Erasmus+

Laurea Magistrale in Quaternario, Preistoria e Archeologia
International Master in Quaternary and Prehistory

Homo sapiens

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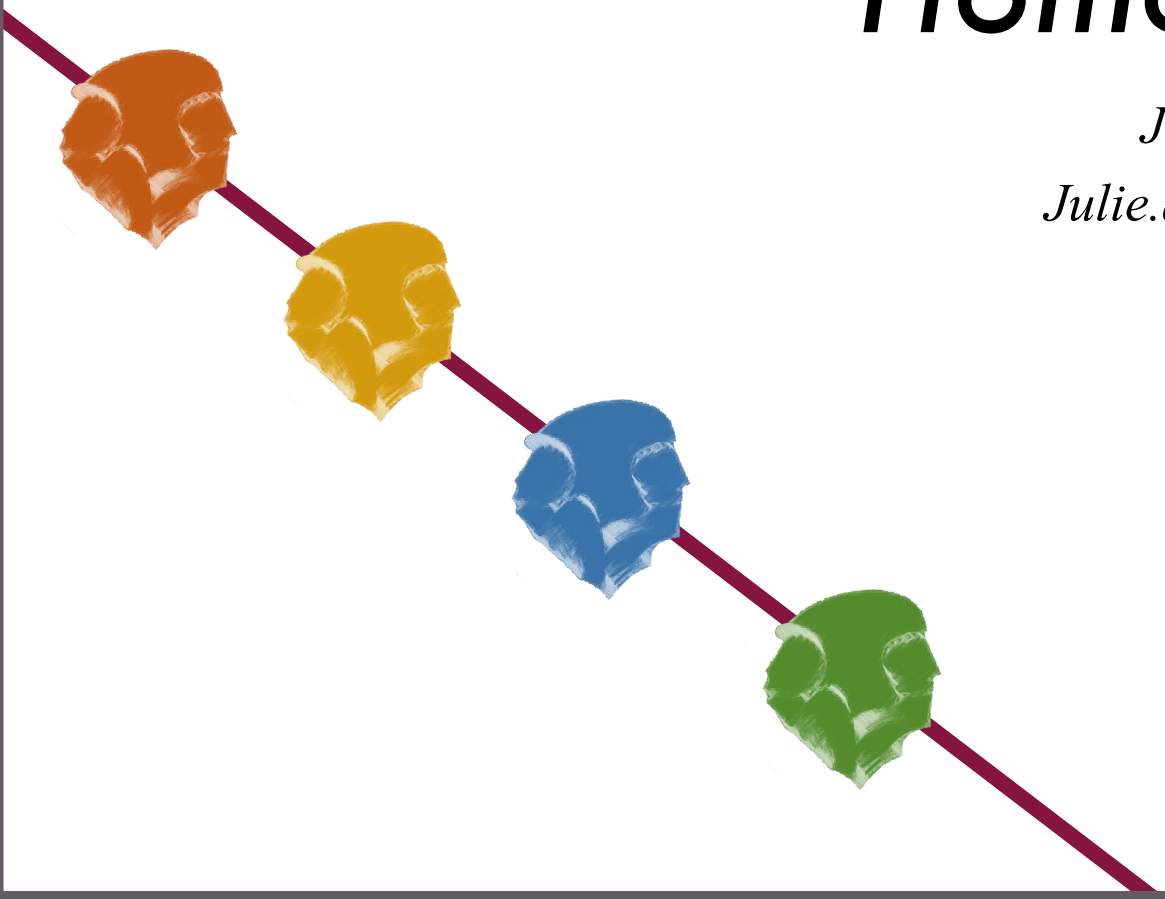
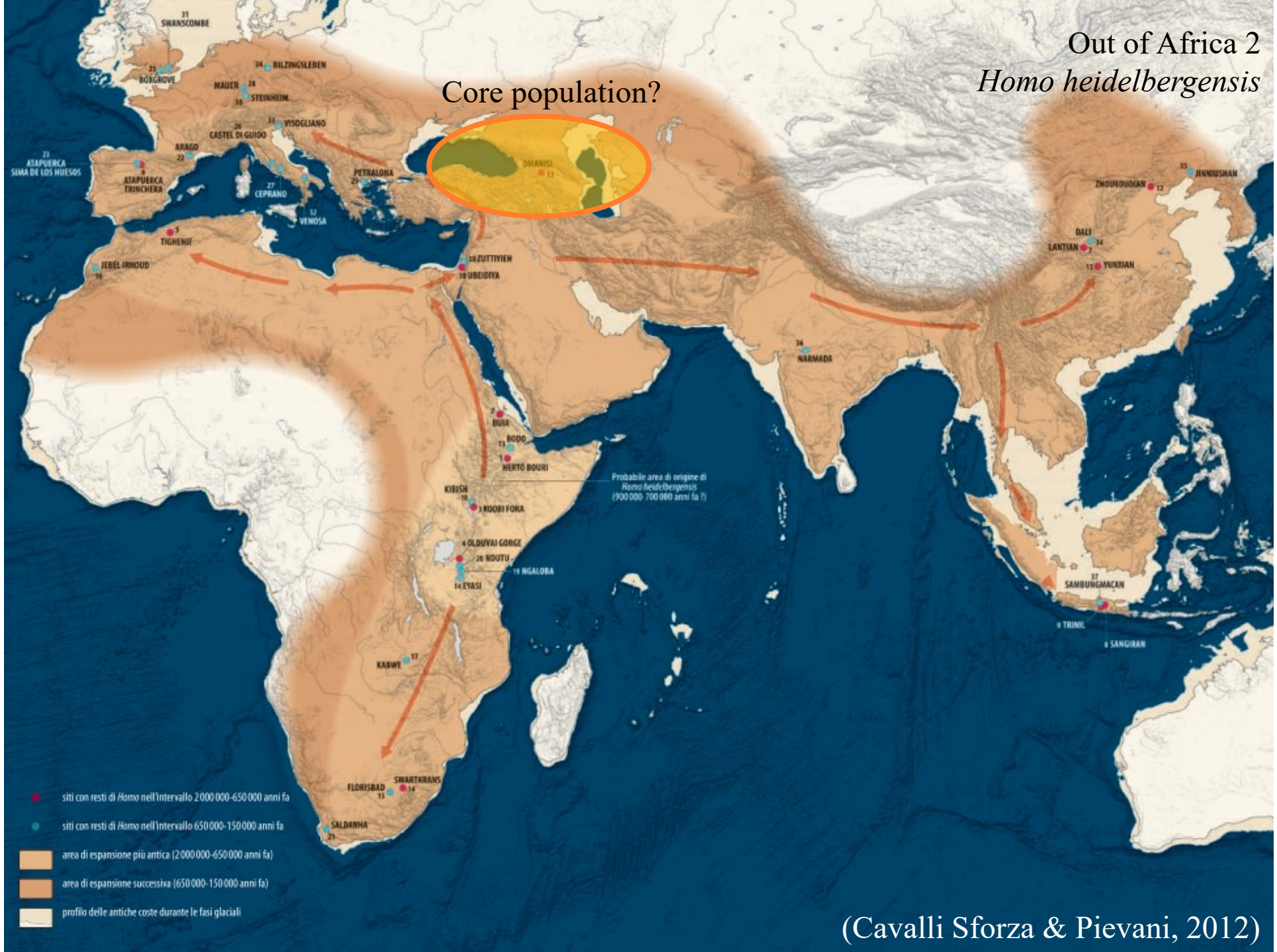
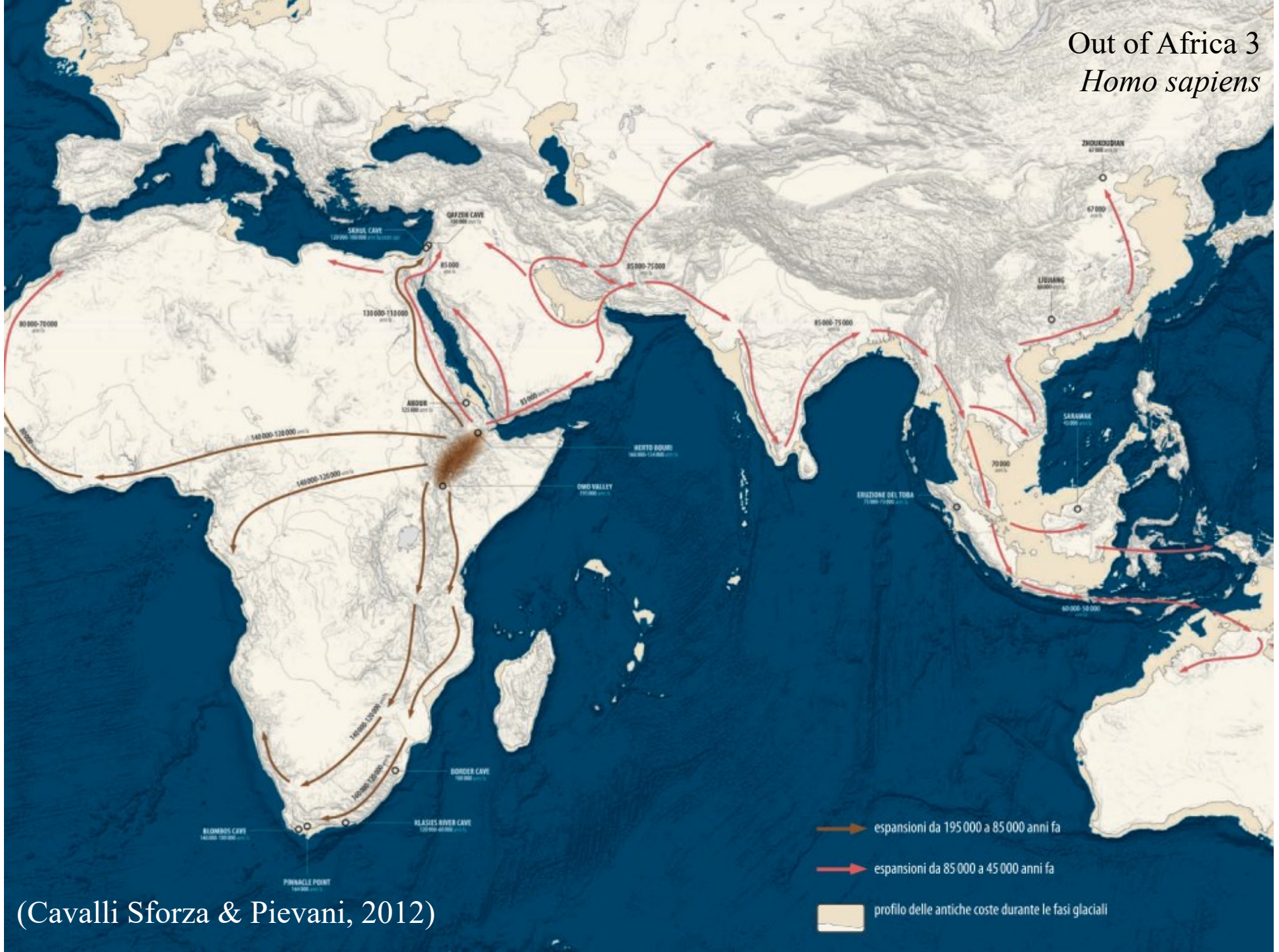


(Cavalli Sforza & Pievani, 2012)

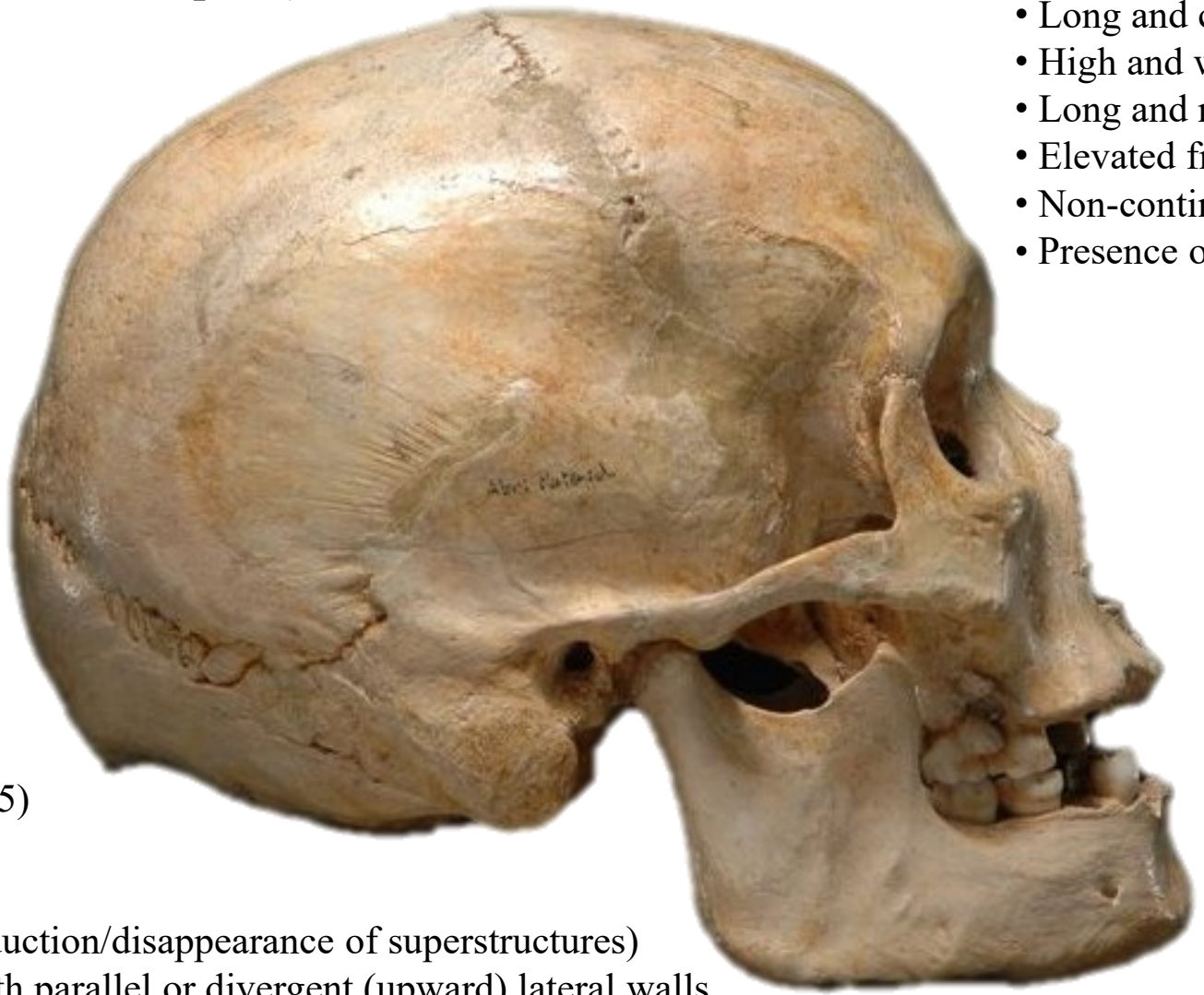


(Cavalli Sforza & Pievani, 2012)



(Cavalli Sforza & Pievani, 2012)

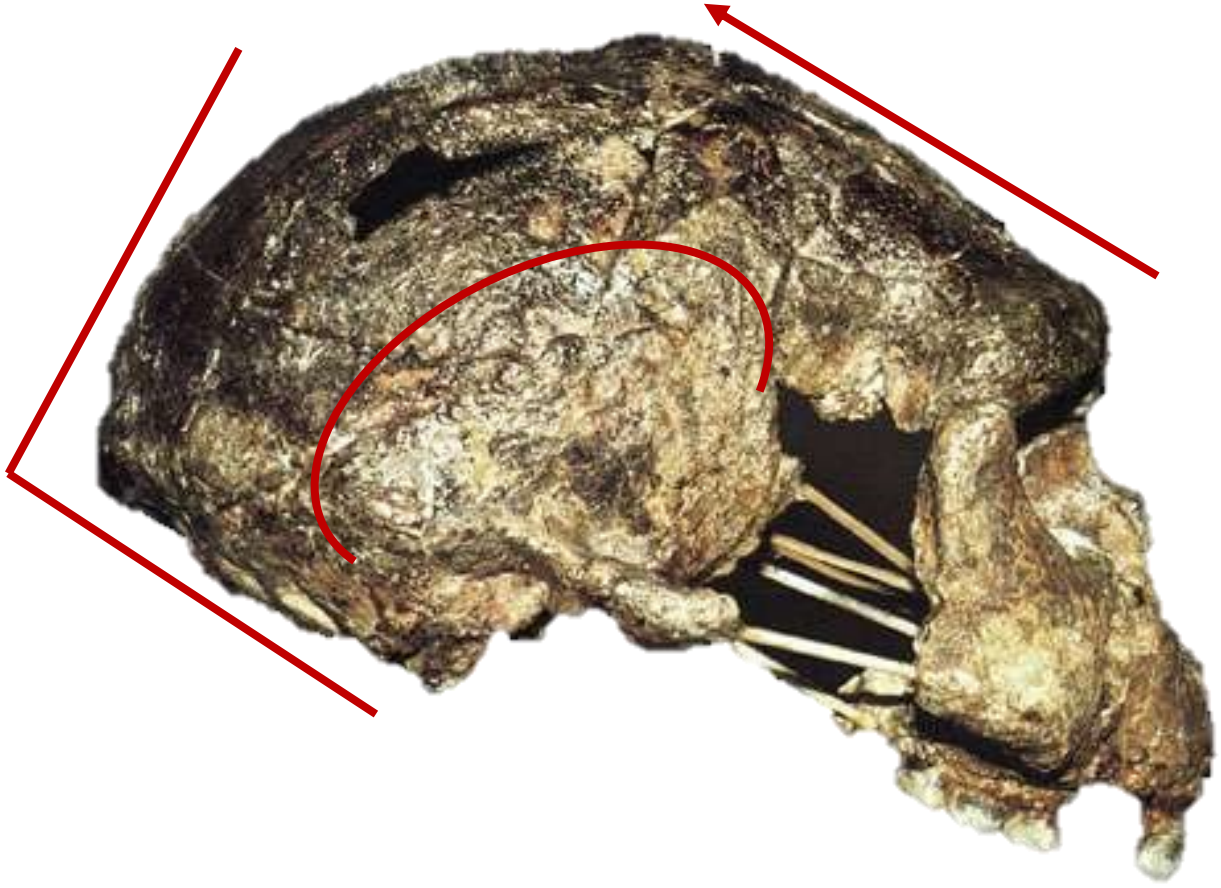
Homo sapiens morphological features (paleontological definition of the specie)



