



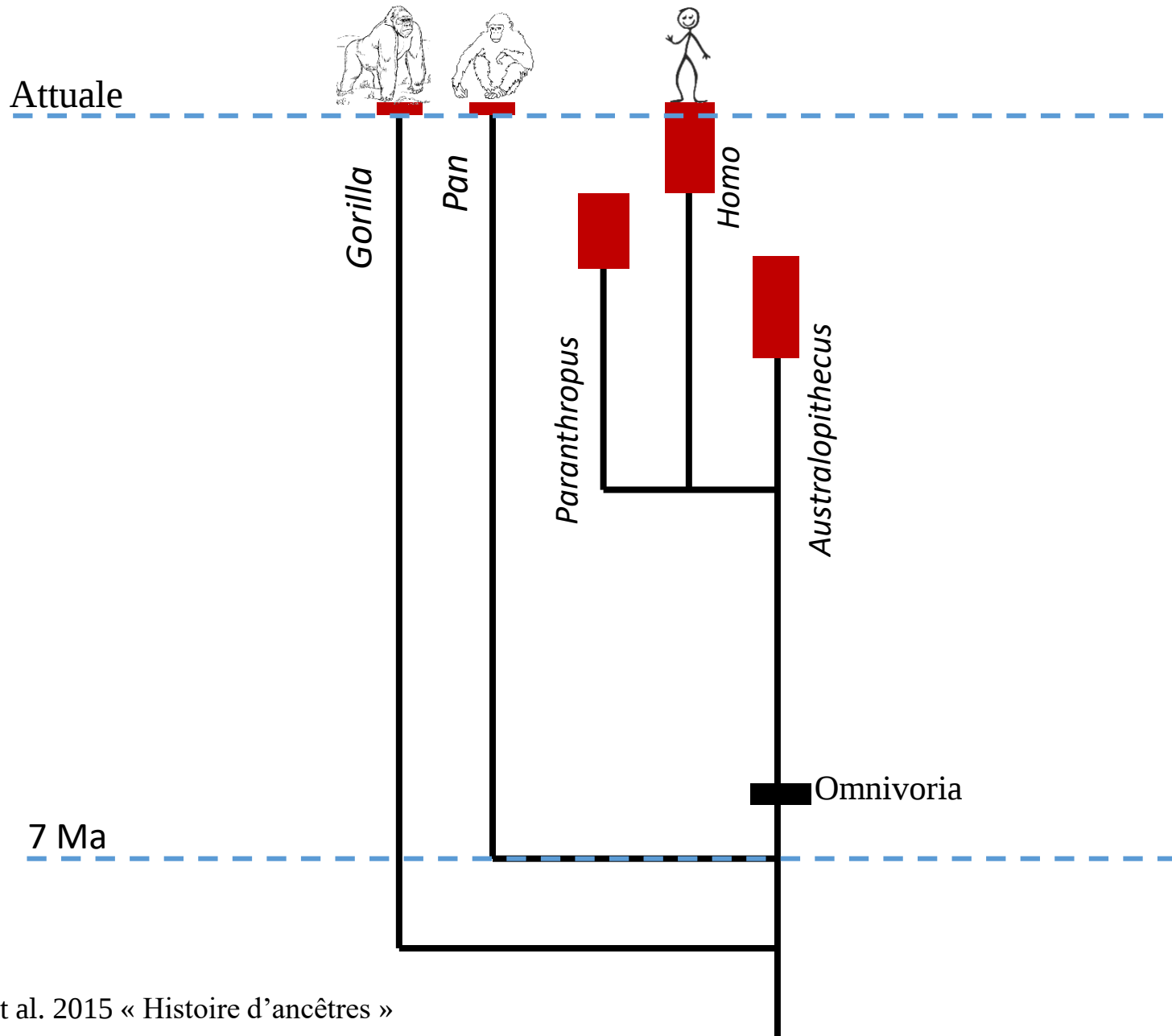
Laurea in Lettere, arti e archeologia

Corso di Antropologia

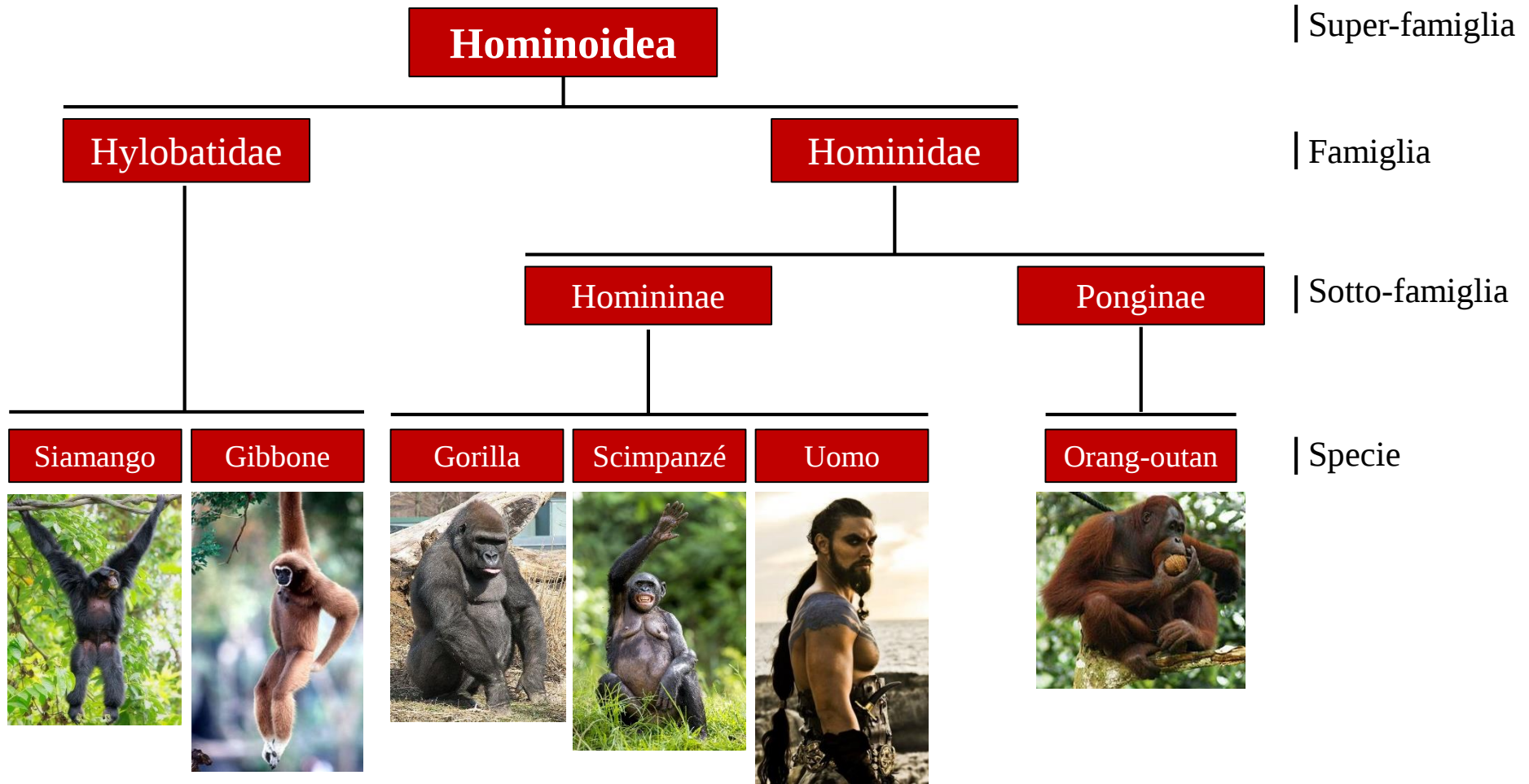
Evoluzione Umana

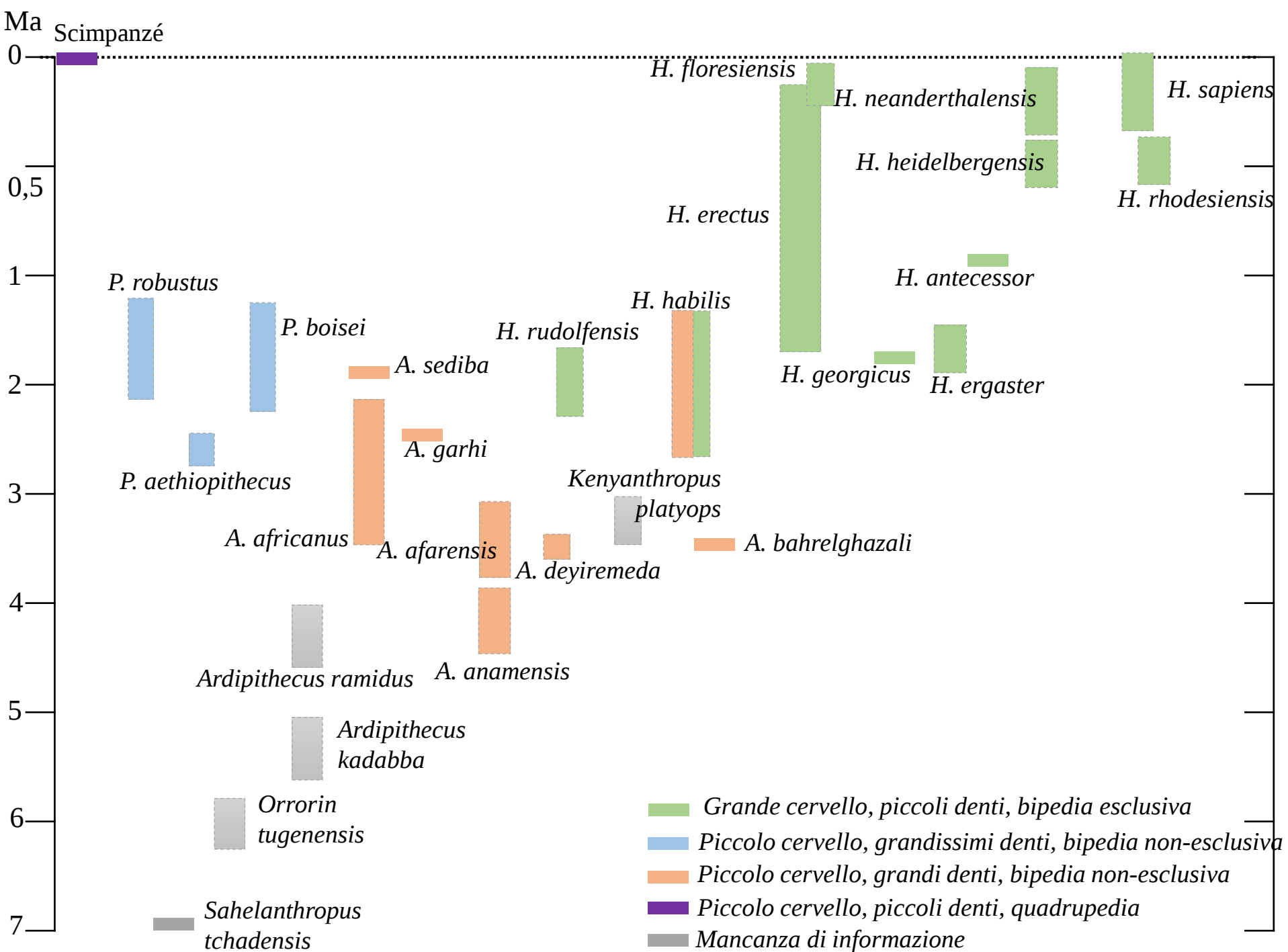
Julie Arnaud
julie.arnaud@unife.it

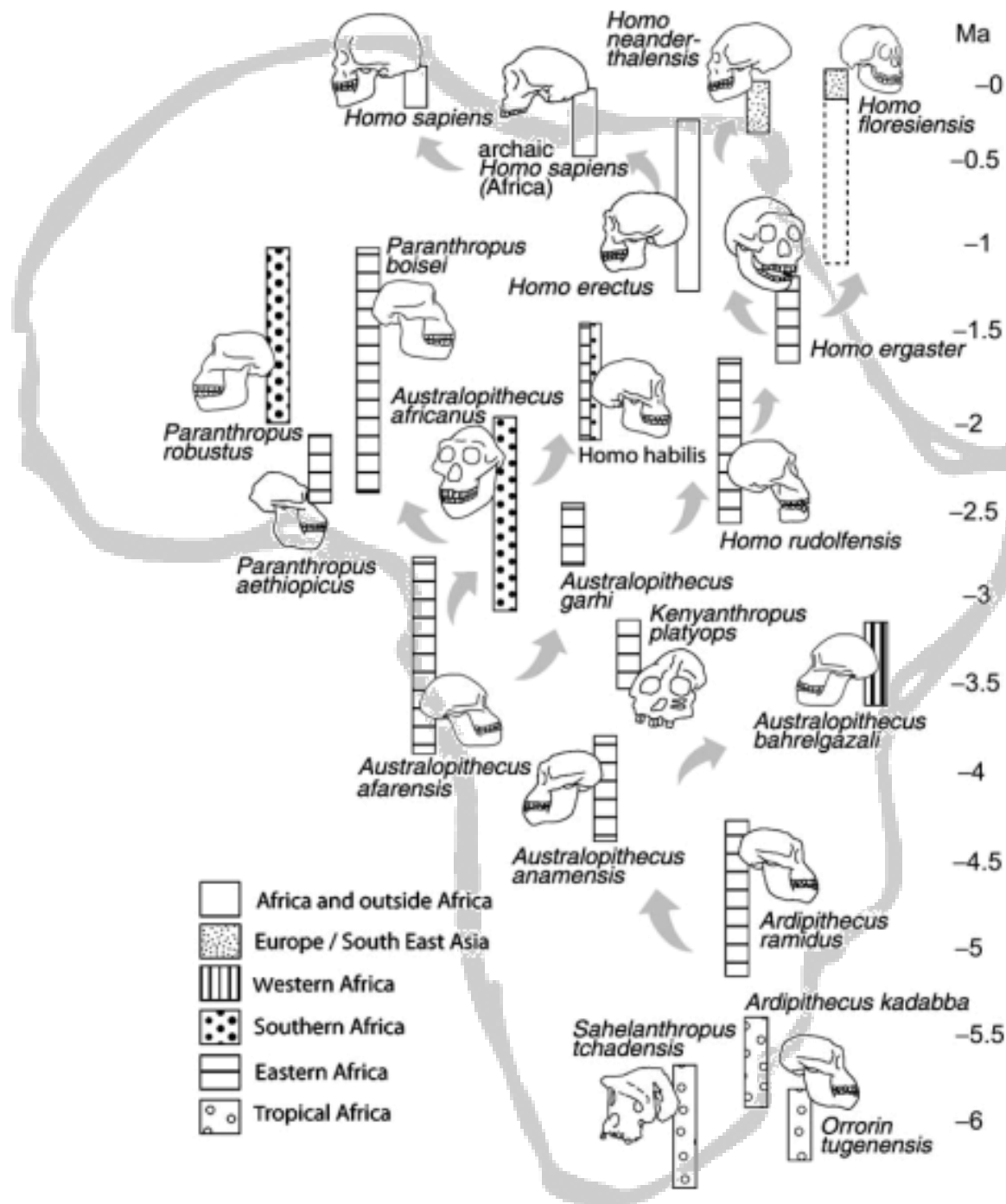
Anthropoidea

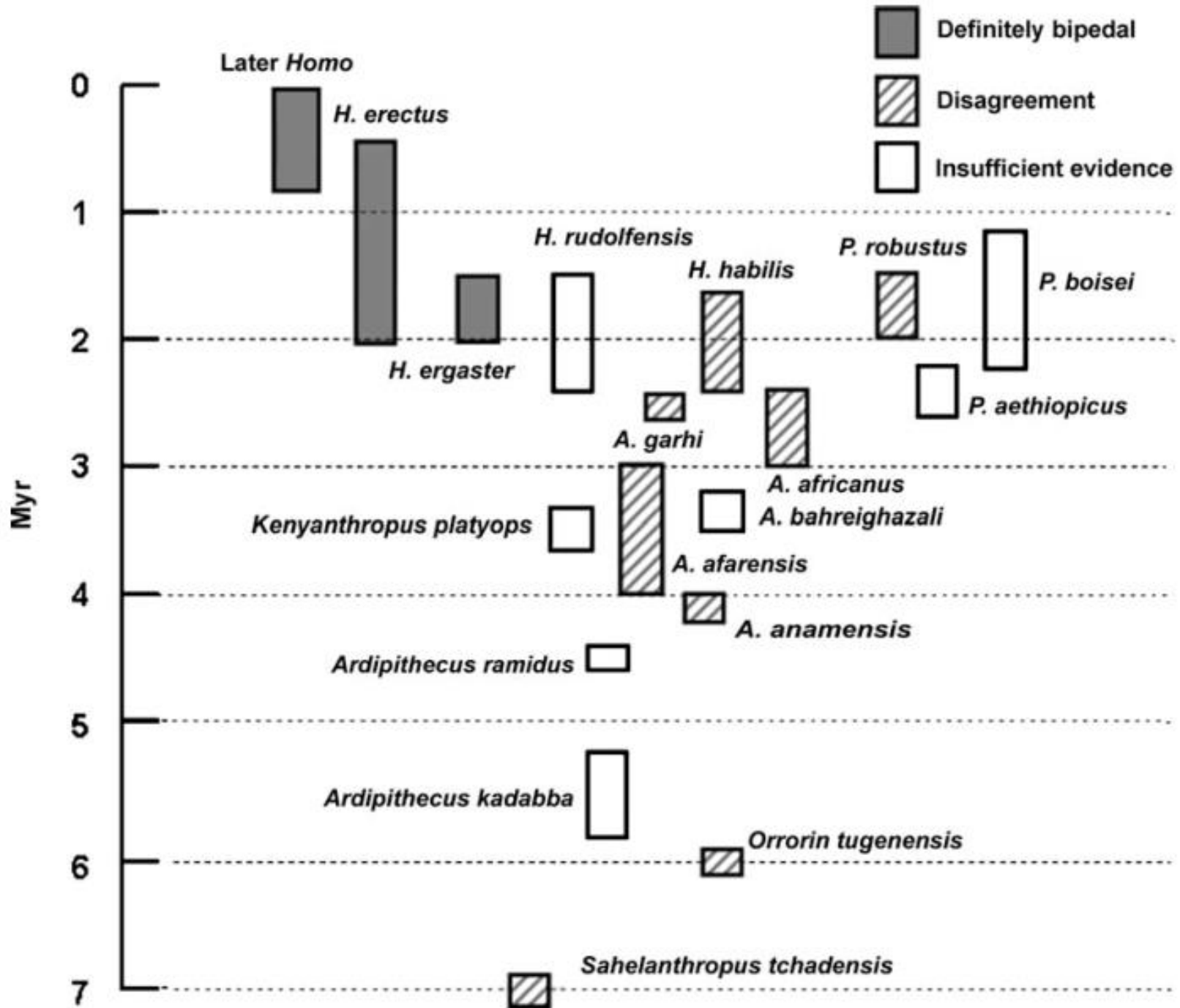


STREPSIRRHINI		HAPLORRHINI				Sotto-ordine
LEMURIFORME		TARSIFORME	SIMIIFORME (O ANTHROPOIDE)			Infra-ordine
			Platyrrhini	Catarrhini		
<i>Lemuroidea</i>	<i>Lorisoidea</i>	<i>Tarsioides</i>	<i>Ceboides</i>	<i>Cercopithecoidea</i>	<i>Hominoidea</i>	Super-famiglia
<i>Daubentidae</i> <i>Indriidae</i> <i>Lepilemuridae</i> <i>Cheirogaleidae</i> <i>Lemuridae</i>	<i>Galagidae</i> <i>Lorisidae</i>	<i>Tarsiidae</i>	<i>Cebidae</i> <i>Atelidae</i>	<i>Cercopithecidae</i>	<i>Hylobatidae</i> <i>Pongidae</i> <i>Hominidae</i>	Famiglia
36 o 40 denti (3 o 4 premolari) Con o senza coda prensile			36 denti (3 premolari) Coda prensile	32 denti (2 premolari) Coda non prensile	32 denti (2 premolari) Senza coda	Anatomia
		 Loris	 Tarsi tarsi (marmose)		 scimmie	Geografia
PROSCIMMIE			SIMIIFORME (O ANTHROPOIDE)			Sotto-ordine

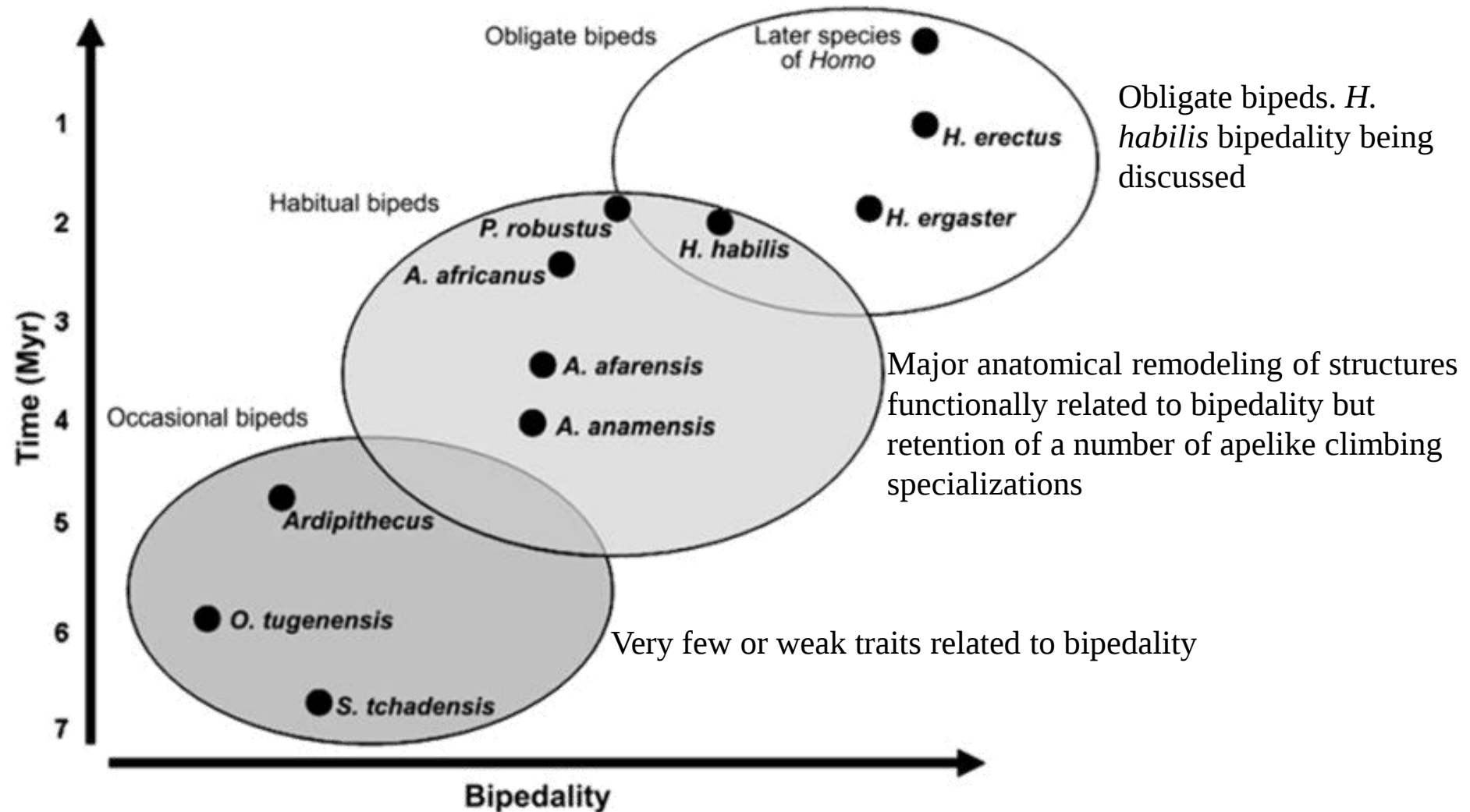






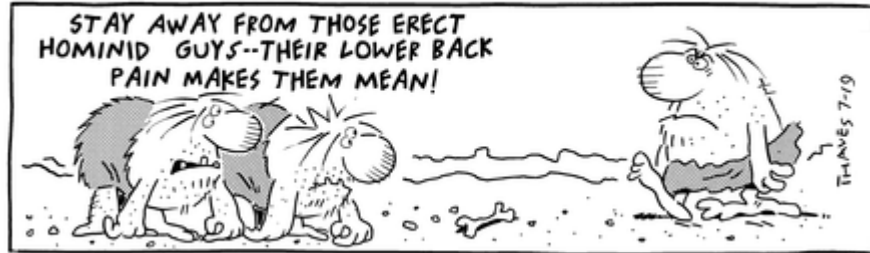


Degree of bipedality in known fossil hominins relative to time. Only taxa with documented traits relating to bipedal locomotion are included.

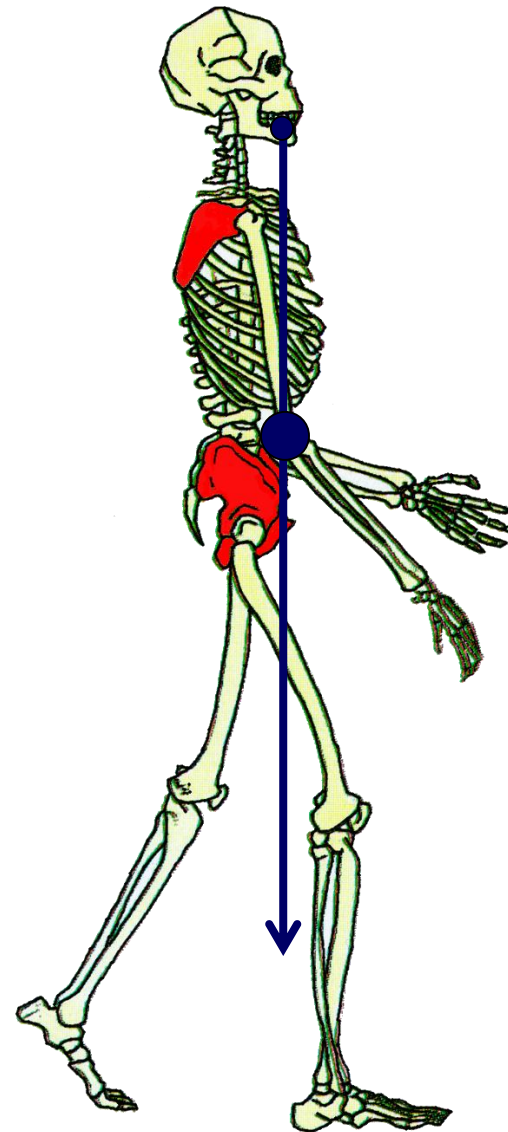
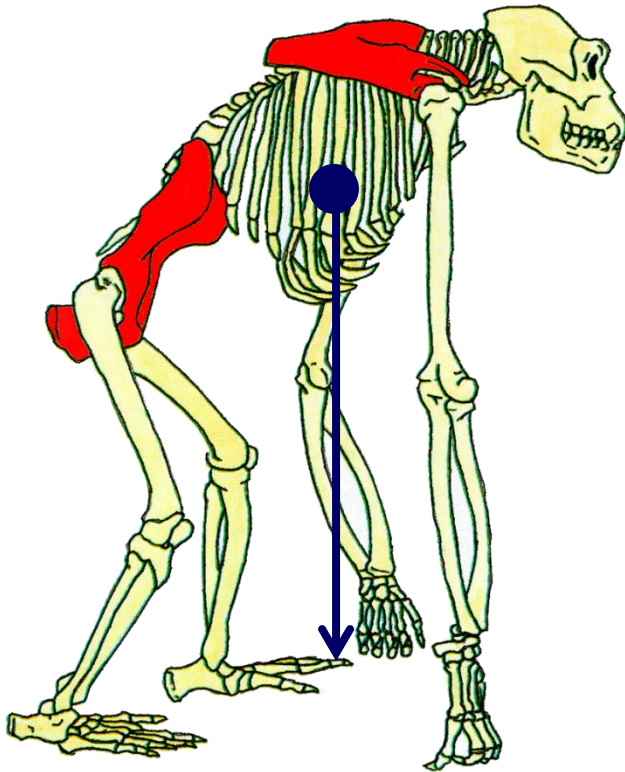


Frank and Ernest

STAY AWAY FROM THOSE ERECT
HOMINID GUYS--THEIR LOWER BACK
PAIN MAKES THEM MEAN!



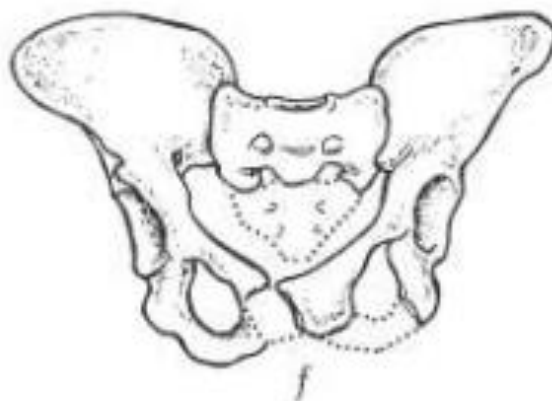
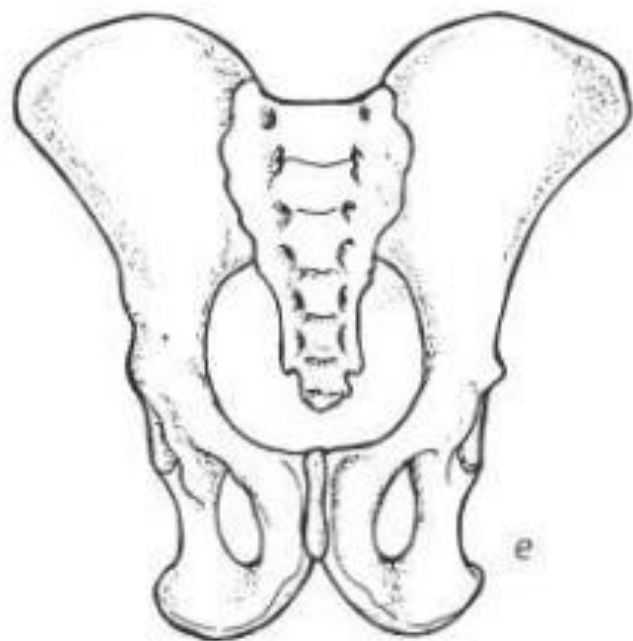
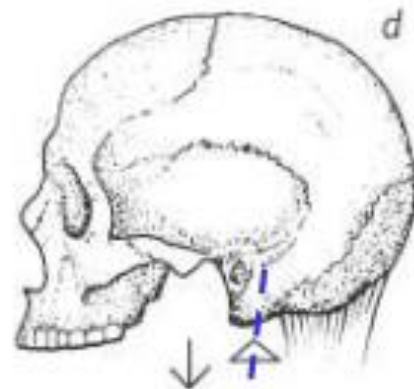
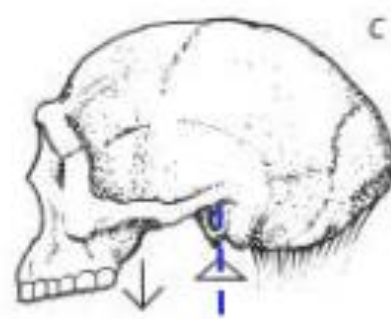
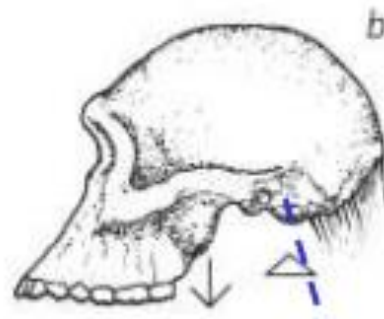
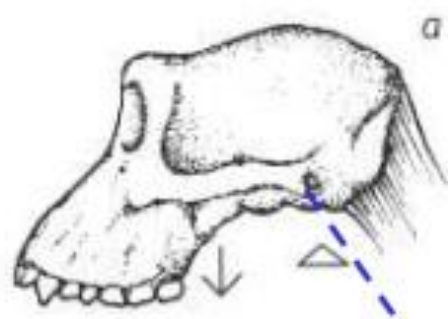
Copyright (c) 1994 by Thaves.



