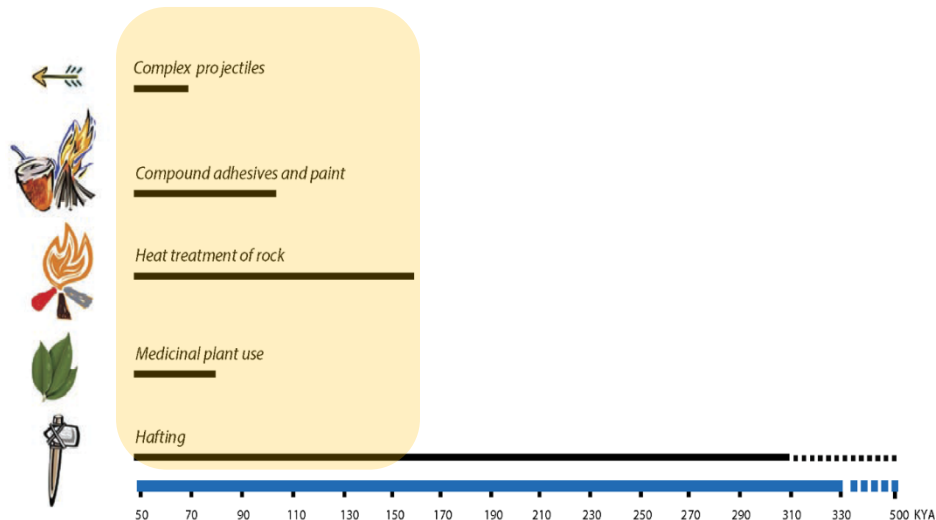
- reflected in the fossil record
- supported by genetic studies
- **Early** vs. **later**, perhaps **both**? ^{160–200 ka}
- **Northern** vs. **southern** route?





Out-of-Africa: *Current Views*

In search of *fossile directeurs*



Out-of-Africa: *Decisive technologies/behaviors*

Complex projectiles



© allposters



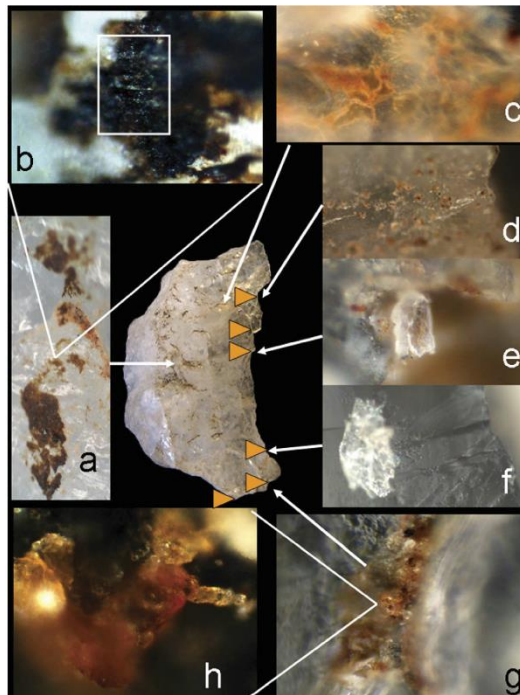
© Martin Harvey/Corbis

- enabling technology
- indication of complex cognition

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

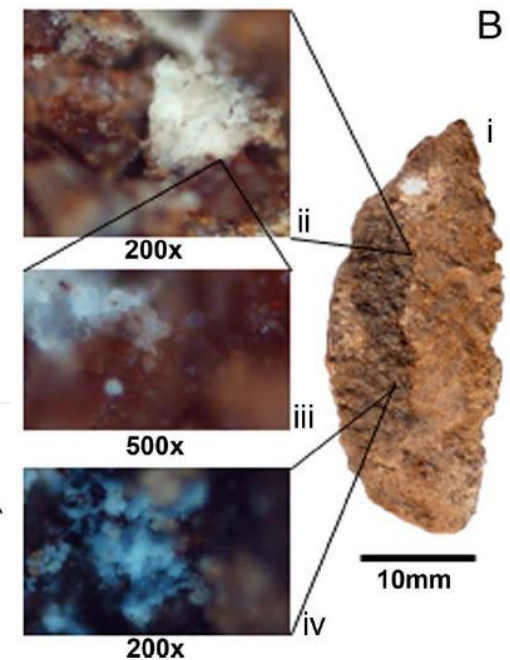
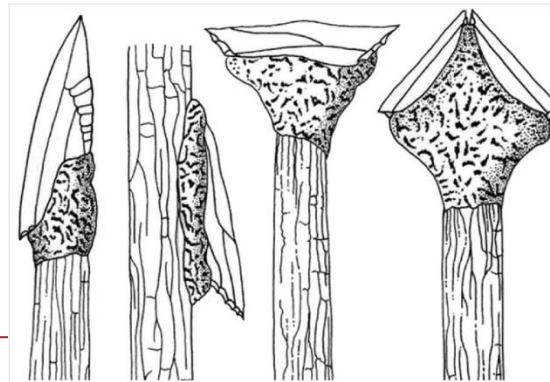
Out-of-Africa: *Decisive technologies/behaviors*

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



- adhesive
- residue

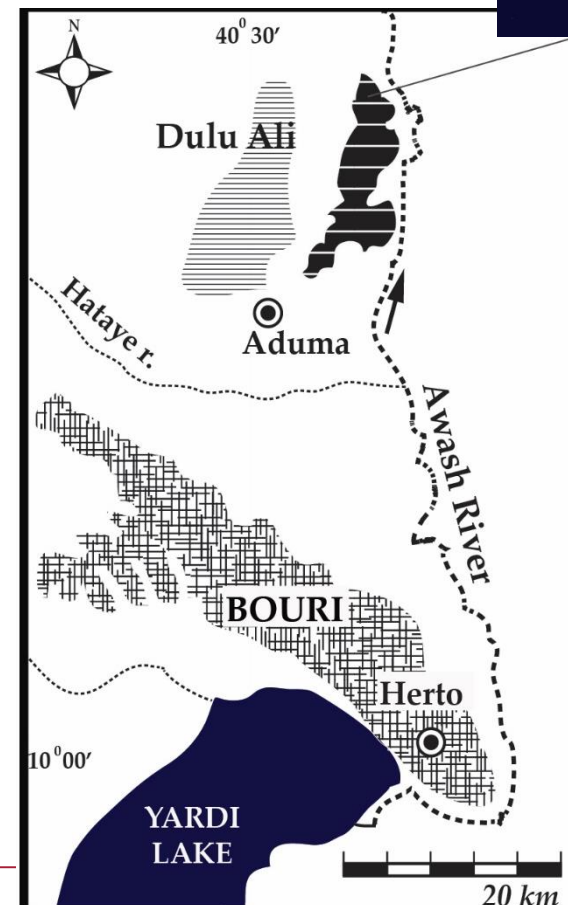
Complex Projectiles?