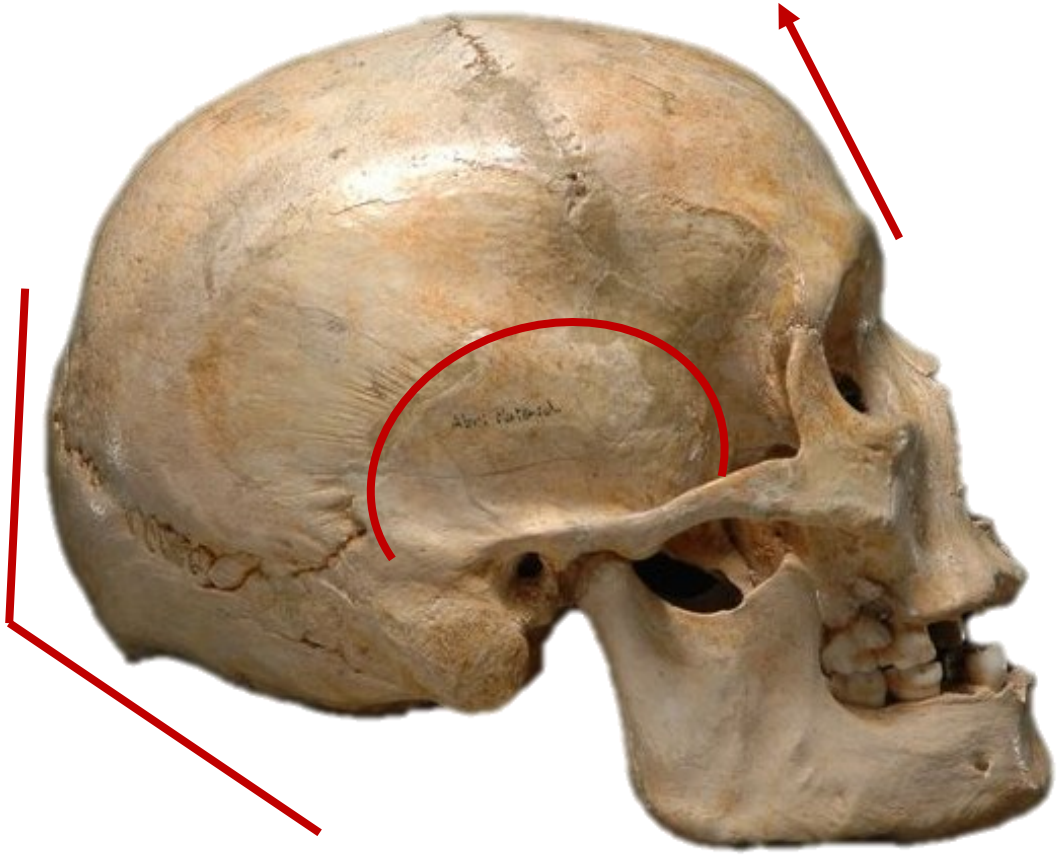
Day & Stringer (1982)
- Short and elevated cranial vault
- Long and curved parietal bones in the sagittal plan
- High and wide biparietal vault in the coronal plan
- Long and narrow occipital bone, without projection
- Elevated frontal bone
- Non-continuous supra-orbital complex
- Presence of a canine fossa

Vandermeersch (1981, 2005)
- rounded cranial shape
- large cranial capacity
- decreased robustness (reduction/disappearance of superstructures)
- elevated cranial vault, with parallel or divergent (upward) lateral walls
- regularly rounded occipital bone
- short face
- teeth-size reduction tendency

Homo erectus
Sangiran 17



Homo sapiens
Pataud 1



Short and rounded vault
Elevated frontal bone
Rounded occipital bone
Reduced face, placed under the braincase

Global decrease of robustness

Elevated and convex frontal bone

Reduced supra-orbital relief (separated elements)

Canine fossa

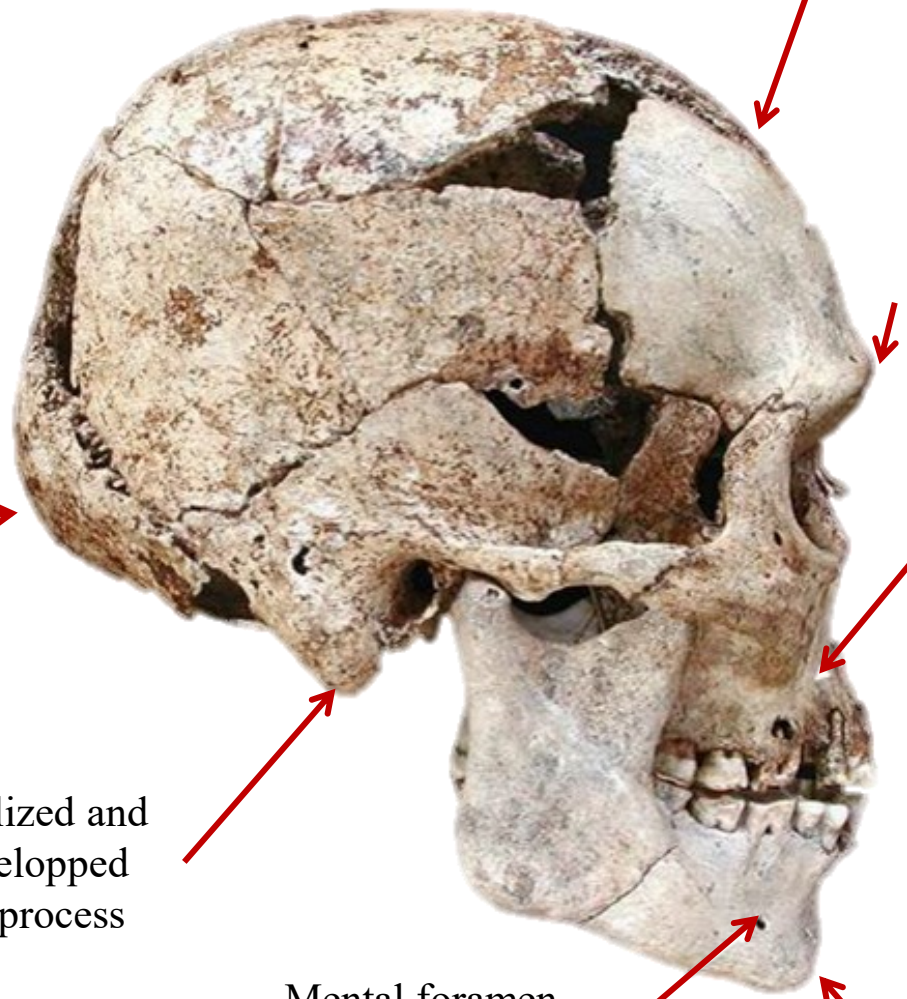
Reduced relief of nuchal lines

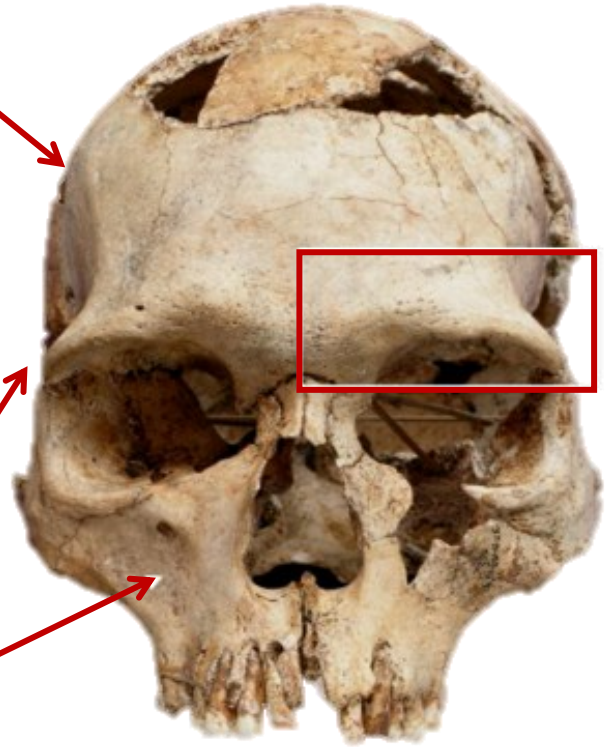
Individualized and well developped mastoid process

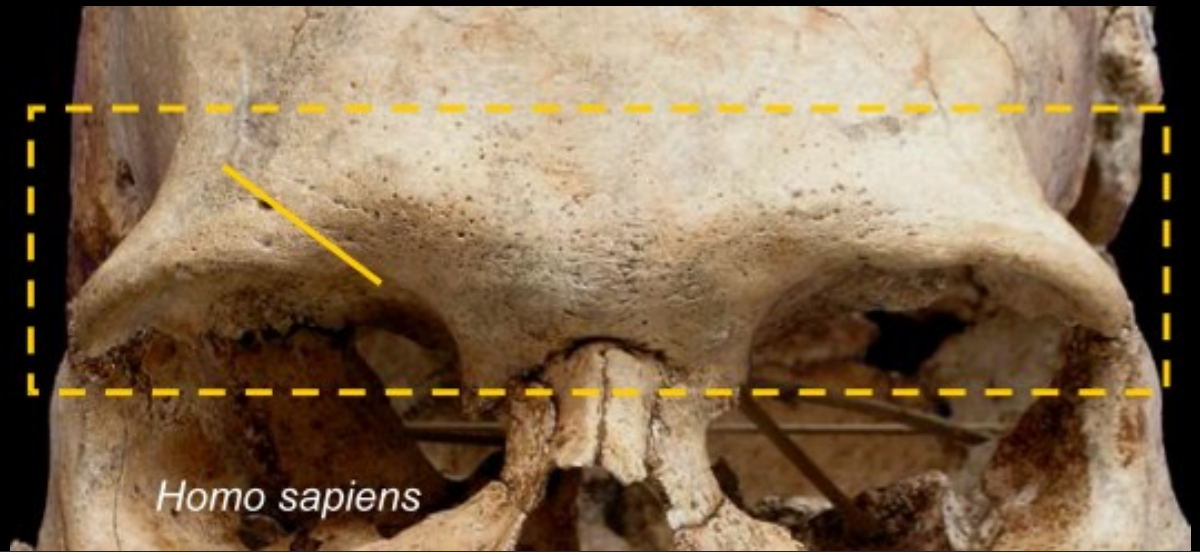
Mental foramen located under the premolar

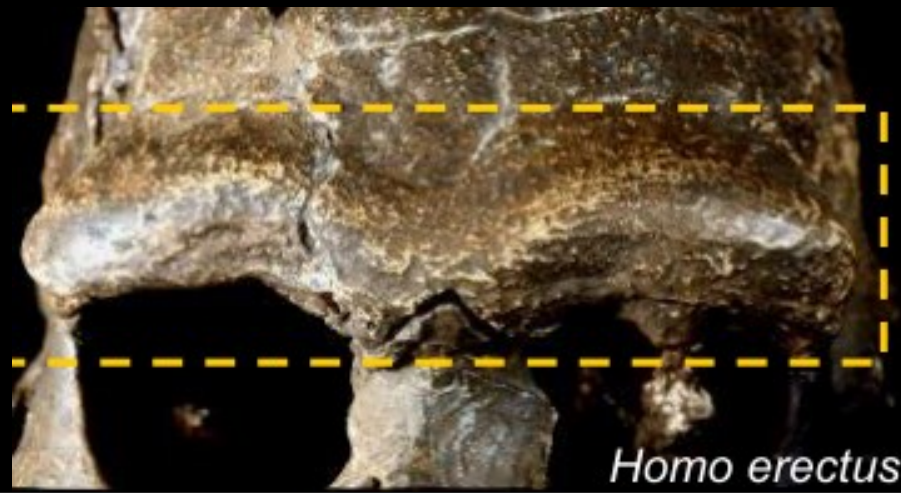
Marked chin (mental trigone)

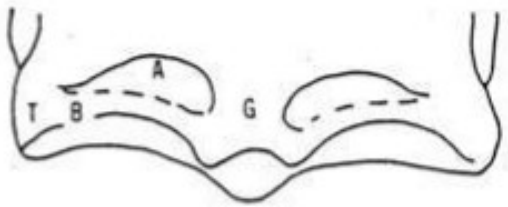
Dental crowns reduced in size (particularly anterior teeth)

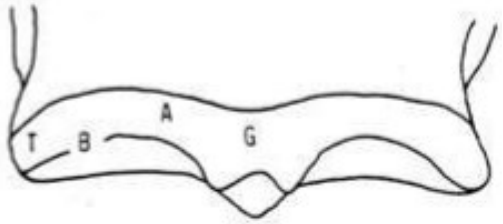








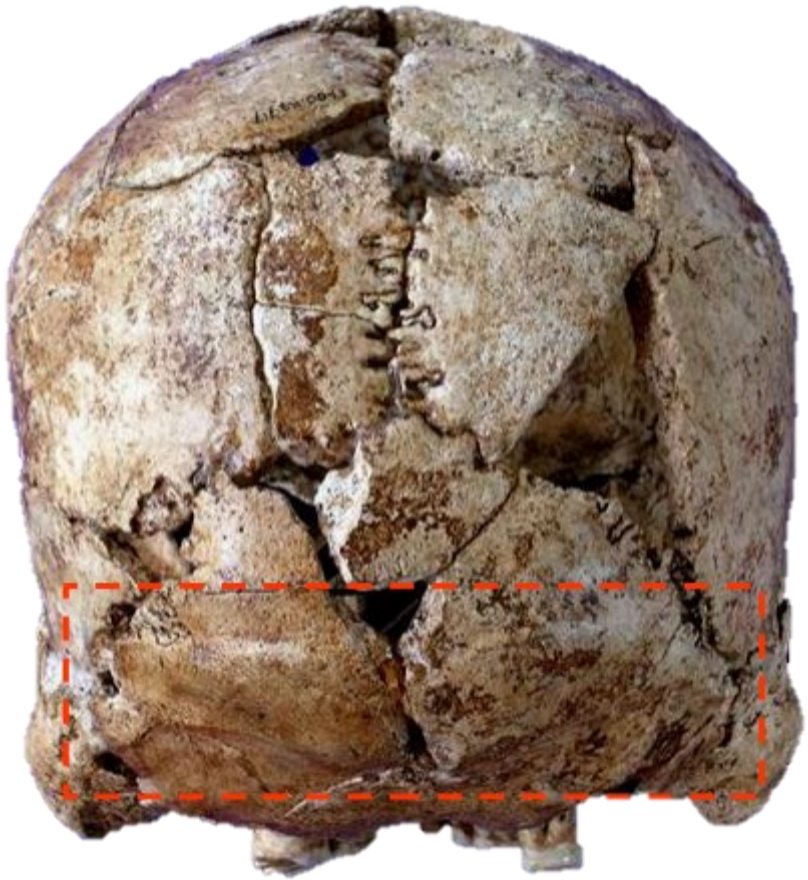




G: Glabella
A: Superciliary arch
B: Upper border of the orbit
T: Lateral trigone

Transverse occipital torus

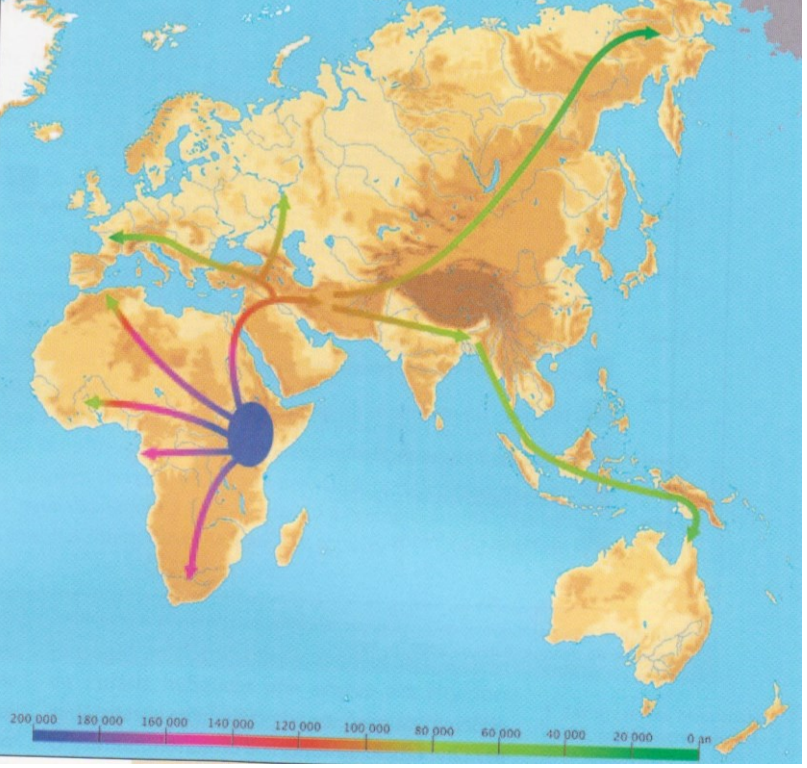
Homo erectus



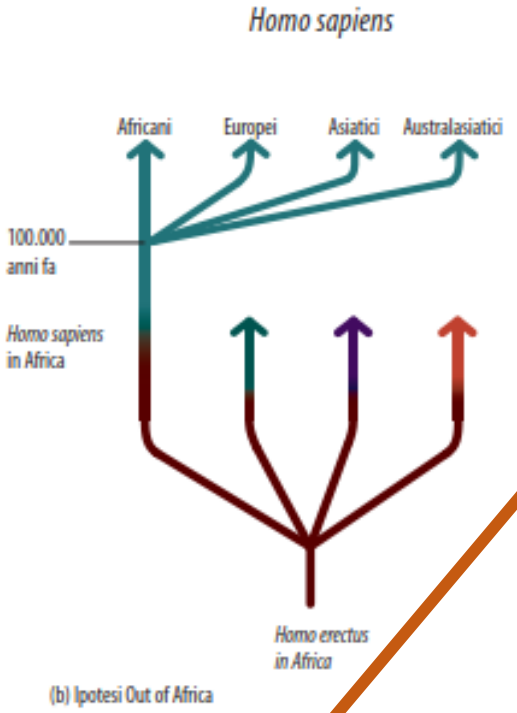
Homo sapiens

- 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*)