- - - Axe de la colonne vertébrale

△ Point d'appui de la colonne vertébrale

↓ « déséquilibre » face / boîte crânienne



Homme



Les échelles ne sont pas respectées.

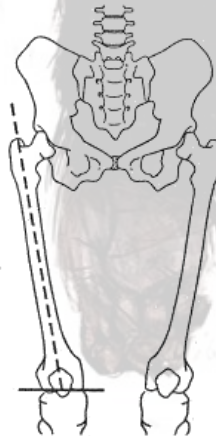
Chimpanzé

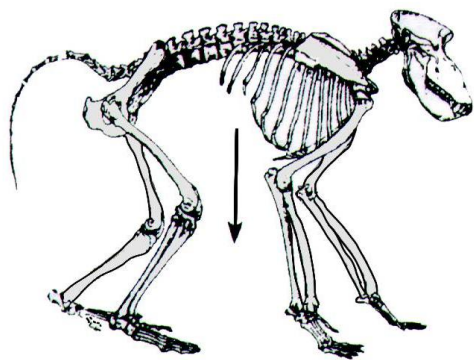


Volume cérébral :
1 300 à 1 500 cm³

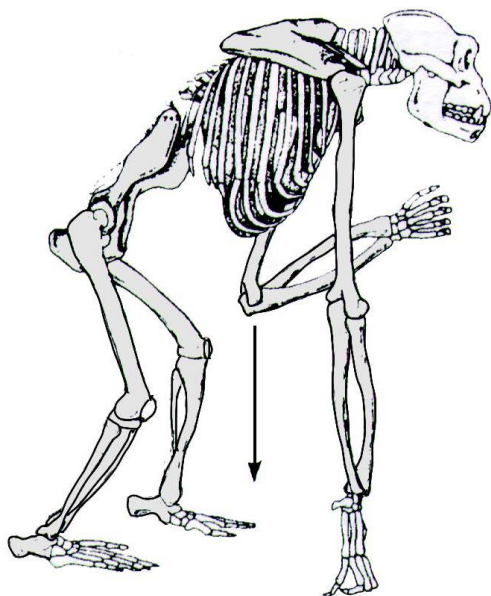


Volume cérébral :
320 à 450 cm³





babbuino



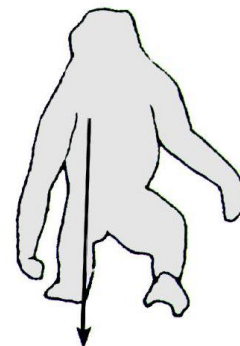
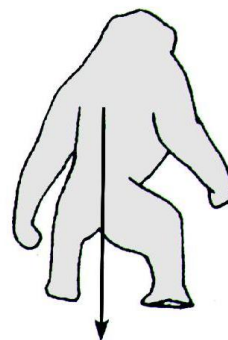
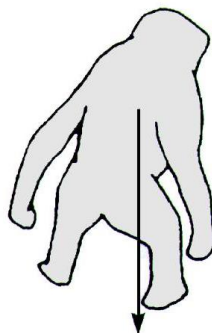
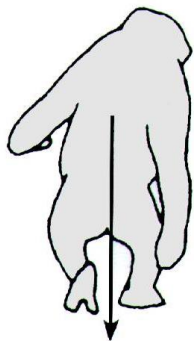
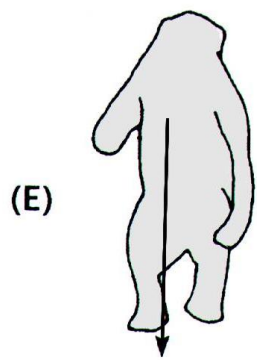
gorilla



scimpanzè



uomo



Bipedismo occasionale



(d)

Chimp



Human



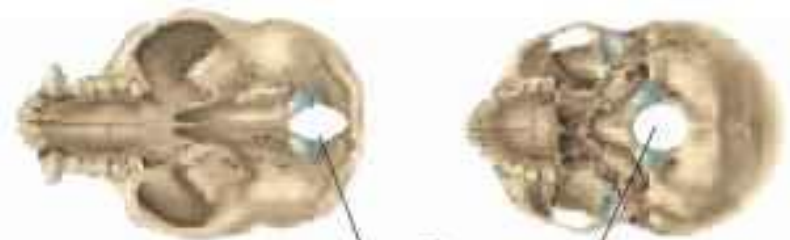
(e)

Chimp

Human



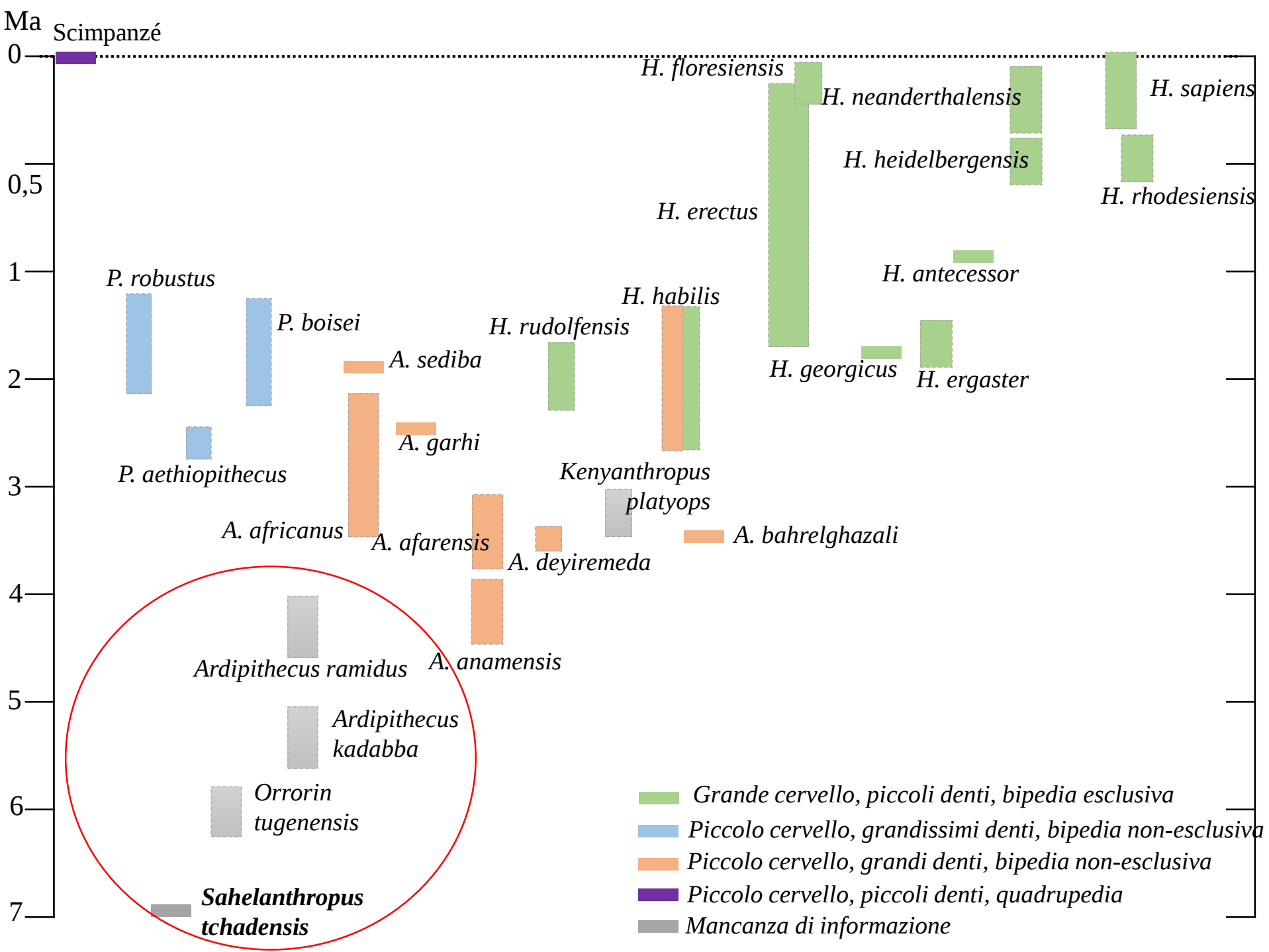
(f)



Chimp

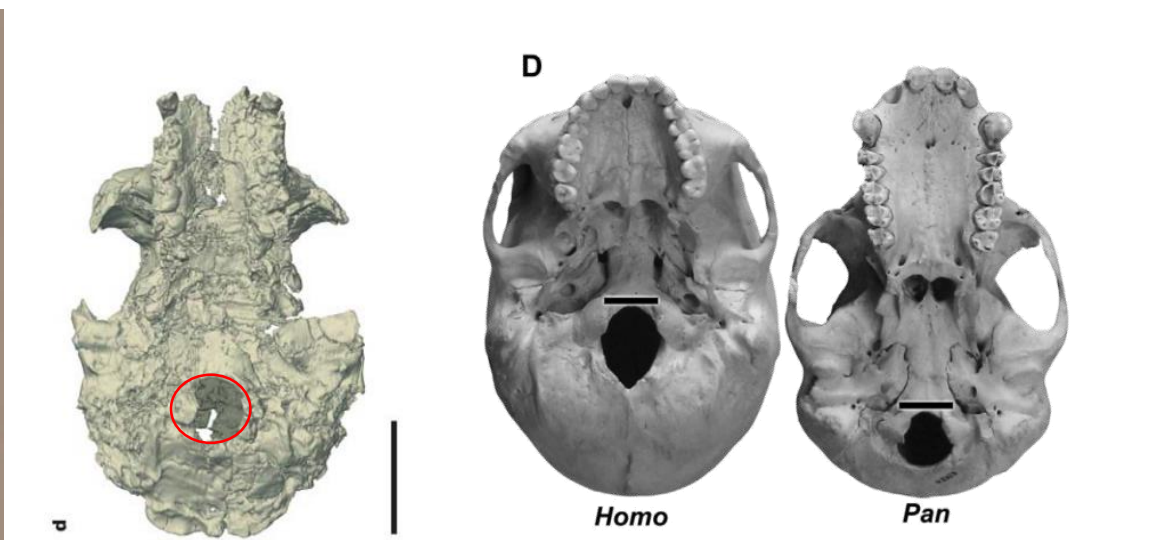
Foramen
magnum

Human





Sahelanthropus tchadensis



Orrorin tugenensis



(A) *P. troglodytes*, (B) *O. tugenensis* (BAR 1002'00), (C and D) *Paranthropus robustus* (SK 97 and SK 82, reversed), (E) *A. afarensis* (A.L. 288-1ap), (F) *Paranthropus boisei* (KNM-ER 1503, reversed), (G) early *Homo* (KNM-ER 1481), and (H) modern *H. sapiens*. Scale bar, 2 cm.

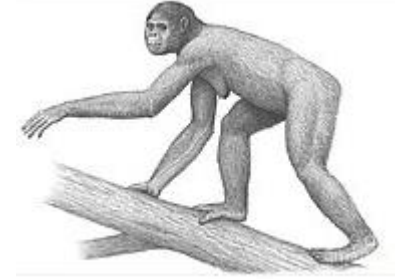
Come gli altri femore dei primi ominini (C a F), *Orrorin* si distingue dei umani moderni e delle grande scimmie con un collo femorale lungo e stretto e una diafisi prossimale larga.

Ardipithecus ramidus and the Paleobiology of Early Hominids

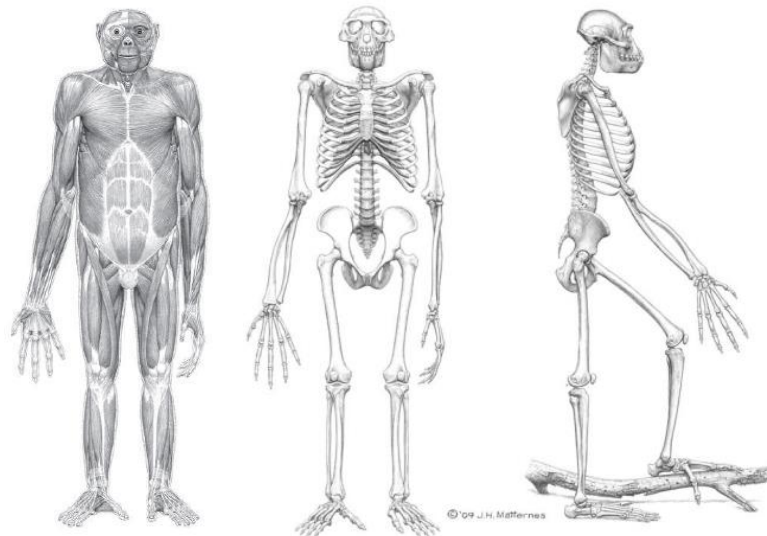
Tim D. White,^{1*} Berhane Asfaw,² Yonas Beyene,³ Yohannes Haile-Selassie,⁴ C. Owen Lovejoy,⁵ Gen Suwa,⁶ Giday WoldeGabriel⁷

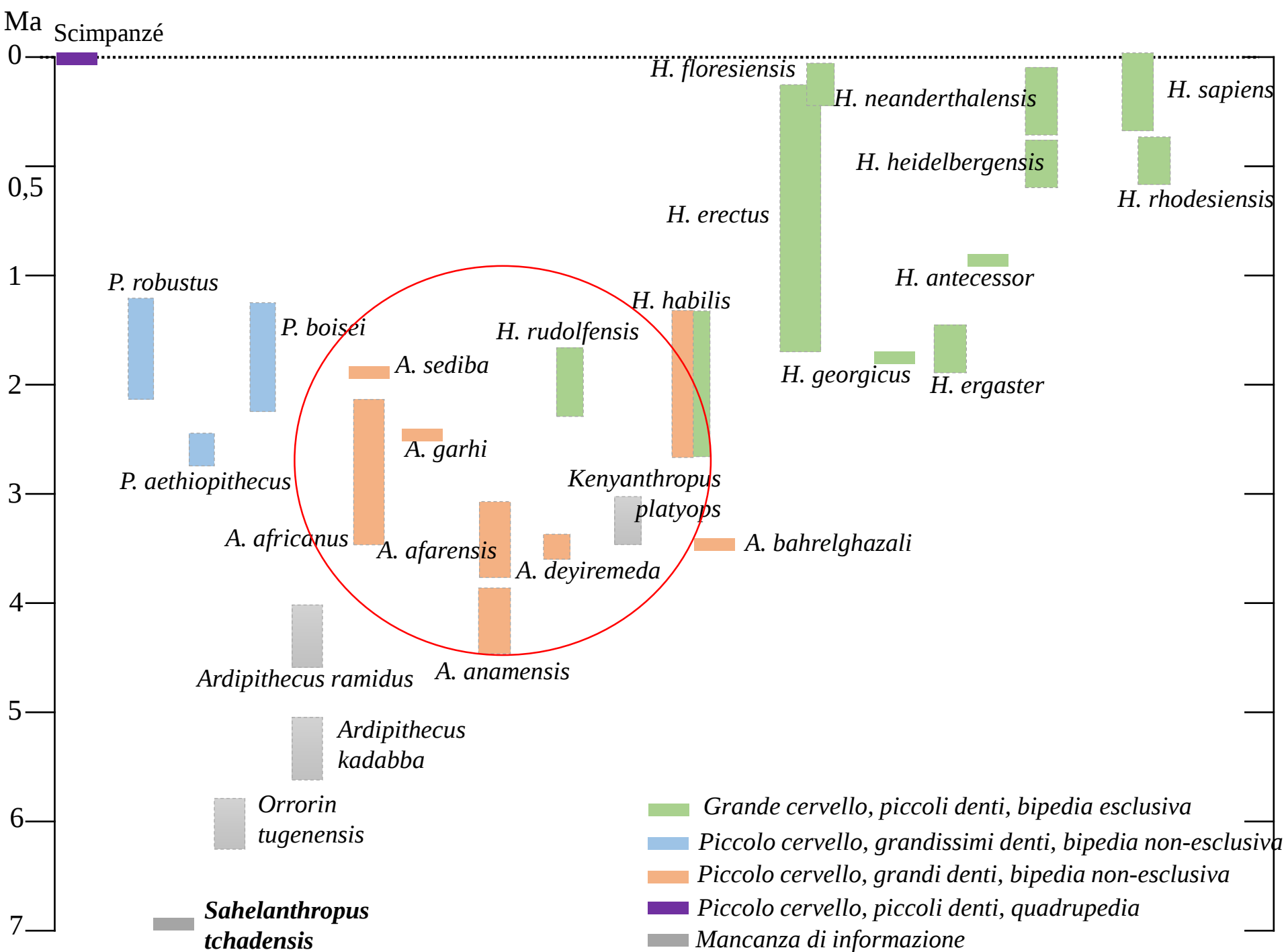
Età: 4.4 Ma

- 110 resti ritrovati
- 50 kg , 120 cm di altezza
- Piccole differenze nella taglia corporea tra maschio e femmina
- Capacità cranica = chimpanzees
- Faccia piccola e canini/premolari ridotti (riduzione delle competizione sociali)
- Nessuna sospensione, o knuckle-walking ma una bipedia più primitiva che i Australopitecini
- Riduzione dello spessore delle smalto in confronto a *Australopithecus*



Ar. Ramidus indica che gli ultimi antenati comuni tra i umani e le scimmie africane non erano «chimpanzee-like» e che gli ominidi e le scimmie africani estinti sono fortemente specializzati, ma attraverso un cammino evolutive molto diverso.





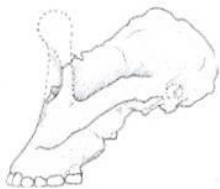


Australopithecus africanus Dart 1925

Holotype : Crâne de Taung (Afrique du Sud)

Synonymies :

- *Australopithecus transvaalensis* Broom, 1936 Sterkfontein, fgt de maxillaire TM 1511 (S1)
- *Plesianthropus transvaalensis* (Broom et Schepers, 1946) Sterkfontein, fgt mandibule TM 1516 et crâne Sts 5
- *Australopithecus prometheus* Dart, 1948 Makapansgat, calotte crânienne MDL-1



Paranthropus robustus Broom 1938

Holotype : Crâne et postcrânien TM 1517 (Kromdraai, Afrique du Sud)

Synonymies :

- *Paranthropus crassidens* Broom, 1949 Swartkrans, mandibule SK 6



Paranthropus boisei (Tobias 1967)

Holotype : Crâne OH 5 (Olduvai, Tanzanie)

Synonymies :

- Zinjanthropus boisei* Leakey, 1959
- Paranthropus boisei* (Robinson, 1960)
- Australopithecus (Paranthropus) boisei* (Leakey, Tobias et Napier, 1964)



Paranthropus aethiopicus (Arambourg et Coppens 1967)

Holotype : Mandibule Omo 18-1967-18 (Shungura, Omo, Éthiopie)



Australopithecus afarensis Johanson, White et Coppens 1978

Holotype : Mandibule LH 4 (Laetoli, Tanzanie)

Synonymies :

- *Meganthropus africanus* (Wernert, 1950) Maxillaire Garusi I
- *Praeanthropus africanus* (Senyürek, 1955) Maxillaire Garusi I



Australopithecus bahrelghazali Brunet *et al.* 1996

Holotype : Mandibule KT 12/H1 (Koro Toro, Tchad)



Australopithecus anamensis Leakey *et al.* 1995

Holotype : Mandibule KNM-KP 29 281 (Kanapoi, Kenya)



Australopithecus garhi Asfaw *et al.* 1999

Holotype : Bou-VP-12/130 (Bouri, Middle Awash, Éthiopie)

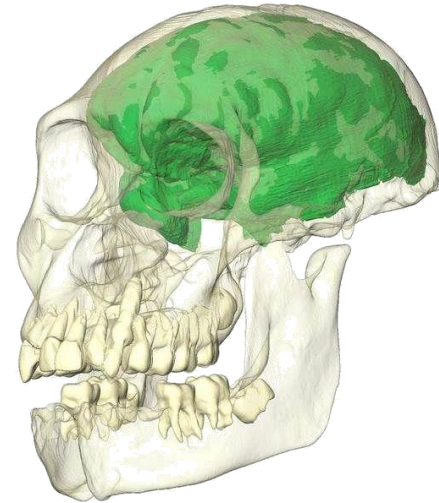


Kenyanthropus platyops Leakey *et al.* 2001

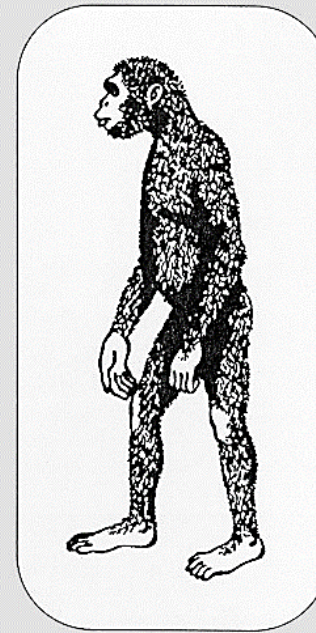
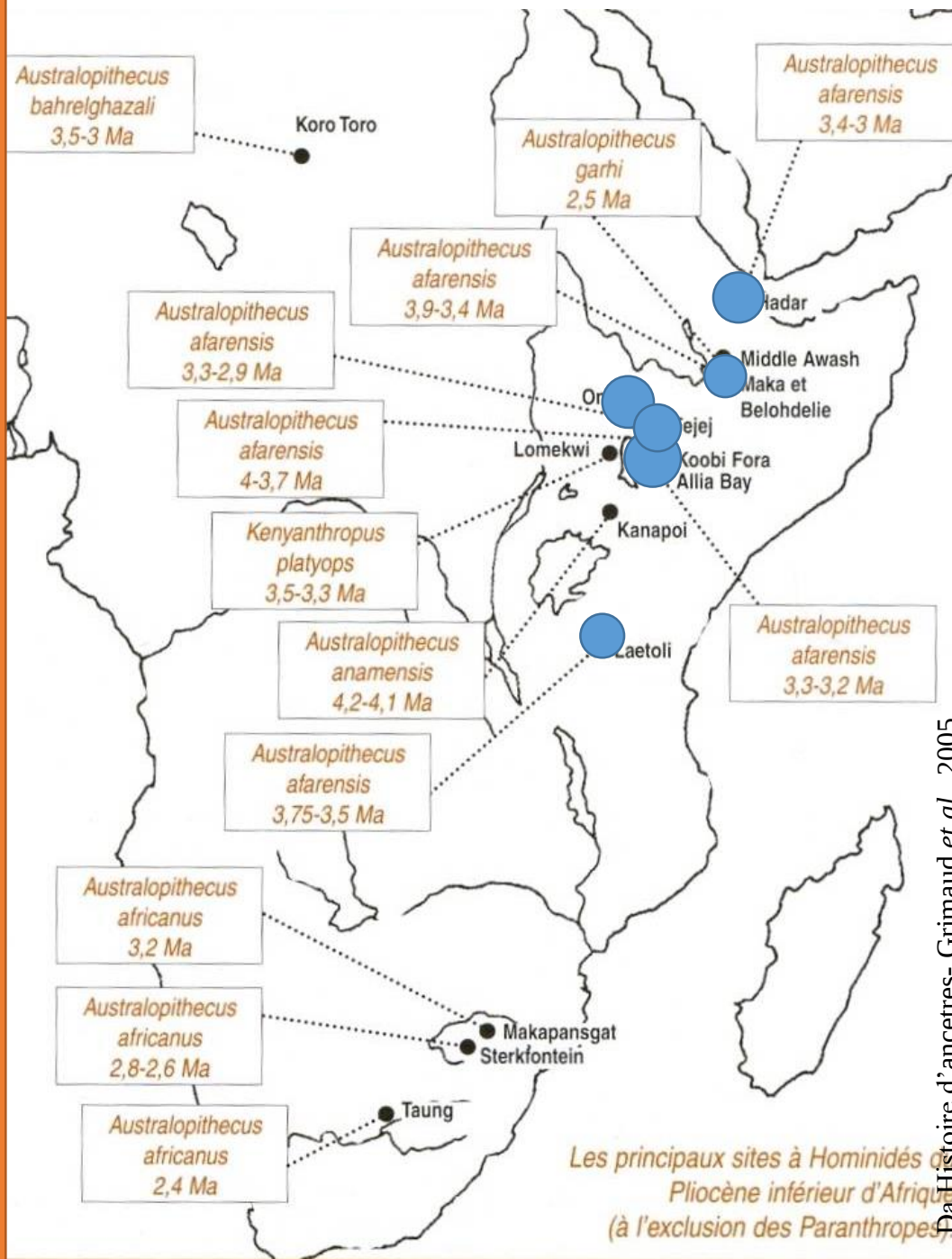
Holotype : Crâne KNM-WT 40000 (Lomekwi, Ouest-Turkana, Kenya)

Caratteristiche condivise dalle Australopithecine

1. Dimensione del cervello $\pm$ scimpanzé (ca. 375-550 cm³)
2. Parte mesio-facciale verticale e corta inferio-superiormente con una regione zigomaticomascellare massiccia e un forte prognatismo subnasale
3. Basicranio corto con un foramen magnum posizionato anteriormente
4. Canini ridotti e non affilati
5. Premolari e molari grandi (in rapporto alla taglia del corpo) con smalto spesso
6. Corpo mandibolare spesso trasversalmente e rami alti

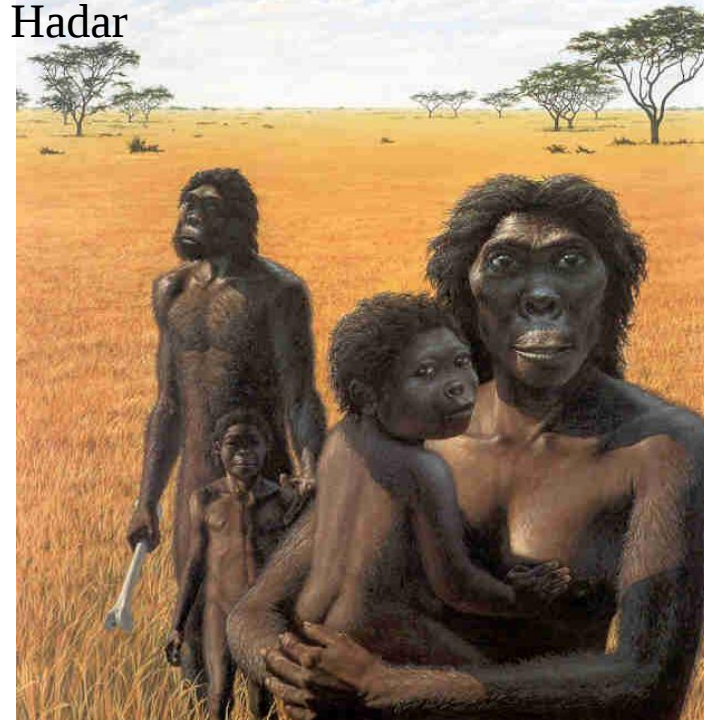


Australopithecus afarensis



Nom : *Australopithecus afarensis*
 Origine : Afrique de l'Est (Hadar, Laetoli, Maka, Belohdelie, Cheron, Omo, Koobi Fora)
 Dates : 5 (?) à 3 MA
 Cerveau : 300 à 400 cm³
 Taille : 1,10 m

Hadar

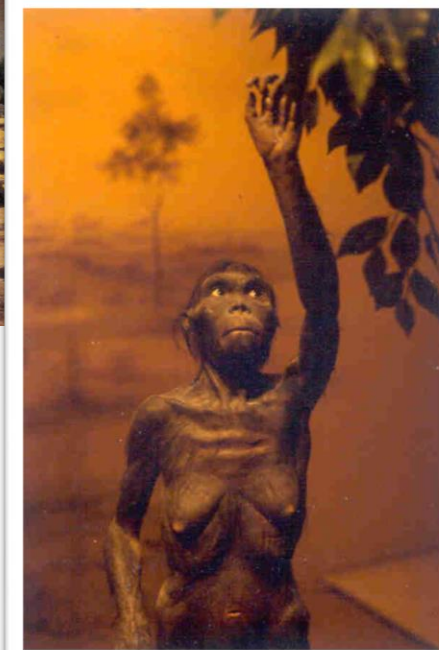


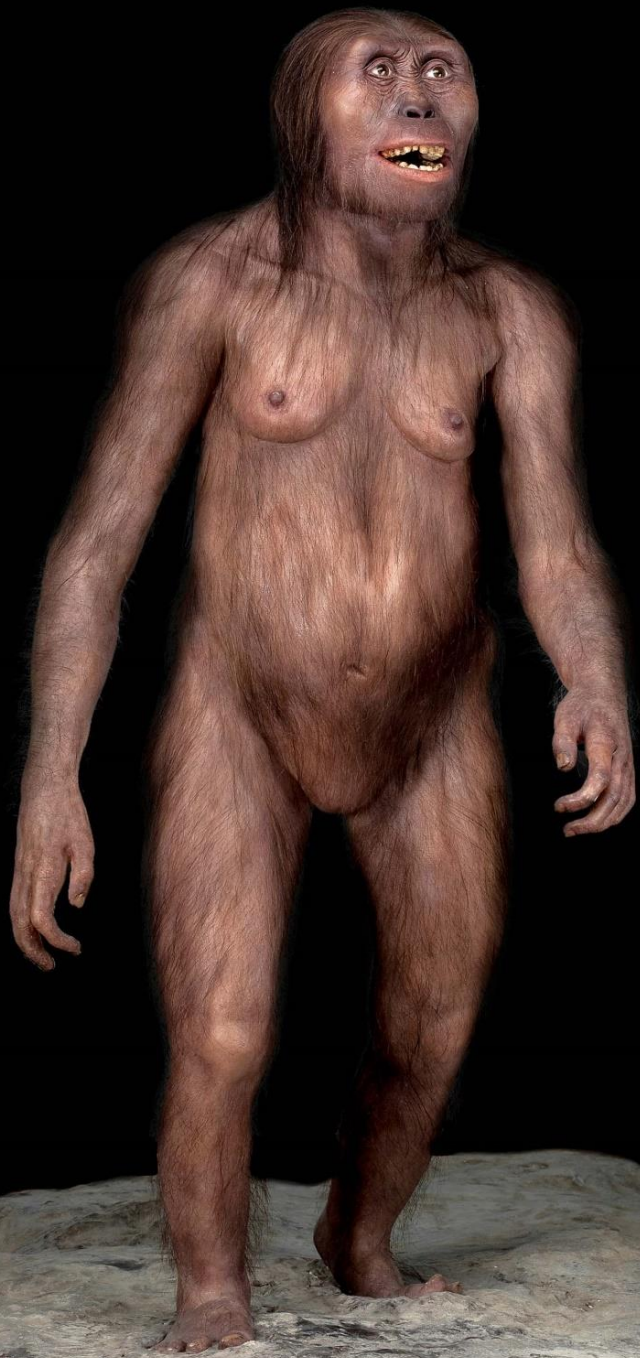
De l'Histoire d'ancêtres- Grimaud et al., 2005