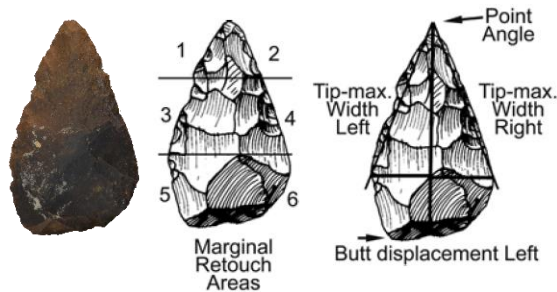
Lombard & Phillipson (2010) *Antiquity*

Out-of-Africa: *Decisive technologies/behaviors*

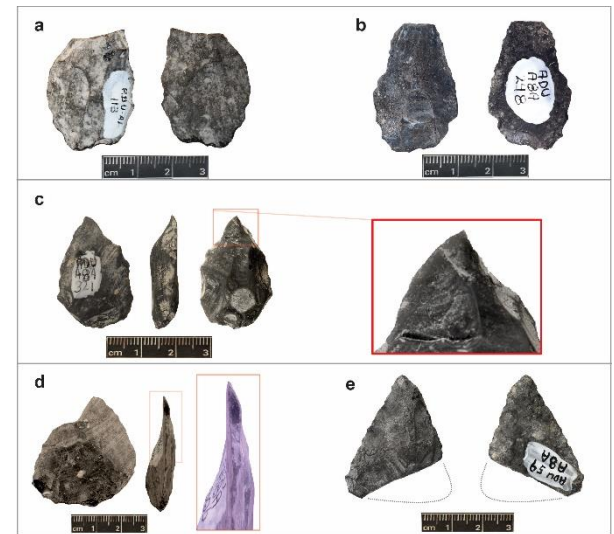
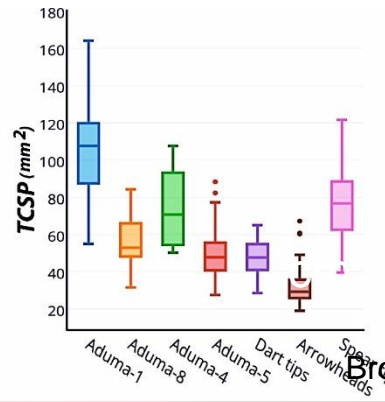
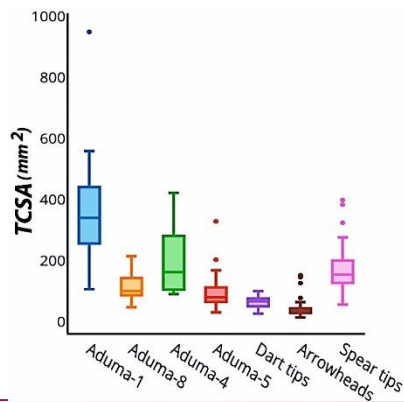
Aduma, Ethiopia (spearthrower at ~80 ka?)



Out-of-Africa: *Decisive technologies/behaviors*



- Small size
- Consistent tip angle
- Modified base



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

Out-of-Africa: *Decisive technologies/behaviors*

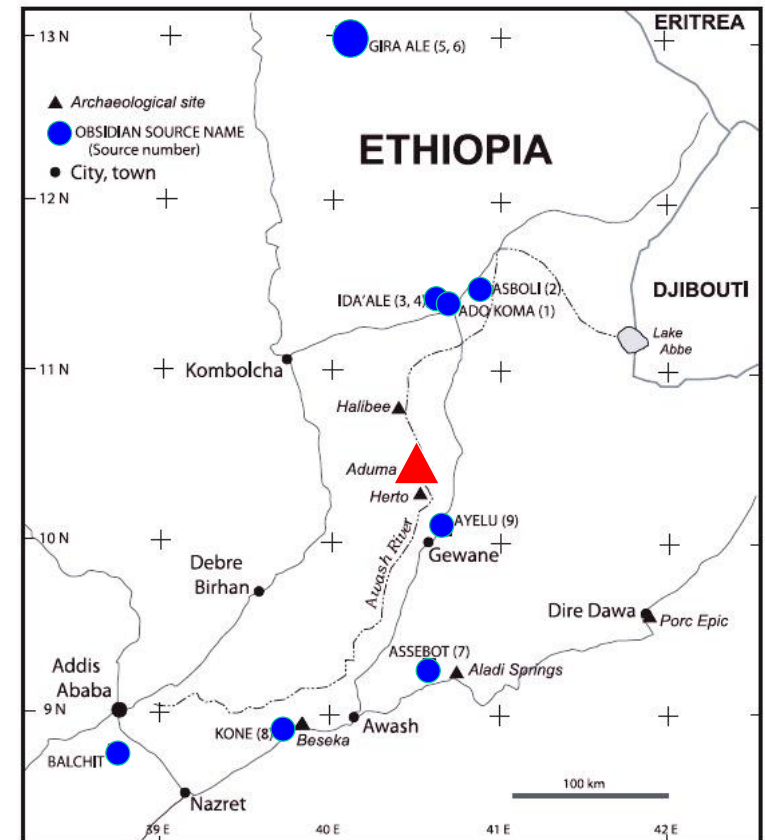
Raw material exploitation

- 15 different sources
- one 232 km away



Table 4 *Rarefaction of shared obsidians with distance between sites (number shared/distance (km))*

	<i>Porc Epic</i>	<i>Herto</i>	<i>Aduma</i>	<i>Beseka</i>	<i>Aladi</i>
Halibee	4/211	3/60	3/46	1/215	0/175
Porc Epic		1/163	2/174	1/237	2/130
Herto			2/15	0/169	0/114
Aduma				0/182	0/129
Beseka					0/108

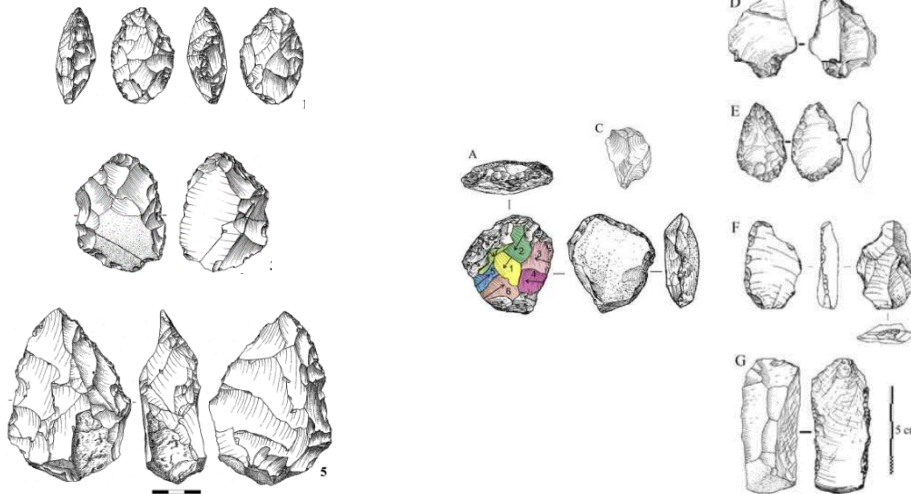


Archaeology at the dawn of modern humans

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

Jebel Faya (UAE, ~125 ka)