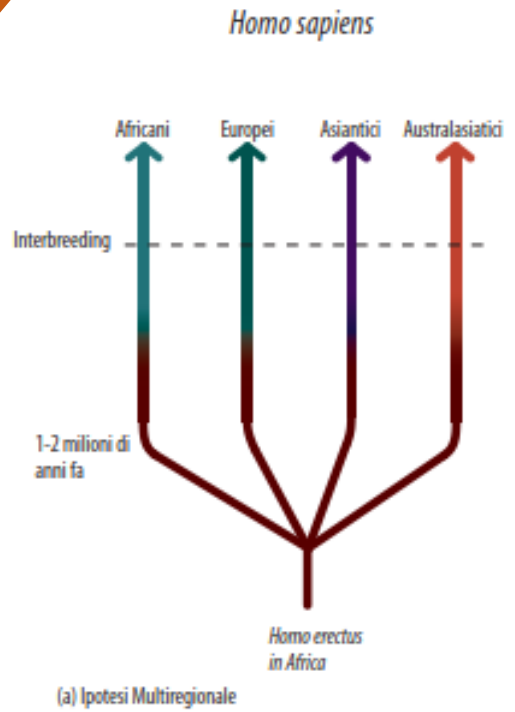
Origin Evolutionary hypothesis



Out-of-Africa Model or substitution model

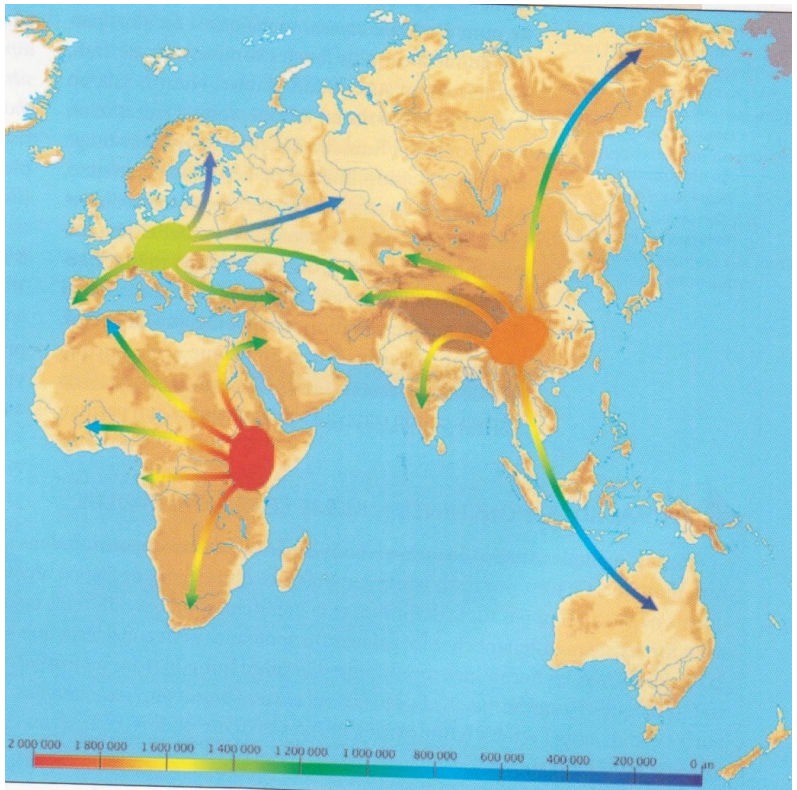


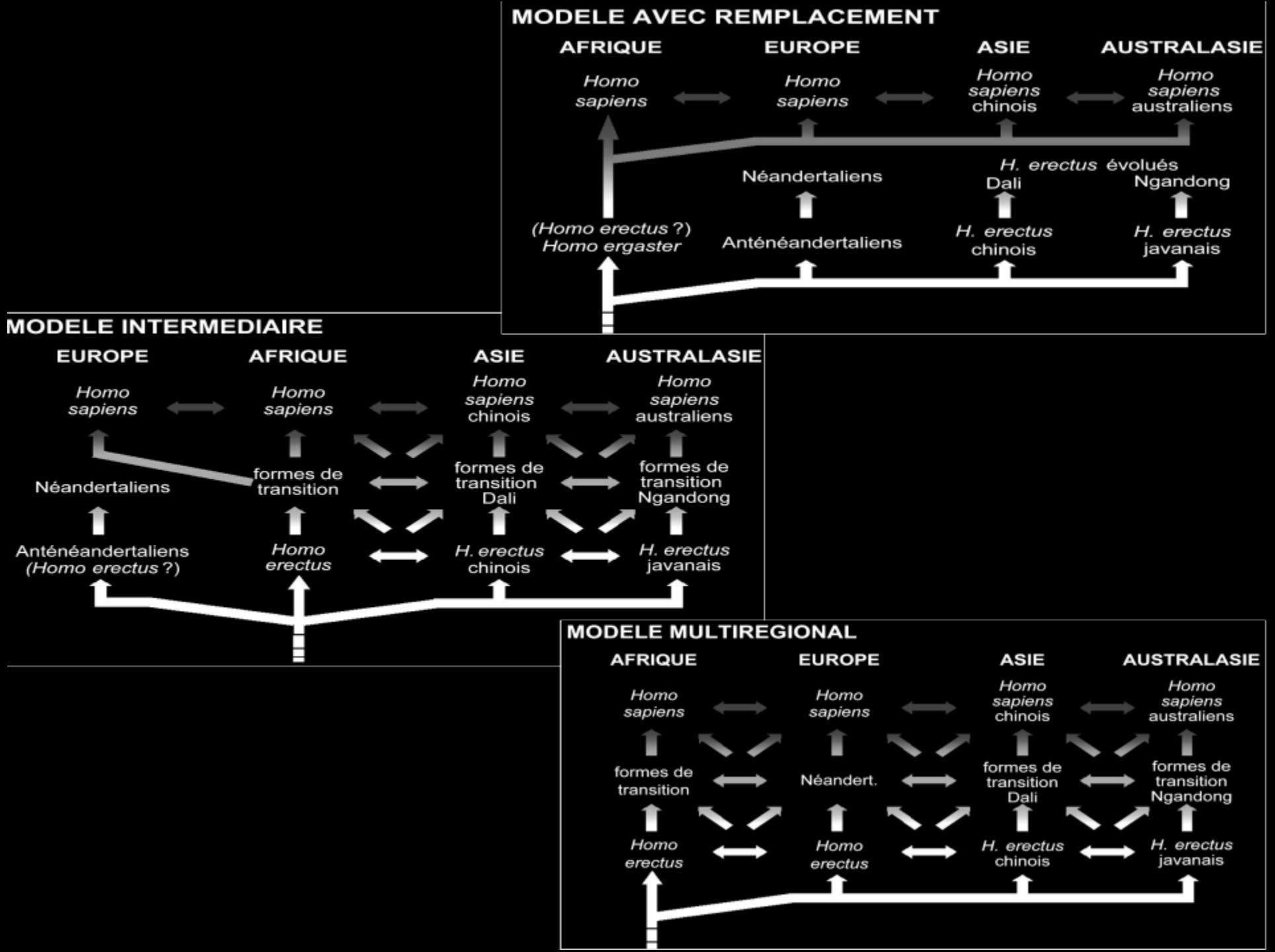
(b) Ipotesi Out of Africa



(a) Ipotesi Multiregionale

Multiregional model

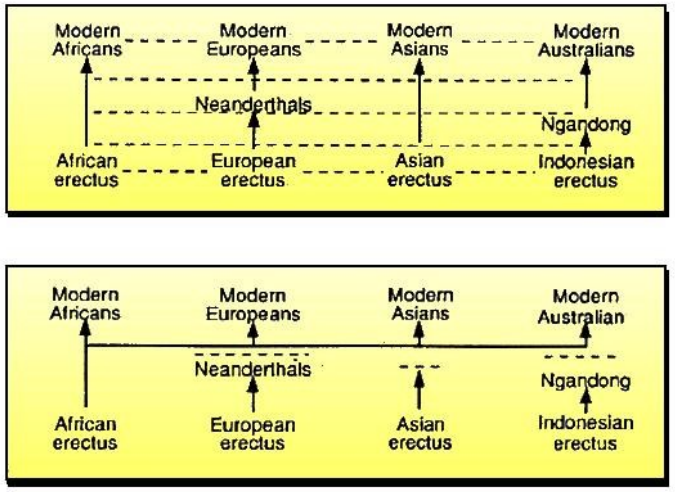



MODELE AVEC REMPLACEMENT
AFRIQUE
EUROPE
ASIE
AUSTRALASIE
Homo sapiens
Homo sapiens
Homo sapiens chinois
Homo sapiens australiens
Néandertaliens
H. erectus évolués
Dali
Ngandong
(Homo erectus ?)
Homo ergaster
Anténéandertaliens
H. erectus chinois
H. erectus javanais
MODELE INTERMEDIAIRE
EUROPE
AFRIQUE
ASIE
AUSTRALASIE
Homo sapiens
Homo sapiens
Homo sapiens chinois
Homo sapiens australiens
Néandertaliens
formes de transition
formes de transition Dali
formes de transition Ngandong
Anténéandertaliens
(Homo erectus ?)
Homo erectus
H. erectus chinois
H. erectus javanais
MODELE MULTIREGIONAL
AFRIQUE
EUROPE
ASIE
AUSTRALASIE
Homo sapiens
Homo sapiens
Homo sapiens chinois
Homo sapiens australiens
formes de transition
Néandert.
formes de transition Dali
formes de transition Ngandong
Homo erectus
Homo erectus
H. erectus chinois
H. erectus javanais

Multiregional model

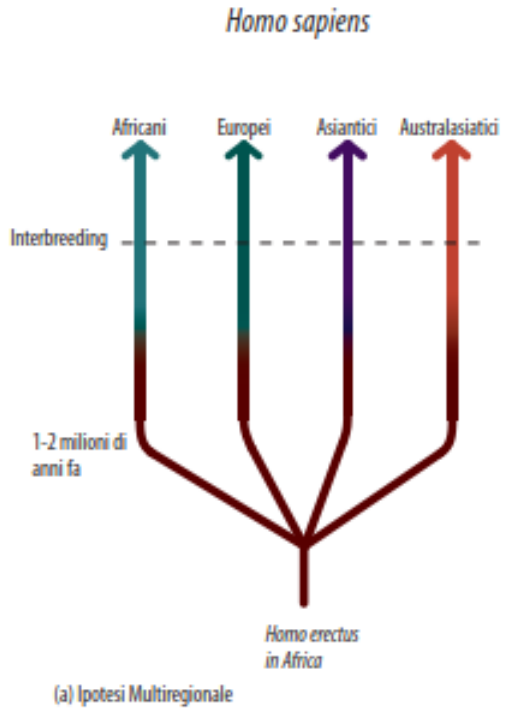
<u>The principal bases of the multiregional theory are:</u>
- Specific regional similarity between archaic *Homo sapiens* and modern one;

<u>Principal criticism :</u>
- Lack of transition shape in Asia and Europe
- Genetical proof
- This theory request a continuous gene flow between the regional population

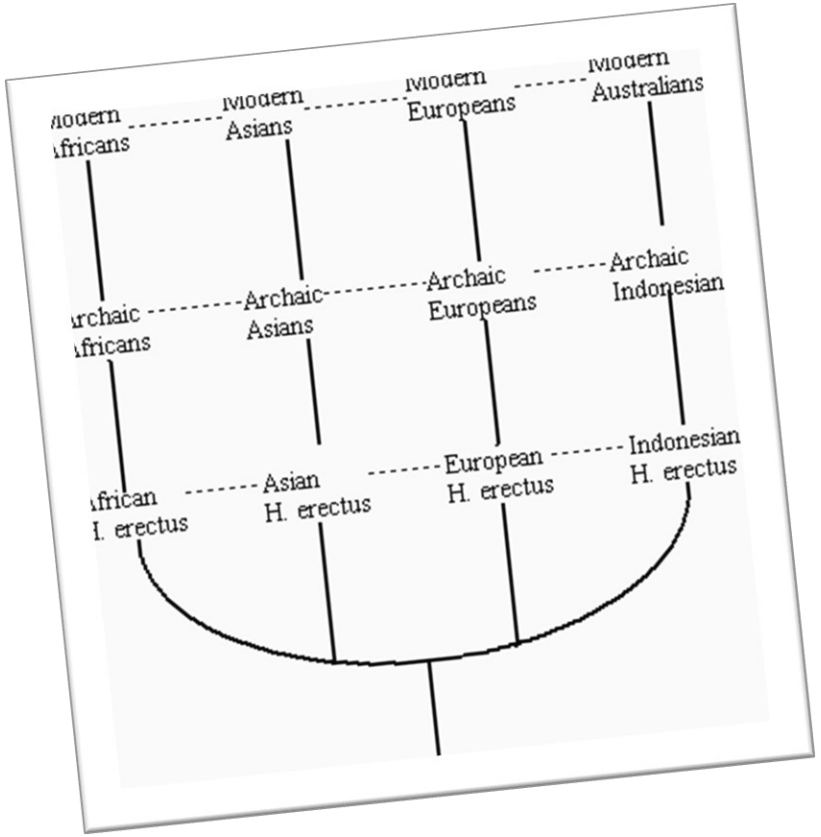


Two views of the origins of modern humans: the multiregional model (top) and the "Out of Africa" model. Each interprets the same fossil evidence in a radically different way

Stringer, 1990



(a) Ipotesi Multiregionale

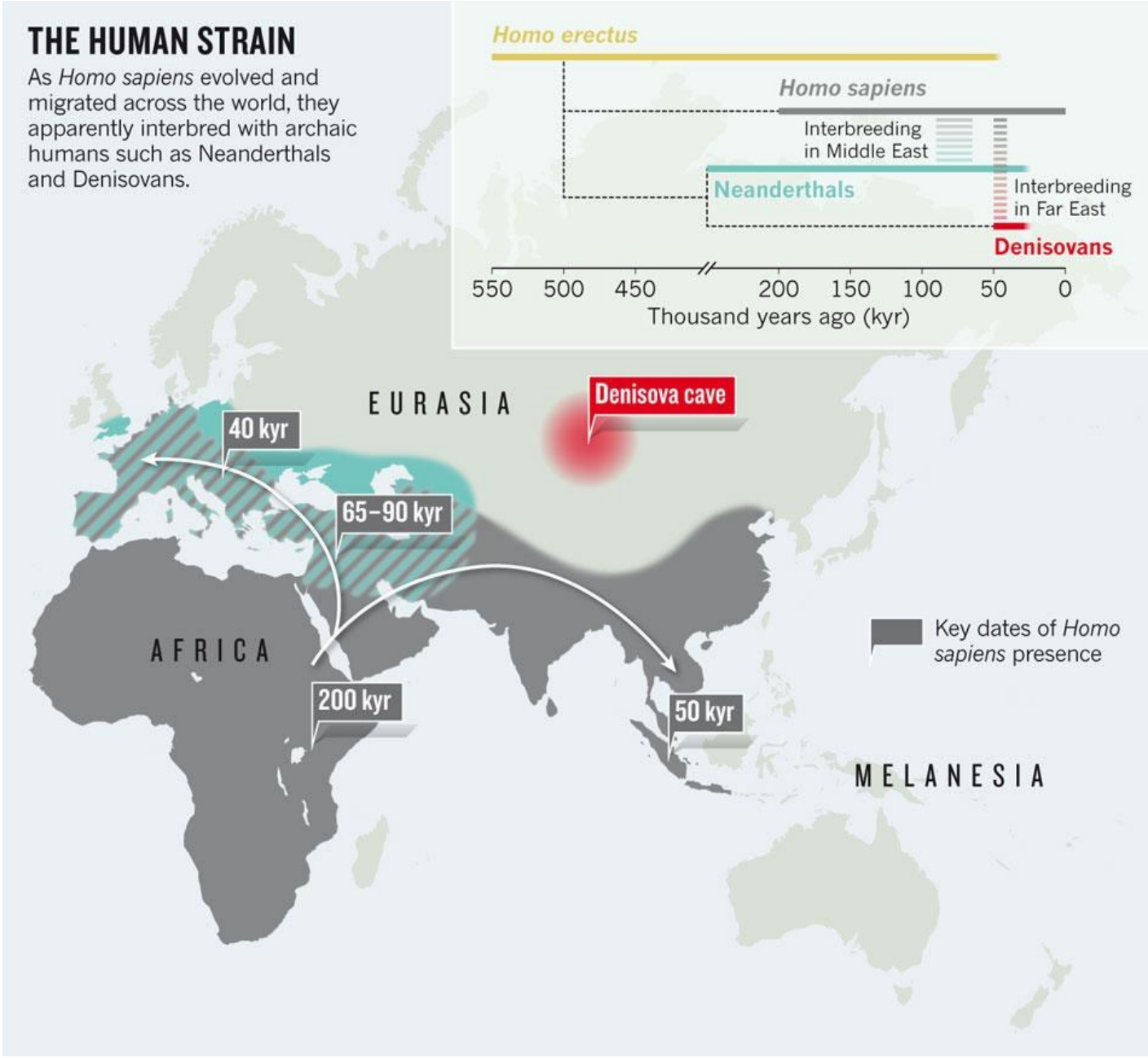


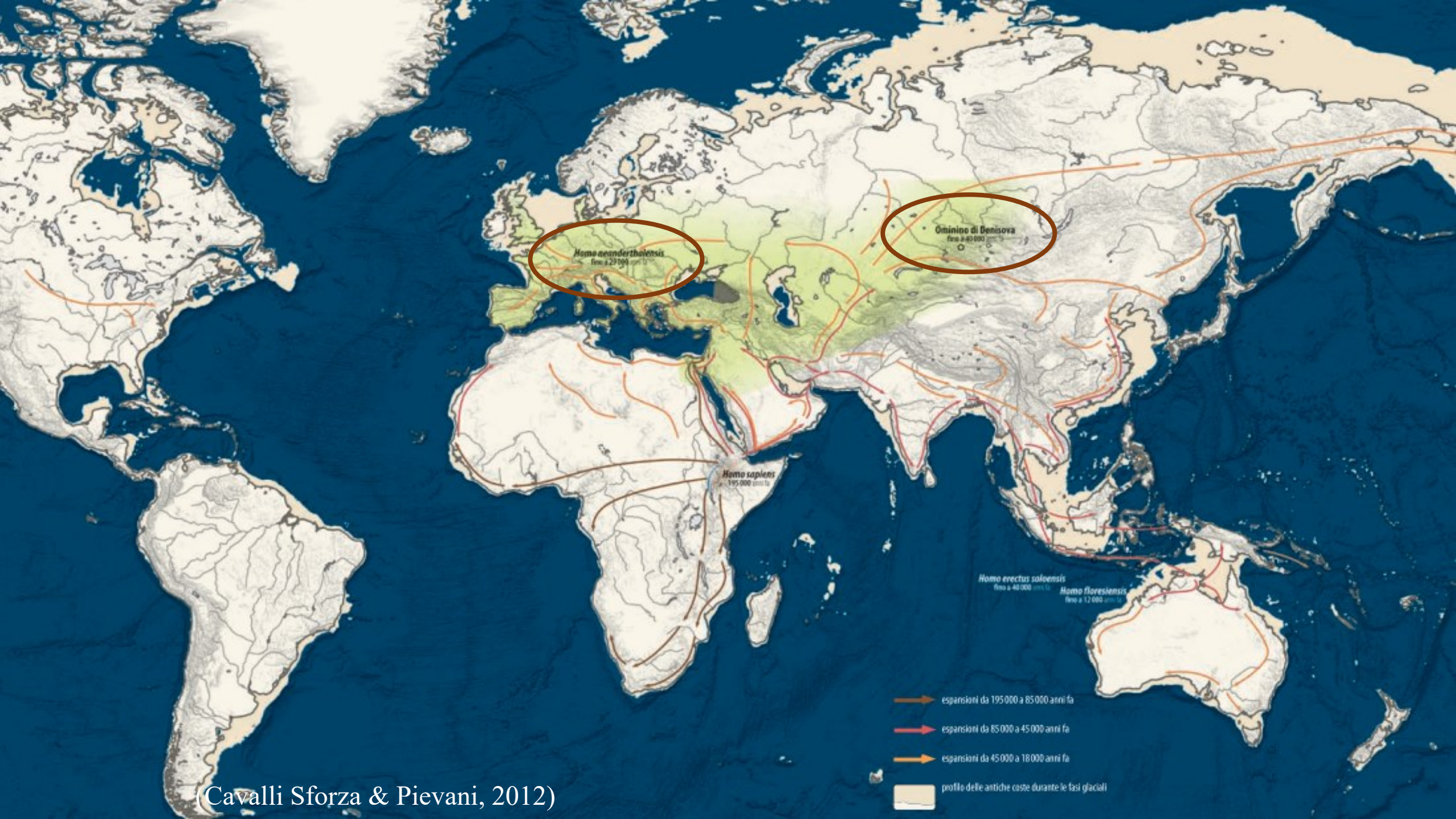
Partial substitution model

Theory of integration (Smith, 1987) or partial replacement:
Integration from European population of the genetic patrimony of modern human, by genetic flow*. Paleontological proof: fossils from eastern Europe (Vindija).

Hybridation theory (Trinkaus):
Interbreeding in the various geographic area of modern human and preexisting population

*Genetic flow is the diffusion of gene between population, by migration of individual in reproductive age. The genetic flow can introduce in a population new allele and can change the allelic frequency. The global genetic effect is the reduction of genetic differences between population and then limit the evolution. In another hand, genetic flow can increase the internal variability of a population, increasing the polymorphism.