Hadar



AL 444-2 (Hadar, Etiopia 3Ma)



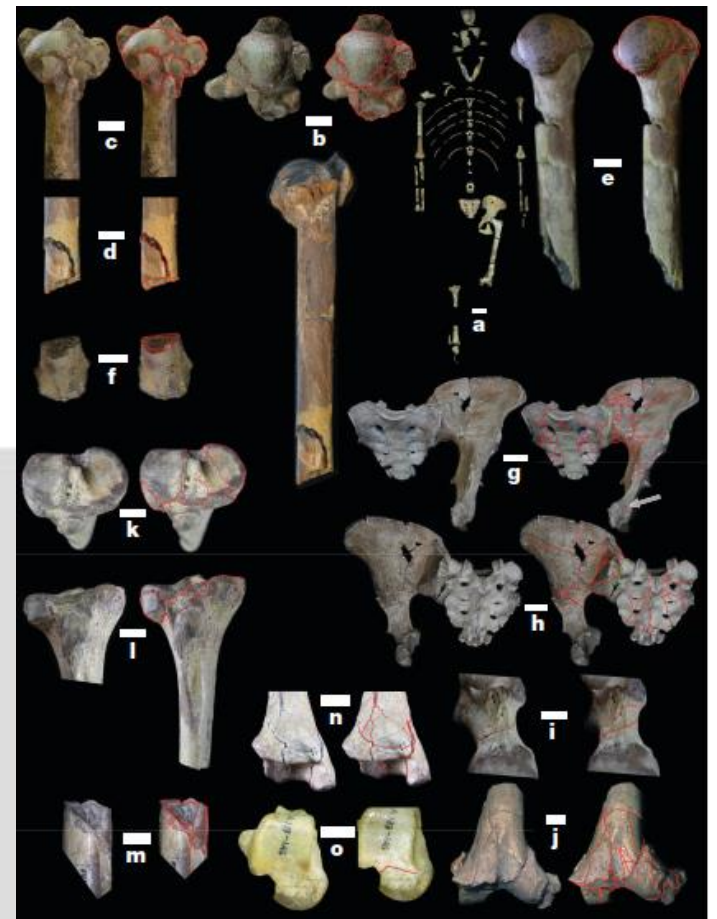
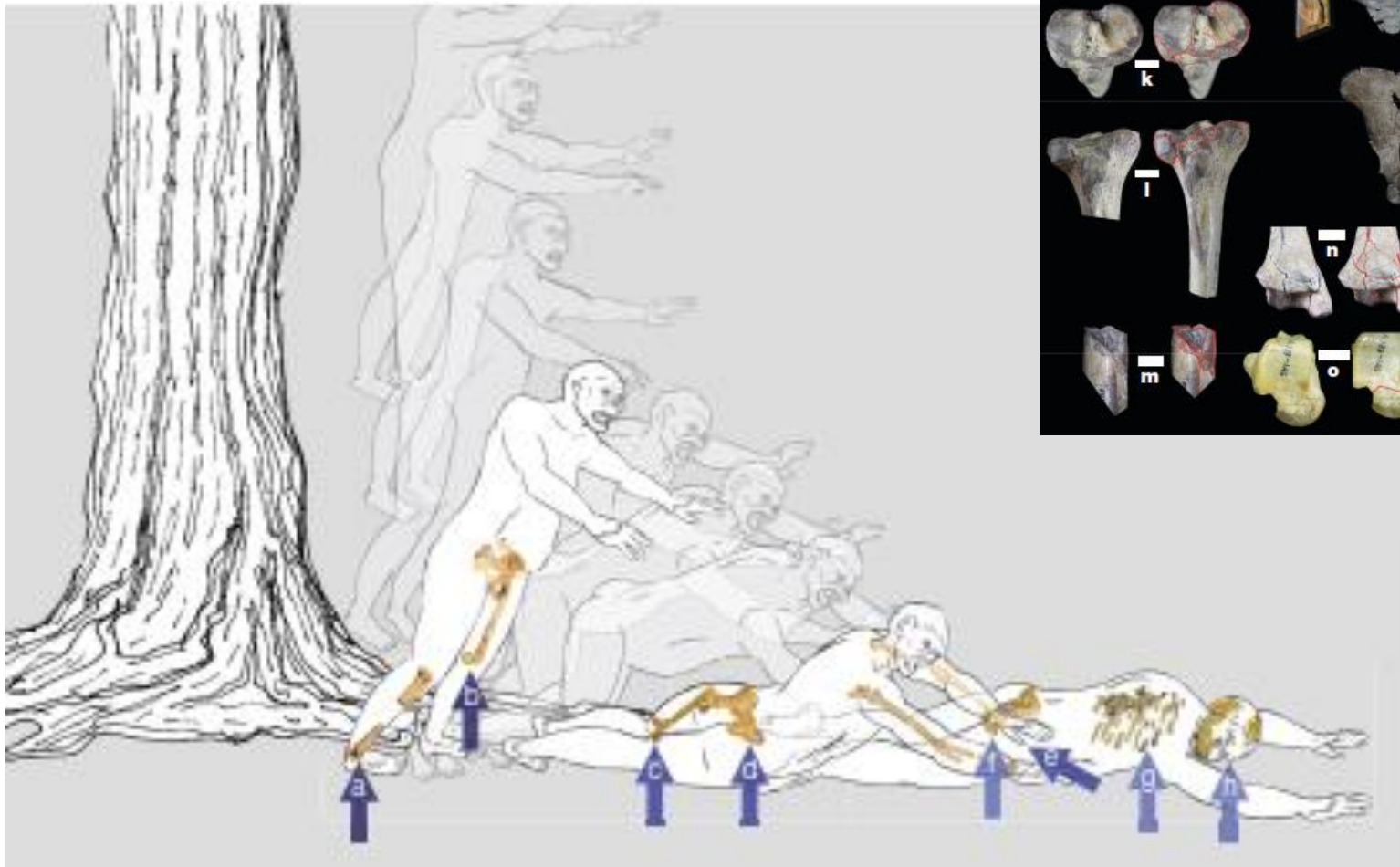


Lucy, 3,2 Ma –AL2881

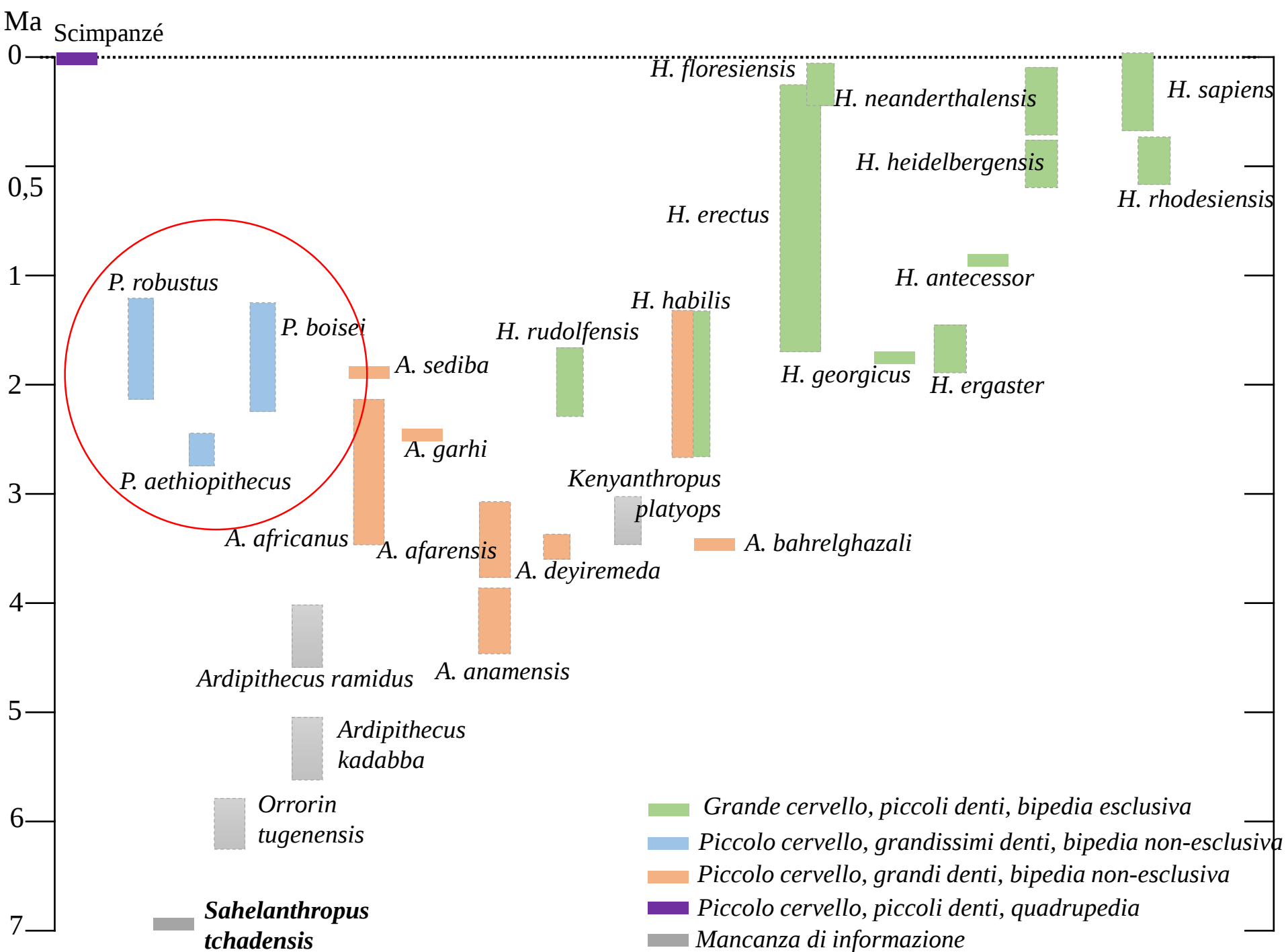


Perimortem fractures in Lucy suggest mortality from fall out of tall tree

John Kappelman^{1,2}, Richard A. Ketcham², Stephen Pearce³, Lawrence Todd¹, Wiley Akins⁴, Matthew W. Colbert², Mulugeta Feseha⁵, Jessica A. Maisano² & Adrienne Witzel¹







PARANTROPI o AUSTRALOPITECI ROBUSTI:

- Così definiti per la robustezza dell'apparato masticatorio (denti, mandibole, mascelle, creste di inserzione muscolare)
- Sviluppata cresta sagittale che da inserzione ai muscoli temporali che avvolgono praticamente tutto il cranio
- Fosse temporali molto ampie
- Arcate zigomatiche vistose
- Scheletro facciale accorciato



Australopithecus sediba: A New Species of *Homo*-Like Australopithecine from South Africa

Lee R. Berger,^{1,2*} Darryl J. de Ruiter,^{3,1} Steven E. Churchill,^{4,1} Peter Schmid,^{5,1} Kristian J. Carlson,^{1,6} Paul H. G. M. Dirks,^{2,7} Job M. Kibii¹

Despite a rich African Plio-Pleistocene hominin fossil record, the ancestry of *Homo* and its relation to earlier australopithecines remain unresolved. Here we report on two partial skeletons with an age of 1.95 to 1.78 million years. The fossils were encased in cave deposits at the Malapa site in South Africa. The skeletons were found close together and are directly associated with craniodental remains. Together they represent a new species of *Australopithecus* that is probably descended from *Australopithecus africanus*. Combined craniodental and postcranial evidence demonstrates that this new species shares more derived features with early *Homo* than any other australopithecine species and thus might help reveal the ancestor of that genus.

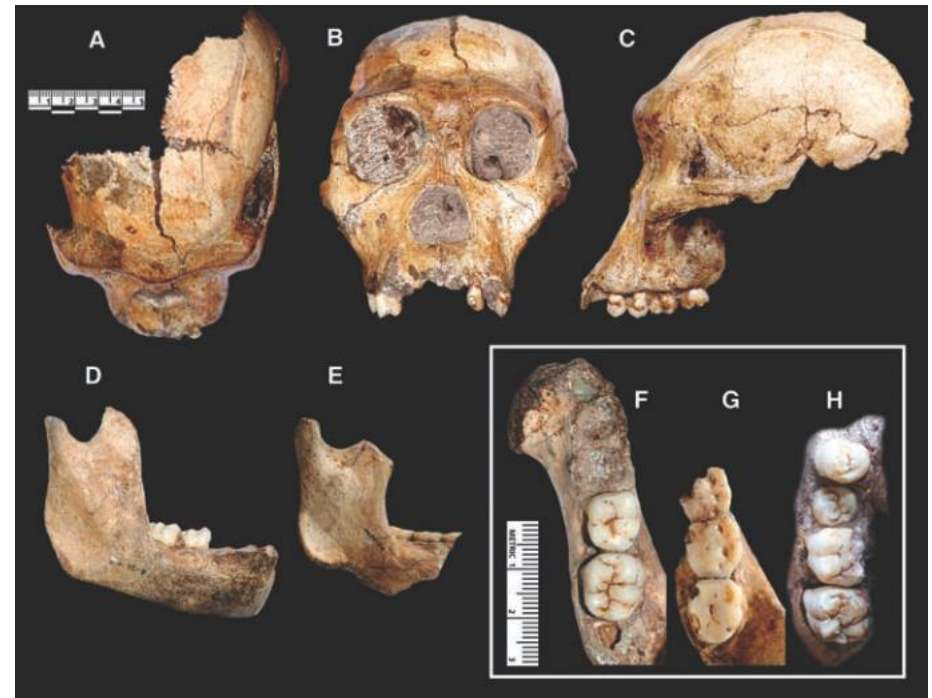
Età: 1,95 e 1,78 Ma

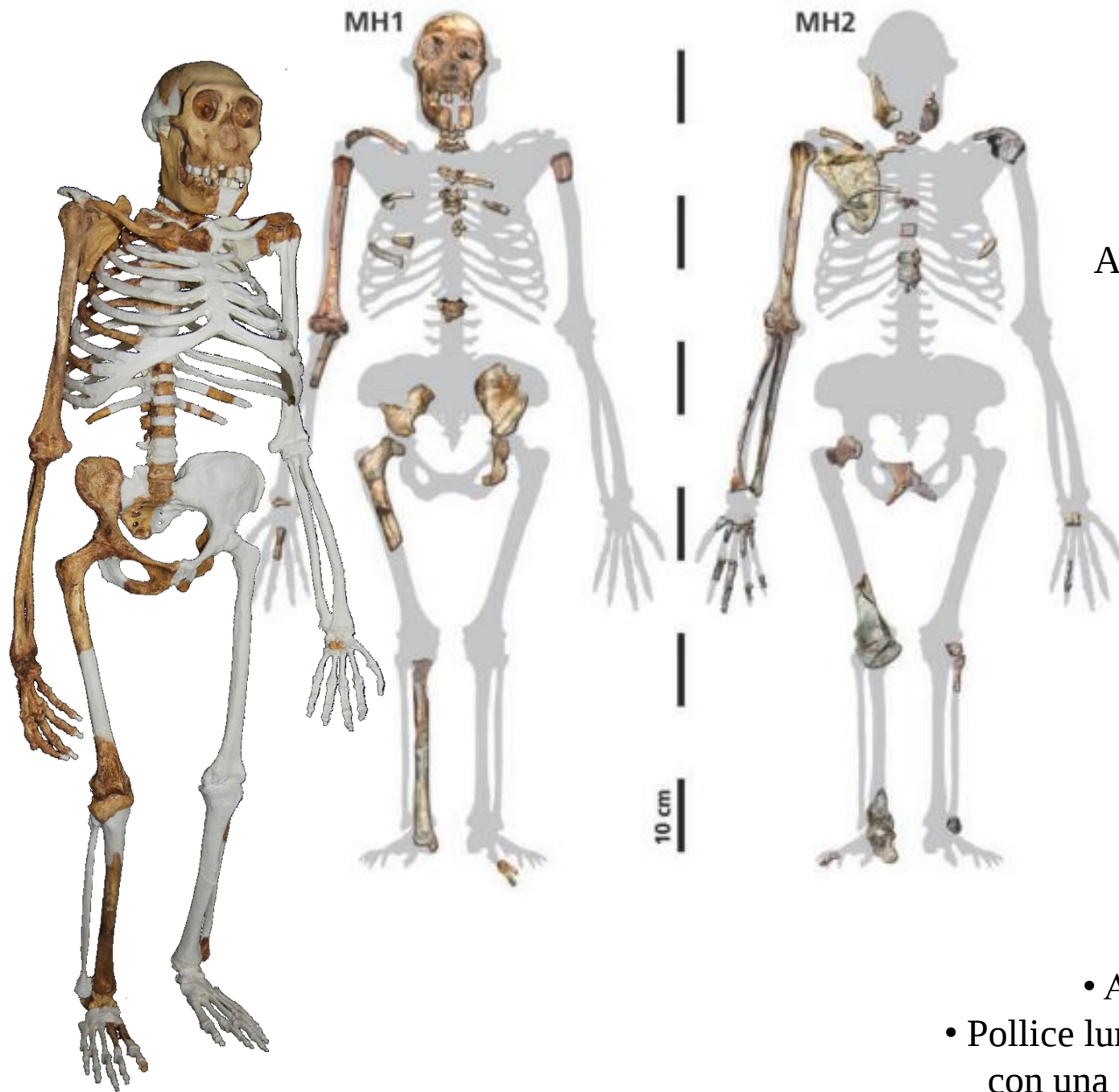
Sito: Malapa, Sudafrica

Resti: 2 scheletri parziali

Caratteristiche: condividono più caratteri derivati con i primi *Homo* che tutti i altri Australopithecine

Craniodental elements of *Au. sediba*. UW88-50 (MH1) juvenile cranium in (A) superior, (B) frontal, and (C) left lateral views. (D) UW88-8 (MH1) juvenile mandible in right lateral view, (E) UW88-54 (MH2) adult mandible in right lateral view, (F) UW88-8 mandible in occlusal view, (G) UW 88-54 mandible in occlusal view, and (H) UW 88-50 right maxilla in occlusal view (scale bars are in centimeters).





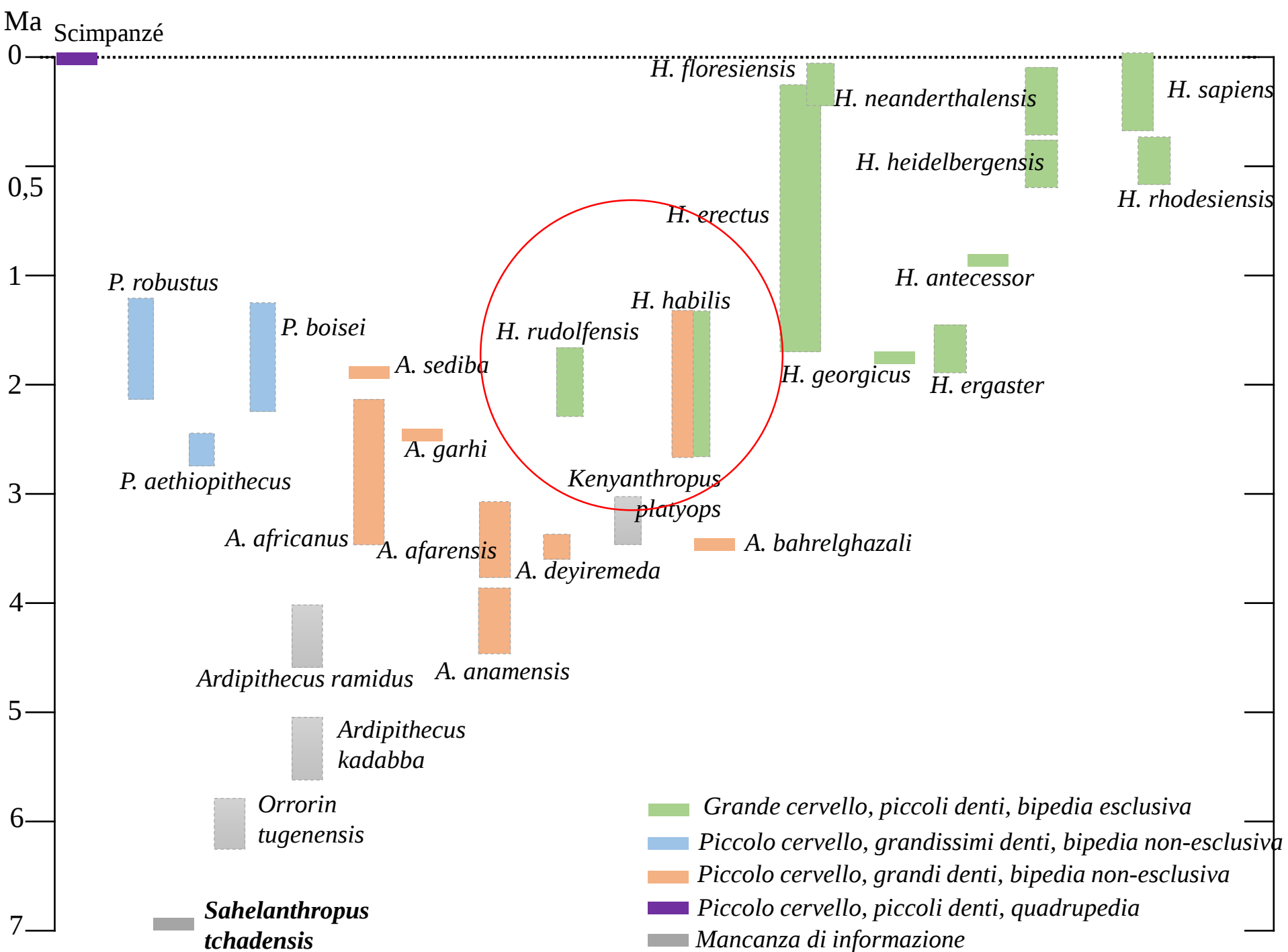
Australopiteco o *Homo* ?

Pro-Australopiteco:

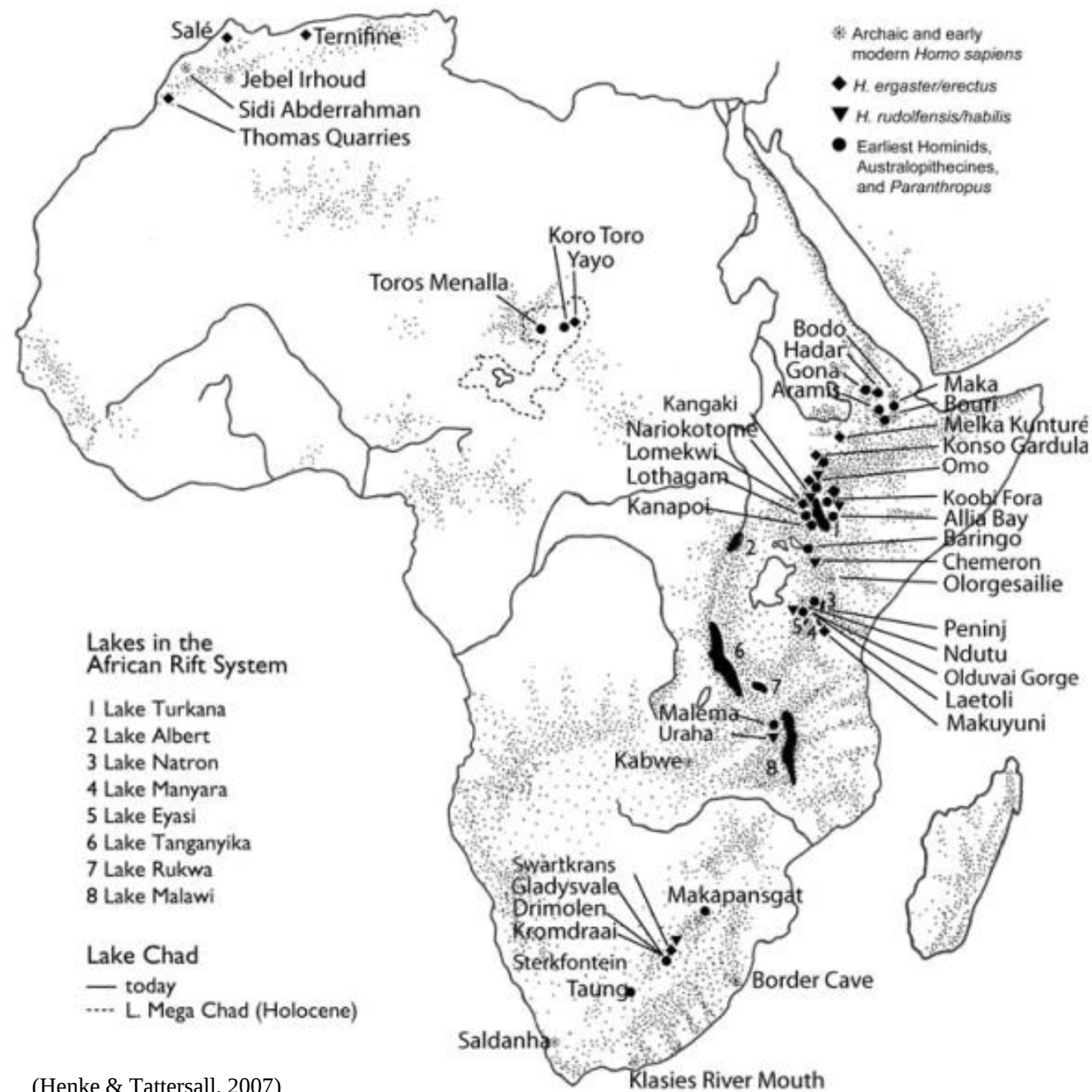
- Piccolo cervello
- Braccia lunghi

Pro-*Homo*:

- Forma del bacino
- Articolazione dell'anca
- Pollice lungo e dita corti = mani con una manipolazione precisa

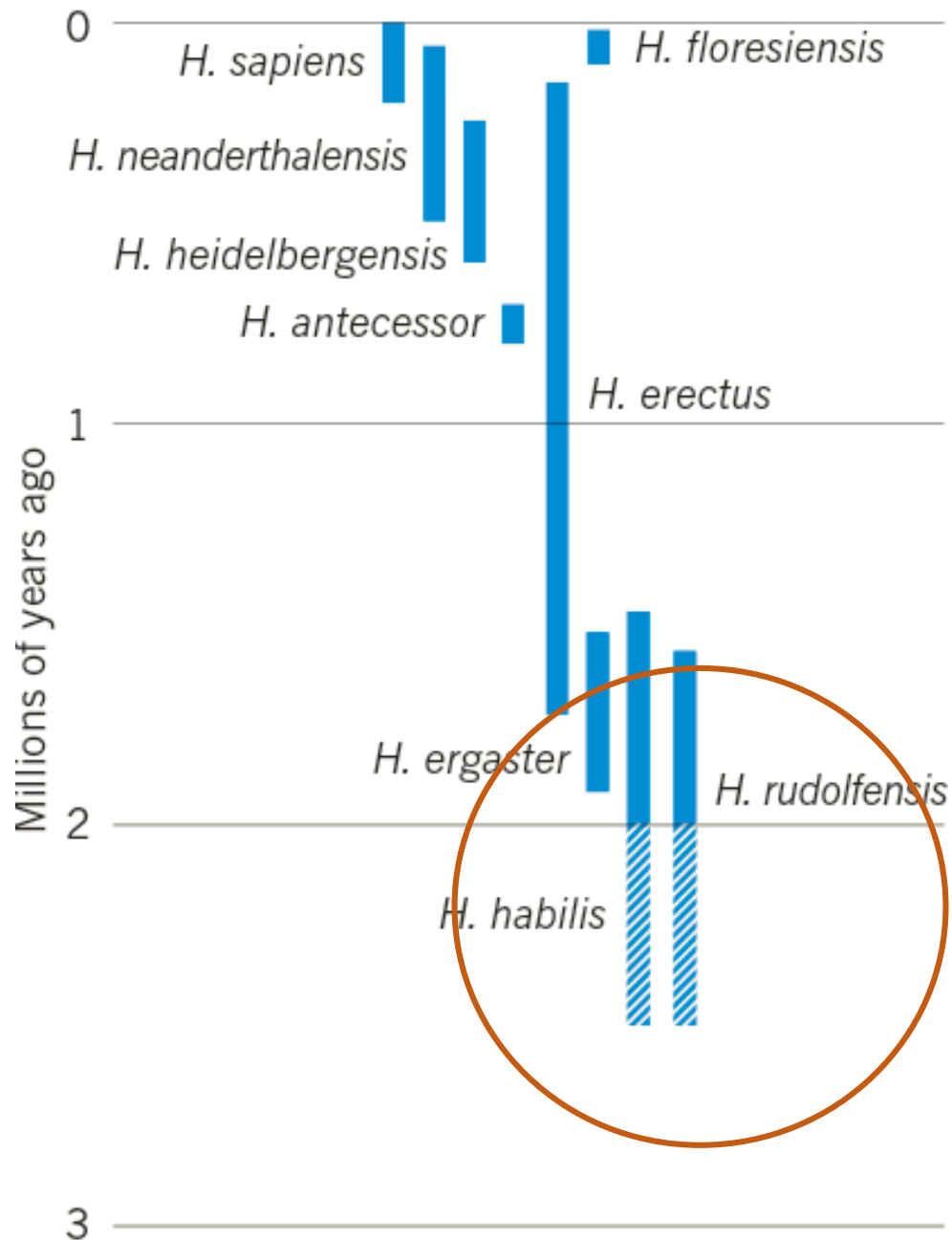


African early hominid sites. *Homo rudolfensis* and *Homo habilis* sites in bold



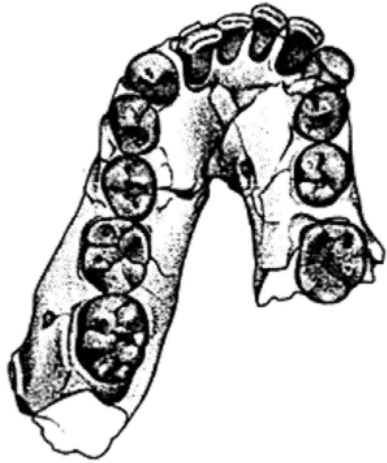
Criteri di assegnazione al genere *Homo* (Keith 1948; Tobias 1991; Wood and Collard 2001)

- Capacità cranica > 600cm³
- Capacità di parlare e di produrre industrie
- Police opponibile



The genus *Homo*, to which modern humans (*Homo sapiens*) and several extinct species belong, most probably arose between **2 million and 3 million years ago**, but fossil evidence **before 2 million years ago** (hatched lines) is frustratingly **sparse**. New fossil discoveries from Leakey and colleagues strengthen the case for recognizing at least two evolutionary lineages at the early stages of the genus, to which the species *Homo habilis* and *Homo rudolfensis* are assigned. However, whether either of these two lineages was ancestral to *Homo erectus*, let alone to modern humans, remains uncertain.