façonnage technique yet to be documented in W Arabia



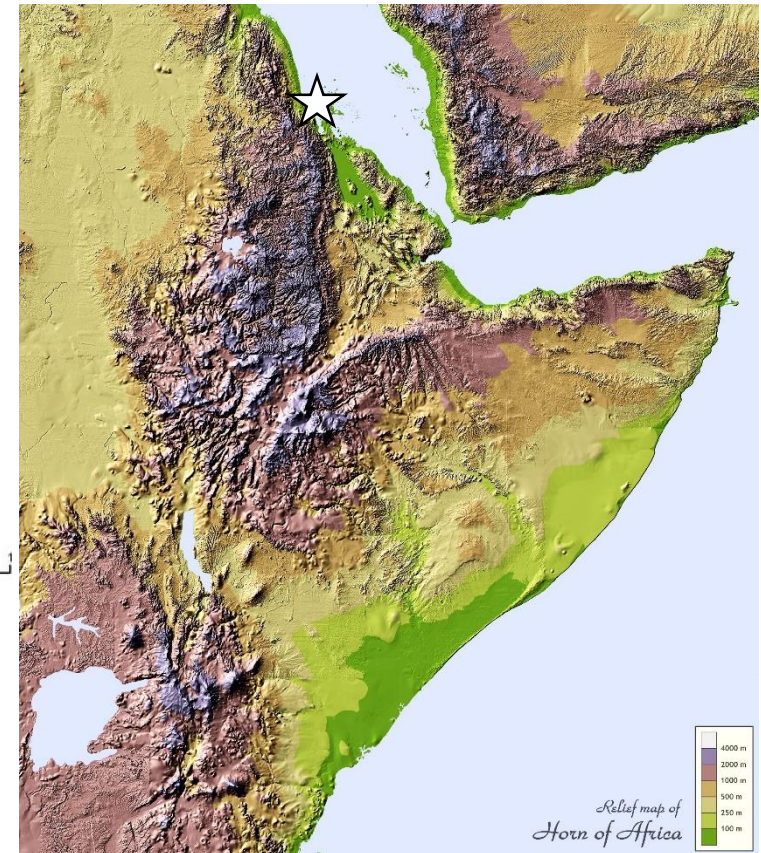
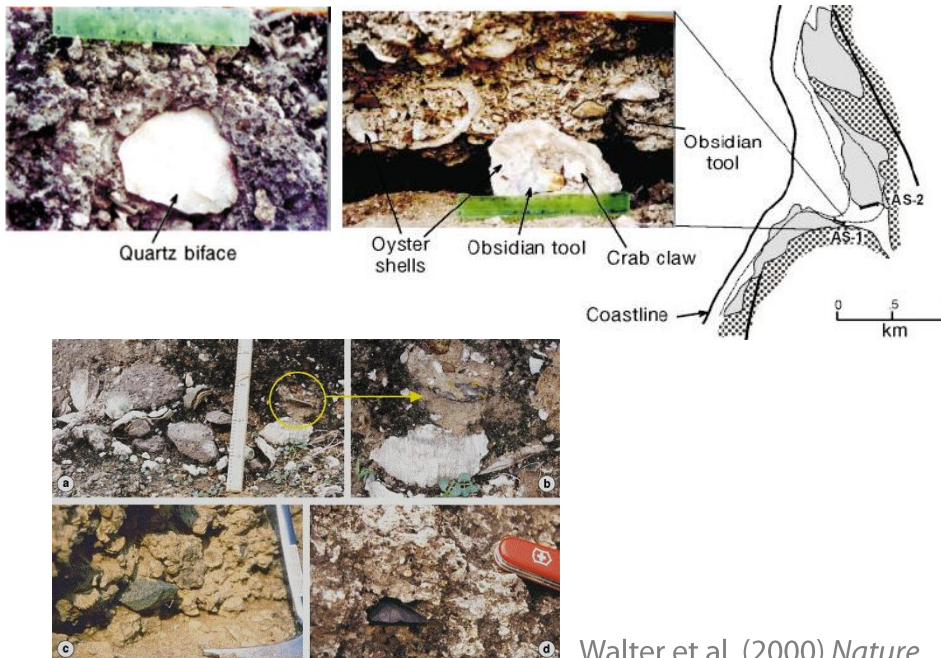
Armitage et al. (2011) *Science*

Groucutt et al. (2015) *Quat Int*

Archaeology at the dawn of modern humans

Costal occupation/marine resource use:

Abdur (Eritrea, ~125 ka)

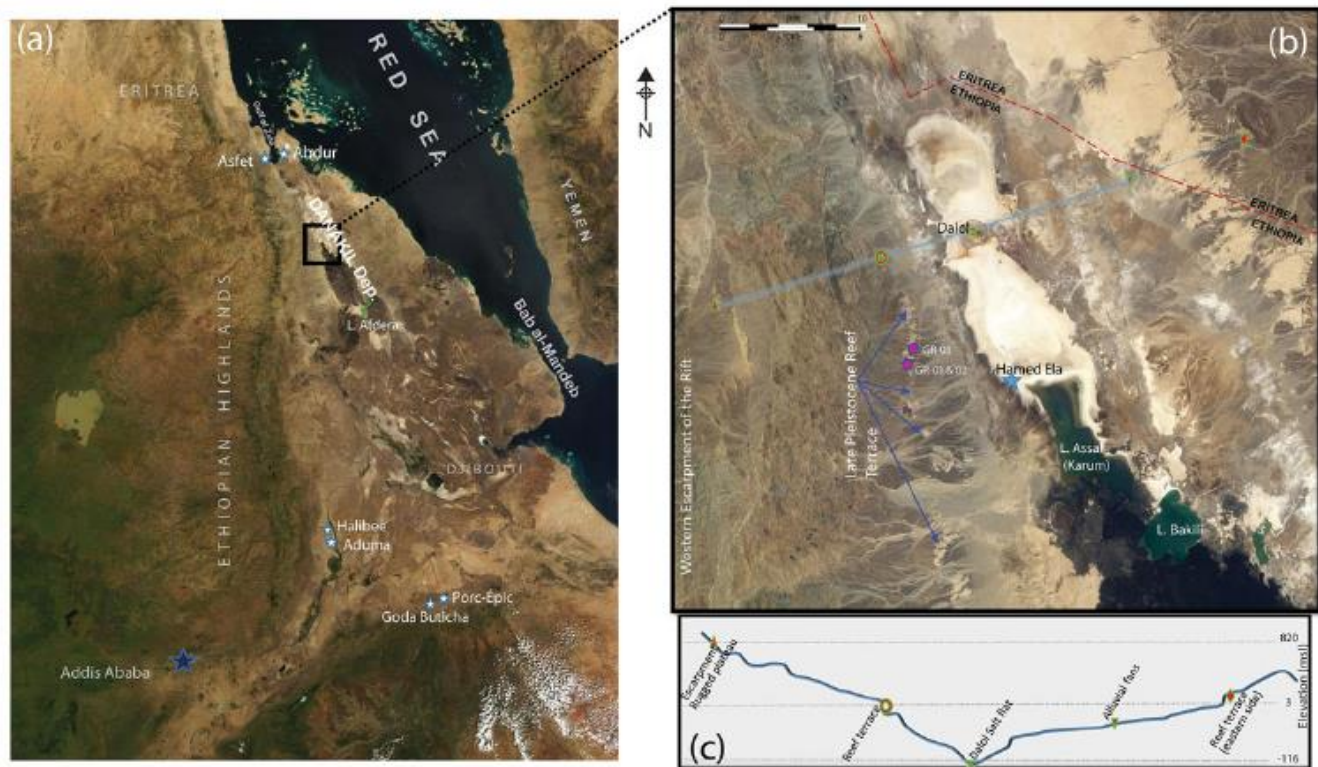


Walter et al. (2000) *Nature*.