(Cavalli Sforza & Pievani, 2012)

Ancestors evolve into Neanderthals and first modern humans

Neanderthals die out

Researchers looked at five groups of modern humans

Common ancestor with Neanderthal

Neanderthal

Some Neanderthal and *Homo sapiens* interbreeding

Homo sapiens

Some modern humans leave Africa

French

Han-Chinese

Papuan

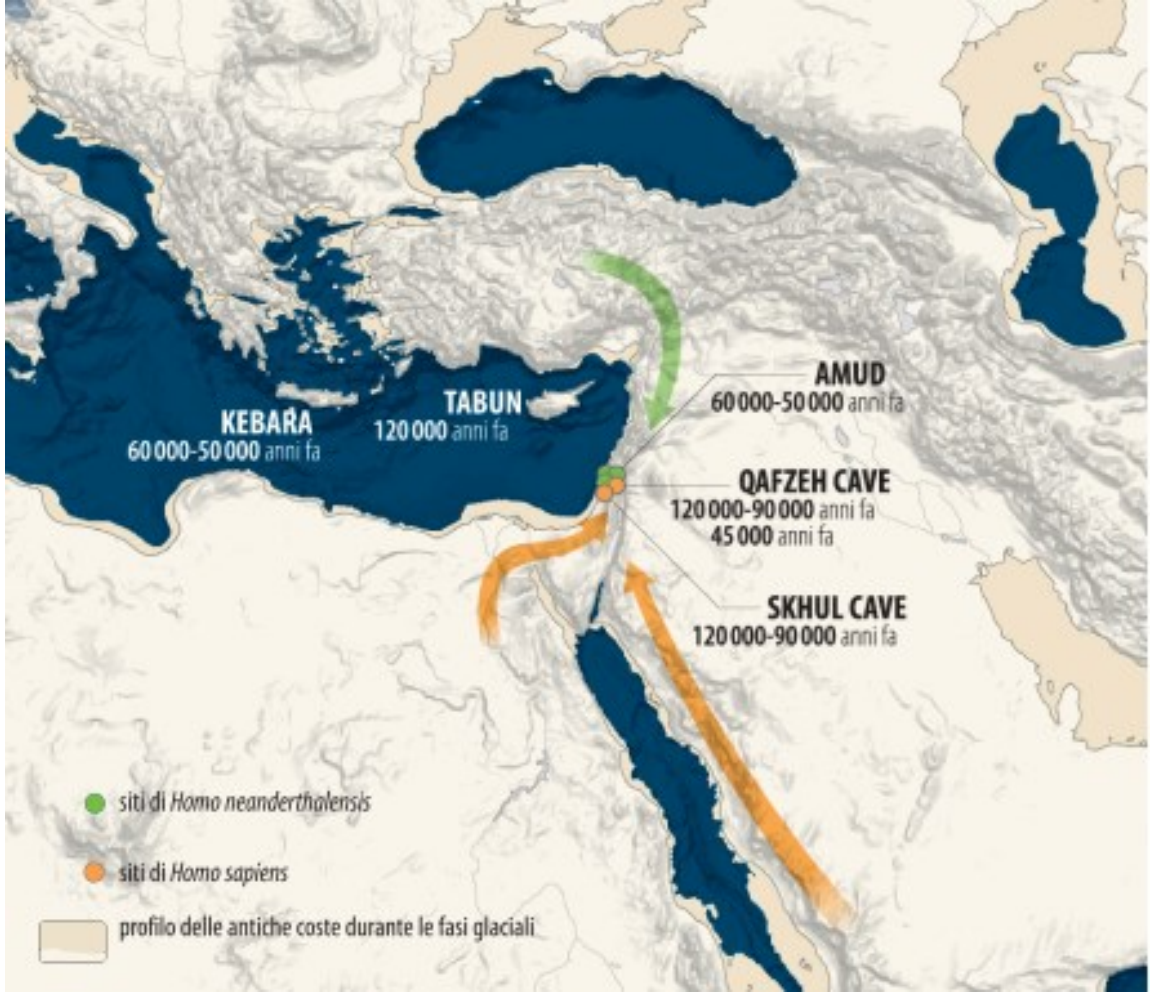
Yoruba

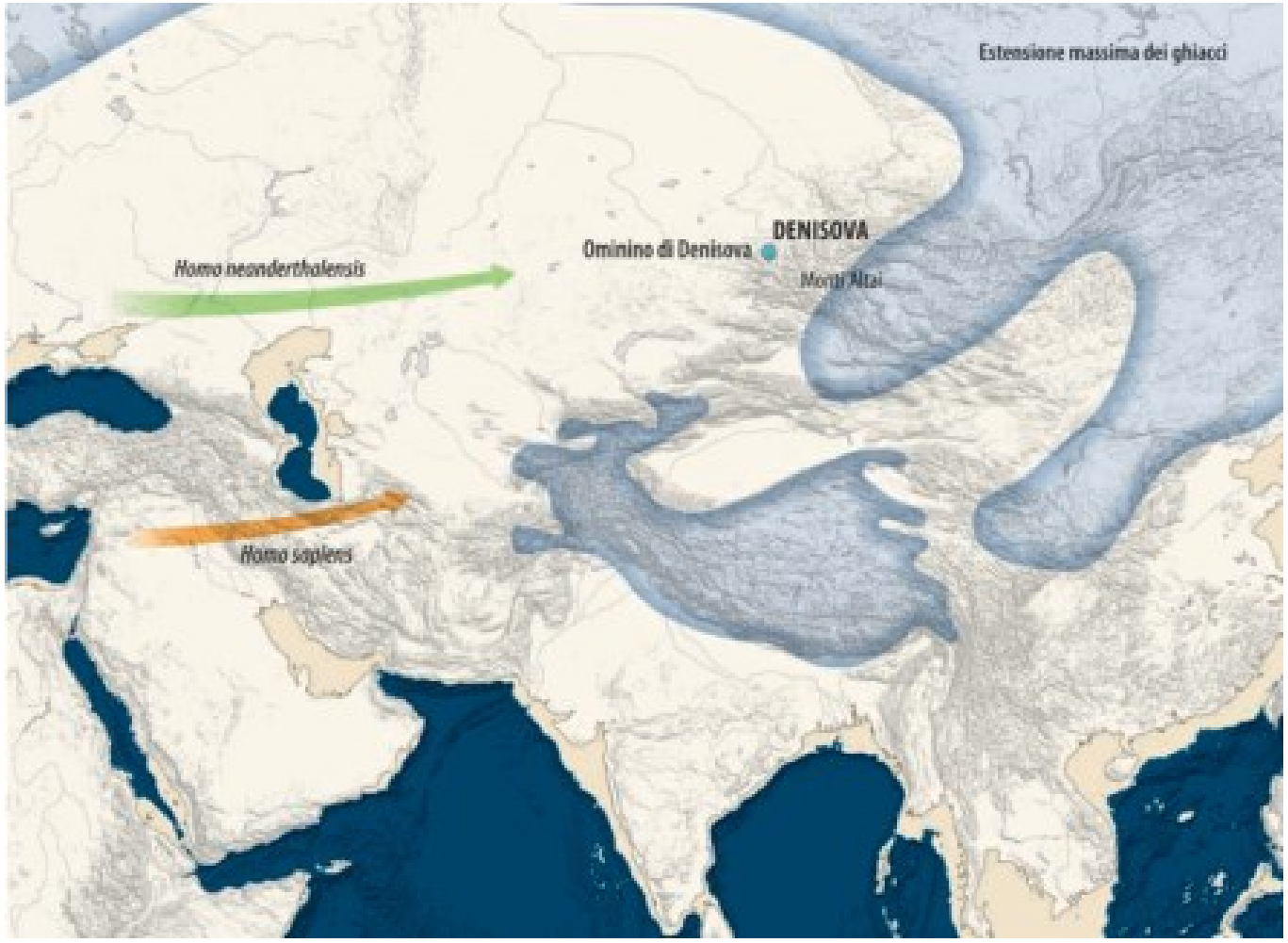
San

Source: Science journal

Note: Time periods not to scale

Possible interbreed area





LETTER

doi:10.1038/nature14558

An early modern human from Romania with a recent Neanderthal ancestor

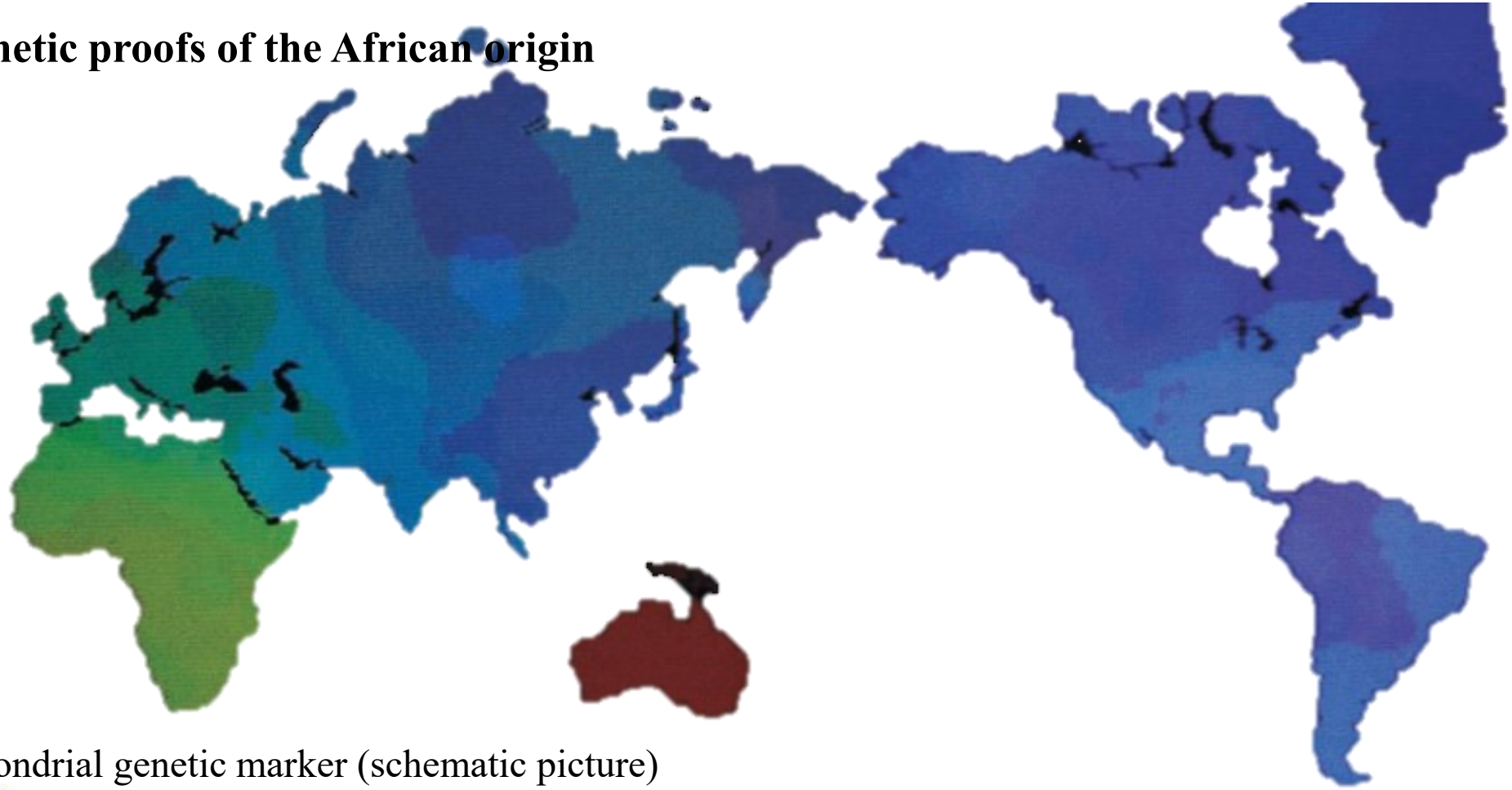
Qiaomei Fu[1,2,3]*, Mateja Hajdinjak[3]*, Oana Teodora Moldovan[4], Silviu Constantin[5], Swapan Mallick[2,6,7], Pontus Skoglund[2], Nick Patterson[6], Nadin Rohland[2], Iosif Lazaridis[2], Birgit Nickel[3], Bence Viola[3,7,8], Kay Prüfer[3], Matthias Meyer[3], Janet Kelso[3], David Reich[2,6,9] & Svante Pääbo[3]

Neanderthals are thought to have disappeared in Europe approximately 39,000–41,000 years ago but they have contributed 1–3% of the DNA of present-day people in Eurasia[1]. Here we analyse DNA from a 37,000–42,000-year-old[2] modern human from Peştera cu Oase, Romania. Although the specimen contains small amounts of human DNA, we use an enrichment strategy to isolate sites that are informative about its relationship to Neanderthals and present-day humans. We find that on the order of 6–9% of the genome of the Oase individual is derived from Neanderthals, more than any other modern human sequenced to date. Three chromosomal segments of Neanderthal ancestry are over 50 centimorgans in size, indicating that this individual had a Neanderthal ancestor as recently as four to six generations back. However, the Oase individual does not share more alleles with later Europeans than with East Asians, suggesting that the Oase population did not contribute substantially to later humans in Europe.

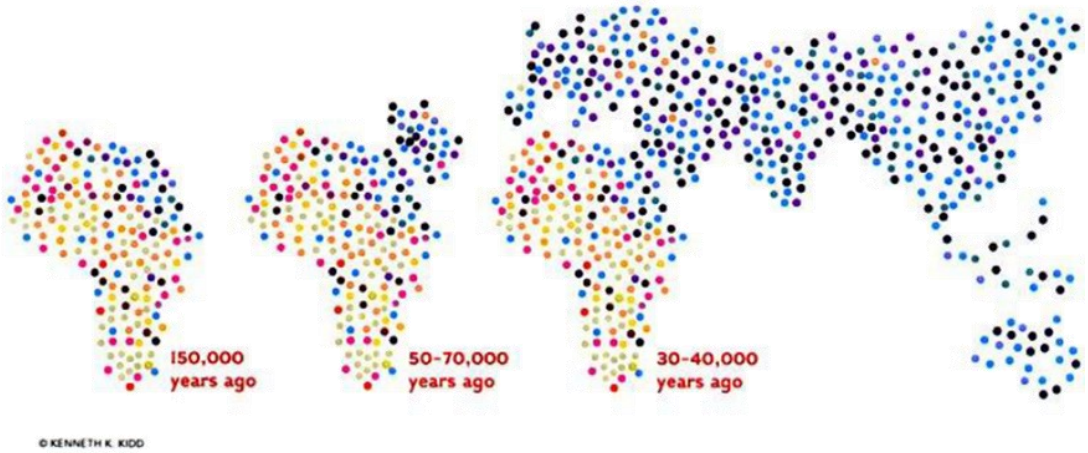
Putative recent Neanderthal ancestry

«Out of Africa» Model – Genetic proofs of the African origin

The African origin of modern human evidenced by the study of actual mitochondrial DNA



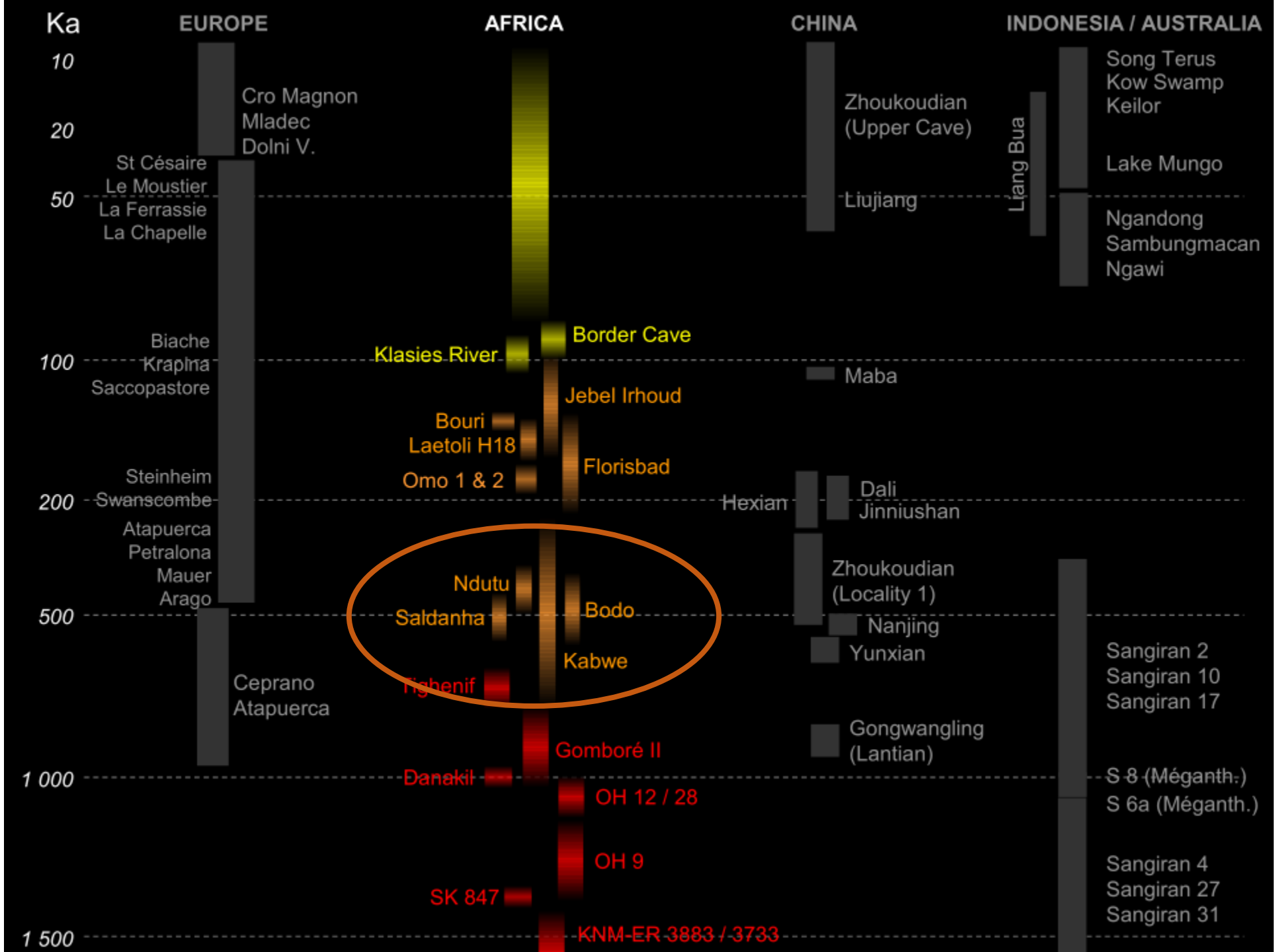
Diversity of one imaginary mitochondrial genetic marker (schematic picture)



Present variability mtDNA

« all the contemporary and worldwide human mtDNA variability is also present in Africa (East Africa), thus it is the most probable place of origin of the species *Homo sapiens.* »