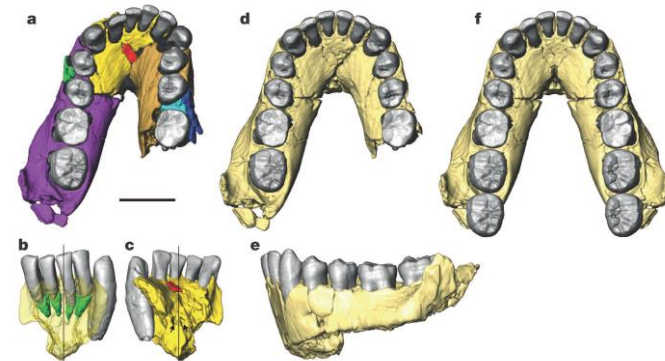
Homo habilis



Homo habilis mandible OH 13 from Olduvai Gorge, Tanzania. Scale is 1cm.

OH 7: Olotipo di *H. habilis* trovato a Olduvai in 1964.

- Spessore elevato
- PM e M < *Australopithecus*
- CC (calcolato a partire di 2 parietali) = 700 ml



Homo habilis

Mosaica di caratteri:

Moderni:

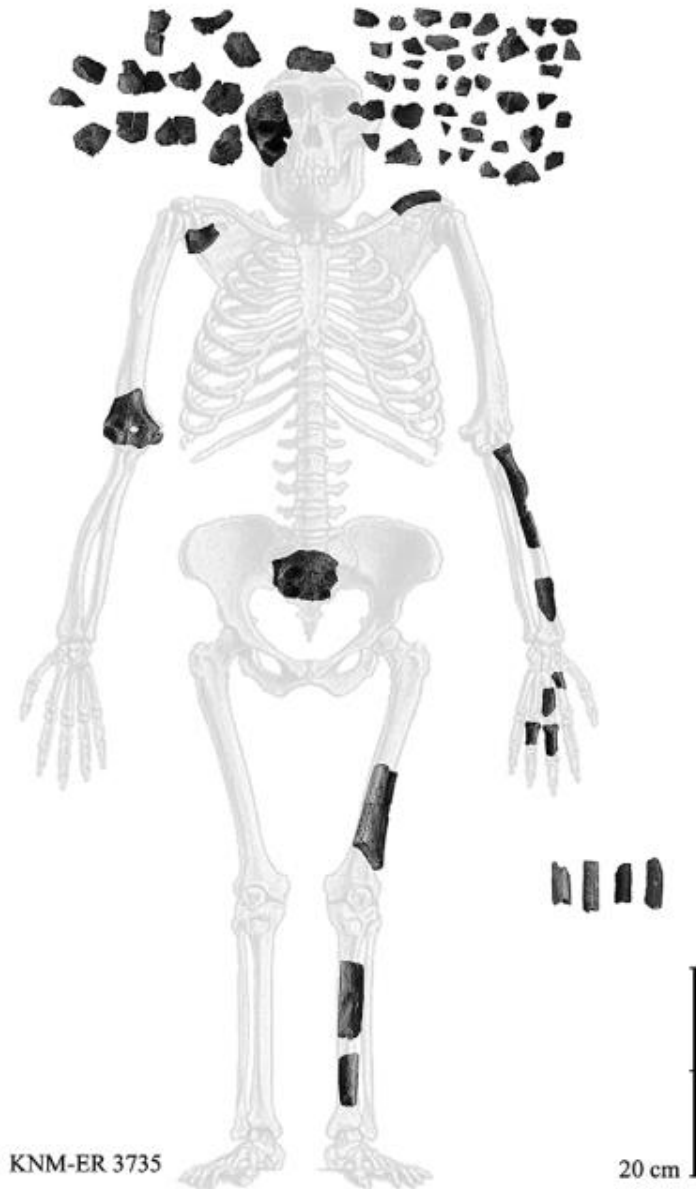
- Gracilità dell'omero e del radio
- Epifisi prossimale delle falange piccole
- Pilastro del femore ben sviluppato
- Geometria della sezione del femore

Ancestrali (condivisi con primi ominidi):

- Sacro piccolo
- Diafisi delle falange robuste

Scimmiesche:

- Scapola robusta
- Avanbraccio lungo

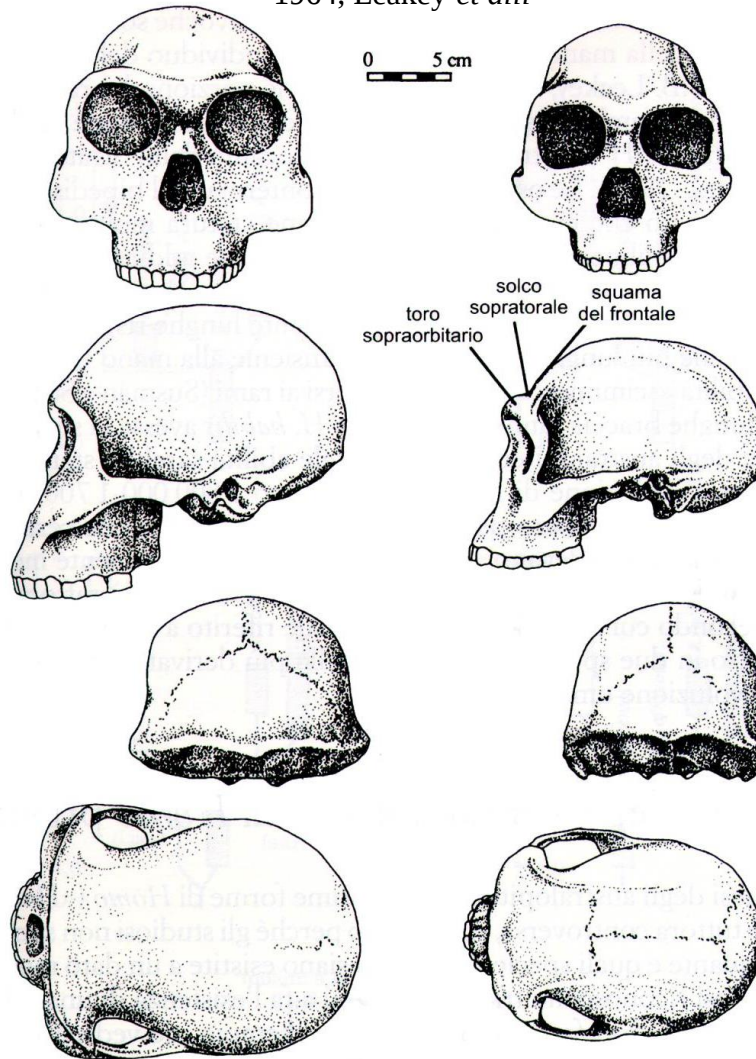


Homo rudolfensis
(2.5-1.6 M.a)

1964, Leakey et alii

Homo habilis
(2.0-1.6 M.a)

0 5 cm



KNM-ER 1470

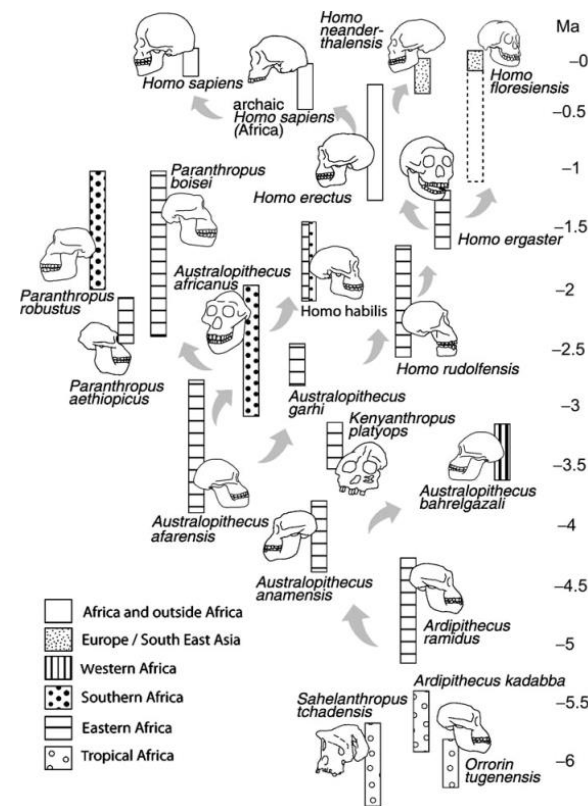
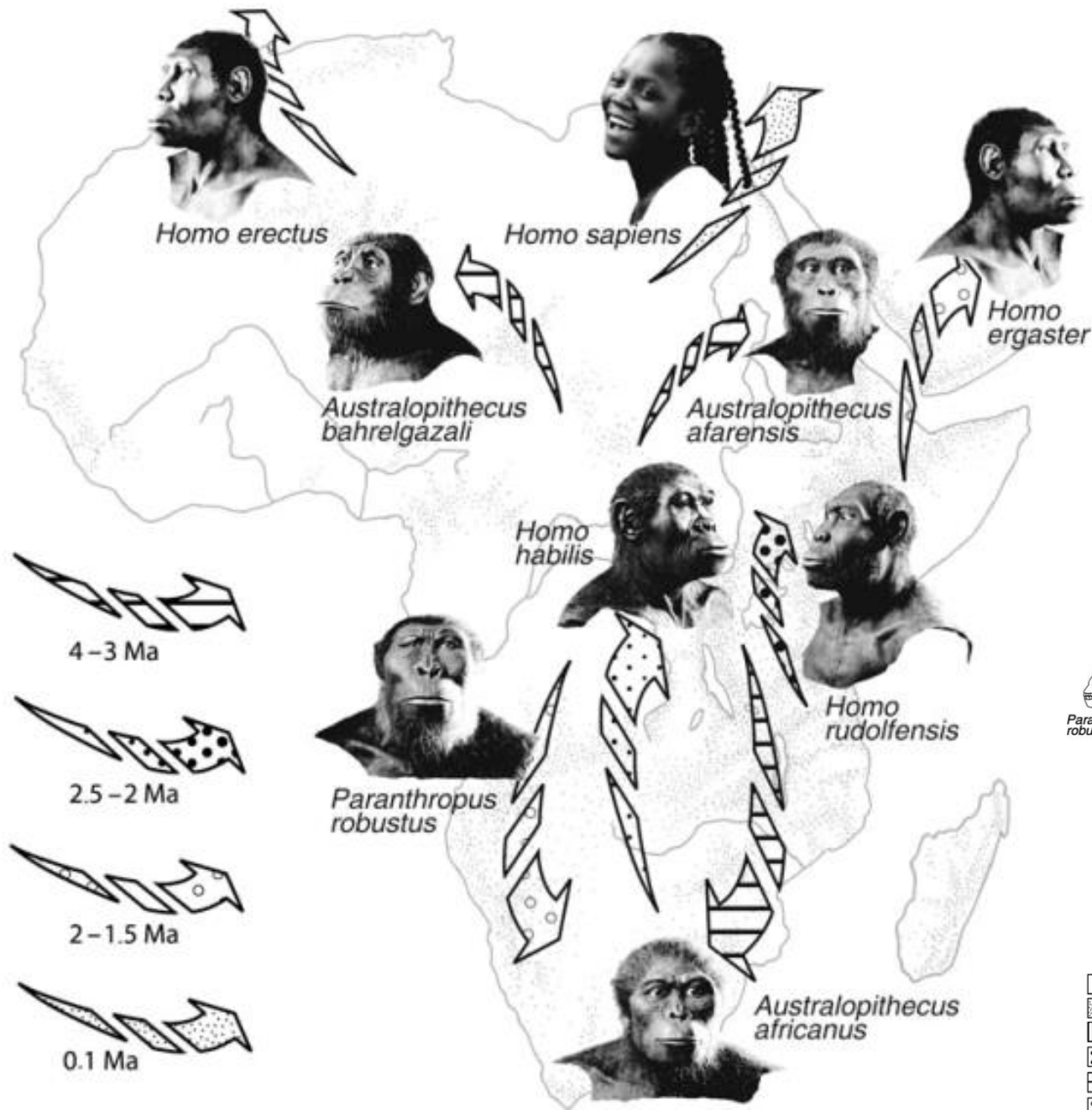
KNM-ER 1813

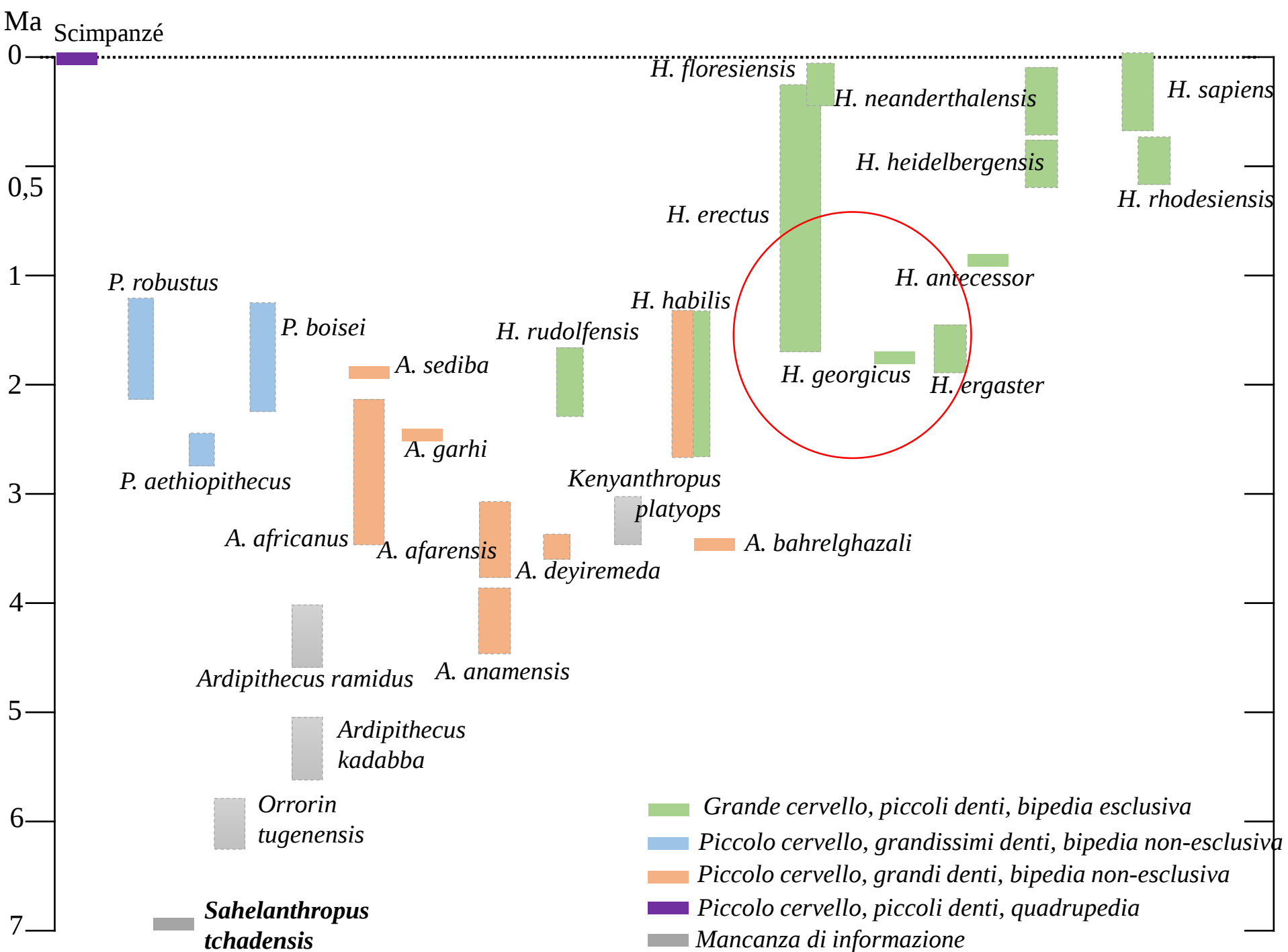
- Specie più gracile cervello più ridotto (610 cm³)
- Si trova a Koobi Fora, Omo e Olduvai.
- Molari più gracili
- Rilievo dei denti usurati più alto

- Morfologia più robusta
- maggiore cc (750 cm³)
- faccia più robusta (larga a metà altezza e ortognata)
- Si trova a Koobi Fora, Chemeron e Uraha
- Denti megadonti e abrasione dei denti orizzontale

Differenze dell'usura dentaria che indicano delle differenze notevole nella dieta e l'ecologia dei primi *Homo*

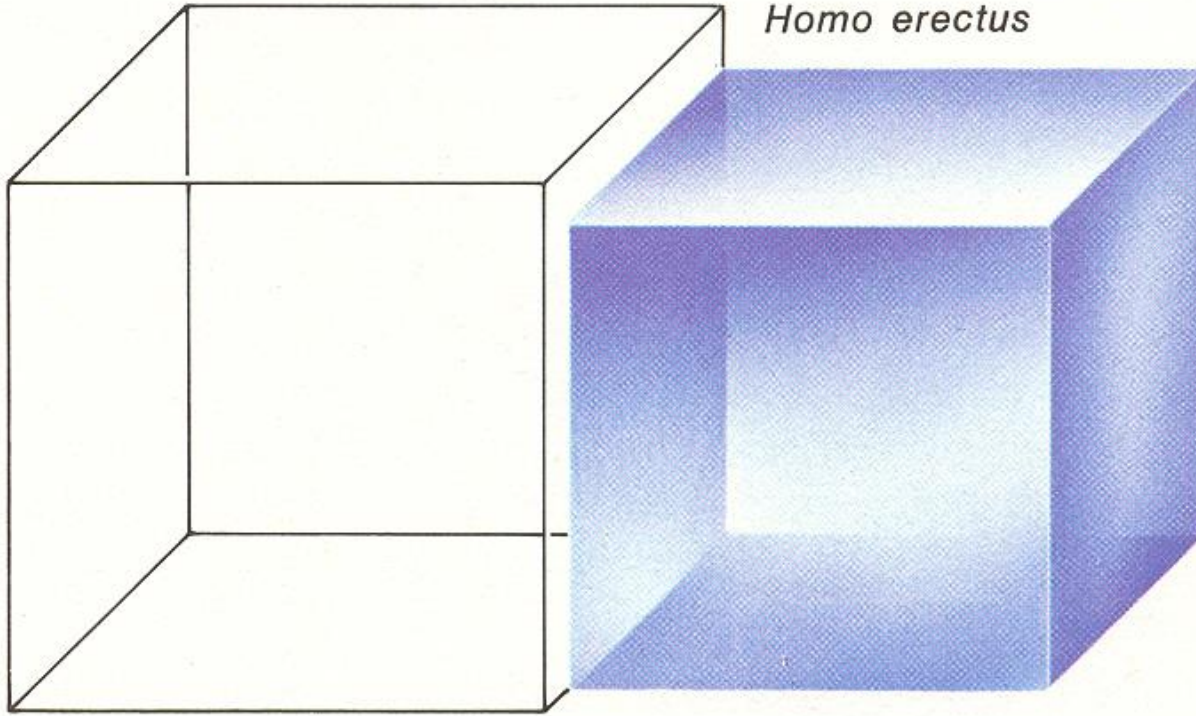
Early hominid biogeography, dispersal and migration in Africa



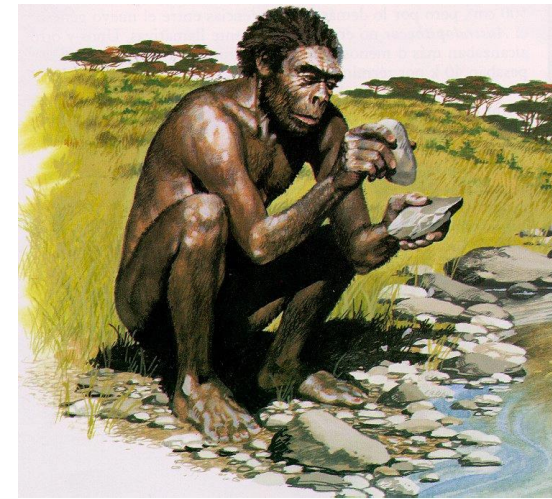


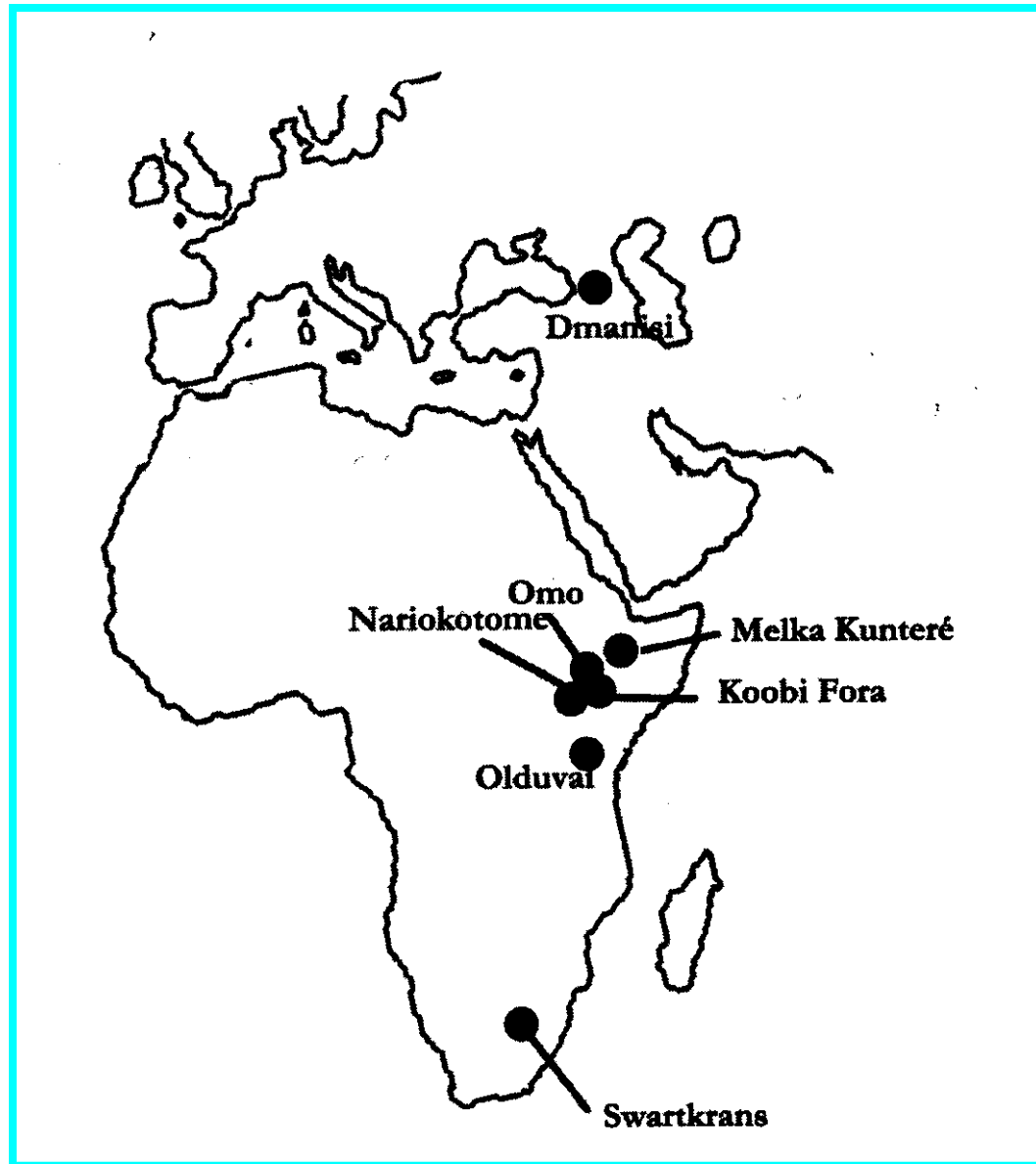
Uomo moderno

Homo erectus



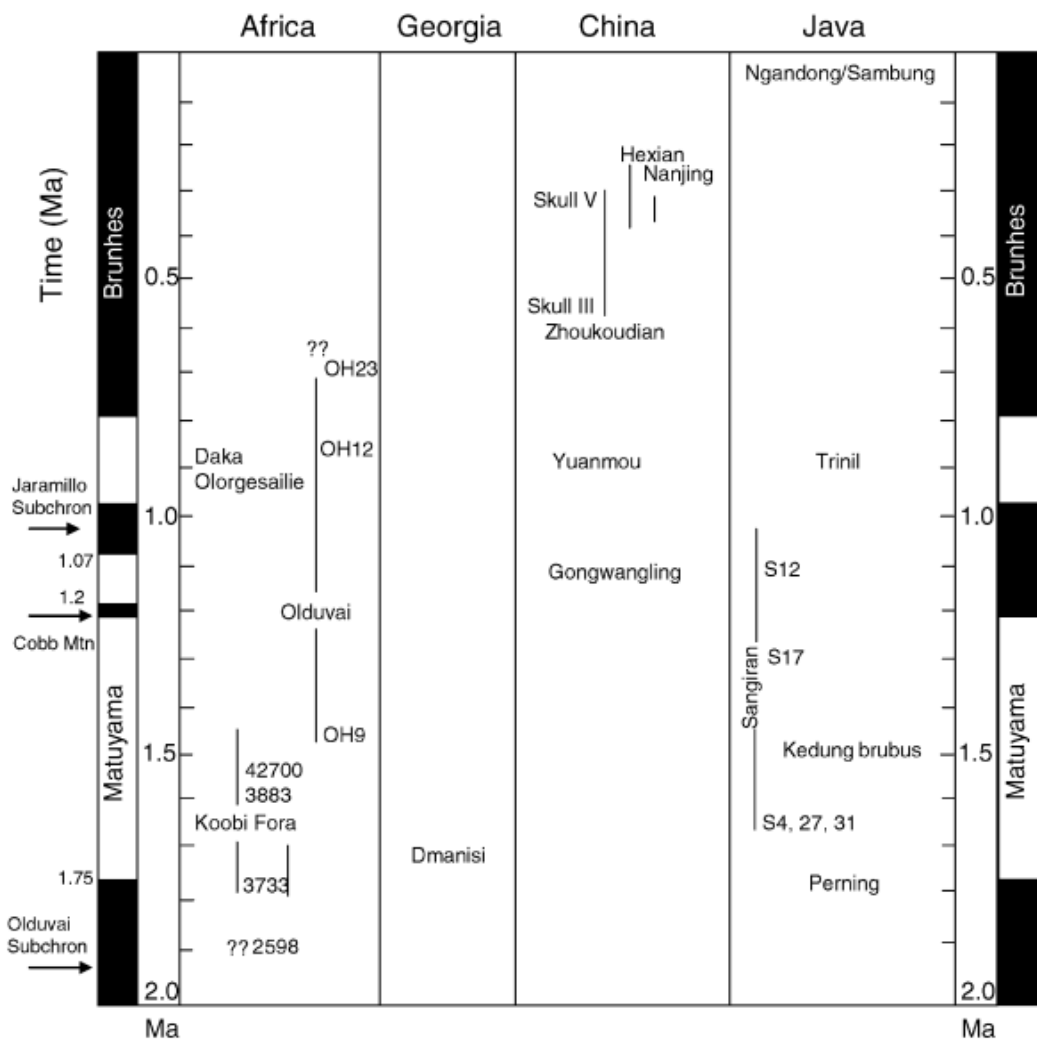
Il graduale aumento nella capacità cranica degli ominidi continuò nell'*Homo erectus*, la cui media era di 950 cm³. Si verificarono anche importanti progressi sociali: la caccia fu organizzata, gli utensili divennero più vari, e nei climi più freddi venne usato il fuoco.