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*

Archaeology at the dawn of modern humans

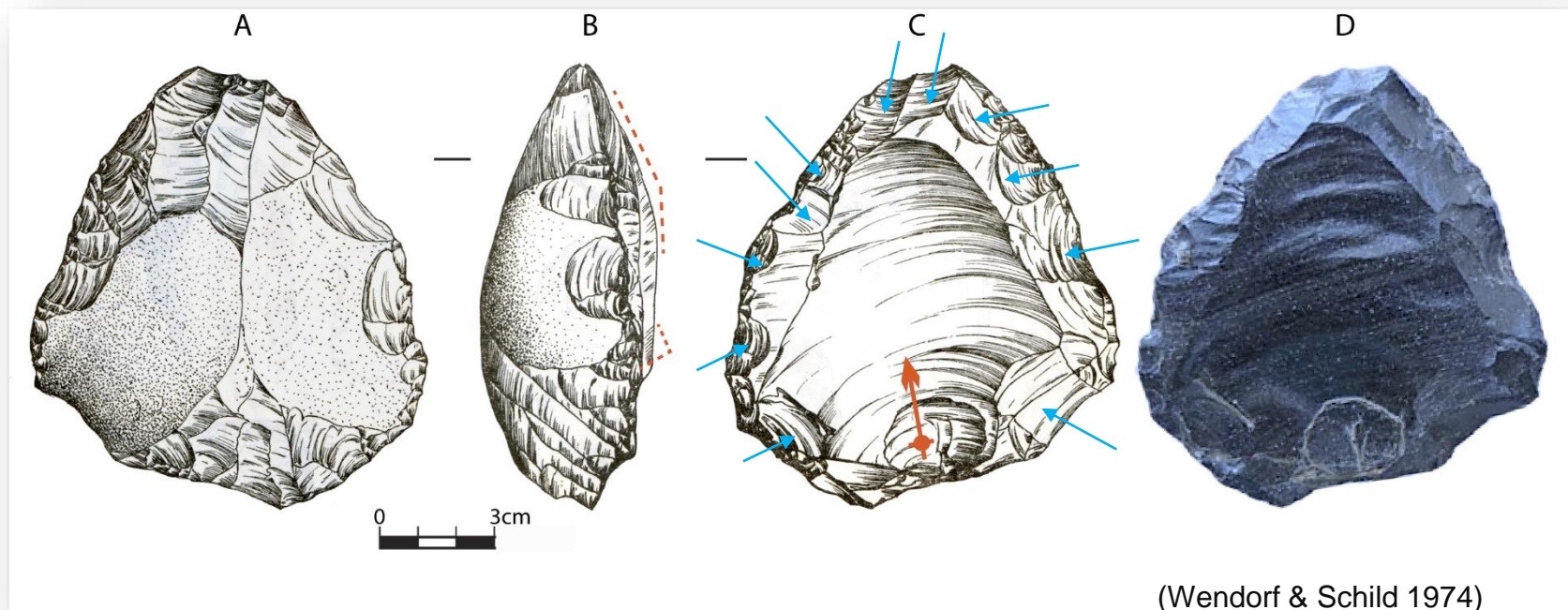
Costal occupation/marine resource exploitation along ancient Red Sea? Danakil Depression (Afar, Ethiopia)



Sahle & Beyin 2017 *Antiquity*

The Out-of-Africa Dispersal: An archaeological perspective

Using “region-specific” technology as a clue

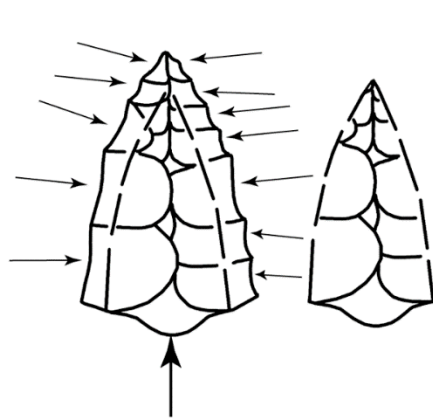


The Out-of-Africa Dispersal: An archaeological perspective

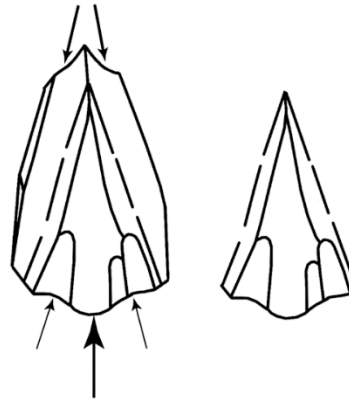
Nubian techno-complex

A Levallois (prep. Core) technology:

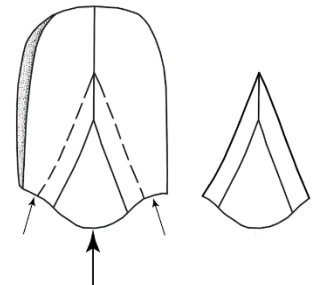
Preferential flake with convergent lateral edges