Fossil proofs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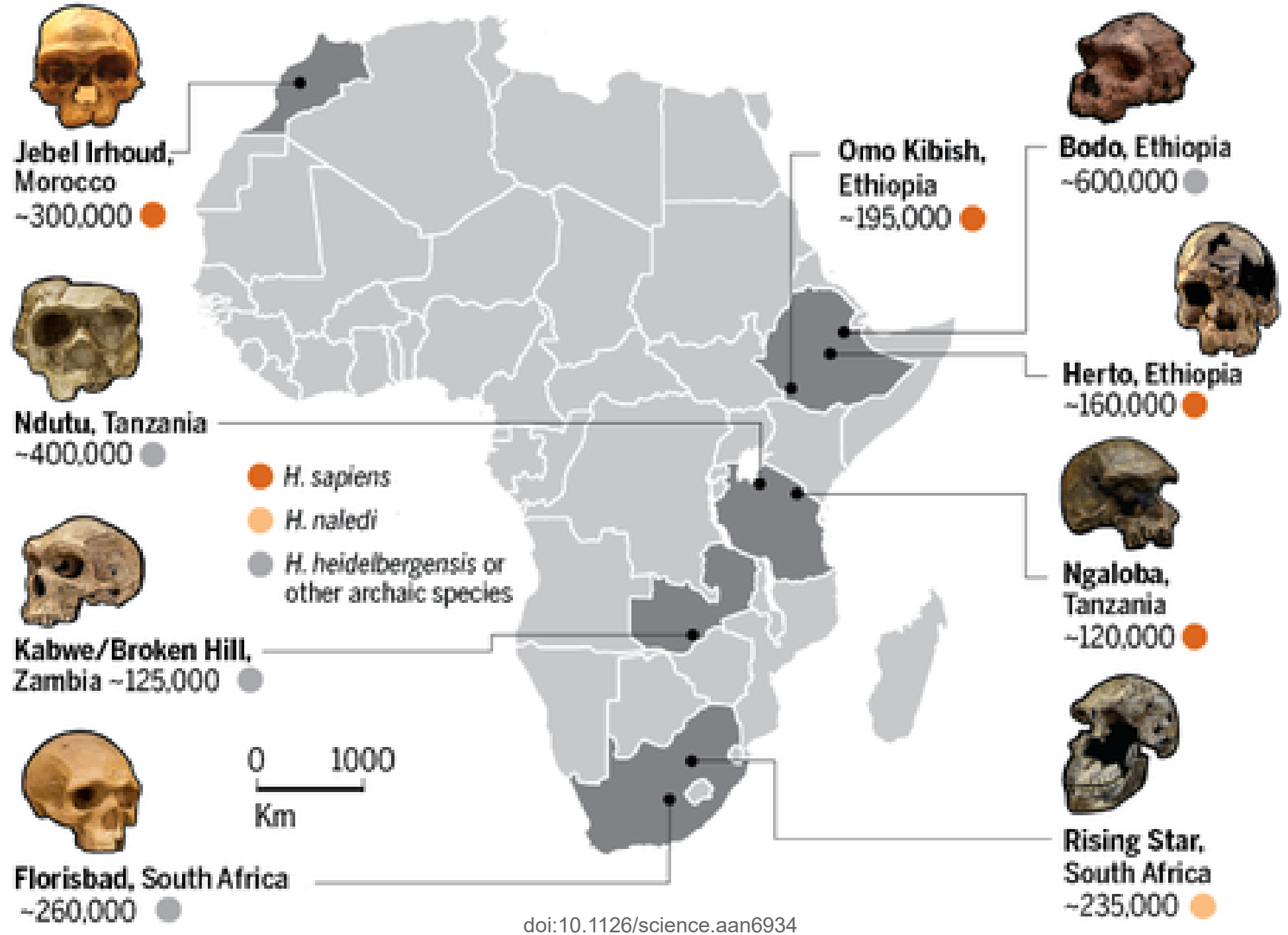
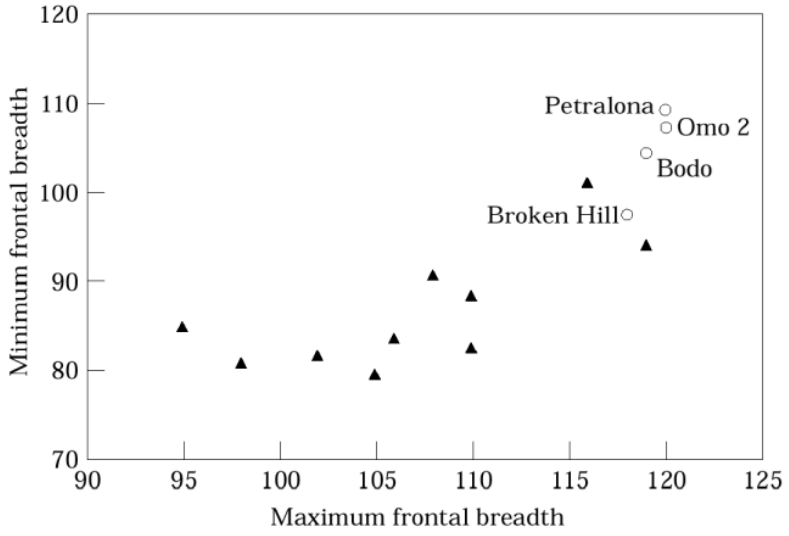
Mladec
Dolni V.
St Césaire
Le Moustier
La Ferrassie
La Chapelle
Biache
Krapina
Saccopastore
Steinheim
Swanscombe
Atapuerca
Petralona
Mauer
Arago
Ceprano
Atapuerca
Klasies River
Border Cave
Jebel Irhoud
Bouri
Laetoli H18
Omo 1 & 2
Florisbad
Ndutu
Saldanha
Bodo
Kabwe
Ighenif
Gomboré II
Danakil
OH 12 / 28
OH 9
SK 847
KNM-ER 3883 / 3733
Zhoukoudian
(Upper Cave)
Liujiang
Maba
Hexian
Dali
Jinniushan
Zhoukoudian
(Locality 1)
Nanjing
Yunxian
Gongwangling
(Lantian)
Liang Bua
Song Terus
Kow Swamp
Keilor
Lake Mungo
Ngandong
Sambungmacan
Ngawi
Sangiran 2
Sangiran 10
Sangiran 17
S 8 (Méganth.)
S 6a (Méganth.)
Sangiran 4
Sangiran 27
Sangiran 31



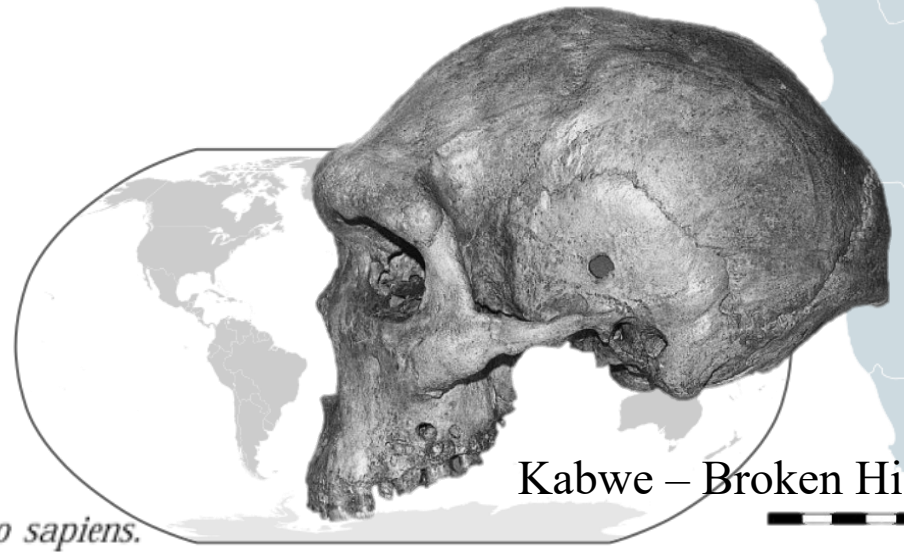
doi:10.1126/science.aan6934

Bodo (Ethiopia) and Kabwe (Broken Hill, Zambia) 600 000 y B.P.?

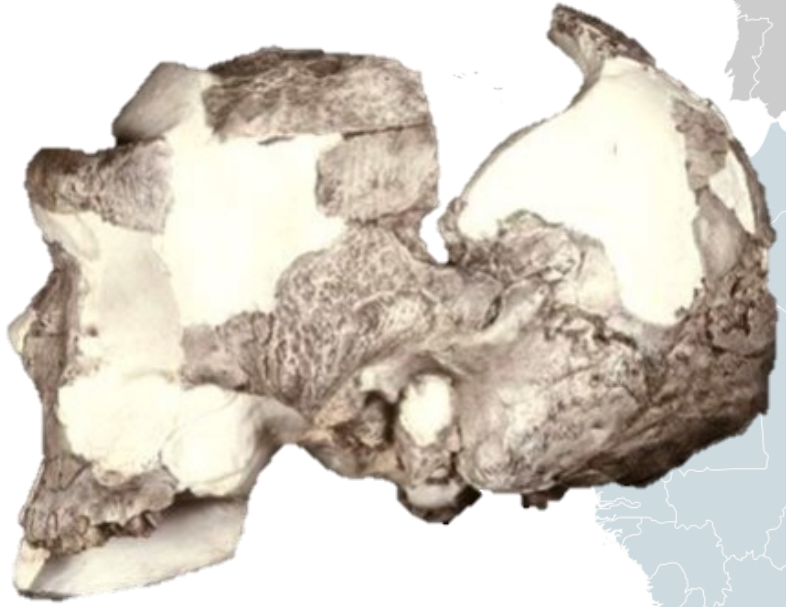
Bodo (Rightmire, 1995)



(▲), *Homo erectus* (Africa and Asia); (○), "archaic" *Homo sapiens.*



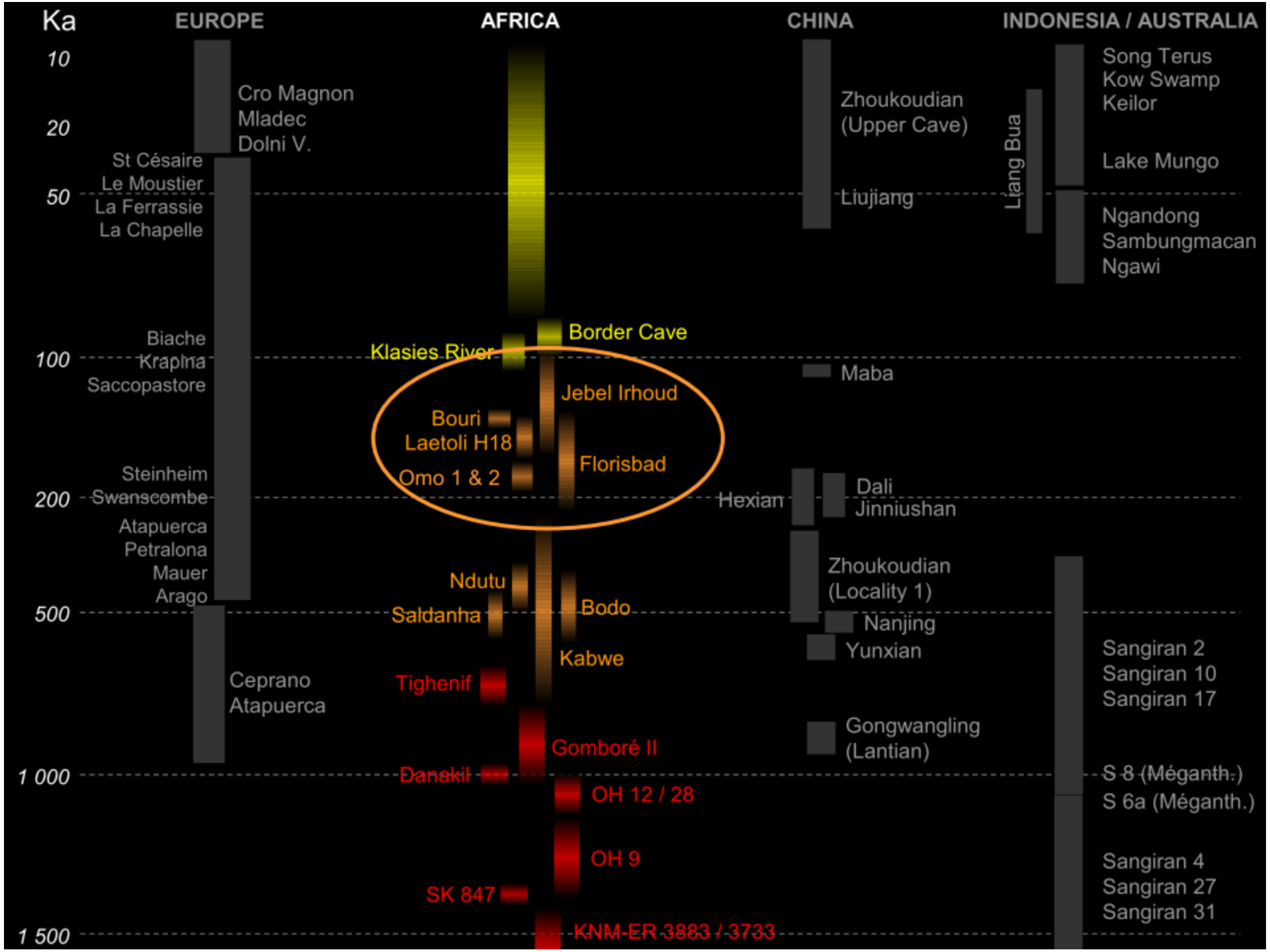
Kabwe – Broken Hill



Ndutu, Tanzania
400 000 y BP

H. erectus: Dimensions of the cranium, thickness of the vault bones.

Archaic *H. sapiens*: Occipital and mastoid morphology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Dolni V.
St Césaire
Le Moustier
La Ferrassie
La Chapelle
Biache
Krapina
Saccopastore
Steinheim
Swanscombe
Atapuerca
Petralona
Mauer
Arago
Ceprano
Atapuerca
Klasies River
Border Cave
Jebel Irhoud
Bouri
Laetoli H18
Omo 1 & 2
Florisbad
Ndutu
Saldanha
Bodo
Kabwe
Tighenif
Gomboré II
Danakil
OH 12 / 28
OH 9
SK 847
KNM-ER 3883 / 3733
Zhoukoudian
(Upper Cave)
Liujiang
Maba
Hexian
Dali
Jinniushan
Zhoukoudian
(Locality 1)
Nanjing
Yunxian
Gongwangling
(Lantian)
Liang Bua
Song Terus
Kow Swamp
Keilor
Lake Mungo
Ngandong
Sambungmacan
Ngawi
Sangiran 2
Sangiran 10
Sangiran 17
S 8 (Méganth.)
S 6a (Méganth.)
Sangiran 4
Sangiran 27
Sangiran 31

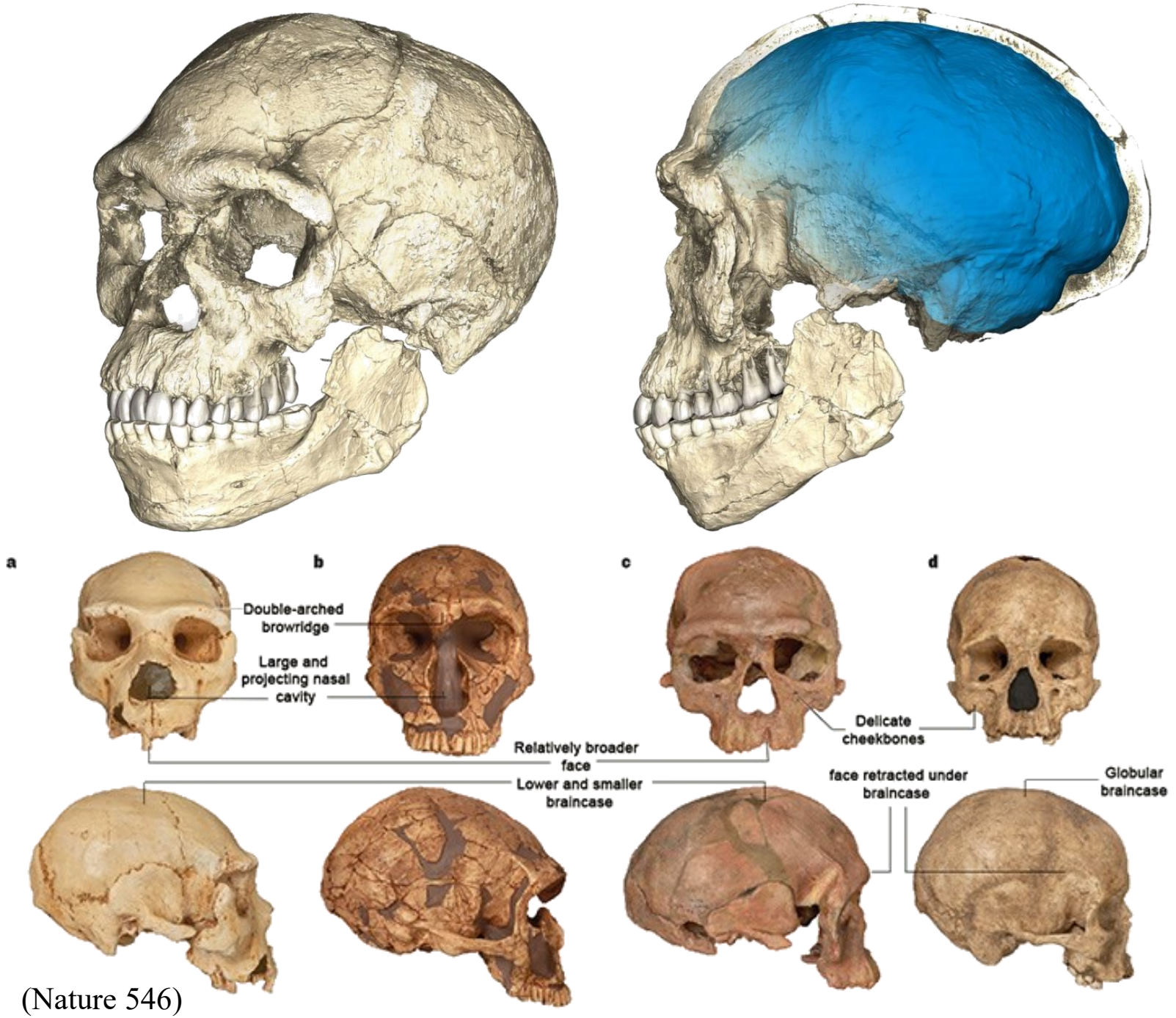
LETTER

doi:10.1038/nature22336

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

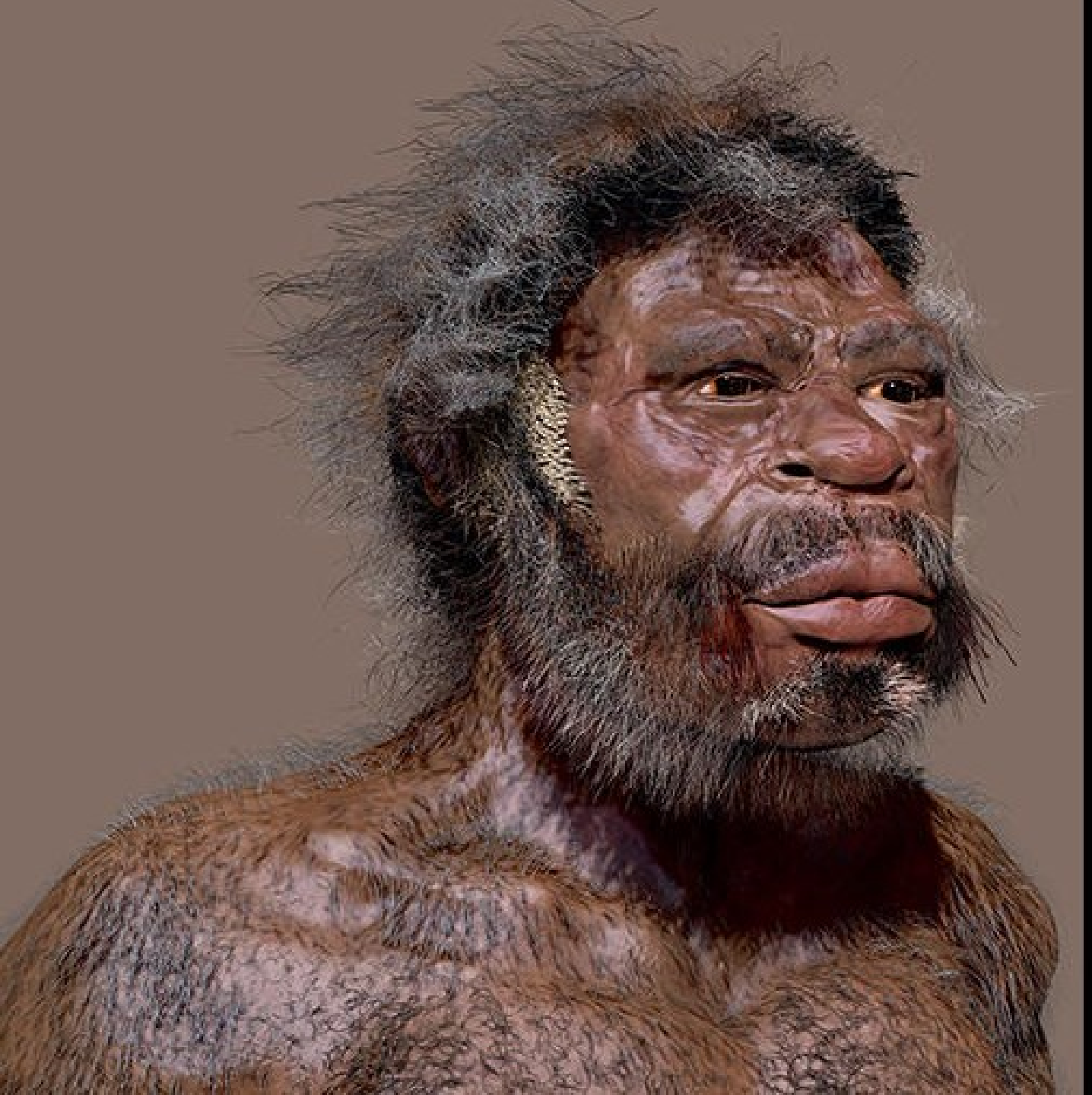
Jean-Jacques Hublin[1,2], Abdelouahed Ben-Ncer[3], Shara E. Bailey[4], Sarah E. Freidline[1], Simon Neubauer[1], Matthew M. Skinner[5], Inga Bergmann[1], Adeline Le Cabec[1], Stefano Benazzi[6], Katerina Harvati[7] & Philipp Gunz[1]

Fossil evidence points to an African origin of *Homo sapiens* from a group called either *H. heidelbergensis* or *H. rhodesiensis*. However, the exact place and time of emergence of *H. sapiens* remain obscure because the fossil record is scarce and the chronological age of many key specimens remains uncertain. In particular, it is unclear whether the present day 'modern' morphology rapidly emerged approximately 200 thousand years ago (ka) among earlier representatives of *H. sapiens*[1] or evolved gradually over the last 400 thousand years[2]. Here we report newly discovered human fossils from Jebel Irhoud, Morocco, and interpret the affinities of the hominins from this site with other archaic and recent human groups. We identified a mosaic of features including facial, mandibular and dental morphology that aligns the Jebel Irhoud material with early or recent anatomically modern humans and more primitive neurocranial and endocranial morphology. In combination with an age of 315 ± 34 thousand years (as determined by thermoluminescence dating)[3], this evidence makes Jebel Irhoud the oldest and richest African Middle Stone Age hominin site that documents early stages of the *H. sapiens* clade in which key features of modern morphology were established. Furthermore, it shows that the evolutionary processes behind the emergence of *H. sapiens* involved the whole African continent.