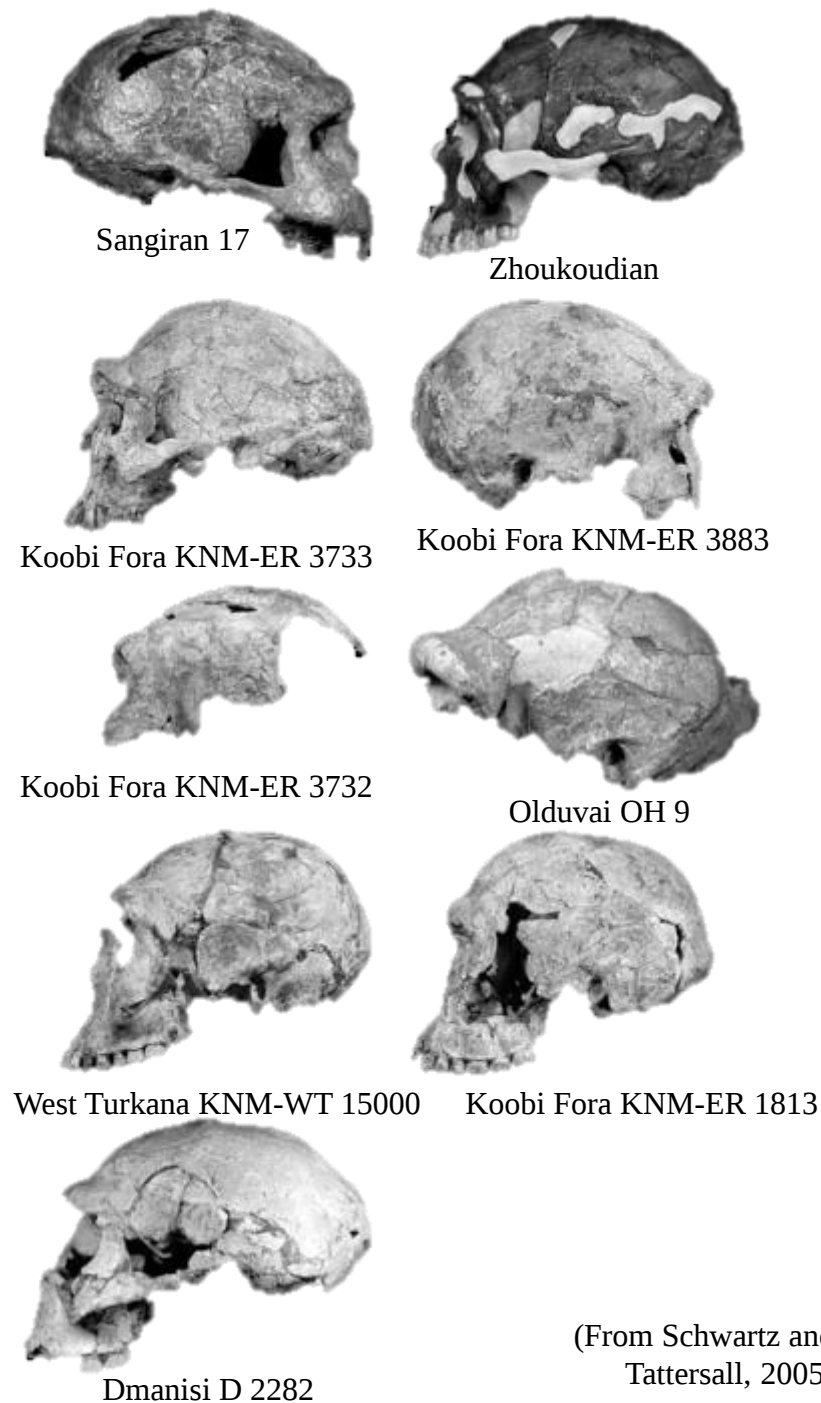


Principali siti con resti di *Homo ergaster*

Temporal distribution of *H. erectus* sites



(Henke & Tattersall, 2007)



(From Schwartz and Tattersall, 2005)

Frontale sfuggente

Toro sopraorbitario spesso



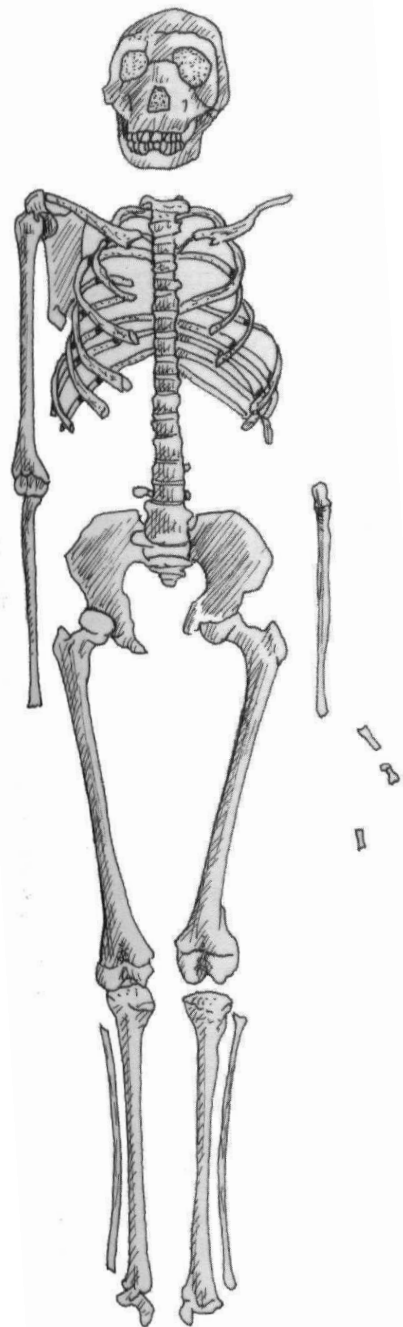
Linee temporali marcate

Restringimento retroorbitario



Solco sopratorale

OH9, calvario incompleto da Olduvai
(caratteri condivisi con le forme asiatiche)

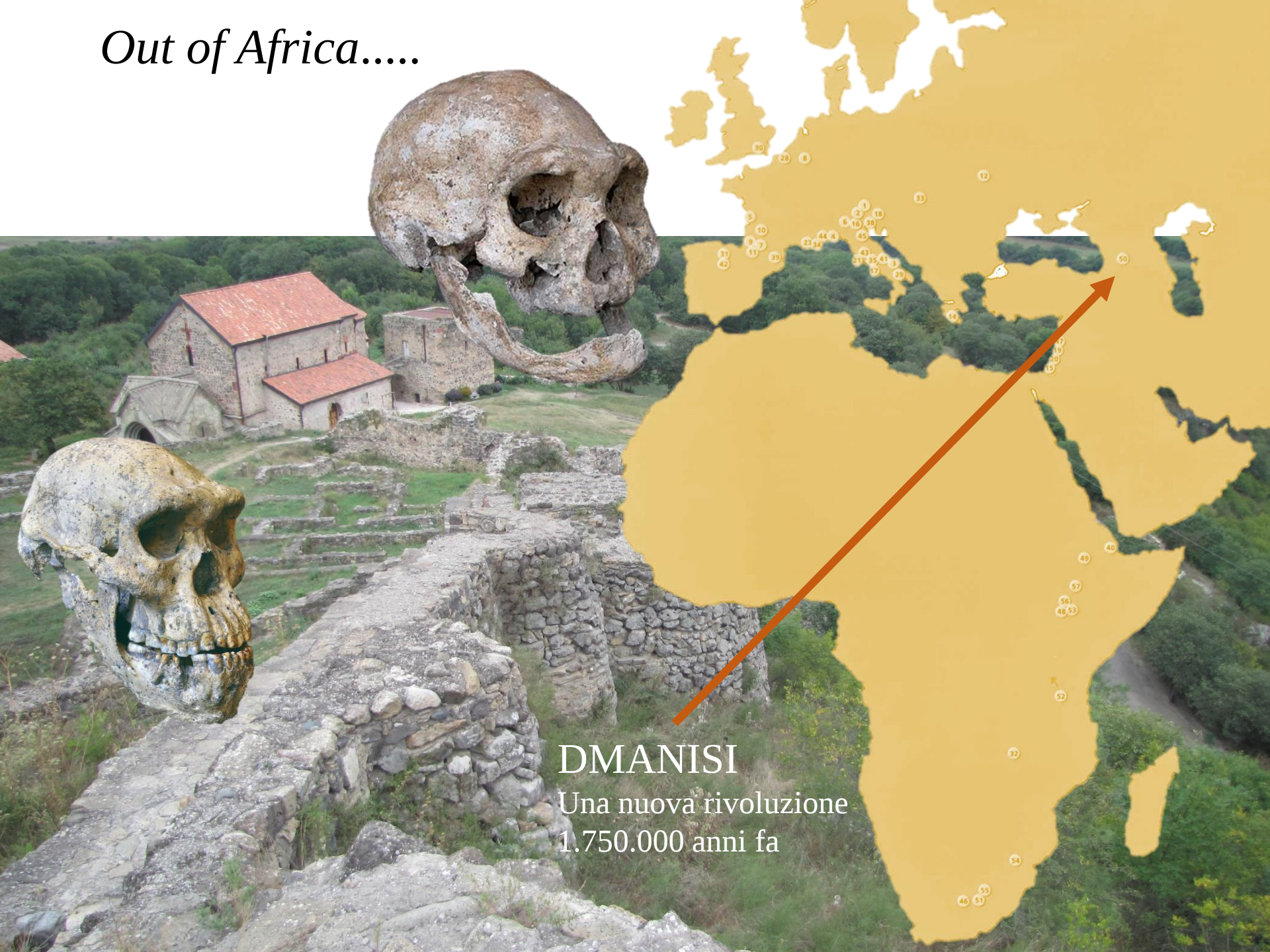


Scheletro di *Homo ergaster* (KNM-WT 15000)
scoperto a Nariokotome (Kenya) e datato a circa
1,6 milioni di anni BP

Out of Africa.....



Out of Africa.....



DMANISI

Una nuova rivoluzione
1.750.000 anni fa

Out of Africa.....

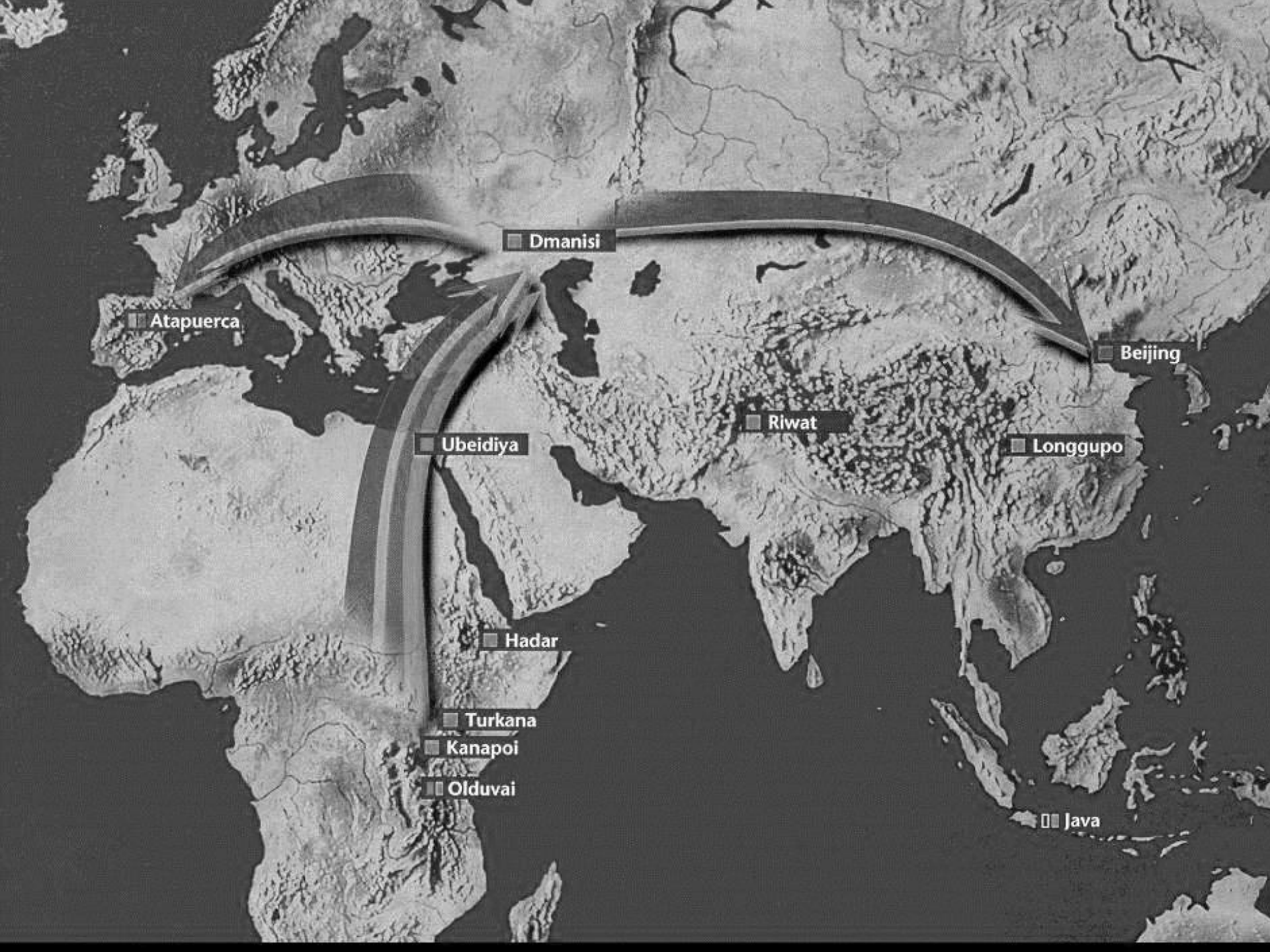
La stratigrafia del sito inizia con una colata basaltica di 4 m di spessore.

La colata su cui si sono insediati gli ominidi è datata a più di 1,8 milioni di anni BP





Campagna di scavo 2002



■ Dmanisi

■ Atapuerca

■ Ubeidiya

■ Hadar

■ Turkana

■ Kanapoi

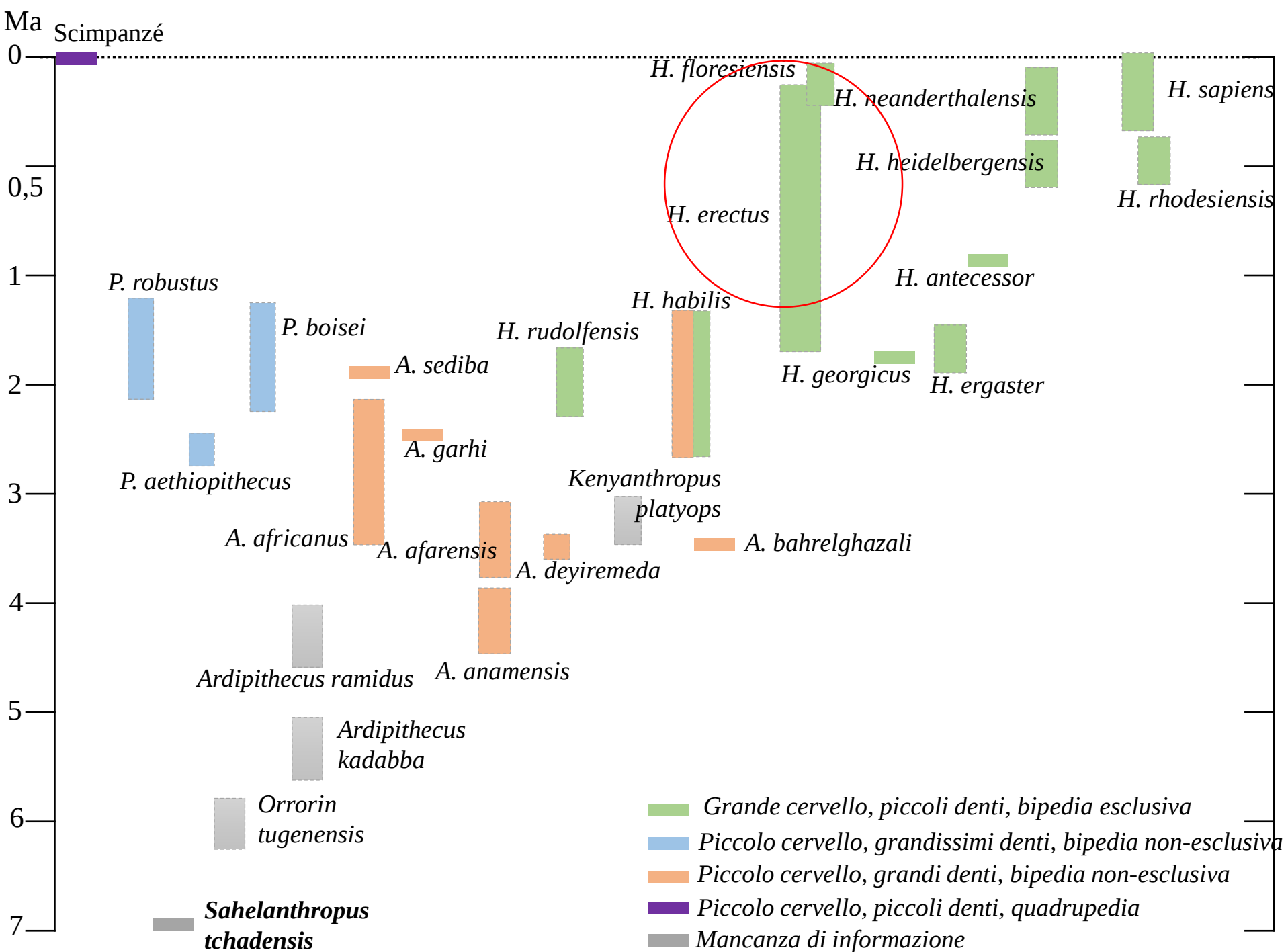
■ Olduvai

■ Riwat

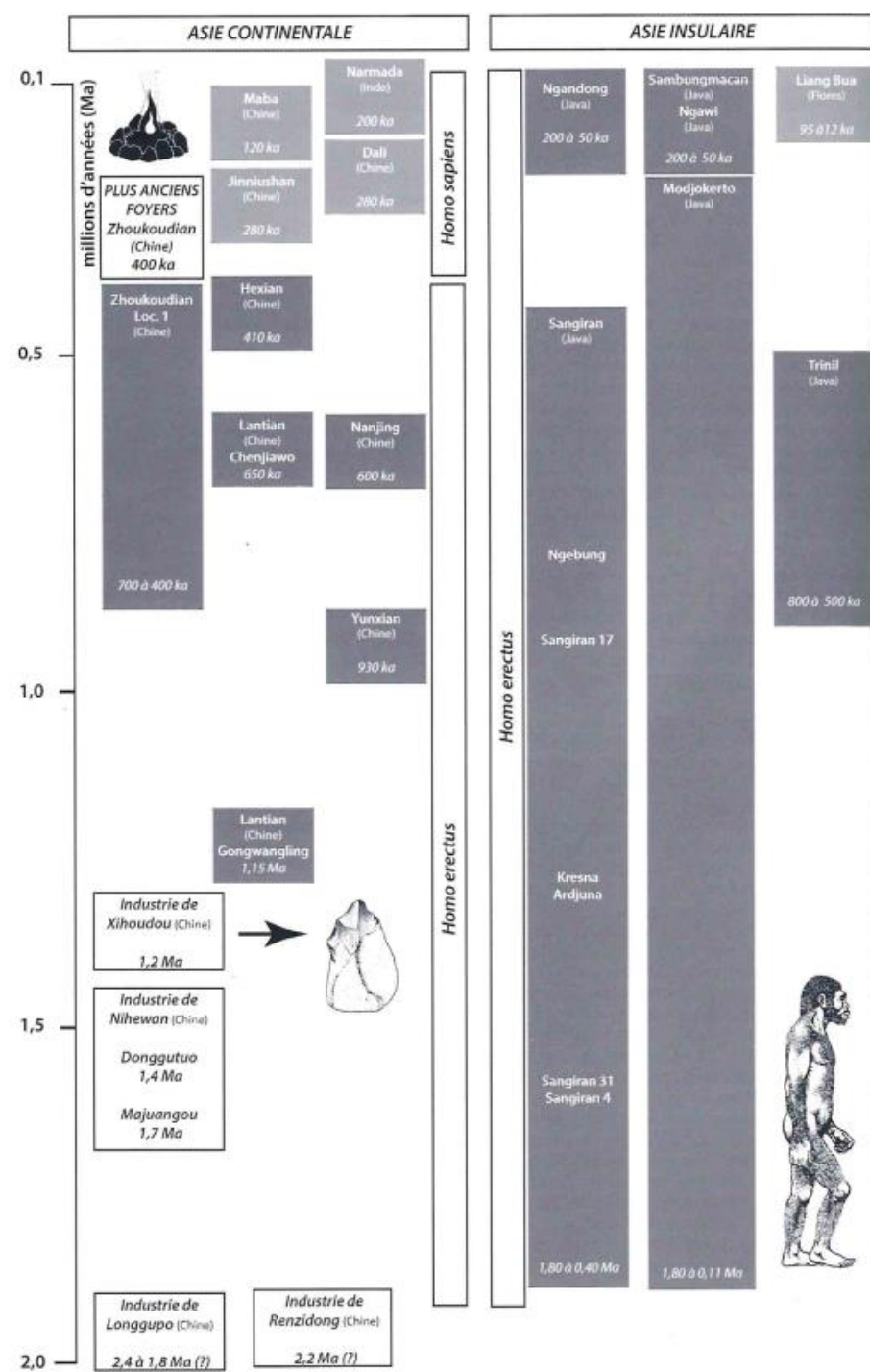
■ Longgupo

■ Beijing

□ Java

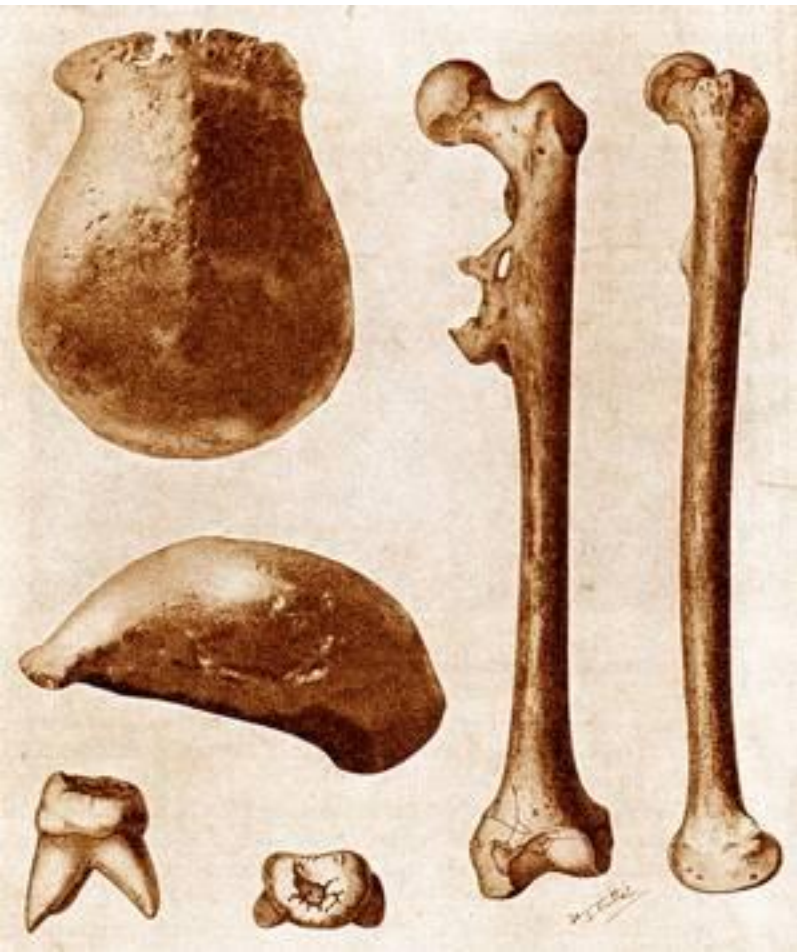


A bronze sculpture of a Neanderthal head and shoulders. The figure has a large, robust build, a thick, dark beard, and a prominent brow. The sculpture is shown in a three-quarter view, looking slightly to the left. The background is plain white.



Out of Africa.....chi?

- L'olotipo di *H. erectus* è il cranio di Trinil (Java)
- Appartengono alla stessa specie i crani di Zhoukoudian (Cina), Sangiran e Ngandong
- ... ritrovamenti africani?



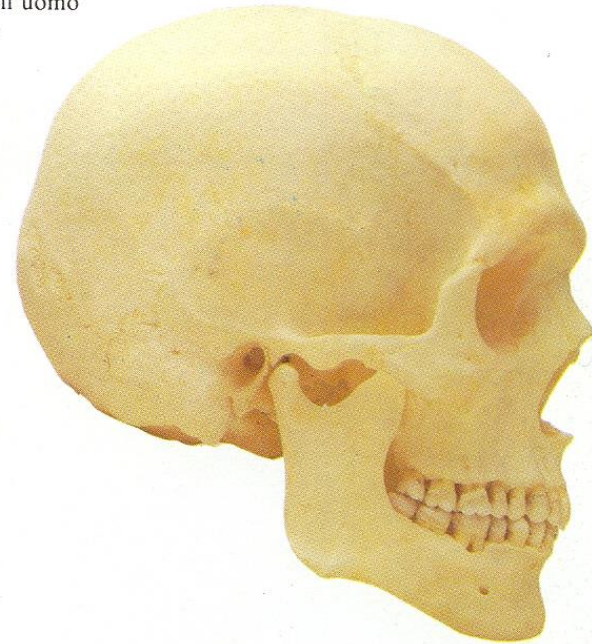
Più antichi fossili africani: *Homo ergaster*
Fossili più recenti: *Homo erectus*

cranio dell'*Homo erectus*, «uomo di Pechino»



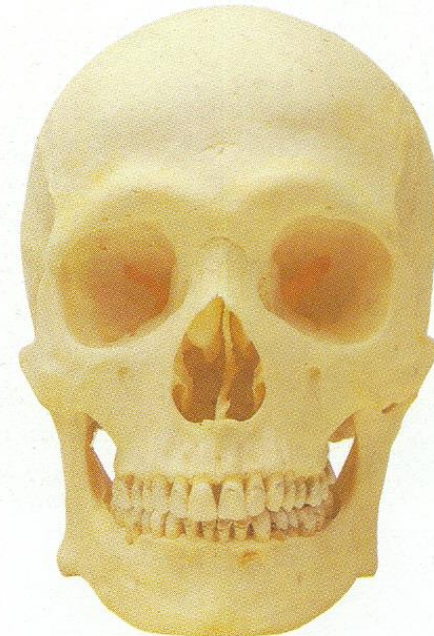
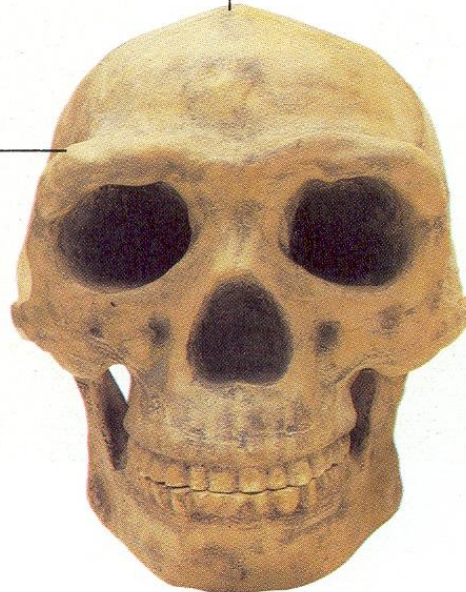
spessa cresta sulla
parte posteriore del
cranio

cranio dell'uomo
moderno



apice del cranio
carenato

arcata sopraorbitale
dritta e spessa



LETTERS

Hominins on Flores, Indonesia, by one million years ago

Adam Brumm¹, Gitte M. Jensen², Gert D. van den Bergh^{1,3}, Michael J. Morwood¹, Iwan Kurniawan⁴, Fachroel Aziz⁴ & Michael Storey²

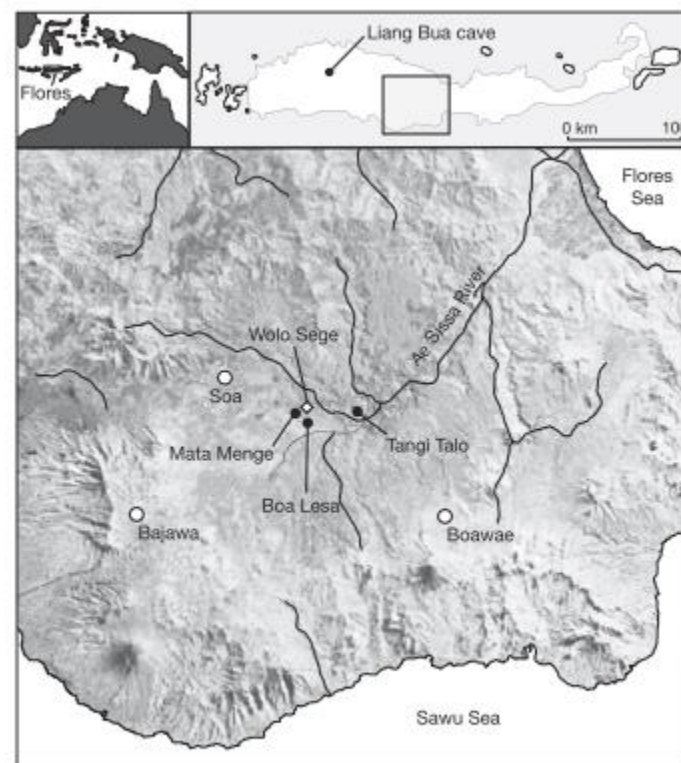
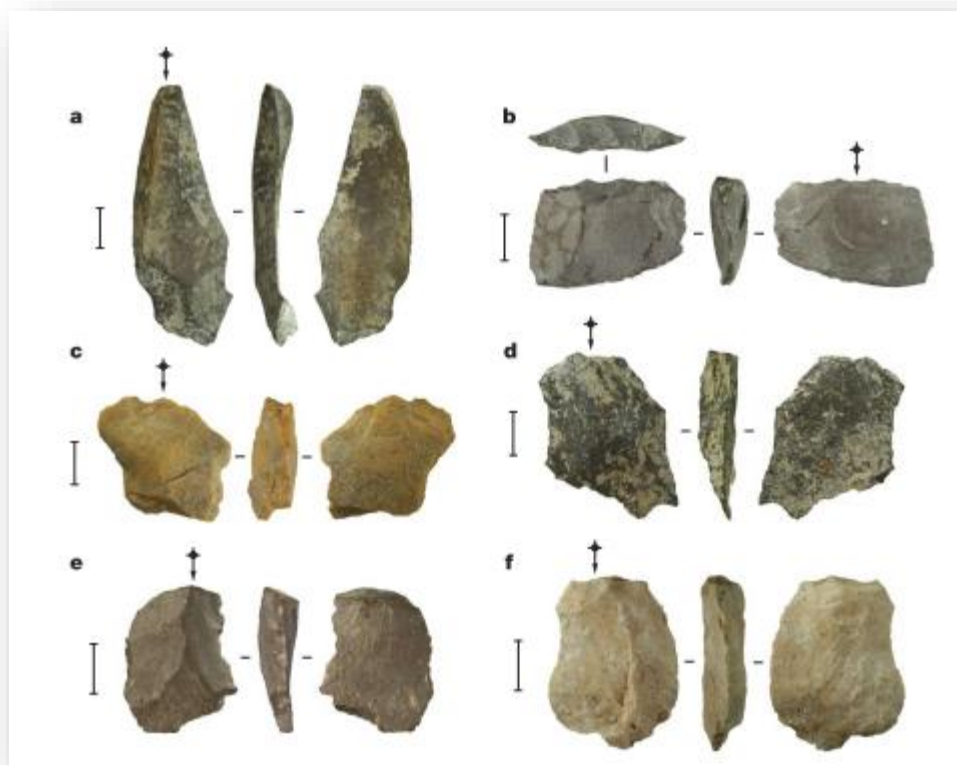


Figure 1 | Map of Flores showing the location of Wolo Sege. Also shown are other key early- or middle-Pleistocene archaeological and palaeontological localities in the Soa Basin mentioned in the text, and the late-Pleistocene Liang Bua cave in western Flores. (Base maps courtesy of D. Hobbs.)