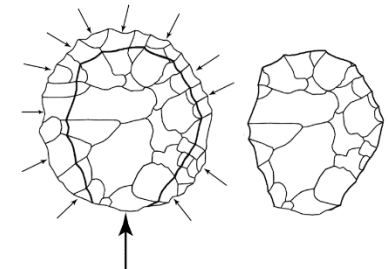
Nubian Type II



Nubian Type I

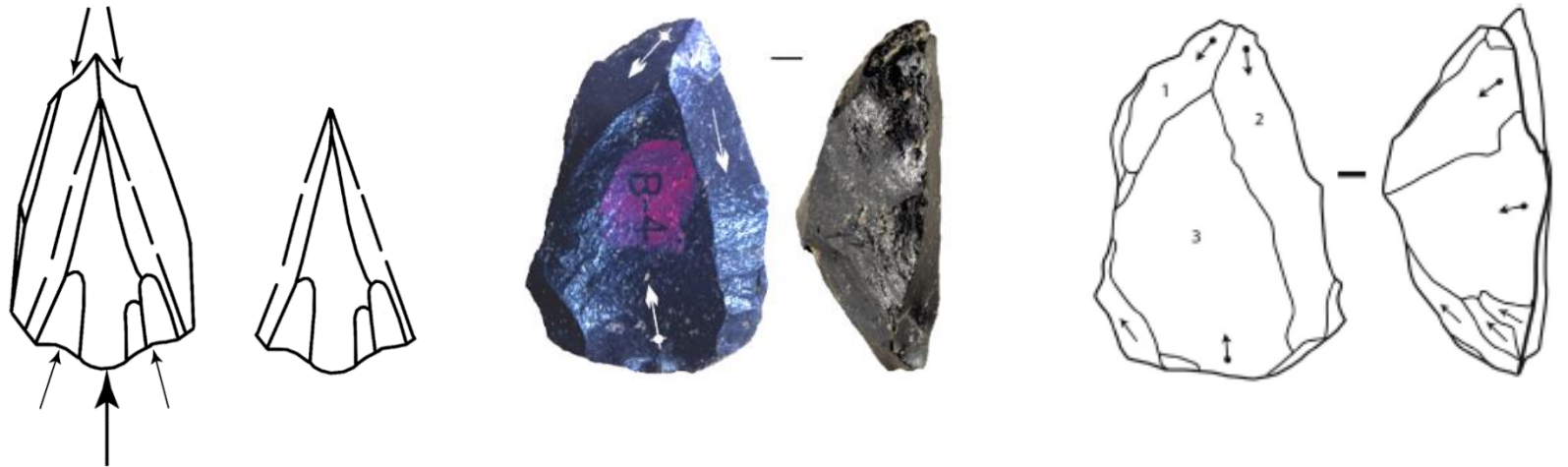


Preferential
Unidirectional convergent



Preferential
centripital

The Out-of-Africa Dispersal: An archaeological perspective

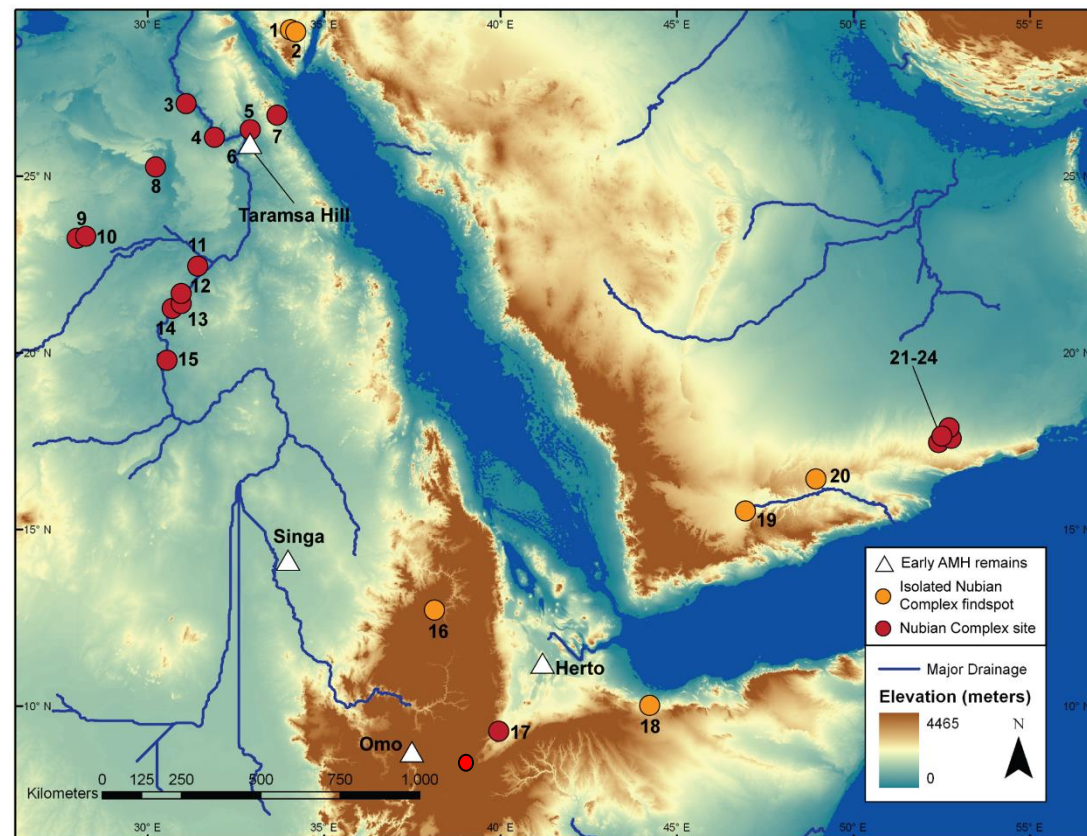


Levallois preferential (distal divergent bidirectional) core
(Nubian type I). Gademotta Fm. (Ethiopia, >105 ka)

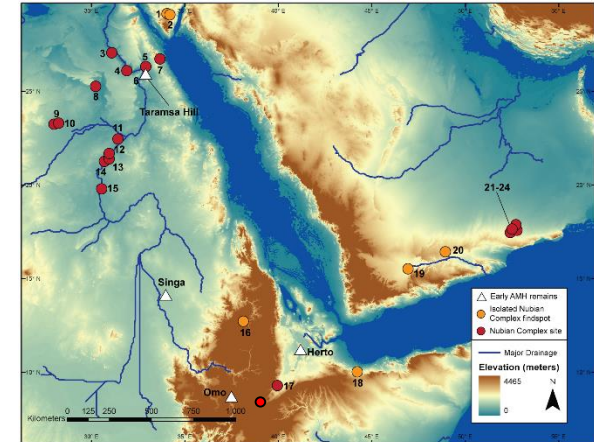
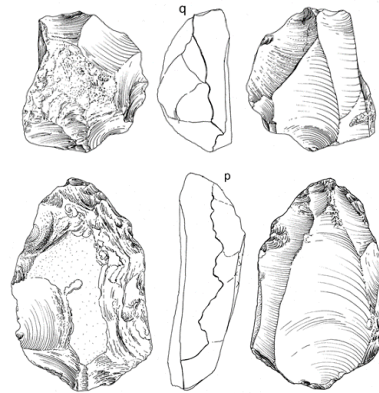
Sahle (2013) *Doc Diss*

The Out-of-Africa Dispersal: An archaeological perspective

Sites with **Nubian** Techno-complex



The Out-of-Africa Dispersal: An archaeological perspective



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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 Geiling⁶, Viktor Černý⁷, Mike W. Morley⁵, Richard G. Roberts⁸

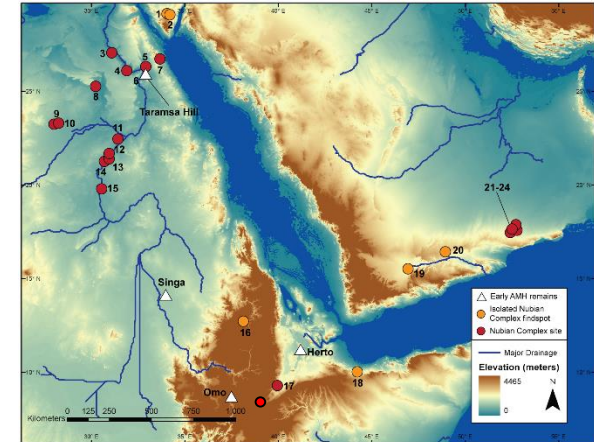
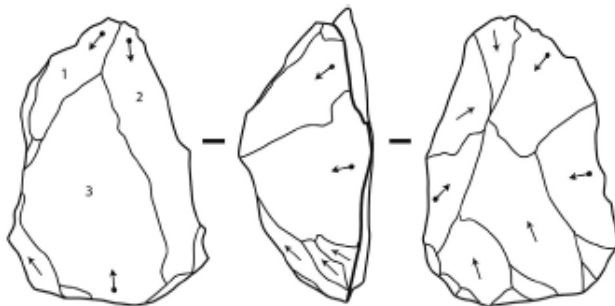
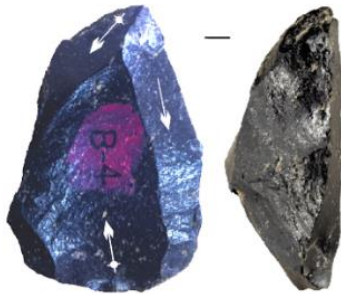
¹ Institute of Archaeology and Antiquity, University of Birmingham, Birmingham, United Kingdom, ² Archaeological Museum, Institute of Archaeology, National Academy of Sciences of Ukraine, Kiev, Ukraine, ³ Department of Anthropology, Southern Methodist University, Dallas, Texas, United States of America, 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