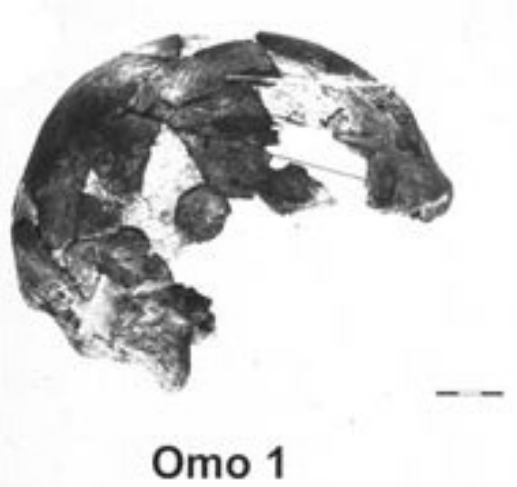
(Nature 546)

Modern face but archaic cranium.



J. BAVARO FINE ART/SPL/COSMOS

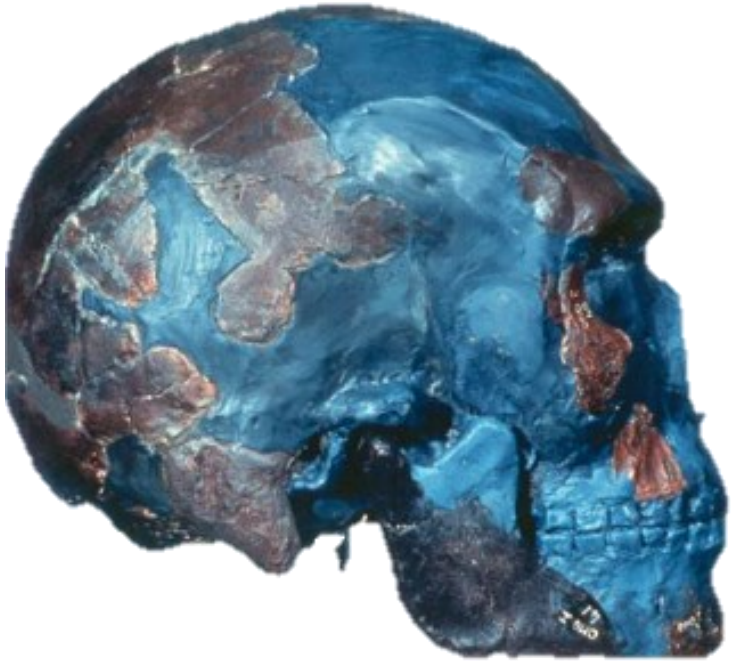
Omo Kibish, Ethiopia
195 000 - 130 000 y BP



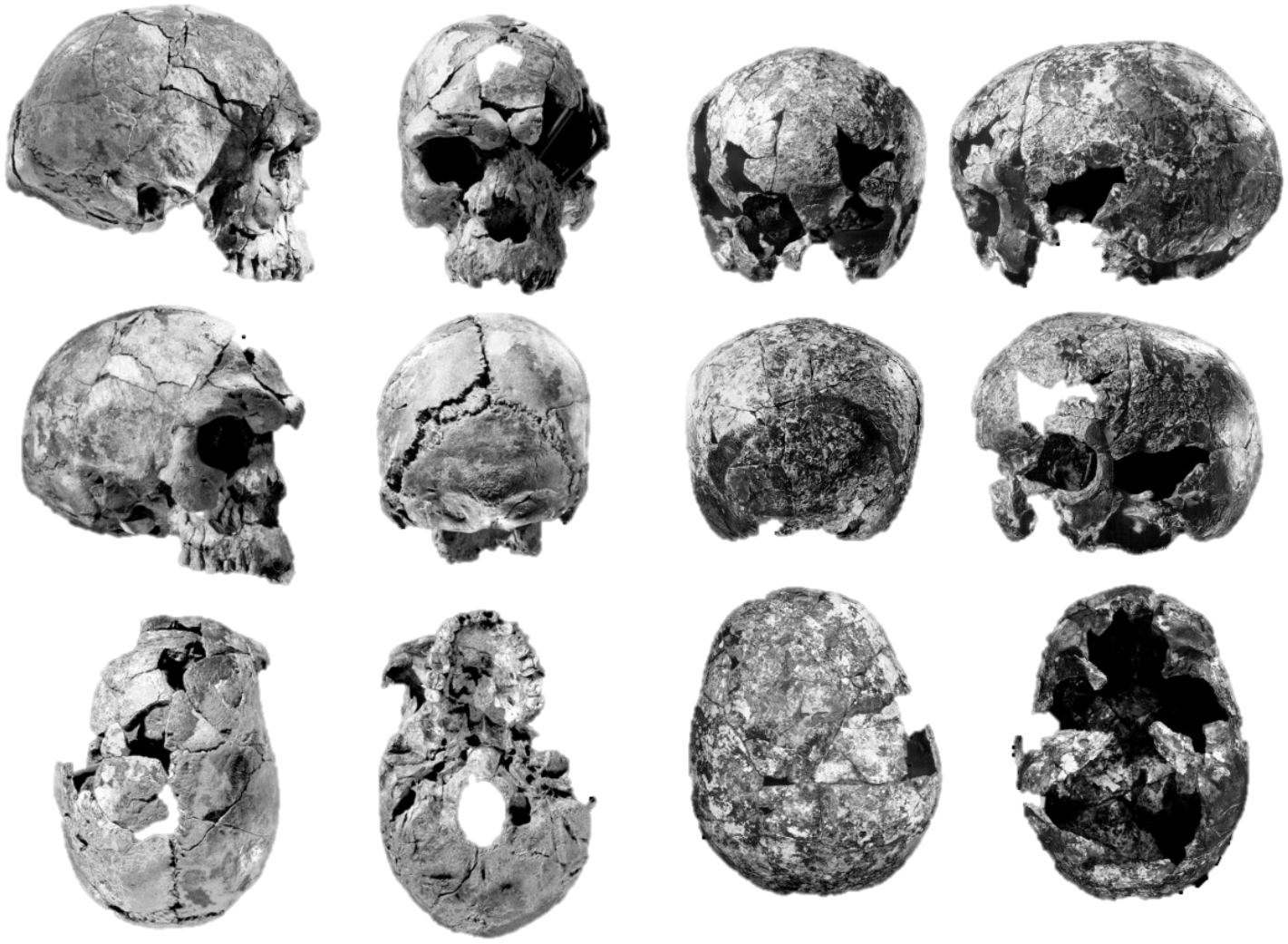
Omo 1

Omo 2

Bab El-Mandeb strait, the area where Africa and Saudi Arabia are close.



Herto Bouri, Middle Awash, Ethiopia
154-160 000 y BP



(White, 2003)

Bab El-Mandeb strait, the area where Africa and Saudi Arabia are close.

Homo sapiens idaltu

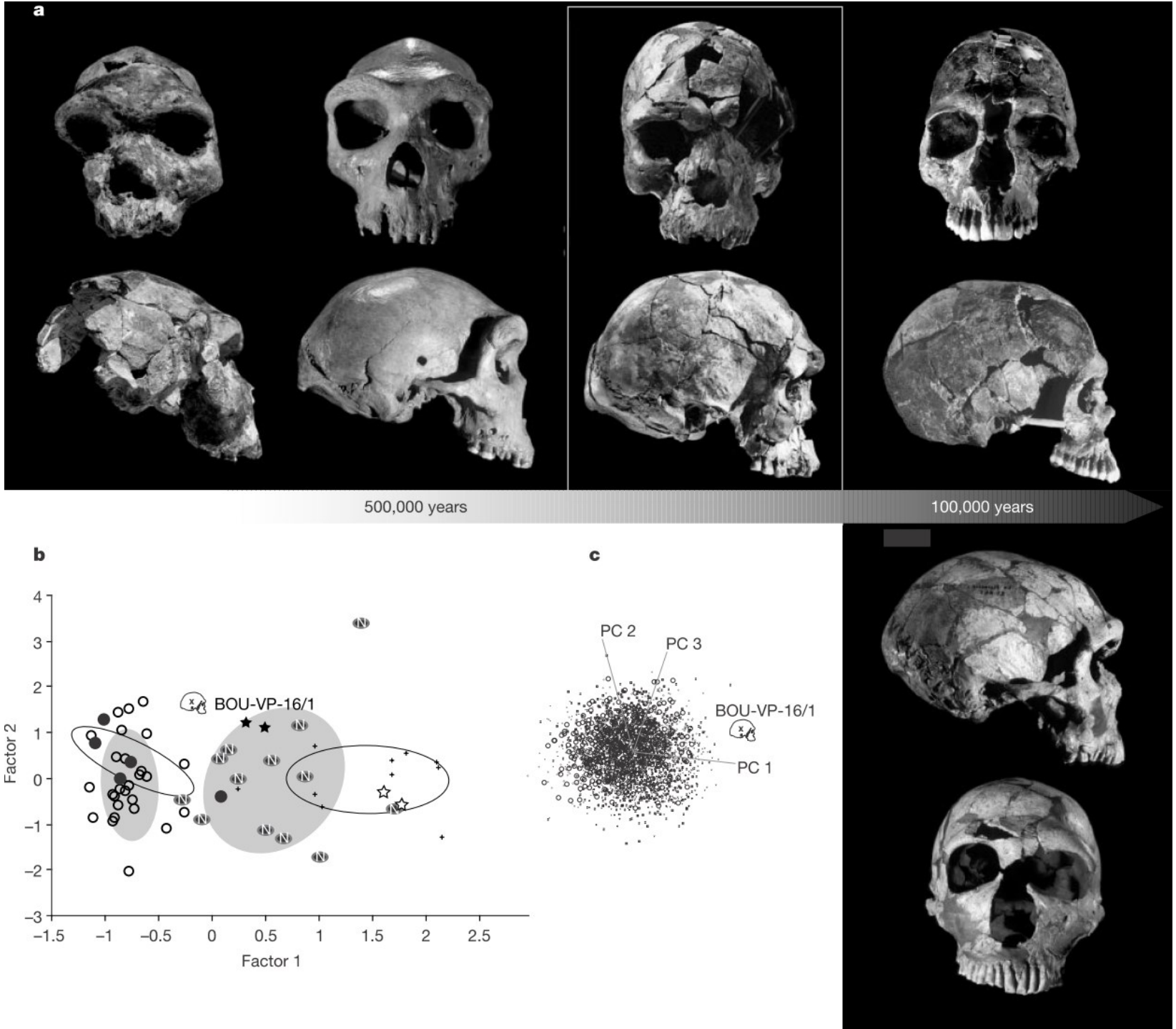
The remains were discovered for the first time in the site of Herto Bouri (Ethiopia) and have been dated to 160 ka BP.

Herto (Afar, Etiopia), 160.000 anni (White, 2003)

"Because the Herto hominids are morphologically just beyond the range of variation seen in AMHS [anatomically modern *Homo sapiens*], and because they differ from all other known fossil hominids, we recognize them here as *Homo sapiens idaltu*, a new palaeosubspecies of *Homo sapiens*".

Order Primates L., 1758
Suborder Anthropoidea Mivart, 1864
Superfamily Hominoidea Gray, 1825
Family Hominidae Gray, 1825
Homo sapiens idaltu subsp. nov.

Etymology. The subspecies name 'idàltu' is taken from the Afar language. It means 'elder'.
Holotype. BOU-VP-16/1 (Fig. 1), an adult cranium with partial dentition. Holotype and referred material are housed at the National Museum of Ethiopia, Addis Ababa. Holotype from Bouri Vertebrate Paleontology Locality 16 (BOU-VP 16); differentially corrected GPS coordinates: 10° 15.5484′ N and 40° 33.3834′ E.
Referred material. BOU-VP-16/2 cranial fragments; BOU-VP-16/3 parietal fragment; BOU-VP-16/4 parietal fragment; BOU-VP-16/5 child's cranium; BOU-VP-16/6 R. upper molar; BOU-VP-16/7 parietal fragment, BOU-VP-16/18 parietal fragments; BOU-VP-16/42 upper premolar, BOU-VP-16/43 parietal fragment.
Stratigraphy and age. Bouri Formation, Upper Herto Member. Dated by $^{40}Ar/^{39}Ar$ to between 160,000 and 154,000 years ago (ref. 6).
Diagnosis. On the limited available evidence, a subspecies of *Homo sapiens* distinguished from Holocene anatomically modern humans (*Homo sapiens sapiens*) by greater craniofacial robusticity, greater anterior–posterior cranial length, and large glenoid-to-occlusal plane distance. *Homo sapiens idaltu* is distinguished from the holotype of *Homo rhodesiensis* (Woodward, 1921) by a larger cranial capacity, a more vertical frontal with smaller face, and more marked midfacial topography (for example, canine fossa). We consider the holotypes of *H. helmei* and *H. njarasensis* too fragmentary for appropriate comparisons.



(White et al. 2003)

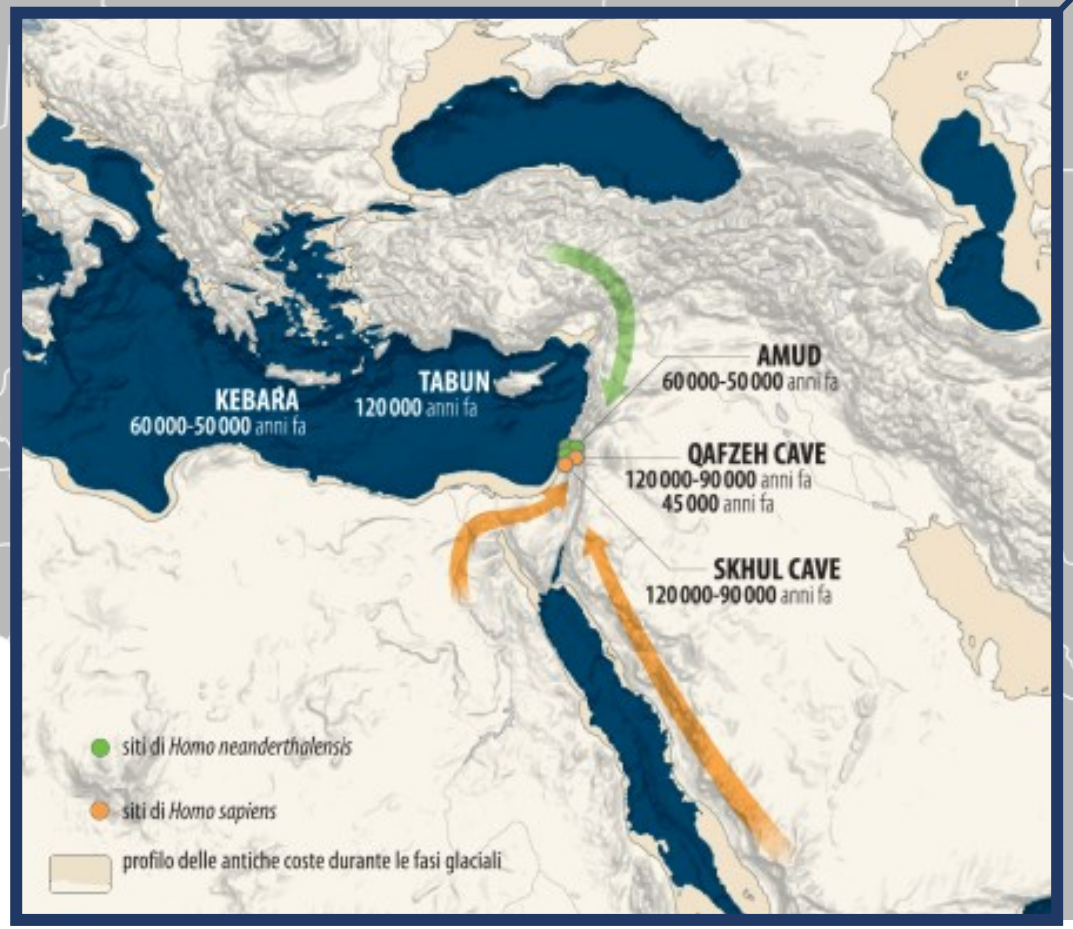
The african « evolutionary sequence » for *Homo sapiens*

Archaic *Homo sapiens*
Homo rhodesiensis?
Homo heidelbergensis?