A new small-bodied hominin from the Late Pleistocene of Flores, Indonesia

P. Brown¹, T. Sutikna², M. J. Morwood¹, R. P. Soejono², Jatmiko², E. Wayhu Saptomo² & Rokus Awe Due²

¹Archaeology & Palaeoanthropology, School of Human & Environmental Studies, University of New England, Armidale, New South Wales 2351, Australia

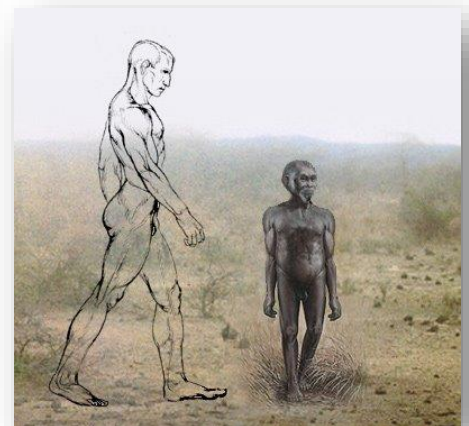
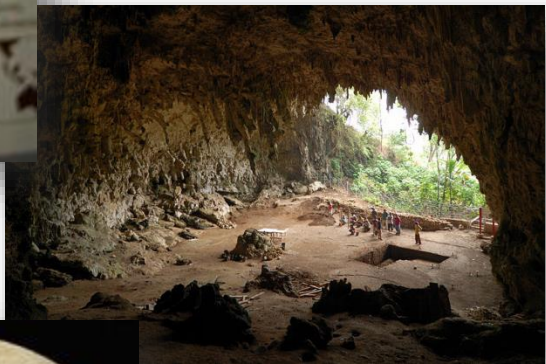
²Indonesian Centre for Archaeology, Jl. Raya Condet Pejaten No. 4, Jakarta 12001, Indonesia

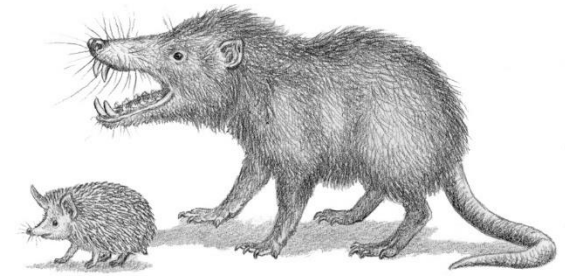
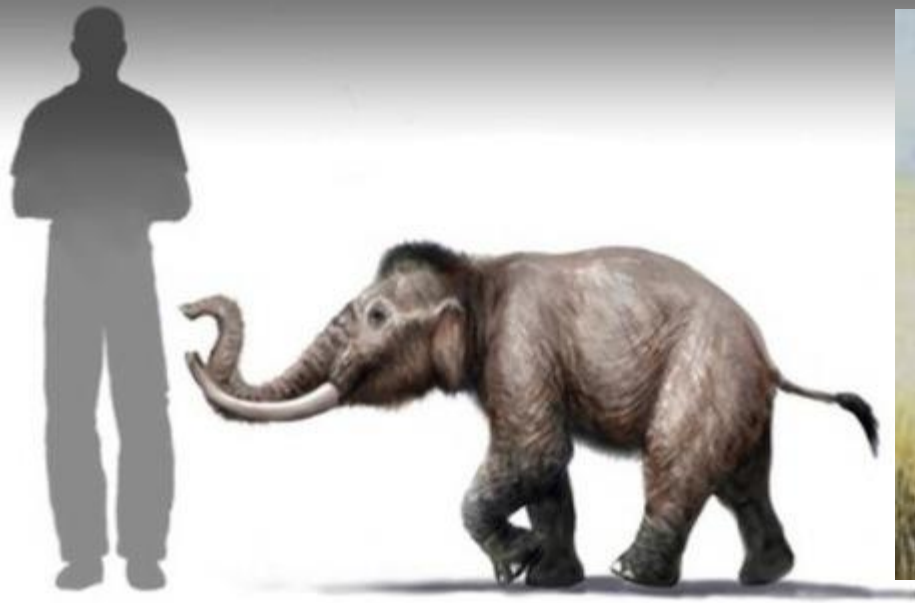
Currently, it is widely accepted that only one hominin genus, *Homo*, was present in Pleistocene Asia, represented by two species, *Homo erectus* and *Homo sapiens*. Both species are characterized by greater brain size, increased body height and smaller teeth relative to Pliocene *Australopithecus* in Africa. Here we report the discovery, from the Late Pleistocene of Flores, Indonesia, of an adult hominin with stature and endocranial volume approximating 1 m and 380 cm³, respectively—equal to the smallest-known australopithecines. The combination of primitive and derived features assigns this hominin to a new species, *Homo floresiensis*. The most likely explanation for its existence on Flores is long-term isolation, with subsequent endemic dwarfing, of an ancestral *H. erectus* population. Importantly, *H. floresiensis* shows that the genus *Homo* is morphologically more varied and flexible in its adaptive responses than previously thought.

Description of *Homo floresiensis*

Order Primates Linnaeus, 1758
Suborder Anthropoidea Mivart, 1864
Superfamily Hominoidea Gray, 1825
Family Hominidae Gray, 1825
Tribe Hominini Gray, 1825
Genus *Homo* Linnaeus, 1758
Homo floresiensis sp. nov.

Horizon. The type specimen LB1 was found at a depth of 5.9 m in Sector VII of the excavation at Liang Bua. It is associated with calibrated accelerator mass spectrometry (AMS) dates of approximately 18 kyr and bracketed by luminescence dates of 35 ± 4 kyr and 14 ± 2 kyr. The referred isolated left P₃ (LB2) was recovered just below a disconformity at 4.7 m in Sector IV, and bracketed by a U-series date of 37.7 ± 0.2 kyr on flowstone, and 20 cm above an electron-spin resonance (ESR)/U-series date of 74^{+14}_{-12} kyr on a *Stegodon* molar.





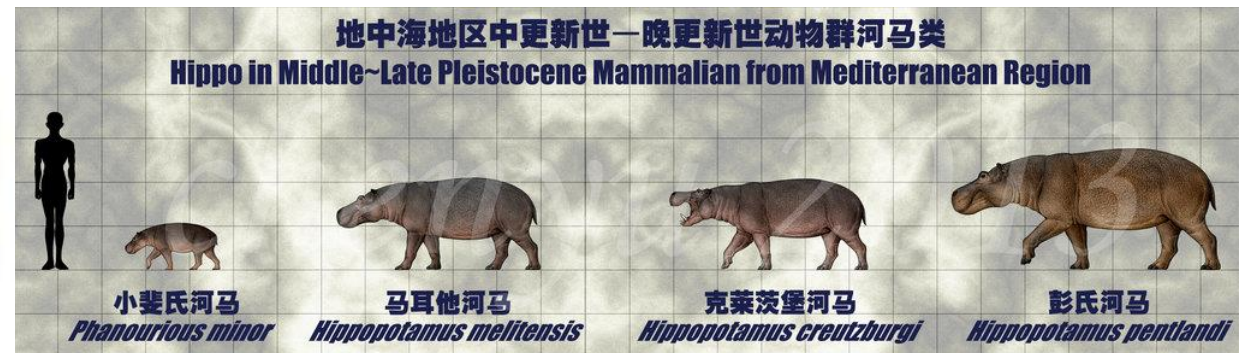
Insular endemism:

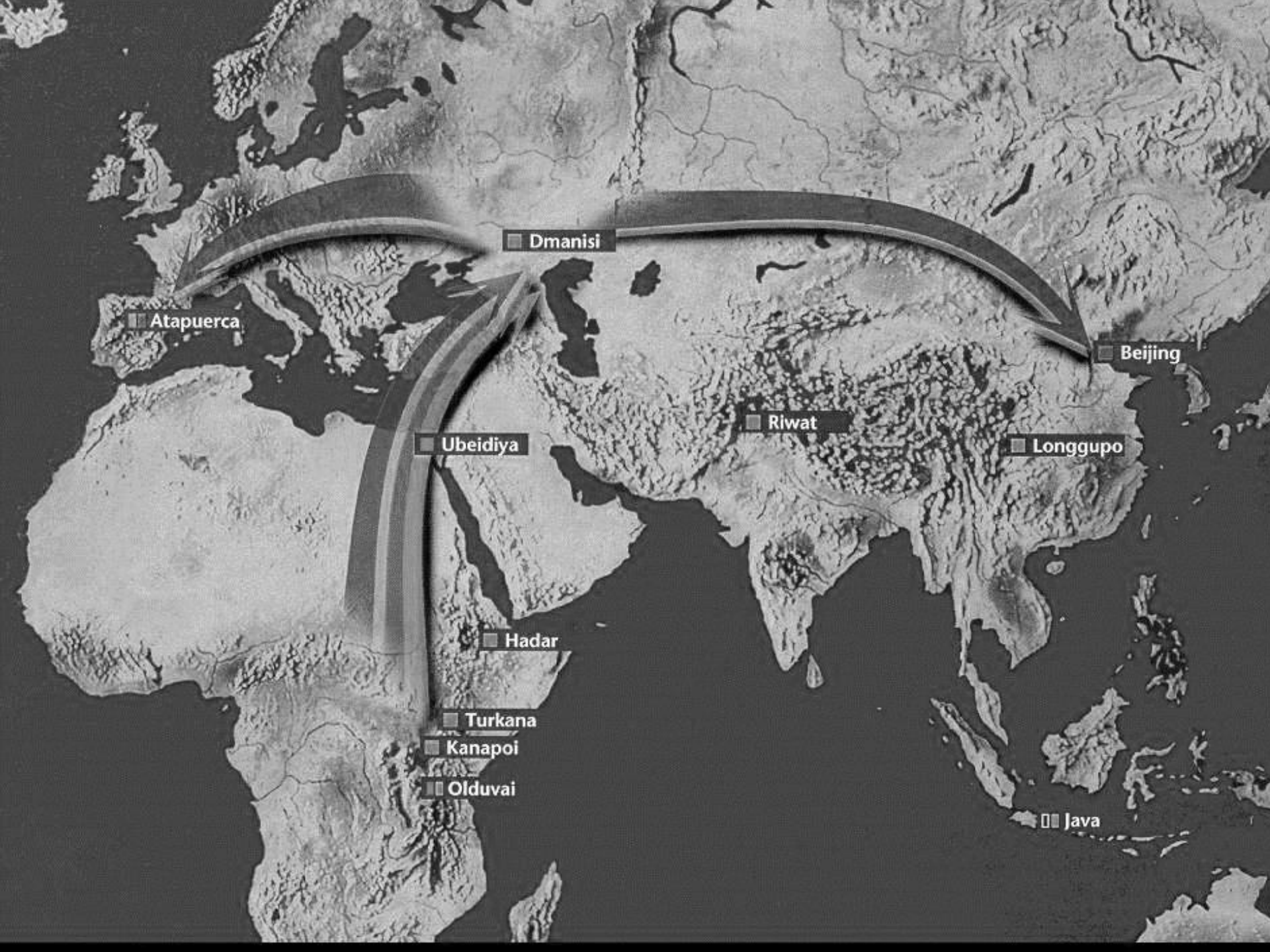
Limited resources

Absence of large predators

Genetic drift

« the smallest become large and the largest become small »





Dmanisi

Atapuerca

Ubeidiya

Hadar

Turkana

Kanapoi

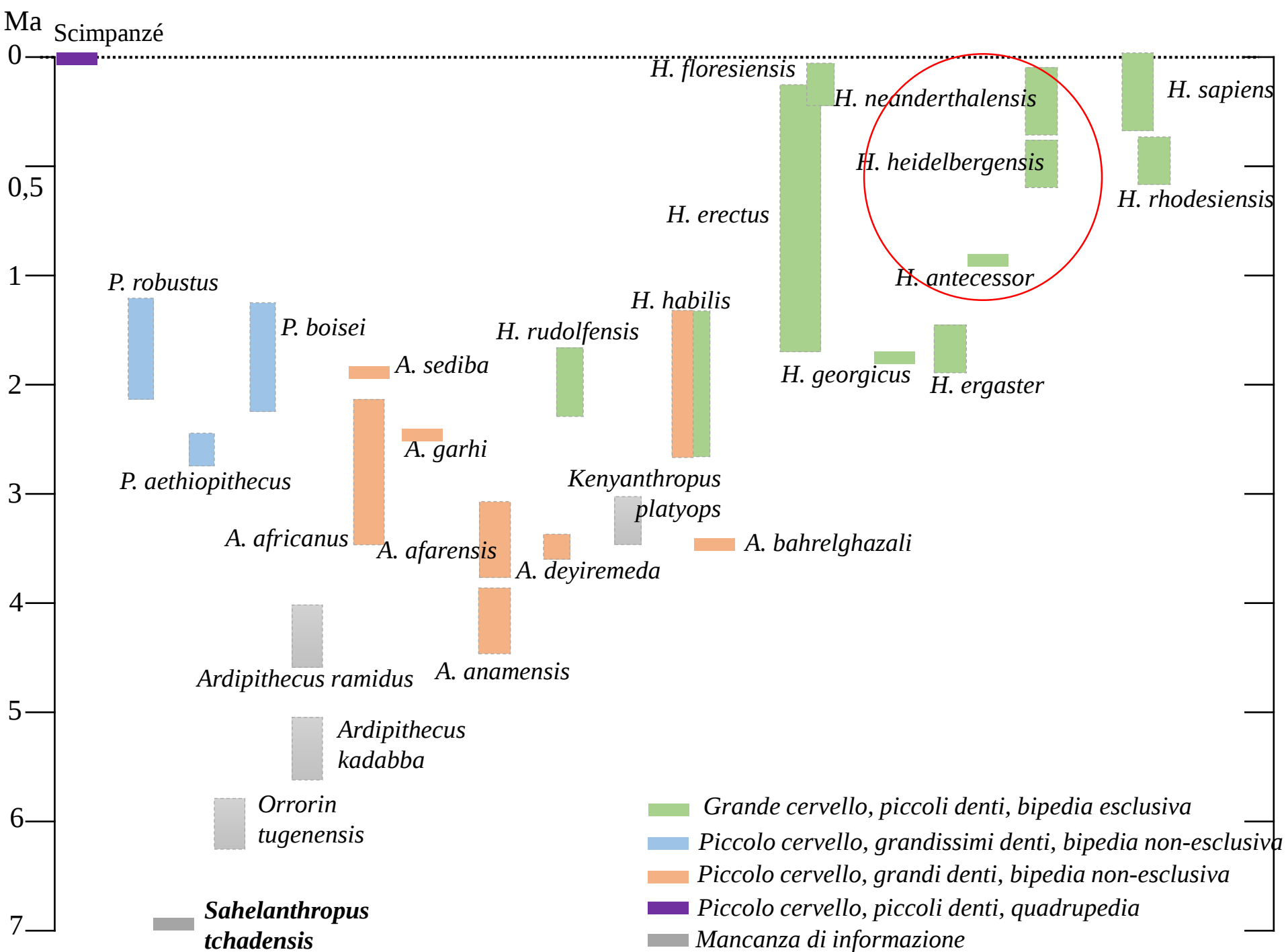
Olduvai

Riwat

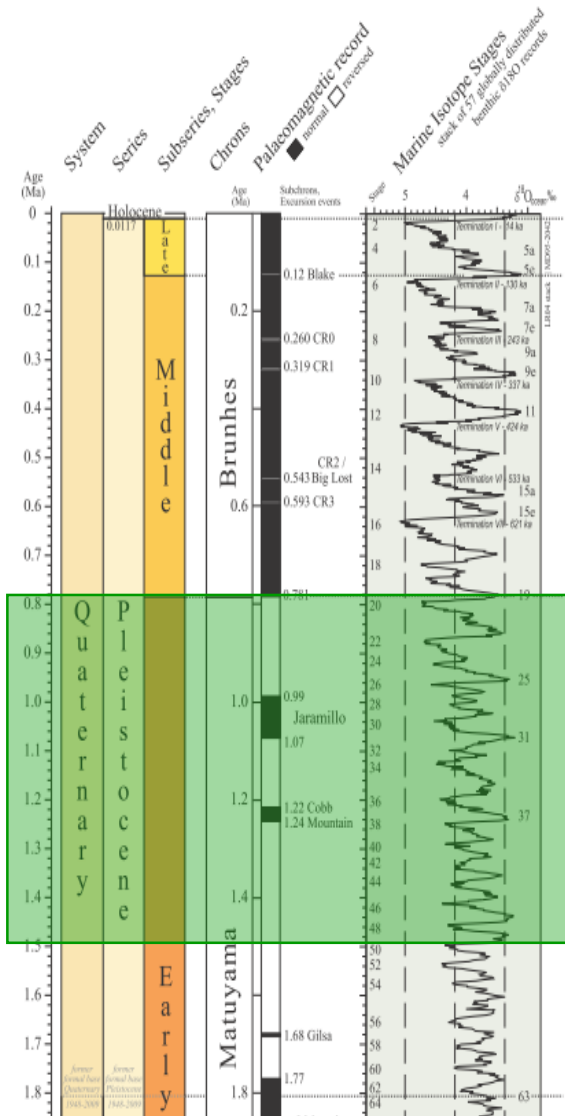
Longgupo

Beijing

Java



Origine : Prime testimonianze del popolamento europeo



(Cohen & Cibbard, 2010)

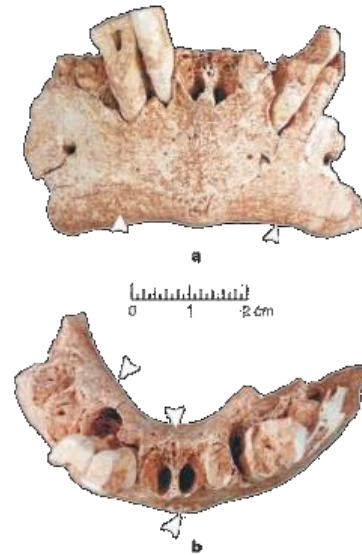


Origine : Il primo popolamento europeo

Anteneandertaliani : non hanno acquisito nessuna delle apomorfie dei neandertaliani

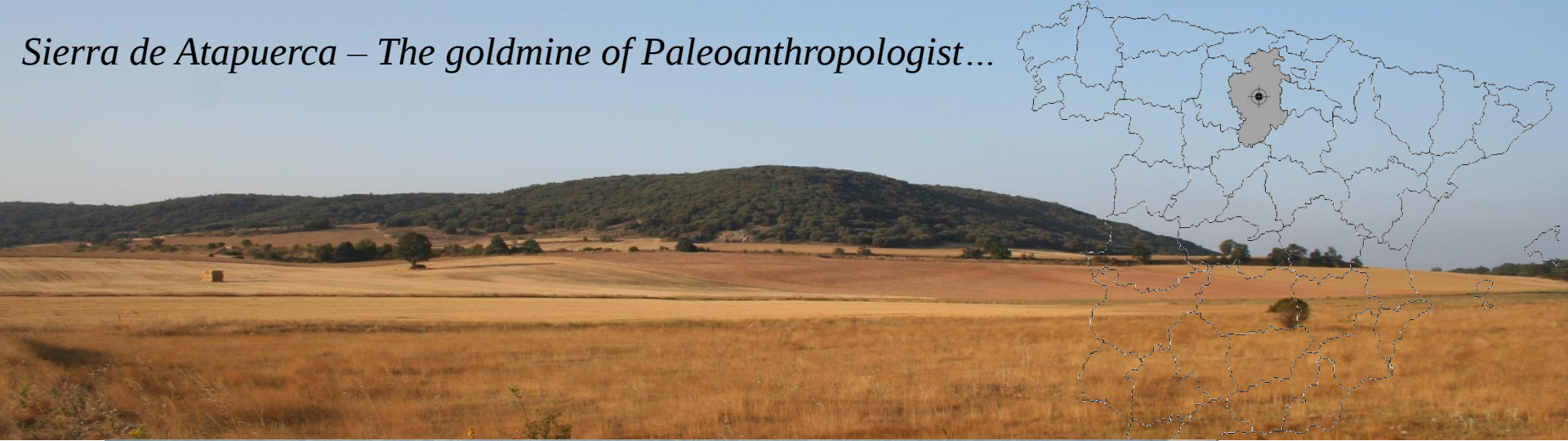


Gran Dolina
Homo antecessor 0,8
Myr (TD6)



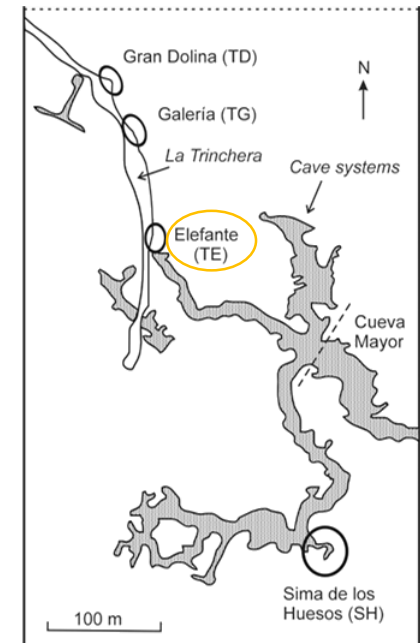
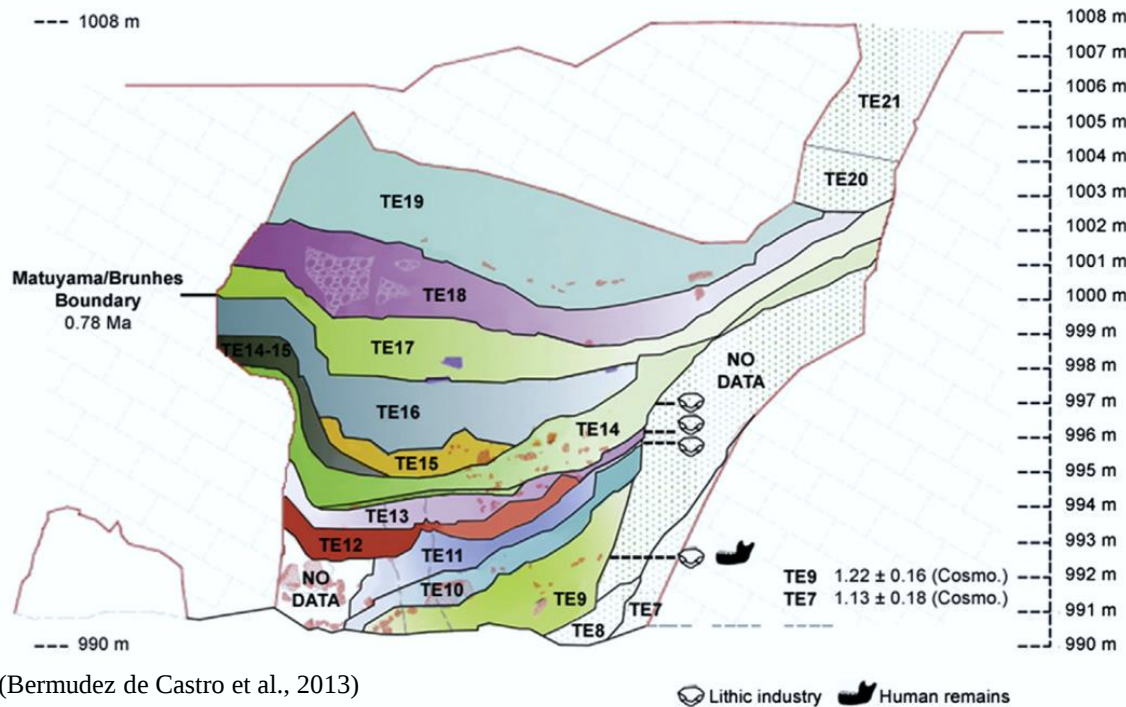
Sima del Elefante
Homo sp.
1,3 Myr (Mandible ATE9-1)

Sierra de Atapuerca – The goldmine of Paleoanthropologist...



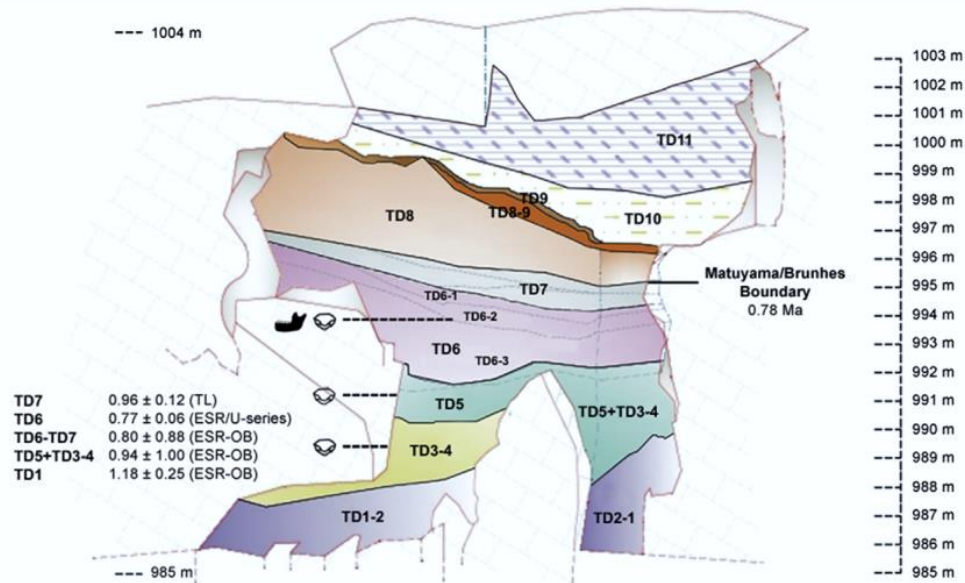
Javier Trueba / Madrid Scientific Films

Sima del Elefante

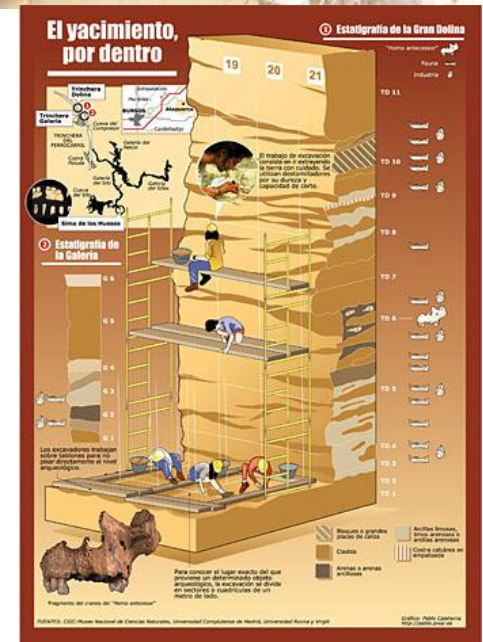


(Bermudez de Castro et al., 2013)

Gran Dolina and the *Homo antecessor* hypodigm



(Bermudez de Castro et al., 2013)





Livello TD6 – c. 800 ka BP

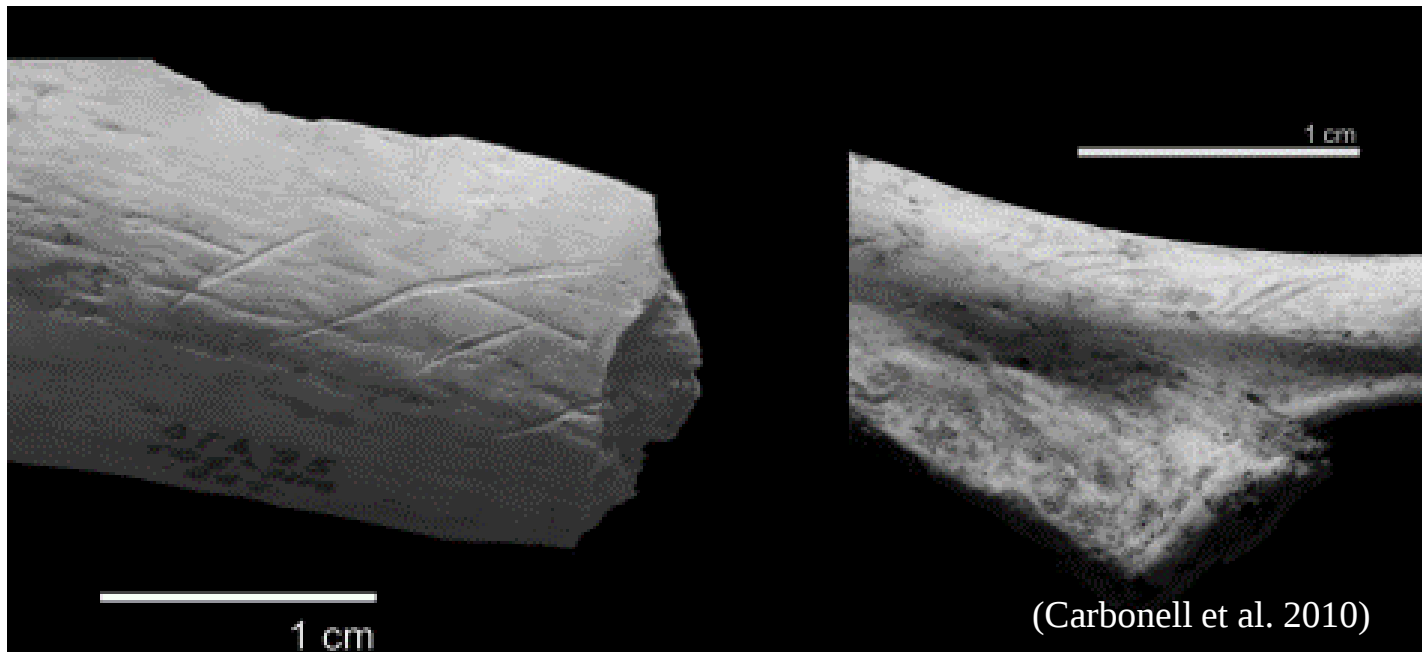
NMI: 2 adulti, 3 adolescenti, 6 bambini

Interpretazione

- cannibalismo gastronomico (Fernandez-Jalvo et al. 1999)
- Cannibalismo culturale (Carbonell et al., 2010)
- Violenza e cannibalismo intergruppo; excocannibalismo (Saladié et al., 2012)

Tracce di macellazione su la diafisi
di una tibia, interpretate come
tracce di scarnificazione

Costola umana con
incisione



(Carbonell et al. 2010)

Origine : Il primo popolamento europeo

I Preneandertaliani : Si cominciano ad individuare alcune apomorfie.

Le prime caratteristiche morfologiche di tale popolazione si osservano attorno a 350-400.000 anni fa, sui fossili dell'Arago (Francia) e di Sima de los Huesos (Spagna).