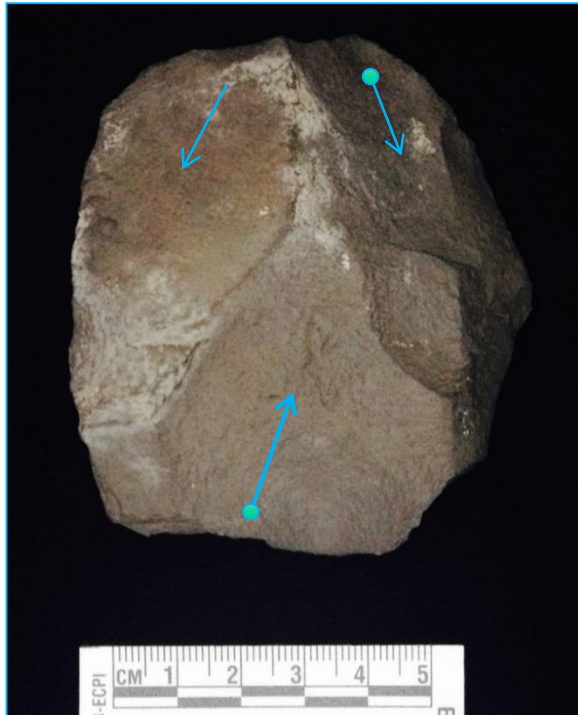
The Out-of-Africa Dispersal: An archaeological perspective



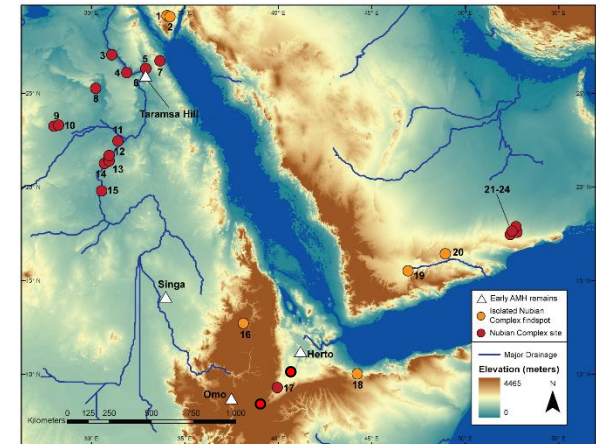
Gademotta Formation: ETH-72-6 (<105 ka)

Levallois core (Nubian type I preferential)
Sahle (2013) *Doctoral Diss*

The Out-of-Africa Dispersal: An archaeological perspective



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



©Y Sahle

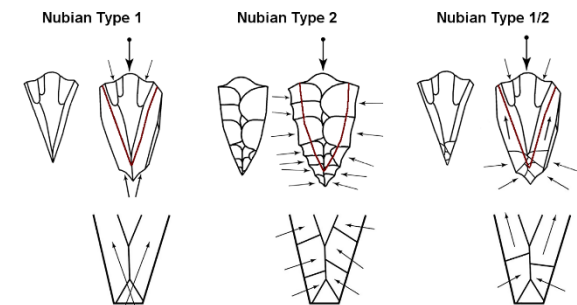
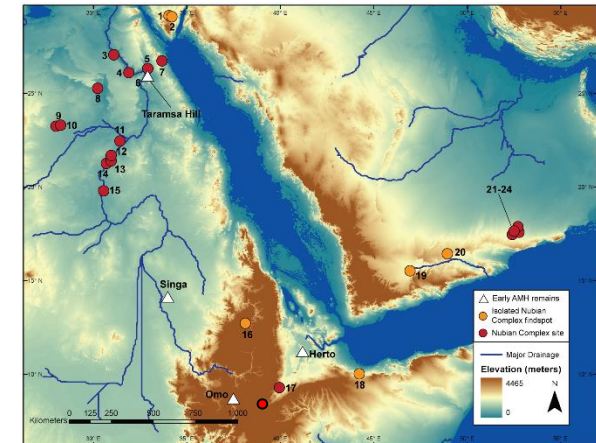
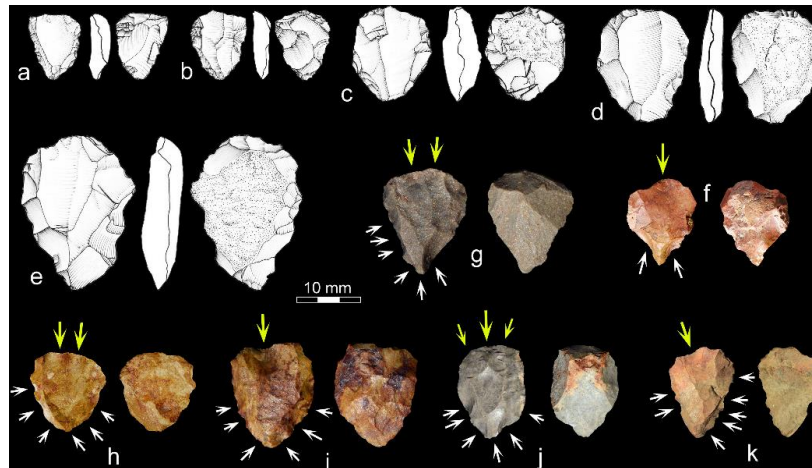
The Out-of-Africa Dispersal: An archaeological perspective