→

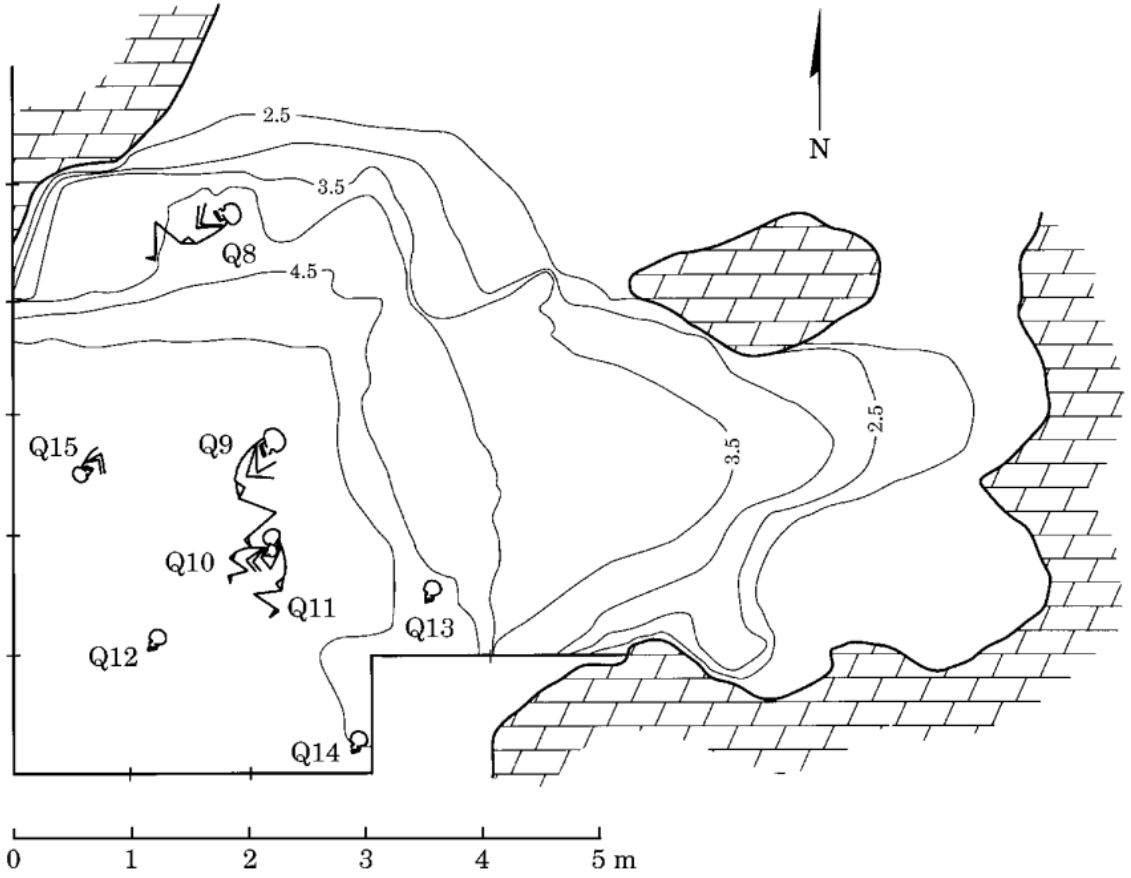
Anat. modern
Homo sapiens

Homo sapiens idaltu


KEBARA
60 000-50 000 anni fa
TABUN
120 000 anni fa
AMUD
60 000-50 000 anni fa
QAFZEH CAVE
120 000-90 000 anni fa
45 000 anni fa
SKHUL CAVE
120 000-90 000 anni fa
siti di Homo neanderthalensis
siti di Homo sapiens
profilo delle antiche coste durante le fasi glaciali

Qafzeh, Israel
90-100 000 y BP

Human remains (NMI 25 individuals)
Mousterian assemblage

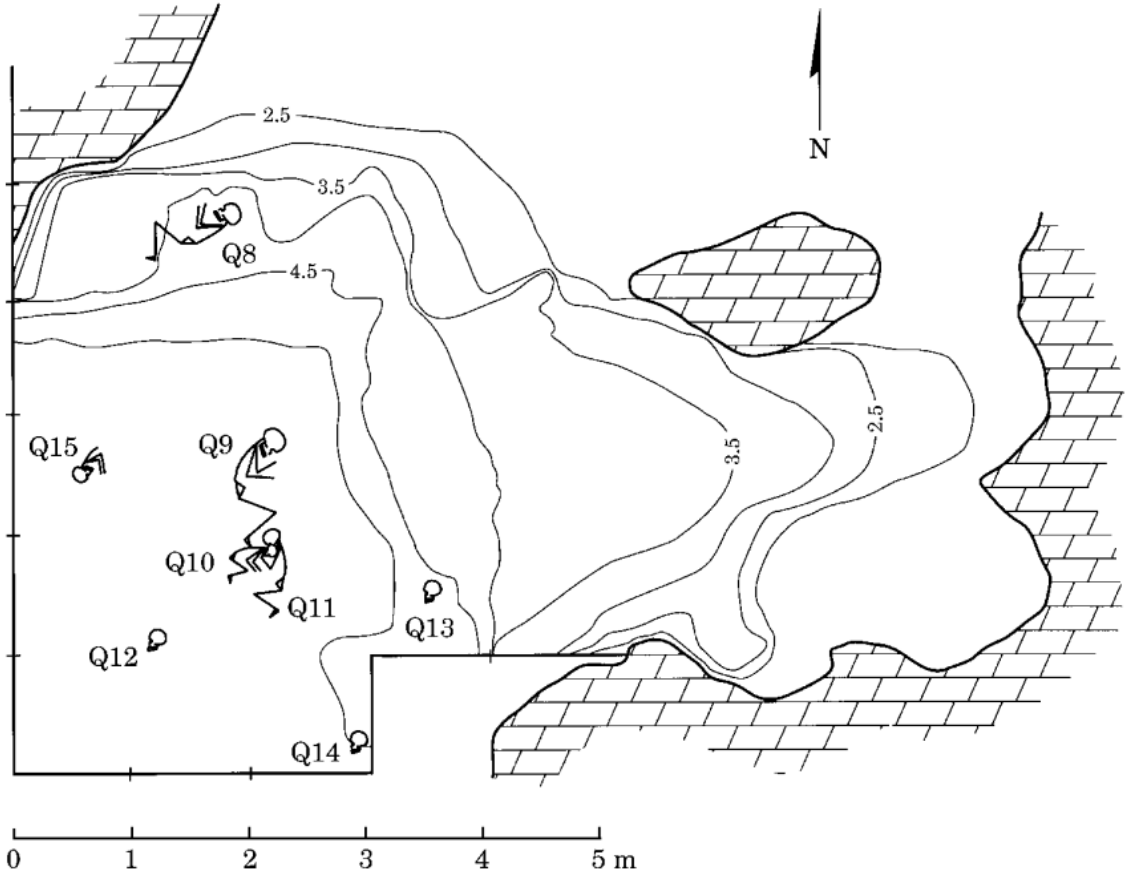


(Vandermeersch, 1981)

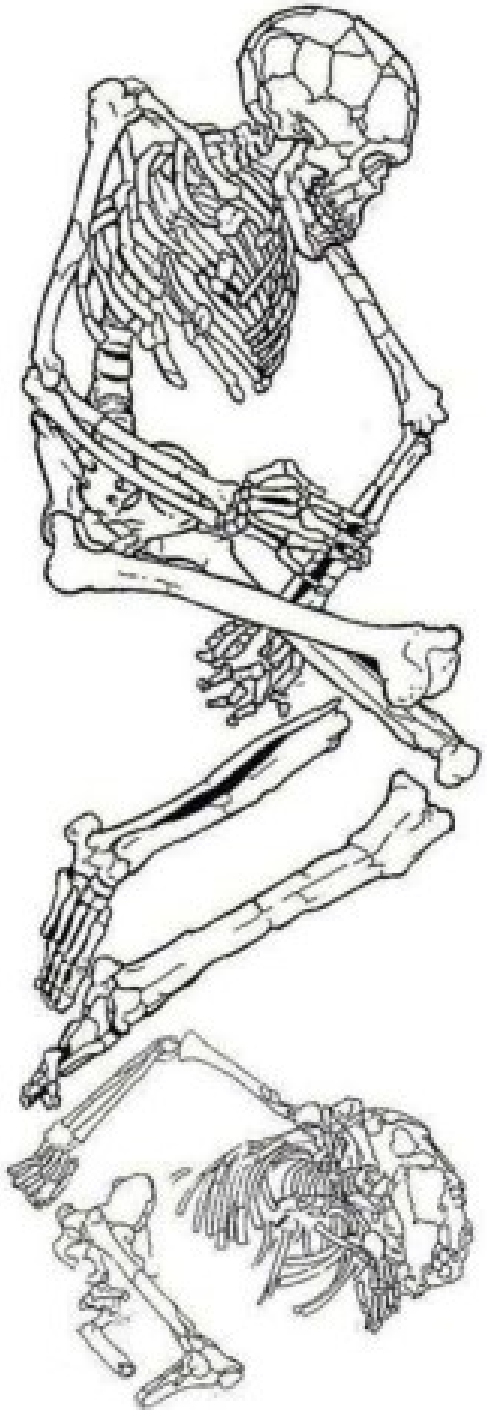
Qafzeh 9

Qafzeh, Israel
90-100 000 y BP

Multiple burial



(Vandermeersch, 1981)



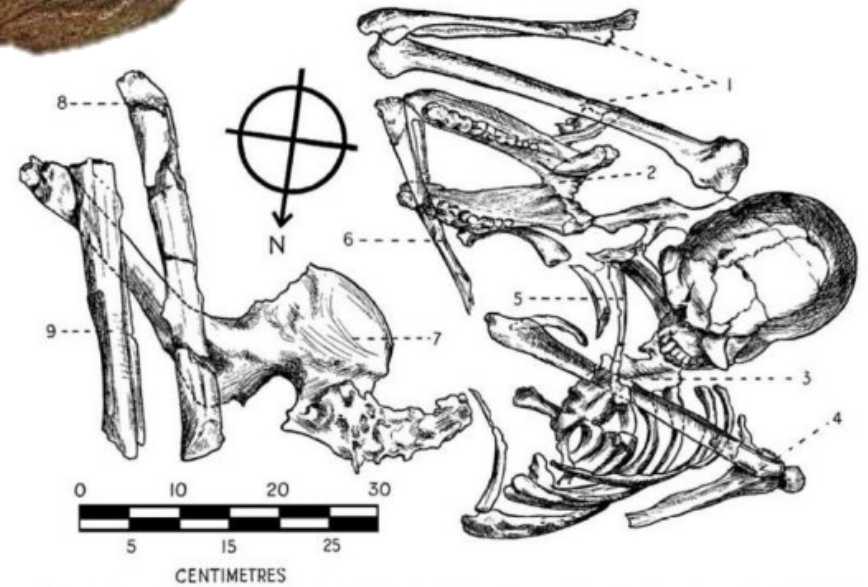
The first *Homo sapiens* in the Near-East

Skhul - Israel (100.000 BP)

- Mousterian lithic industries
-10 complete skeleton
- Archaic morphology (attributed at the beginning to *Homo neanderthalensis*)

Skhul IV

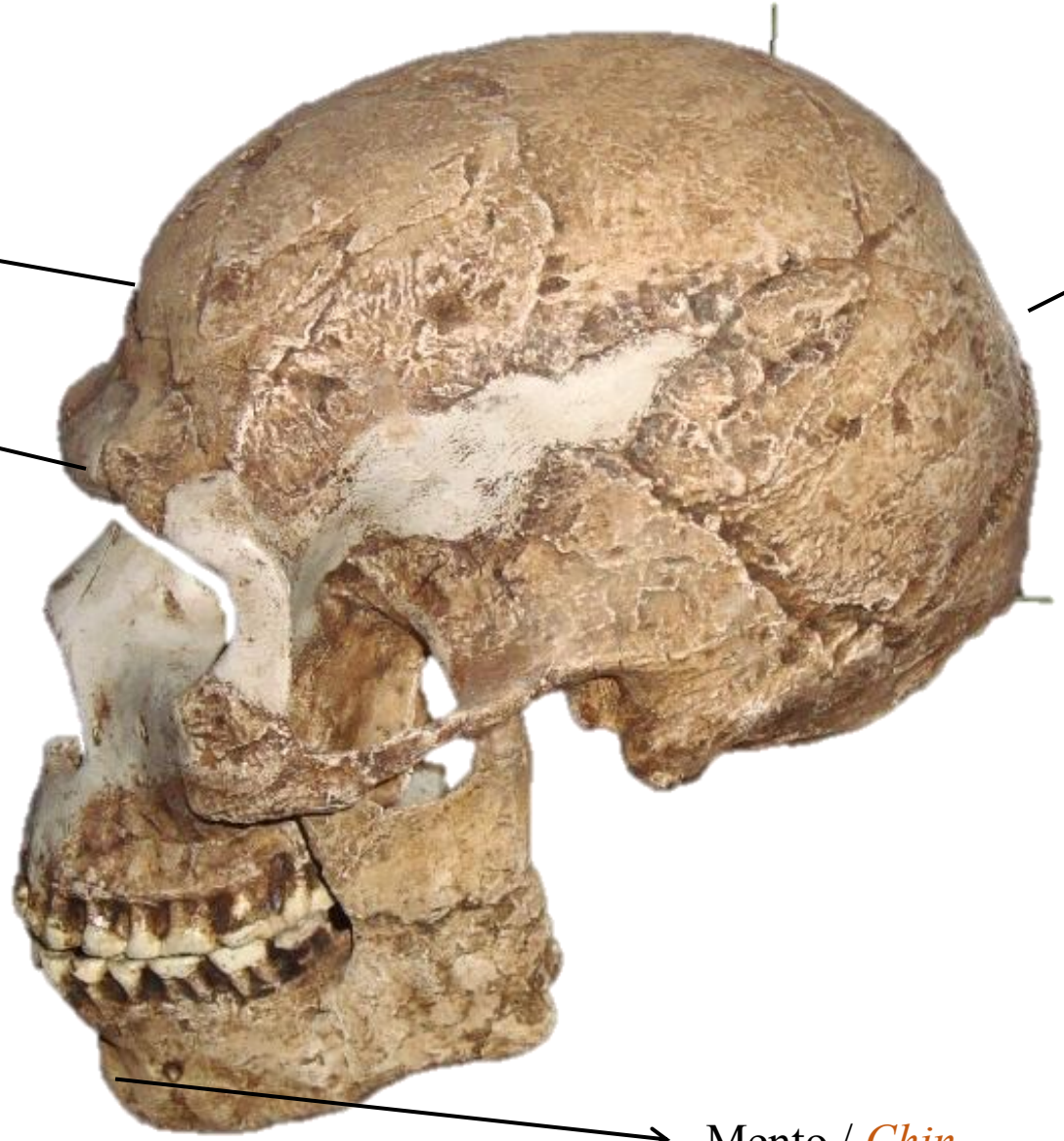
Skhul V, Israel
100 000 y BP



2. Plan of the contracted burial of a tall male, Skhûl V. 1, right arm; 2, Pig's mandible; 3, dorsal vertebrae; 4, left scapula and humerus; 5, left clavicle; 6, left radius; 7, right ilium; 8, left femur; 9, left tibia and fibula.

(Garod & Bate, 1937)

The first *Homo sapiens* in the Near-East

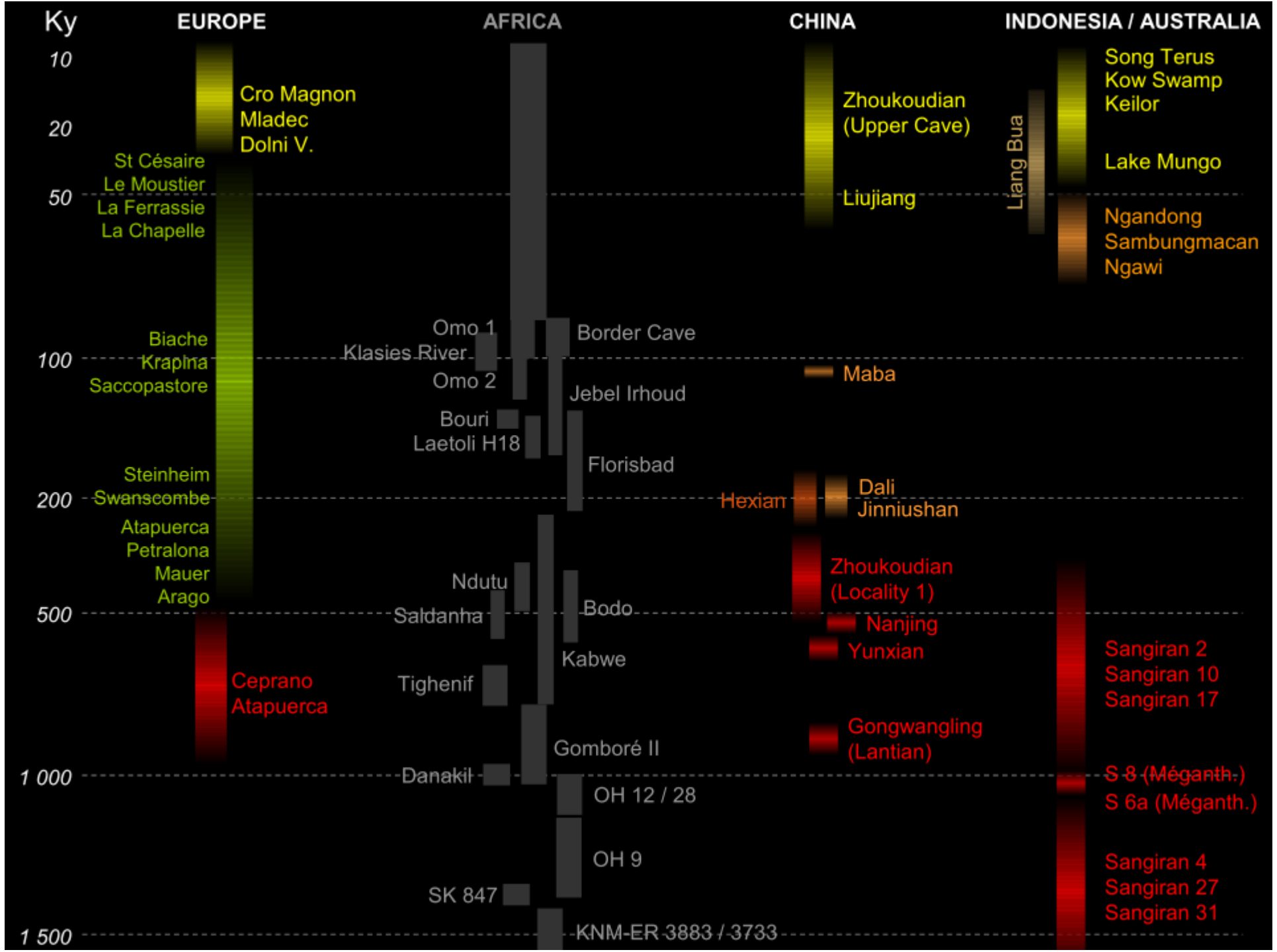


Fronte convessa /
Convexe fronthead

Assenza del toro sopra orbitario /
Lack of supra-orbital torus

Occipitale arrotondato /
Rounded occipital

Mento / *Chin*


Ky
EUROPE
AFRICA
CHINA
INDONESIA / AUSTRALIA
10
20
50
100
200
500
1 000
1 500
Cro Magnon
Mladec
Dolni V.
St Césaire
Le Moustier
La Ferrassie
La Chapelle
Biache
Krapina
Saccopastore
Steinheim
Swanscombe
Atapuerca
Petralona
Mauer
Arago
Ceprano
Atapuerca
Omo 1
Klasies River
Omo 2
Border Cave
Jebel Irhoud
Bouri
Laetoli H18
Florisbad
Ndutu
Saldanha
Bodo
Kabwe
Tighenif
Gomboré II
Danakil
OH 12 / 28
OH 9
SK 847
KNM-ER 3883 / 3733
Zhoukoudian
(Upper Cave)
Liujiang
Maba
Hexian
Dali
Jinniushan
Zhoukoudian
(Locality 1)
Nanjing
Yunxian
Gongwangling
(Lantian)
Liang Bua
Song Terus
Kow Swamp
Keilor
Lake Mungo
Ngandong
Sambungmacan
Ngawi
Sangiran 2
Sangiran 10
Sangiran 17
S 8 (Méganth.)
S 6a (Méganth.)
Sangiran 4
Sangiran 27
Sangiran 31

Fossil record

Homo erectus

East Asia (China)

Southeast Asia

mainland

insular (Java)

H. erectus /archaic *H. sapiens*

East Asia (China)

Southeast Asia

insular (Java)