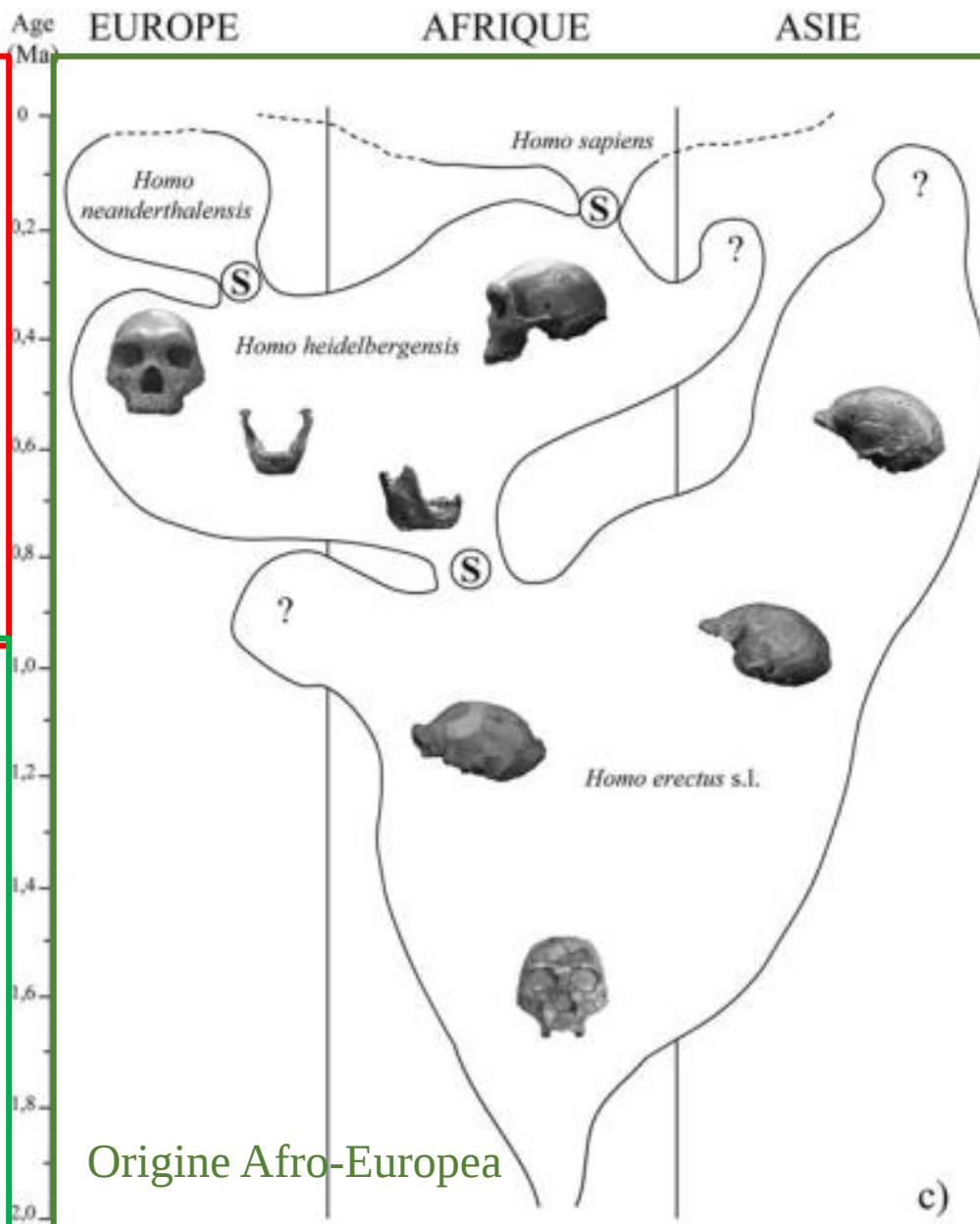
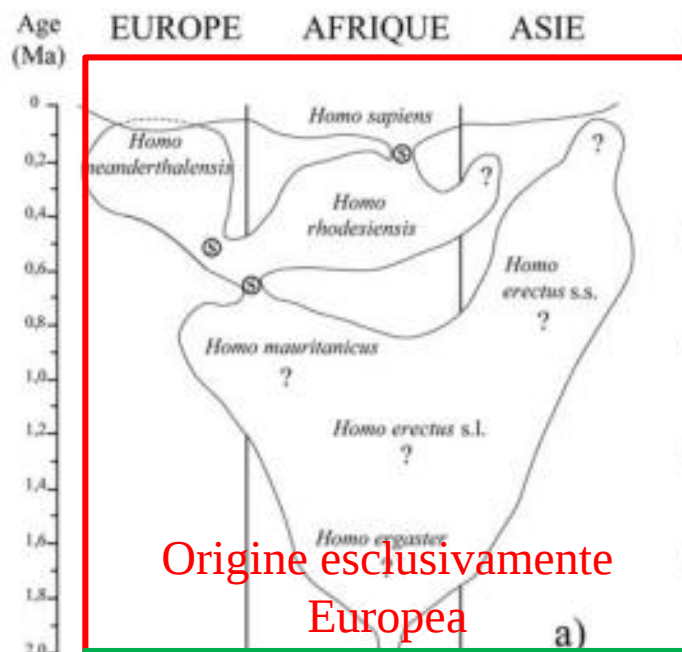
Arago 21



Atapuerca 5

L'Homo heidelbergensis presenta un mosaico di caratteri.

I caratteri derivati compaiono in un modo discontinuo, ma sono sistematicamente rappresentati negli ultimi Neanderthal.

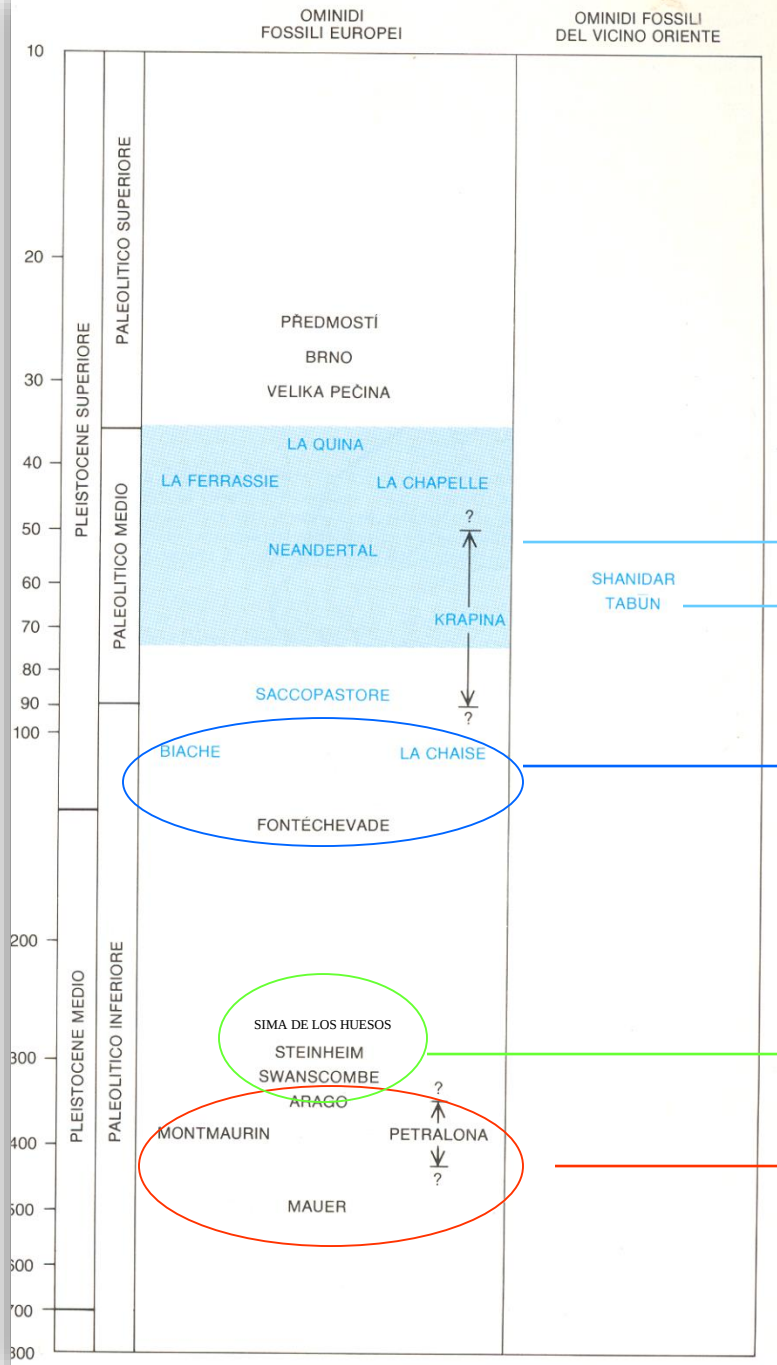


Definizione dei Neandertaliani s.s.

L'uomo di Neanderthal si caratterizza per la presenza di:

- **Caratteri arcaici / Plesiomorfie** : dei caratteri ancestrali che non si ritrovano in nessun fossile moderno.
- **Caratteri condivisi** con *Homo sapiens*.
- **Caratteri derivati / Apomorfie** : presenti solo nei Neandertaliani, peculiari ed identificativi di questa specie.

I Neandertaliani



Neandertaliani classici

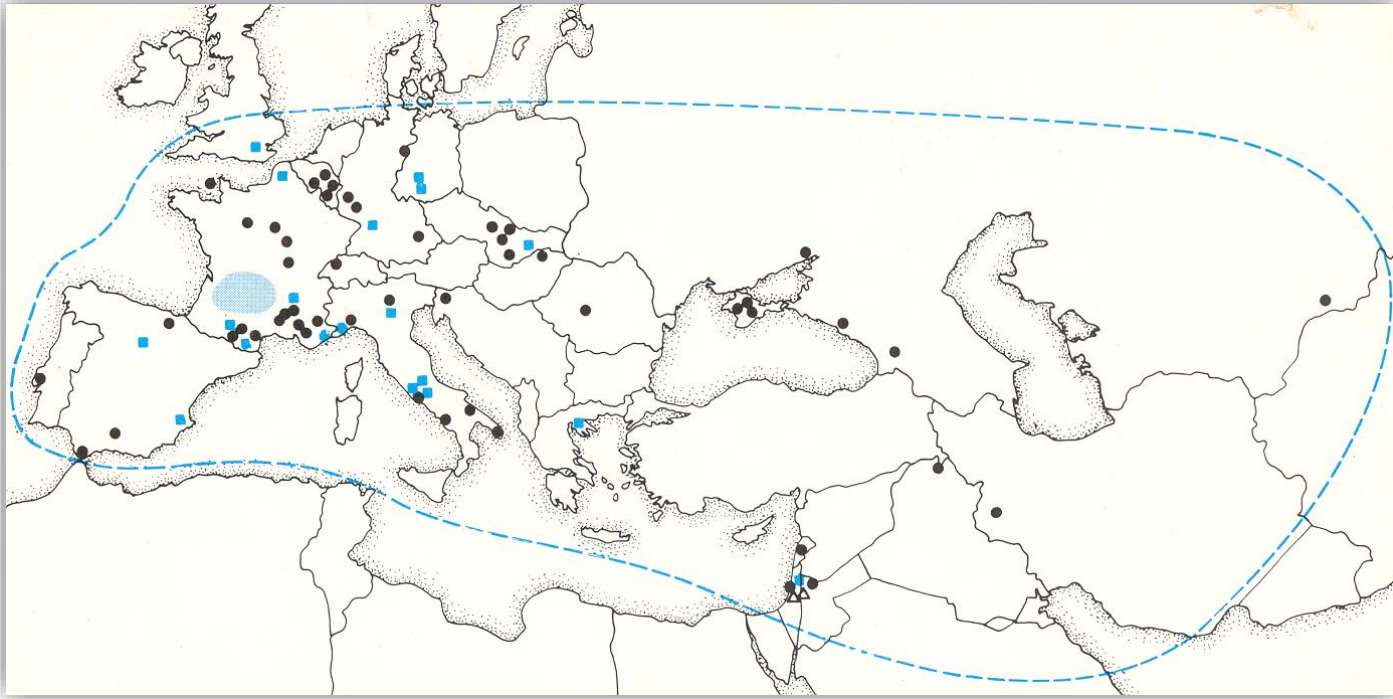
Neandertaliani orientali

III fase (250.000-130.000):
stabilizzazione dei caratteri

II fase (400.000-250.000): regione
nucleare e facciale

I fase (prima di 400.000): regione
infraorbitaria e mandibola

I Neandertaliani



Una speciazione di questi caratteri si osserva nel tempo e nello spazio, infatti i caratteri derivati si mostrano sempre più accentuati man mano che ci si sposta verso Ovest.

→ attorno a 50000 anni in Europa occidentale, gli individui di Neanderthal presentano dei caratteri derivati più pronunciati rispetto agli individui neandertaliani dell'Europa orientale.

Grande capacità cranica 1500-1700 cm³



Il cranio cerebrale è allungato per compensare la faccia voluminosa

La Ferrassie 1



1,65m – 1,55m

Scheletro robusto con inserzioni muscolari robuste.

Vertebre cervicali che denotano un collo corto e tozzo

Muscolatura dorsale molto sviluppata

Torace largo, sviluppato lateralmente e verso l'avanti

Il radio presenta una curvatura che denota una grande capacità di movimento.

Clavicola grande e gracile

Mani grandi ma con dita corte: presa potente ed efficace

Significato della morfologia

Evoluzione della linea neandertaliana

Il modello di evoluzione dei Neanderthal è detto ad accrezione: questo gruppo di ominidi si è sviluppato in un parziale o completo isolamento dal resto dell'umanità.

Questo sviluppo è il risultato di un'accumulazione graduale di tratti morfologici distintivi delle popolazioni Europee.

Alcuni studiosi hanno ipotizzato che i tratti neandertaliani si siano sviluppati seguendo un adattamento a delle condizioni climatiche fredde :

Larga cavità nasale

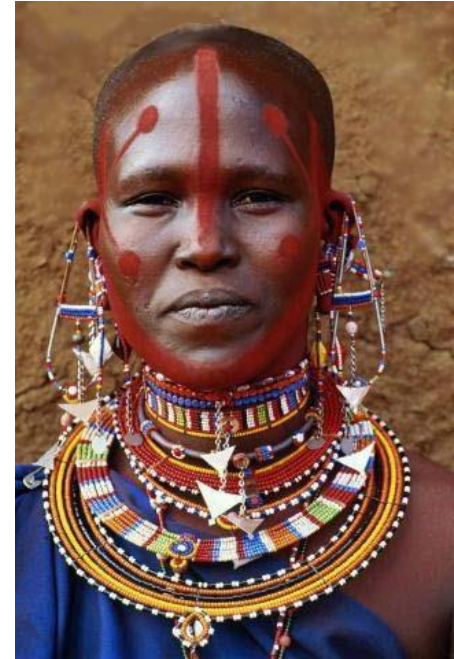
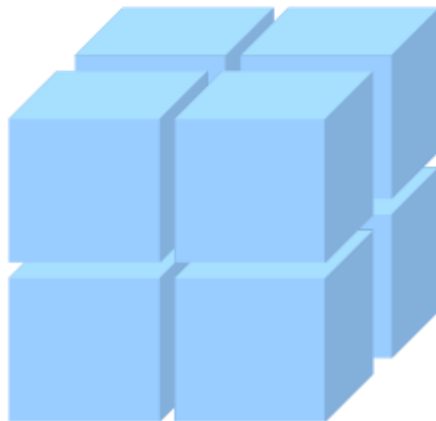
Robustezza

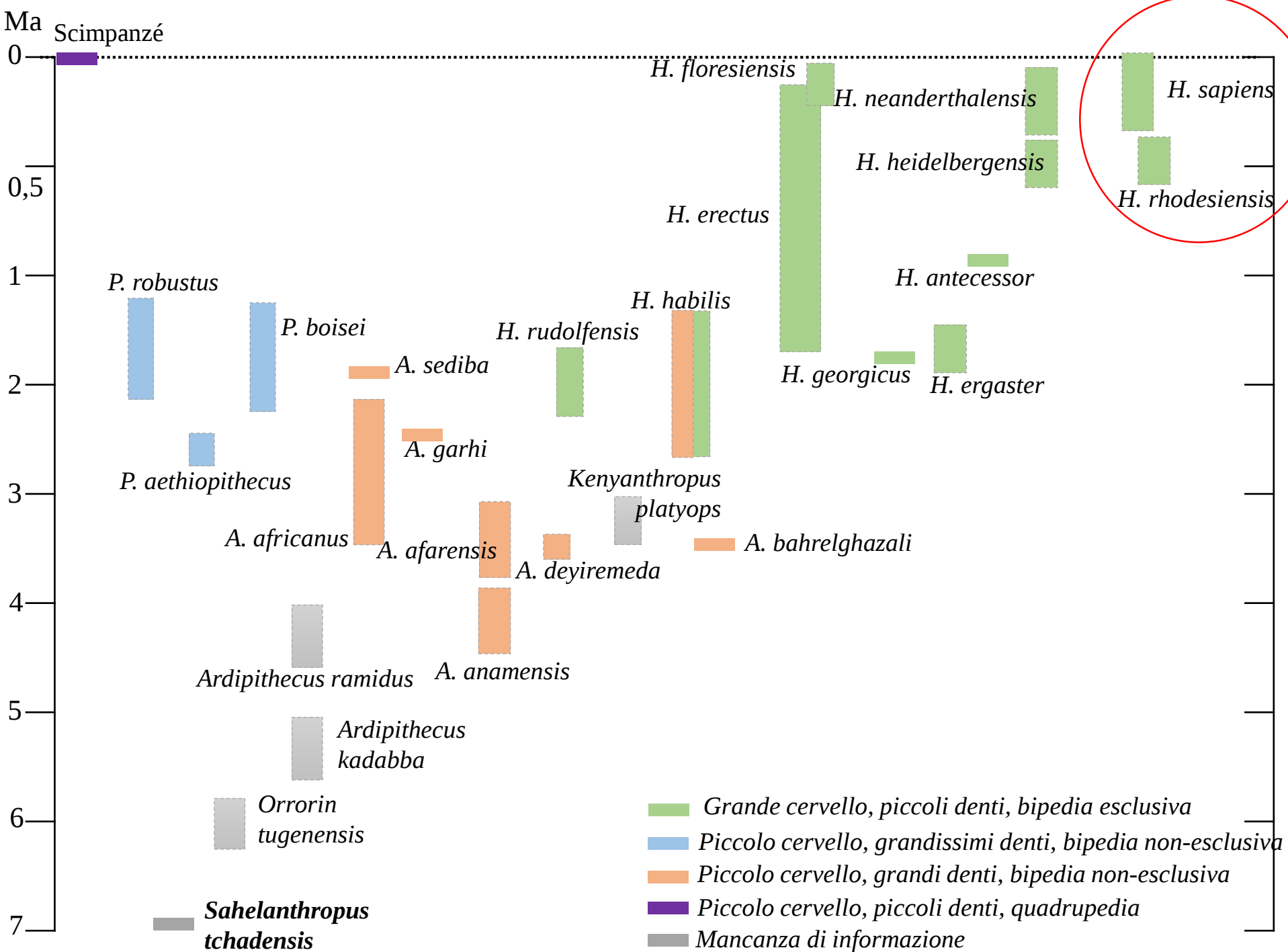
Morfologia tarchiata

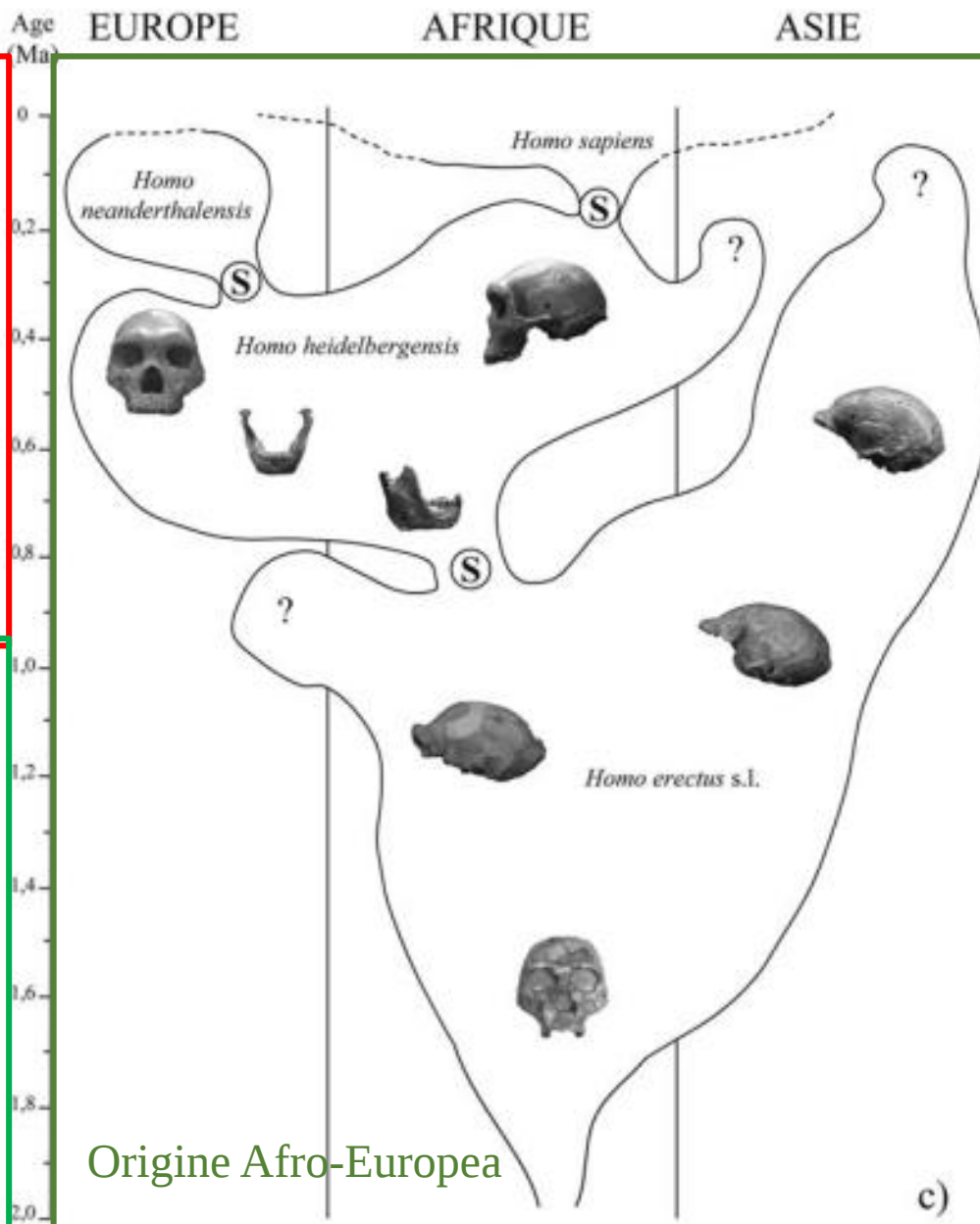
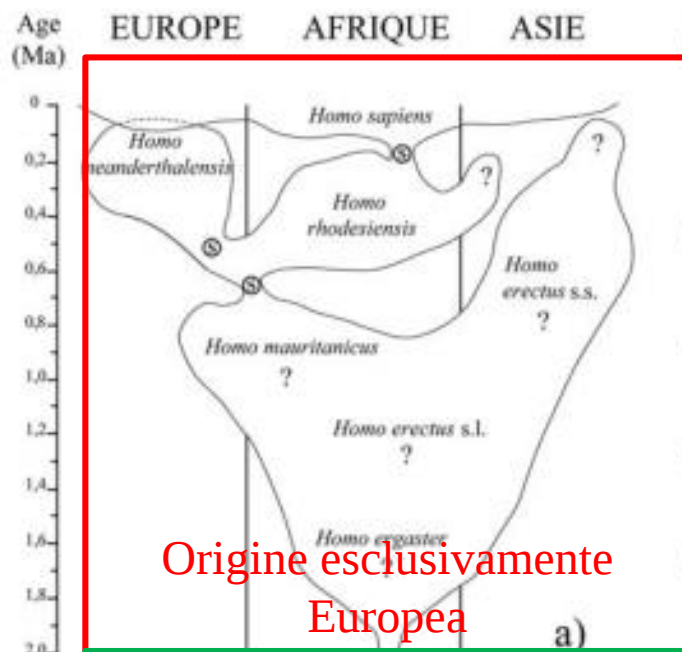


Adattamento al freddo

Regola di Allen : In un clima freddo, gli individui tendono ad essere più larghi e ad avere degli arti più corti rispetto a quelli che vivono in un clima temperato, poiché in questo modo la ritenzione del calore è più efficace (rapporto massa corporea/superficie esposta)

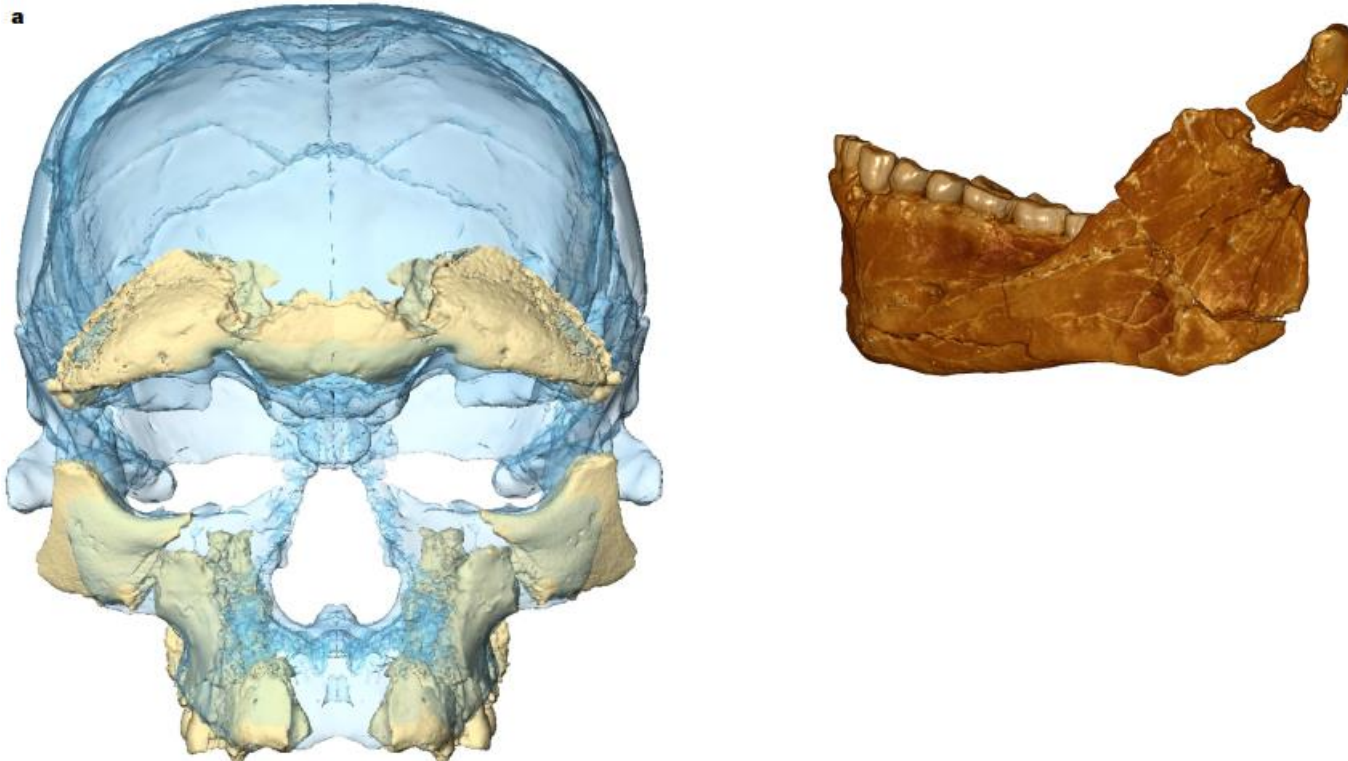




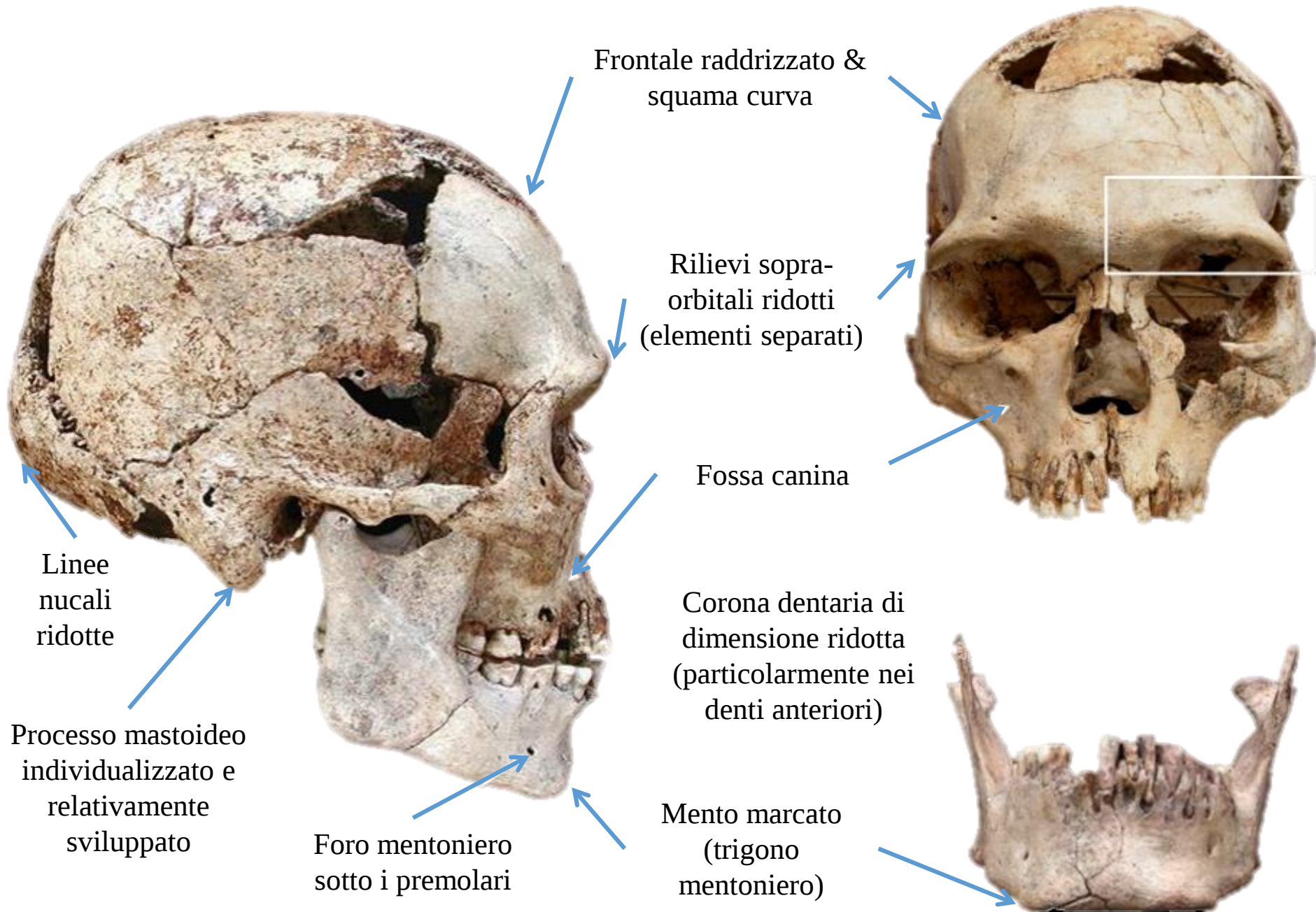


New fossils from Jebel Irhoud, Morocco and the pan-African origin of *Homo sapiens*

Jean-Jacques Hublin^{1,2}, Abdelouahed Ben-Ncer³, Shara E. Bailey⁴, Sarah E. Freidline¹, Simon Neubauer¹, Matthew M. Skinner⁵, Inga Bergmann¹, Adeline Le Cabec¹, Stefano Benazzi⁶, Katerina Harvati⁷ & Philipp Gunz¹