Strength: Could indicate a group, network, culture

Weakness: Dating, convulsion of types, scarce knowledge

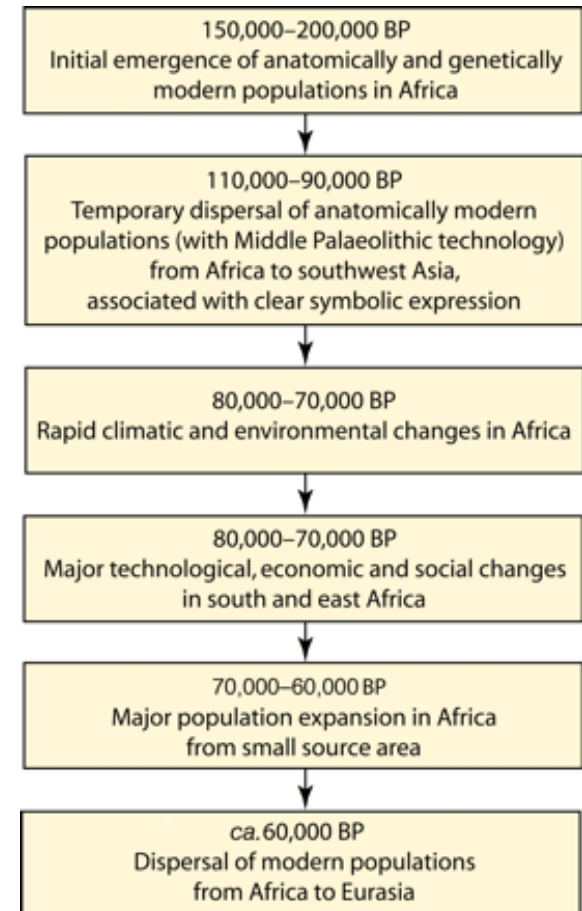
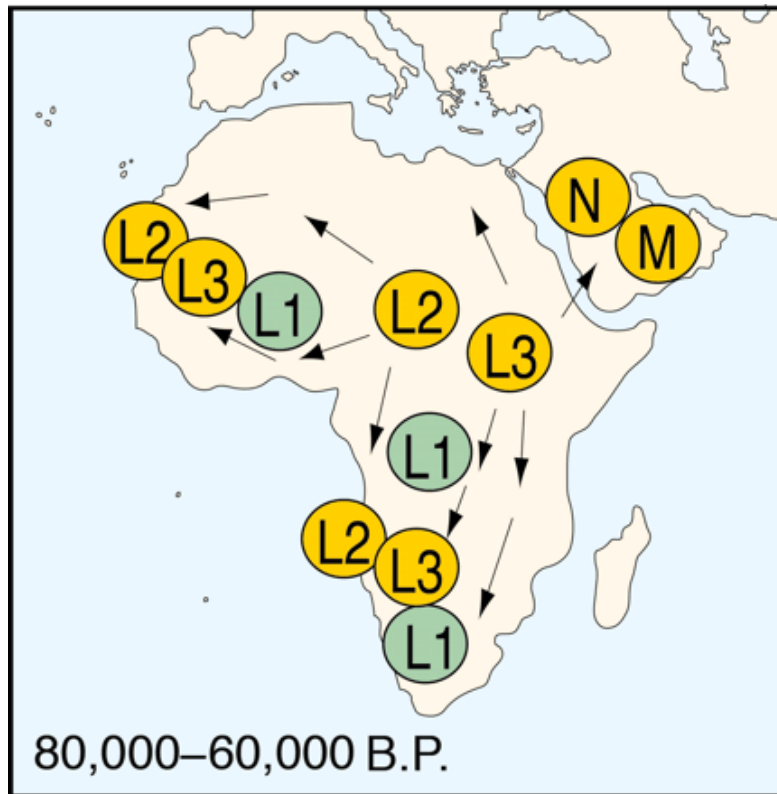
- Any Preferential Levallois core will have Nubian Type II
- Most sites with Nubian tradition not dated well
- More importantly, no Nubian from western Arabia

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

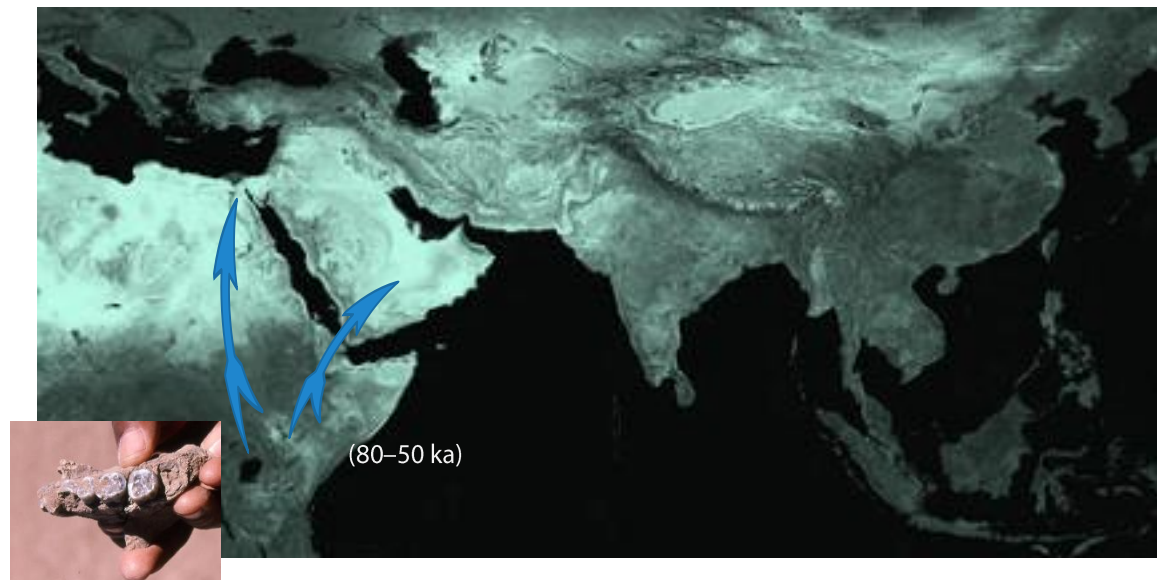


The Out-of-Africa Dispersal: An archaeological perspective

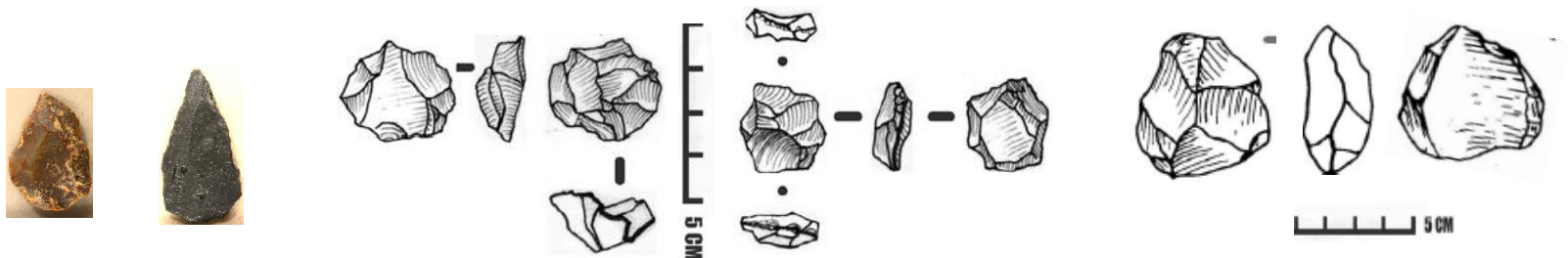
Later Dispersal (60–80 ka)