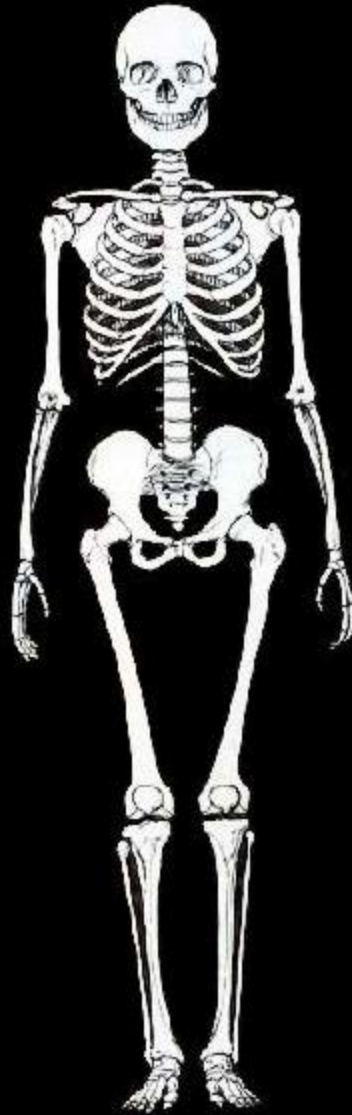


Riduzione globale della robustezza





Homo neanderthalensis



Homo sapiens



Homo ergaster

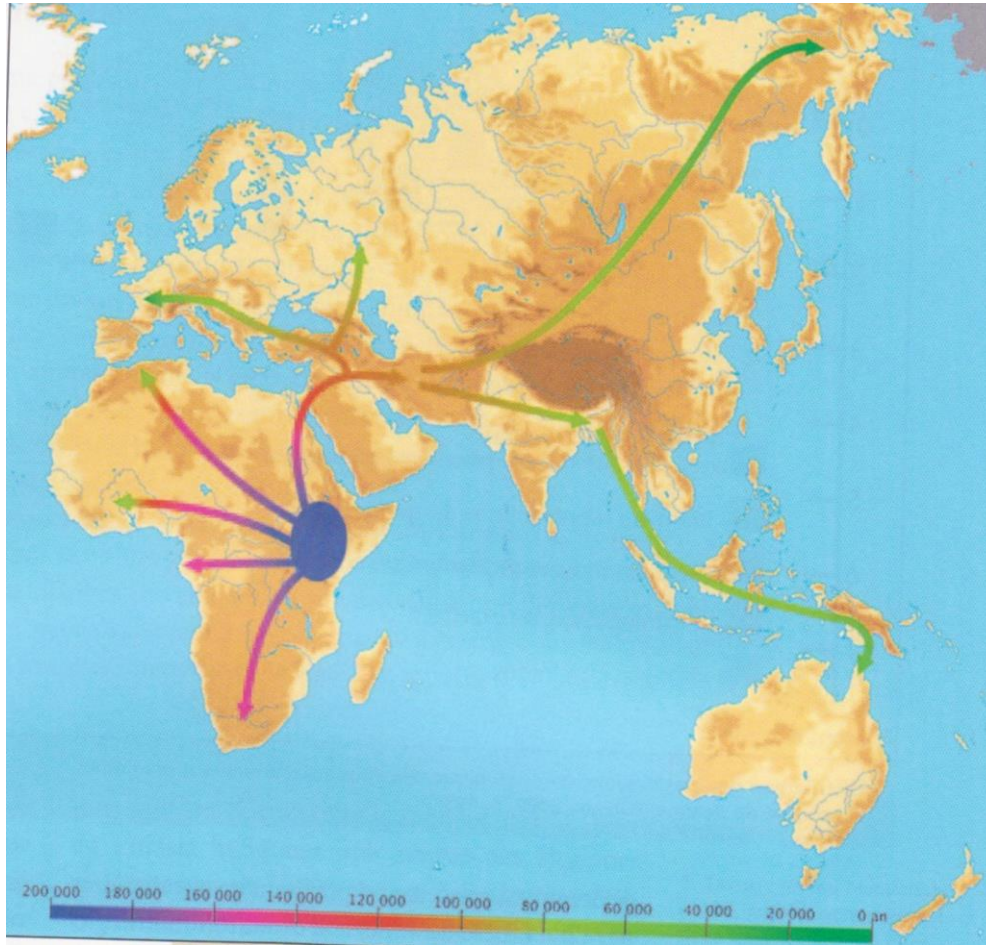
- narrow trunk and pelvis
- low body mass compared to stature
- center of gravity at the level of the 2° sacral vertebra
- vertebral column with marked secondary convexities
- long limbs compared to trunk
- robust and lengthened lower limbs
- lengthening of the distal segments of the limbs
- reduced thickness of cortical bone and large medullar cavity (compared to *Homo erectus*)



- Tronco e bacino stretti
- Massa corporea poco elevata in confronto alla statura
- Centro di gravita situato al livello della seconda vertebra sacra
- Colonna vertebrale a convessità secondarie (verso l'avanti) marcate
- Arti lunghi in confronto al tronco
- Arti inferiori robusti ed allungati
- Allungamento delle porzione distale dei arti
- Spessore ridotta dell'osso corticale ed allargamento delle cavita midollare in confronto a *Homo erectus*

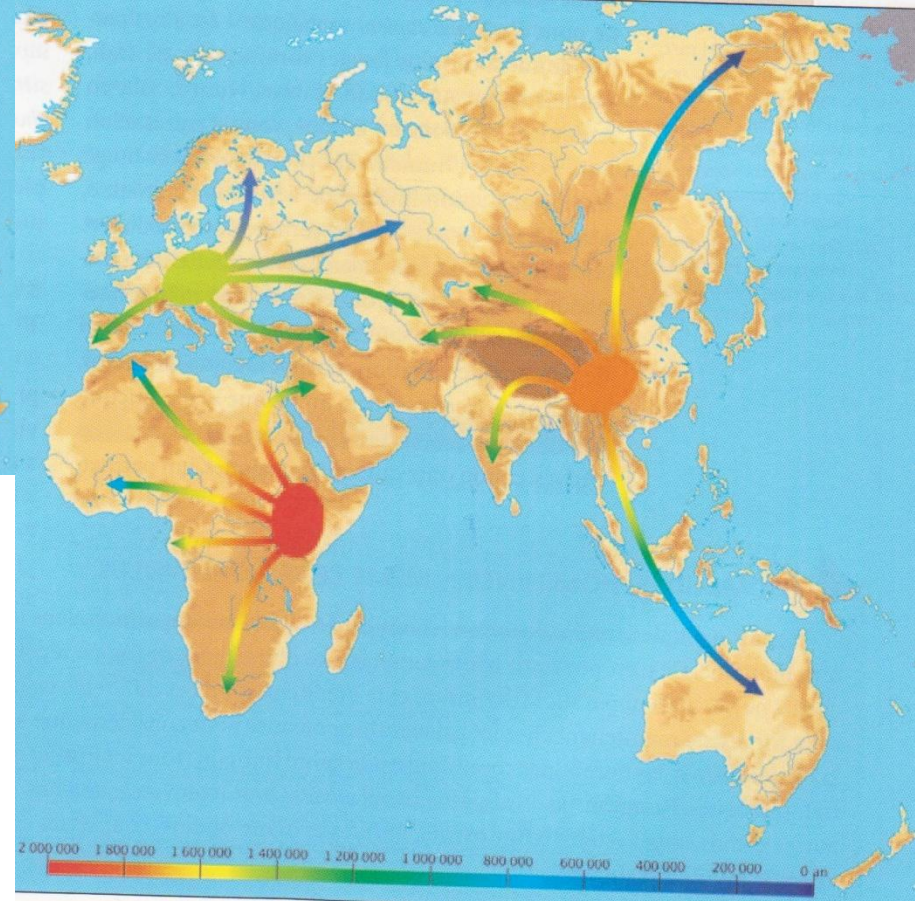
Neandertal
 V. J. J. J. J. J.
 FEB. 08

Origine



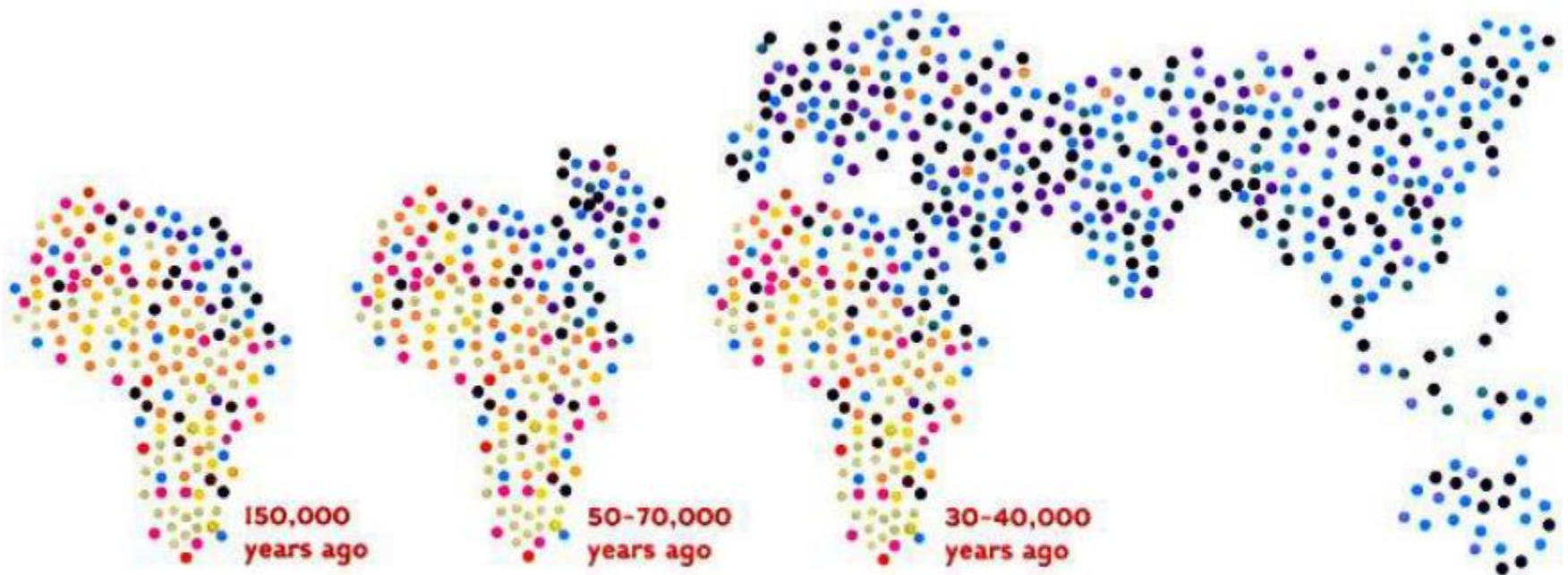
Modello « Out of Africa » o modello di sostituzione

Modello multiregionale



Variabilità del mtDNA attuale

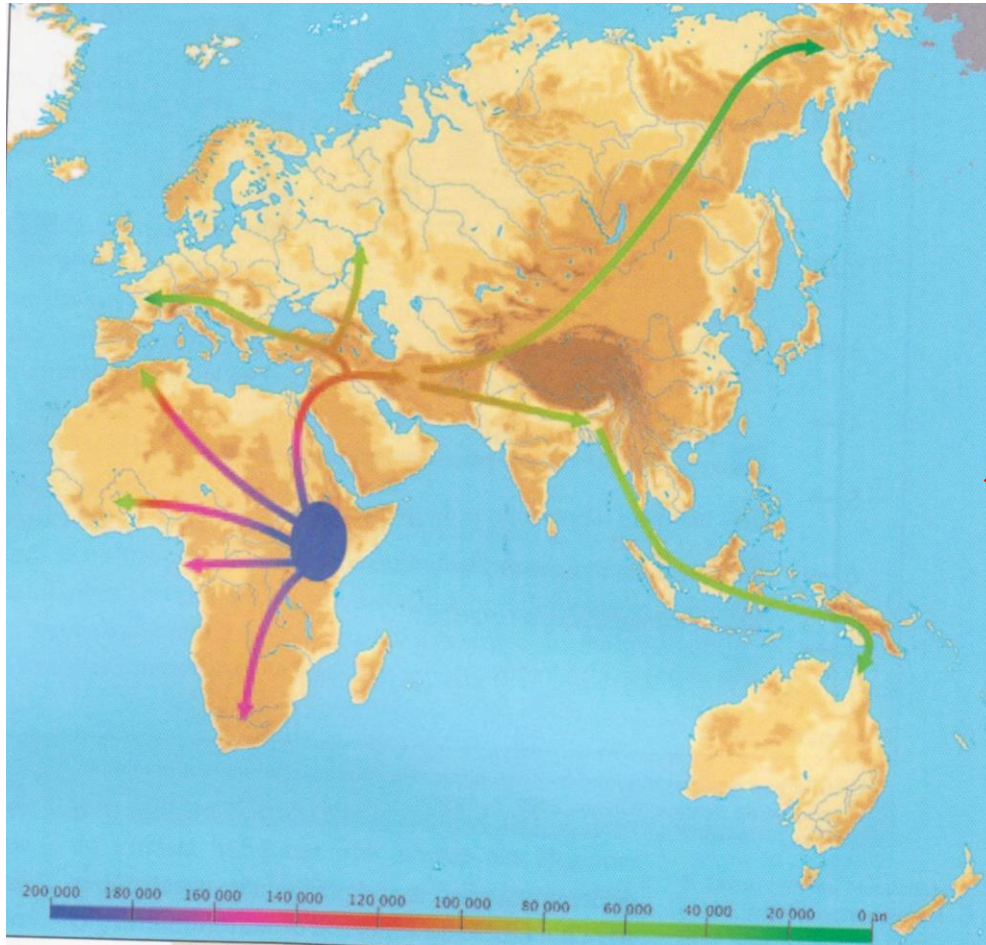
« Tutta la variabilità del mtDNA umano attuale e mondiale è anche presente in Africa (Africa dell'Est), quindi sarebbe il posto più probabile dell'origine della specie *Homo sapiens*. »



© KENNETH K. KIDD

Diversità di un segnale genetico immaginario (schema)

Origine



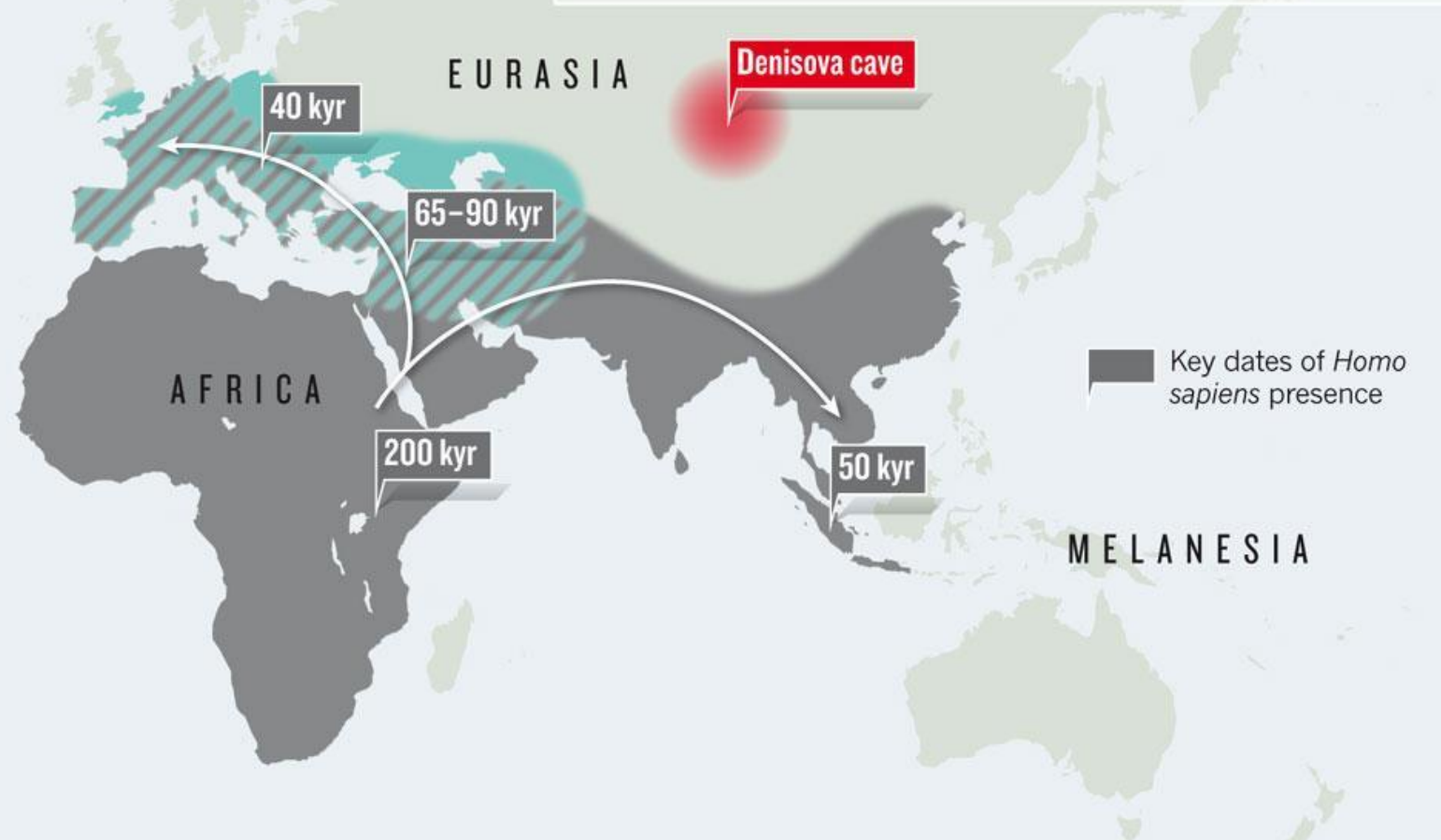
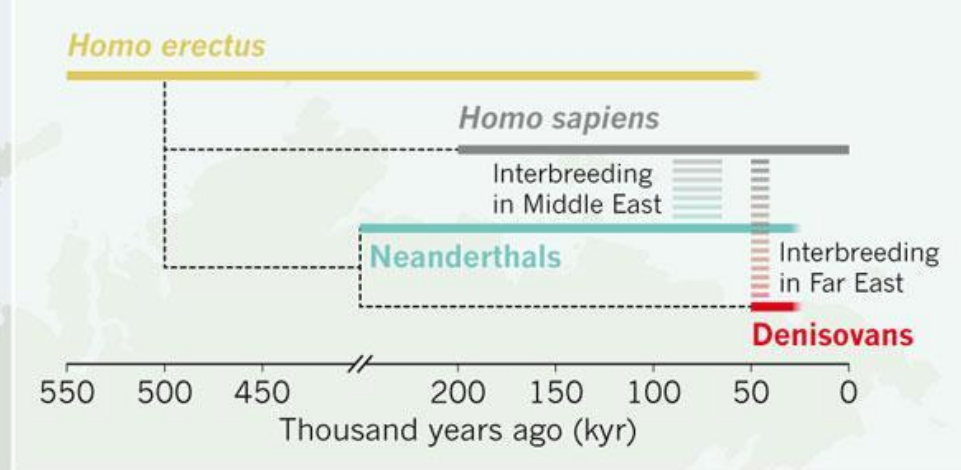
Modello « Out of Africa » o modello di sostituzione

Modello multiregionale

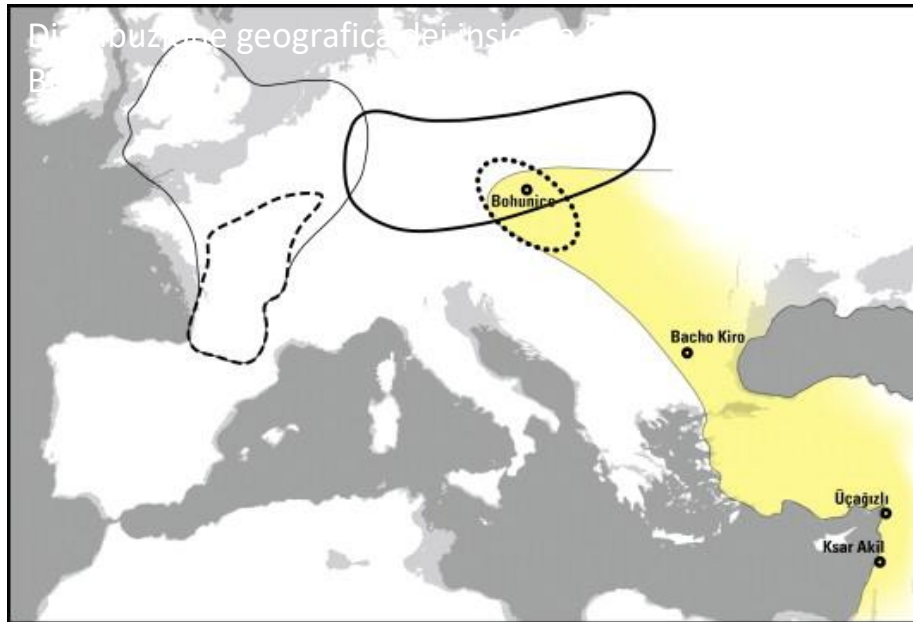


THE HUMAN STRAIN

As *Homo sapiens* evolved and migrated across the world, they apparently interbred with archaic humans such as Neanderthals and Denisovans.



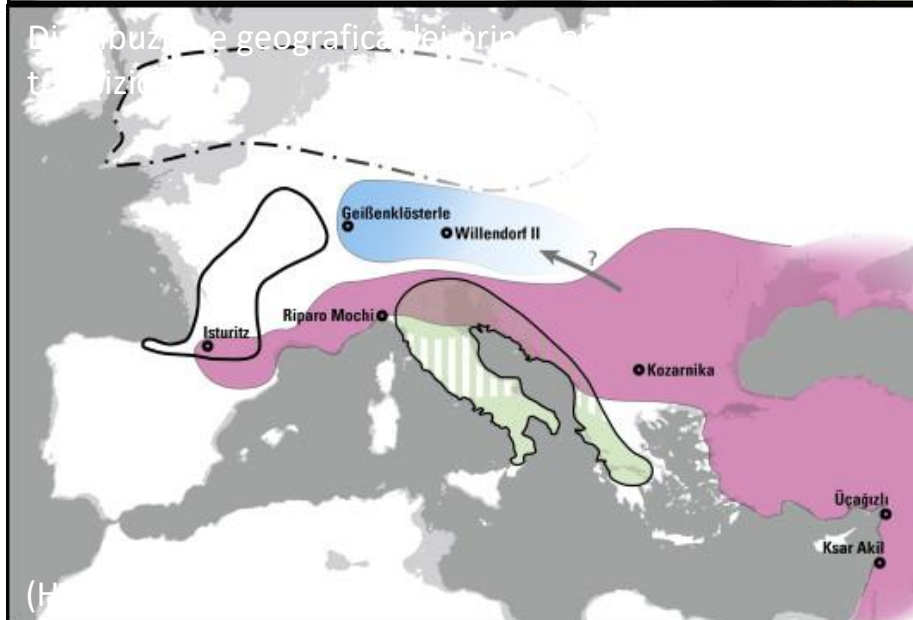
I primi uomini moderni in Europa



Bacho Kiro (Bulgaria) (Aurignaziano antico),
43.000 anni

Grotta del Cavallo (Italia) (Uluzziano),
45.000-43.000 anni

El Castillo (Spagna) (Aurignaziano antico)
37.000- 34.000 anni



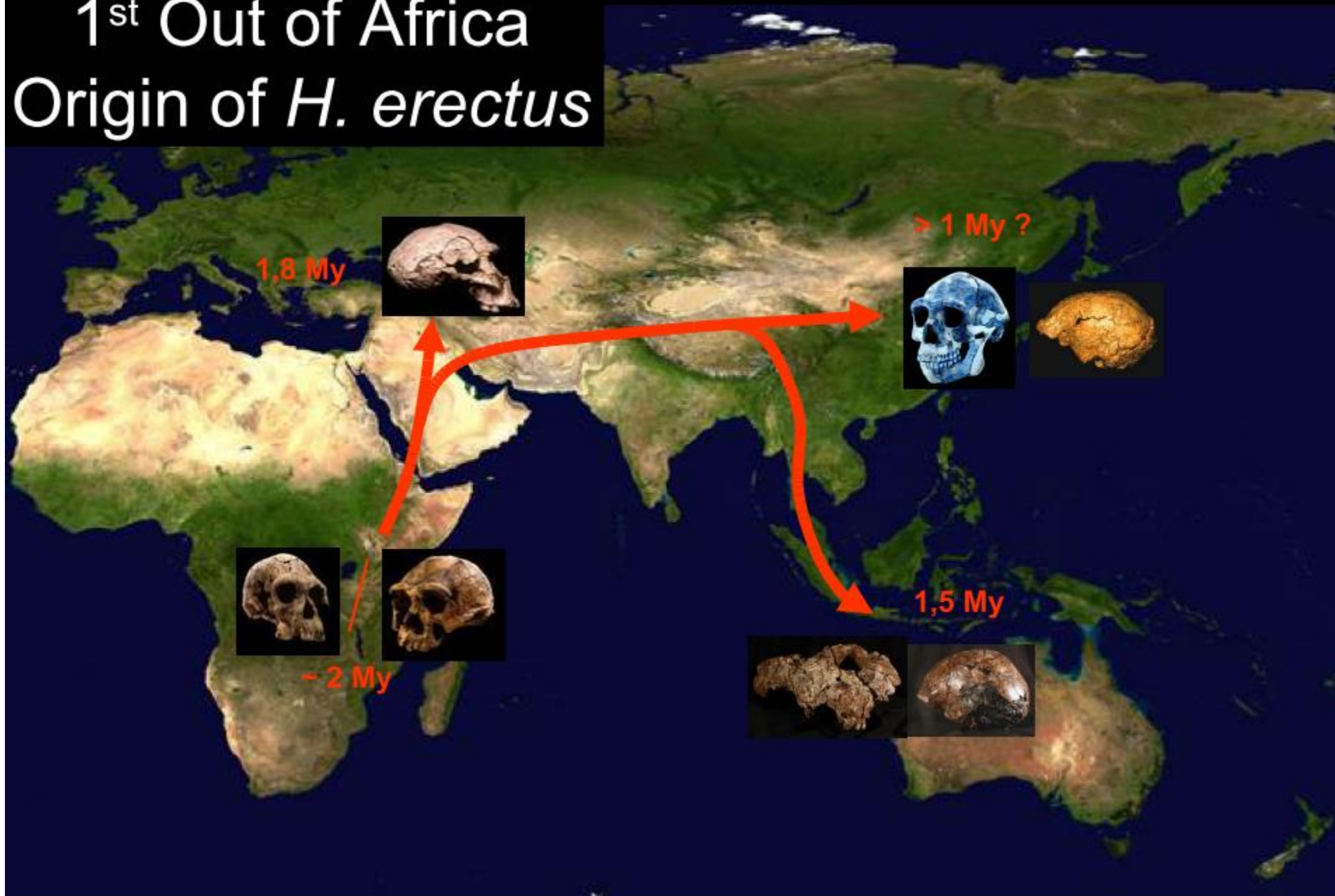
Mladec (Repubblica Ceca) (32.000 anni)

Dolni Vestonice, Pavlov (Repubblica Ceca)
(25.000 anni)

Cro Magnon (Francia) (30.000 anni)

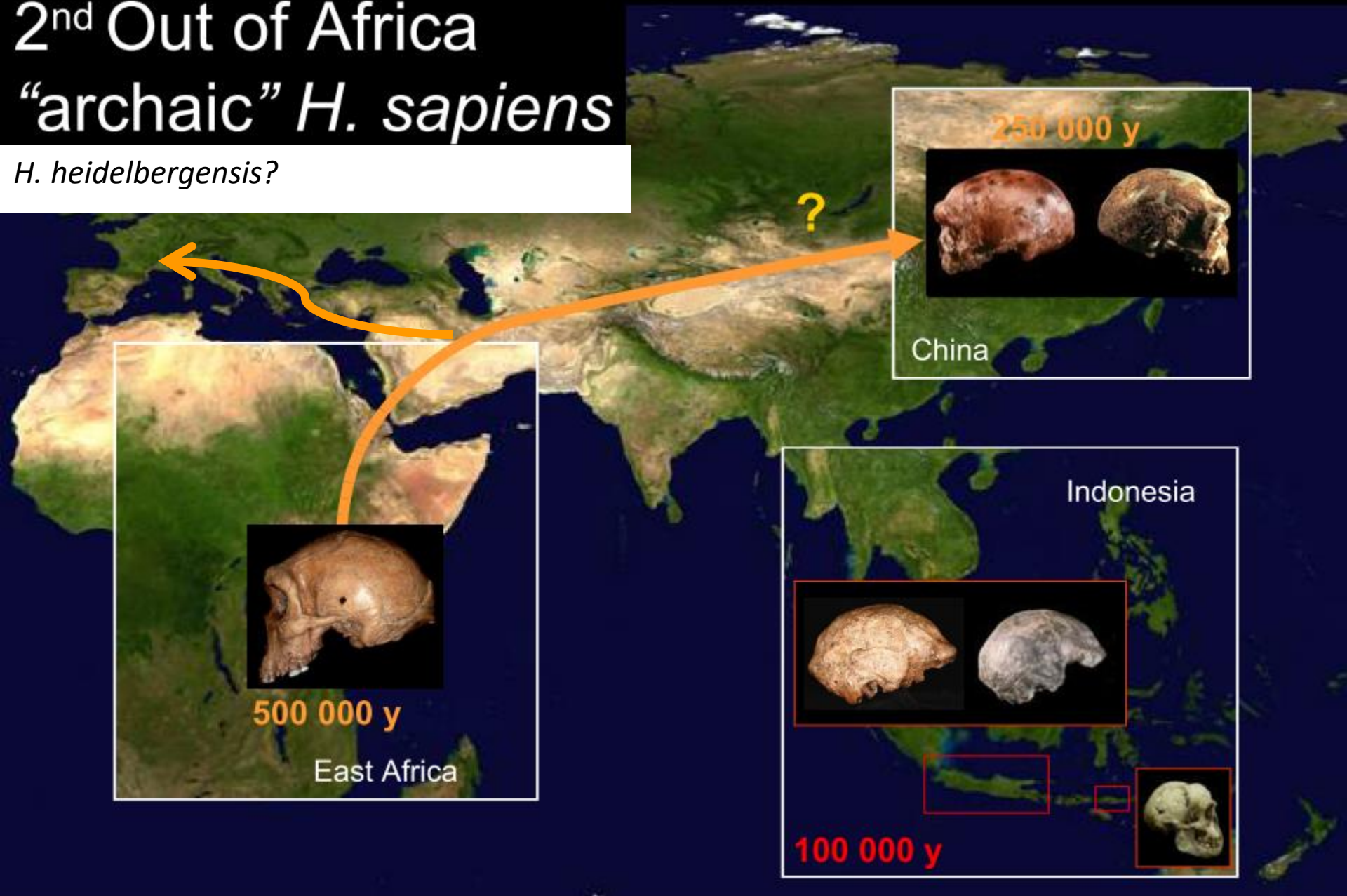
Pestera cu Oase (Grotta degli orsi, Romania)
34-36.000 anni

1st Out of Africa Origin of *H. erectus*



2nd Out of Africa “archaic” *H. sapiens*

H. heidelbergensis?



3rd Out of Africa *Homo sapiens*