The Out-of-Africa Dispersal: An archaeological perspective

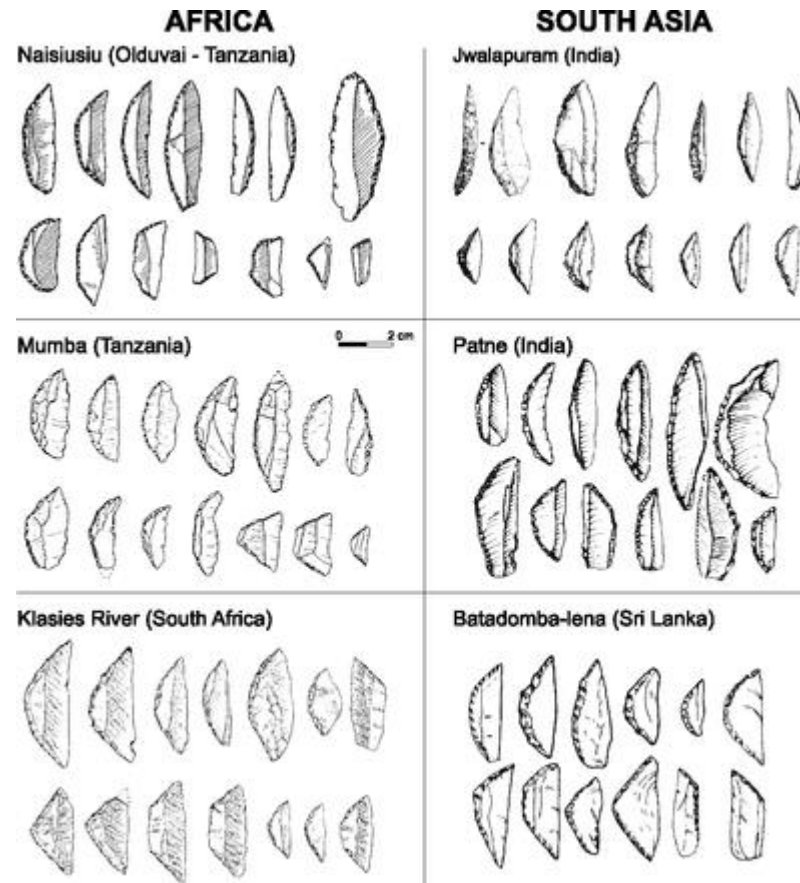


Untimately successful dispersal of AMHs



The Out-of-Africa Dispersal: An archaeological perspective

Later Dispersal (60–80 ka)



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?

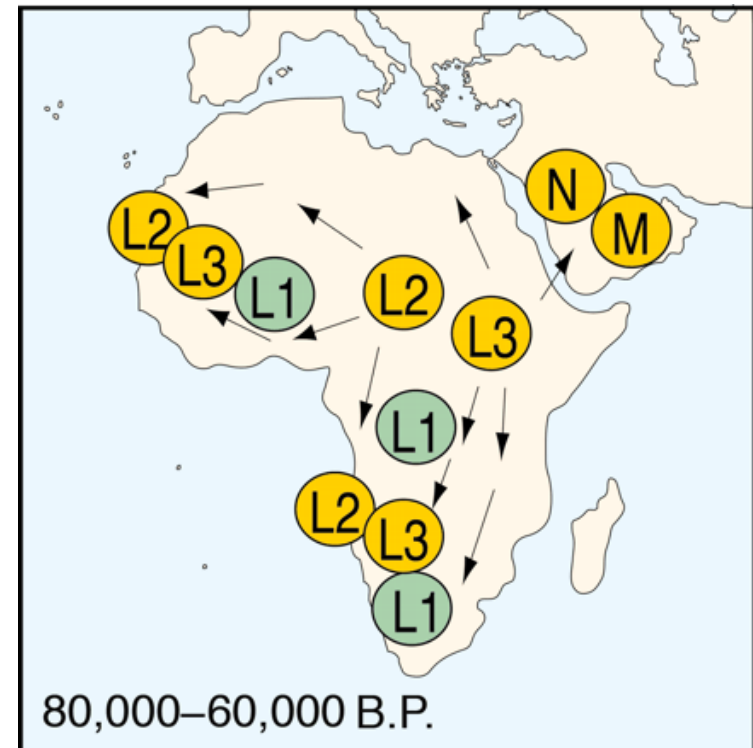
Neurological shift (similar to Klein 2000)?

Rapid climatic change (Ziegler et al 2013)?

Demographic shift (Powell et al 2009)?

Volcanic winter (Ambrose 1998)?

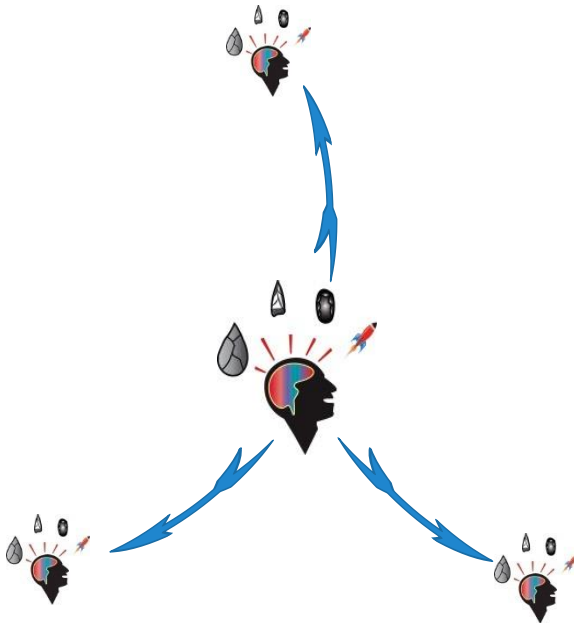
OR a complex set of factors (push & pull) causing adaptive, demographic,...shifts



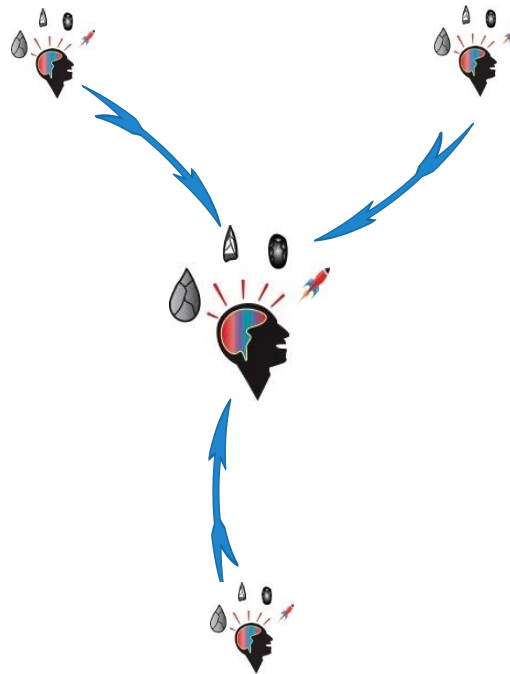


Archaeology at the dawn of modern humans

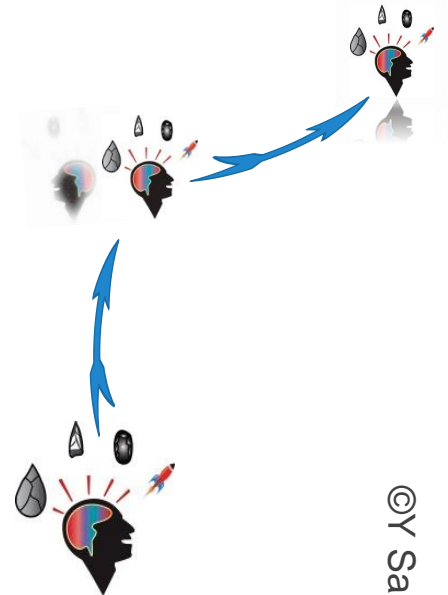
Diffusion



Convergence



Idiosyncrasy





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

The Out-of-Africa Dispersal: An archaeological perspective

For all we know...