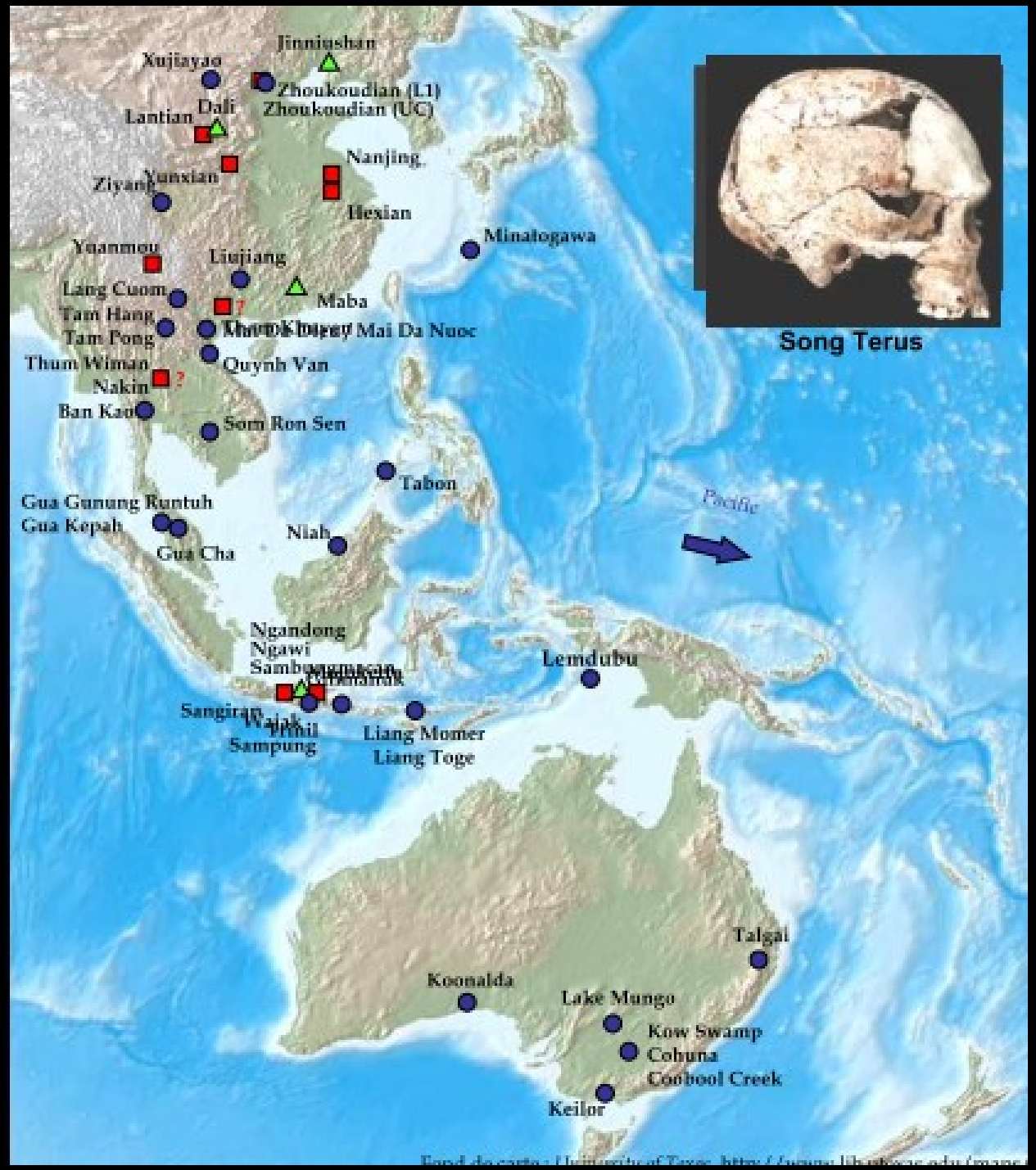
fossil *Homo sapiens*

East Asia

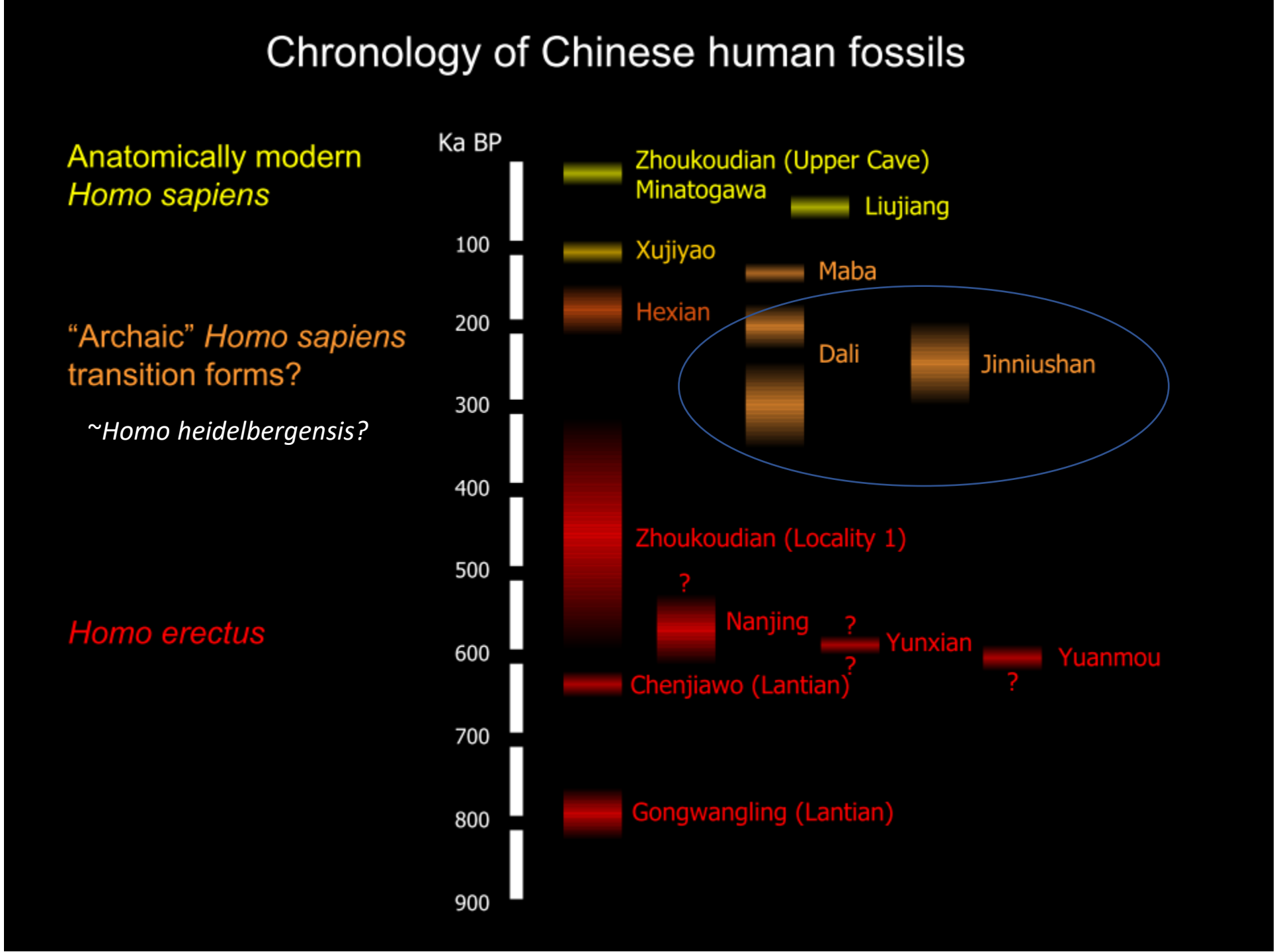
Southeast Asia

Australia

Pacific



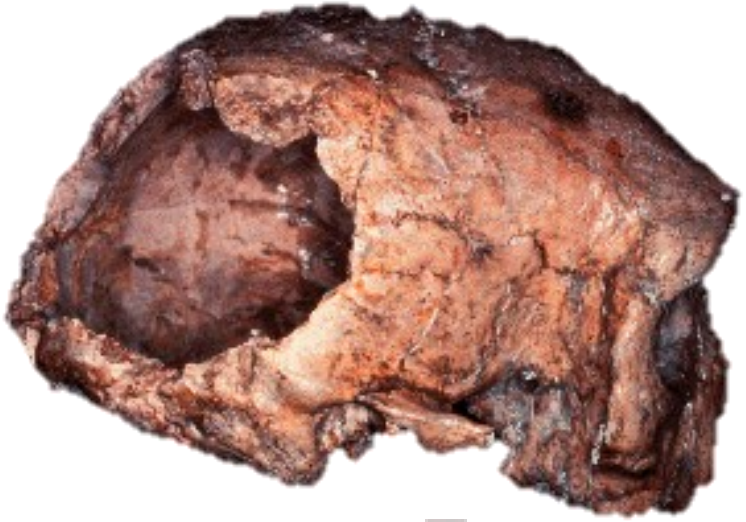
Chronology of Chinese human fossils

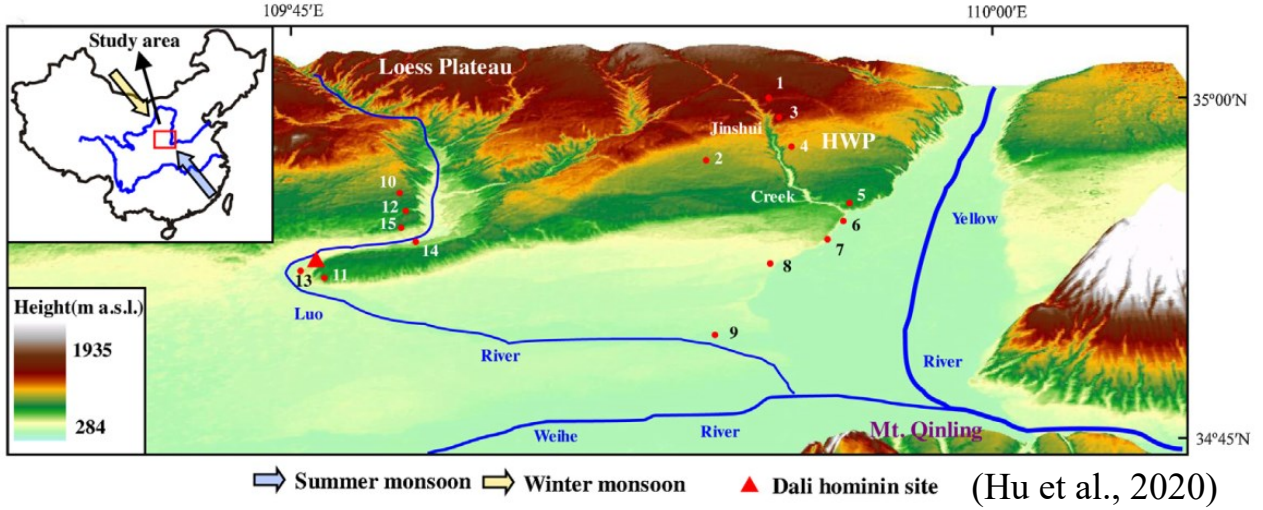


Narmada Valley, India
Middle Pleistocene– 230 ka?

Dali, China

180 – 230 ky BP (U-Th on tooth)
250-350 ky BP (ESR – U-Th on tooth)
~550 ky BP (Geomorphology, Hu et al., 2020)





(Hu et al., 2020)

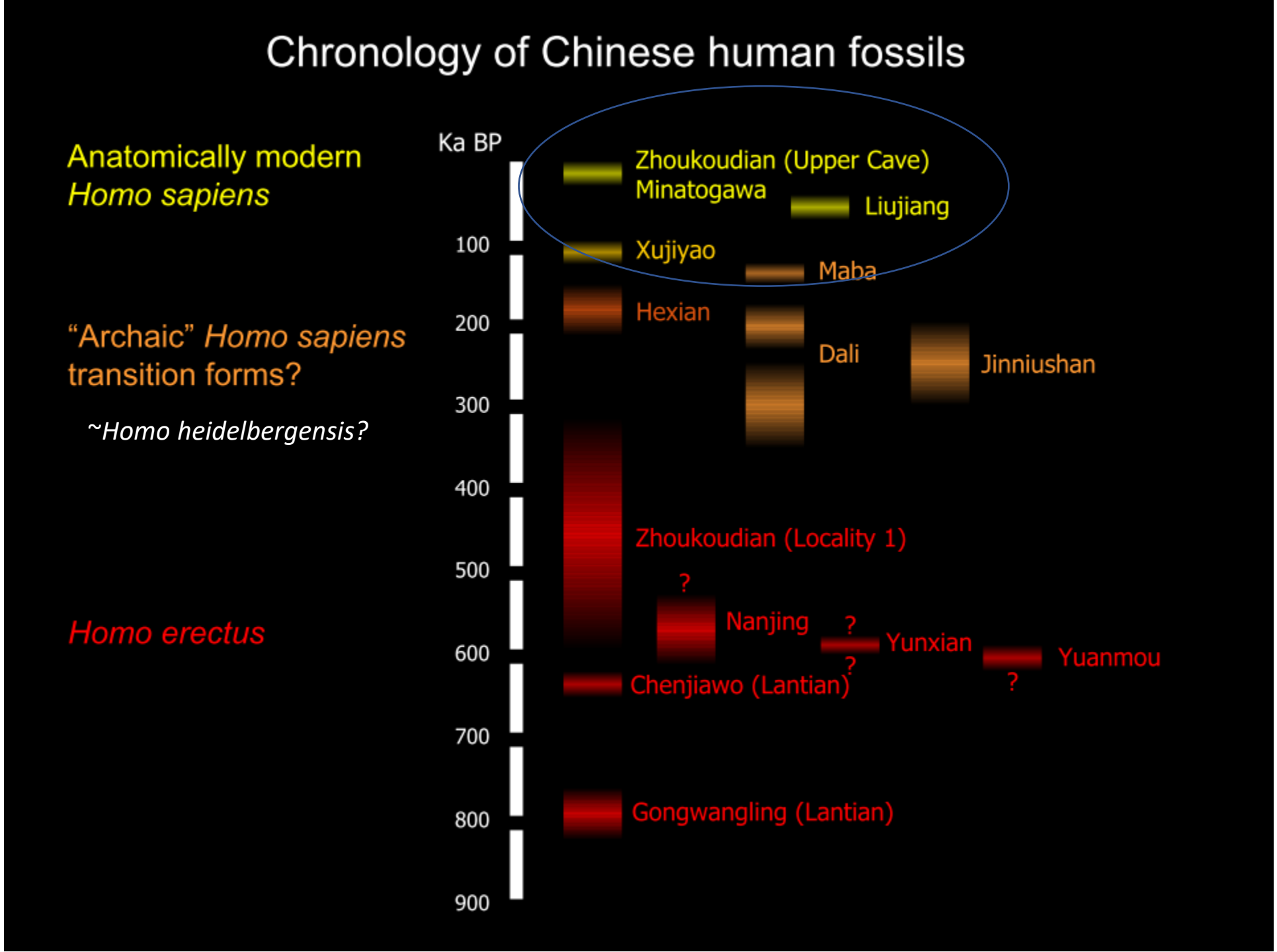
Mosaic of *H. erectus* and *H. sapiens* features
« archaic » *H. sapiens = H. rhodesiensis, H. heidelbergensis?*

Jinniushan, China
260 000 y B.P.

« archaic » *H. sapiens = Homo rhodesiensis / Homo heilderbengensis?*

(Rosenberg et al., 2006)

Chronology of Chinese human fossils



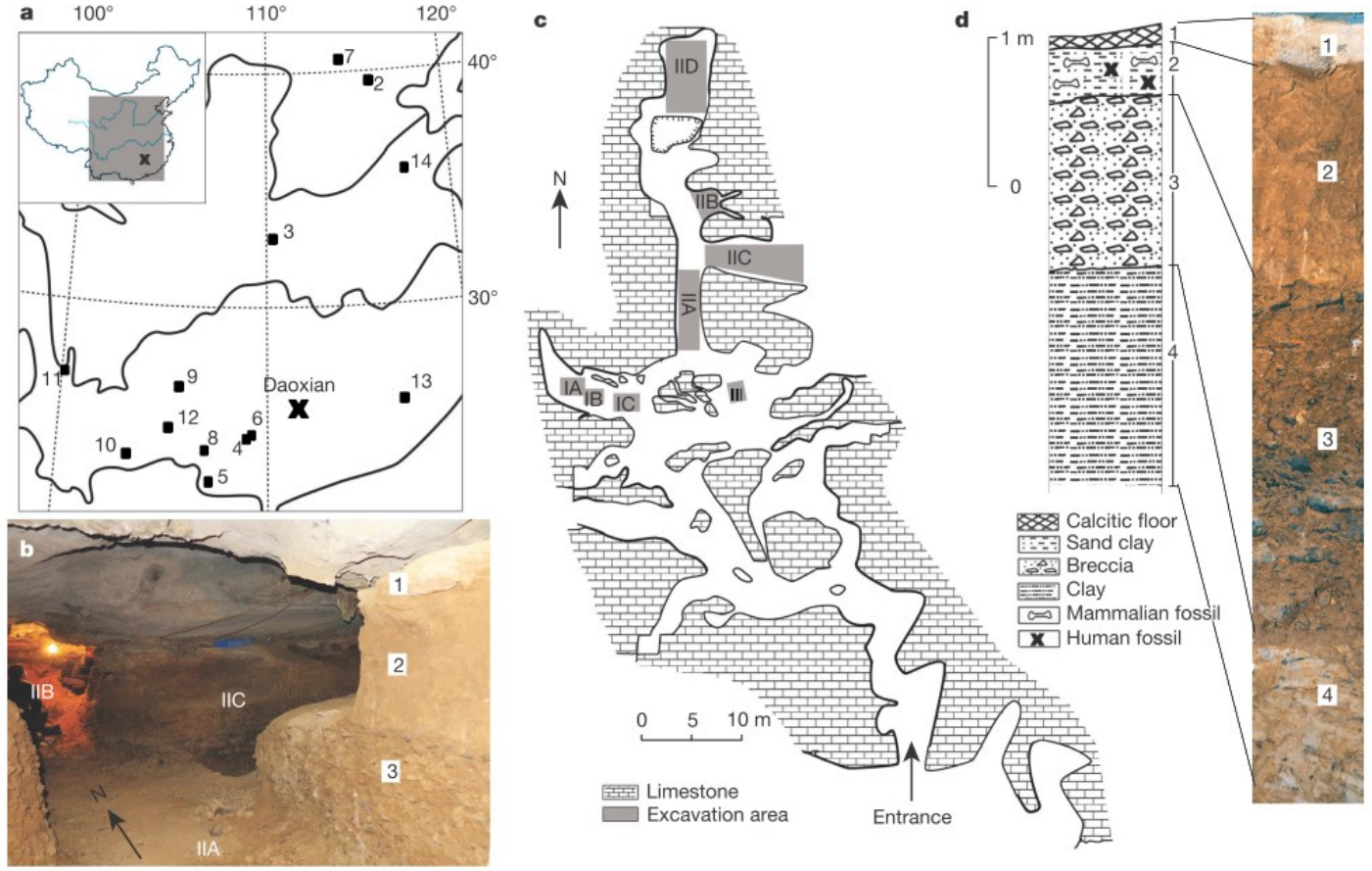
LETTER

doi:10.1038/nature15696

The earliest unequivocally modern humans in southern China

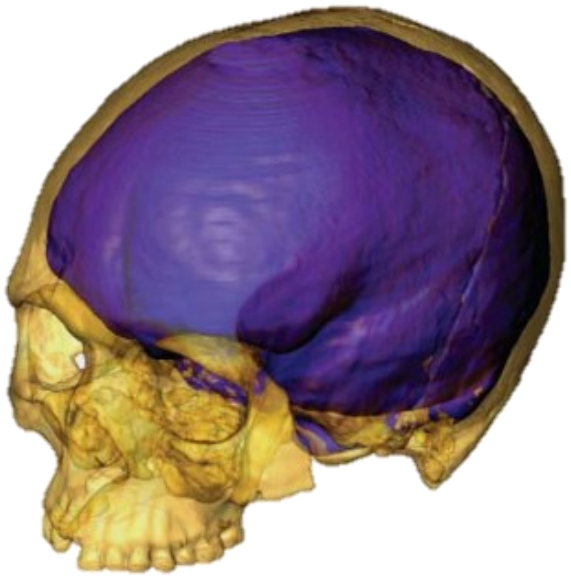
Wu Liu[1]*, María Martinón-Torres[2,3,4]*, Yan-jun Cai[5], Song Xing[1], Hao-wen Tong[1], Shu-wen Pei[1], Mark Jan Sier[4,6,7], Xiao-hong Wu[8], R. Lawrence Edwards[9], Hai Cheng[10], Yi-yuan Li[11], Xiong-xin Yang[12], José María Bermúdez de Castro[2,4] & Xiu-jie Wu[1]*

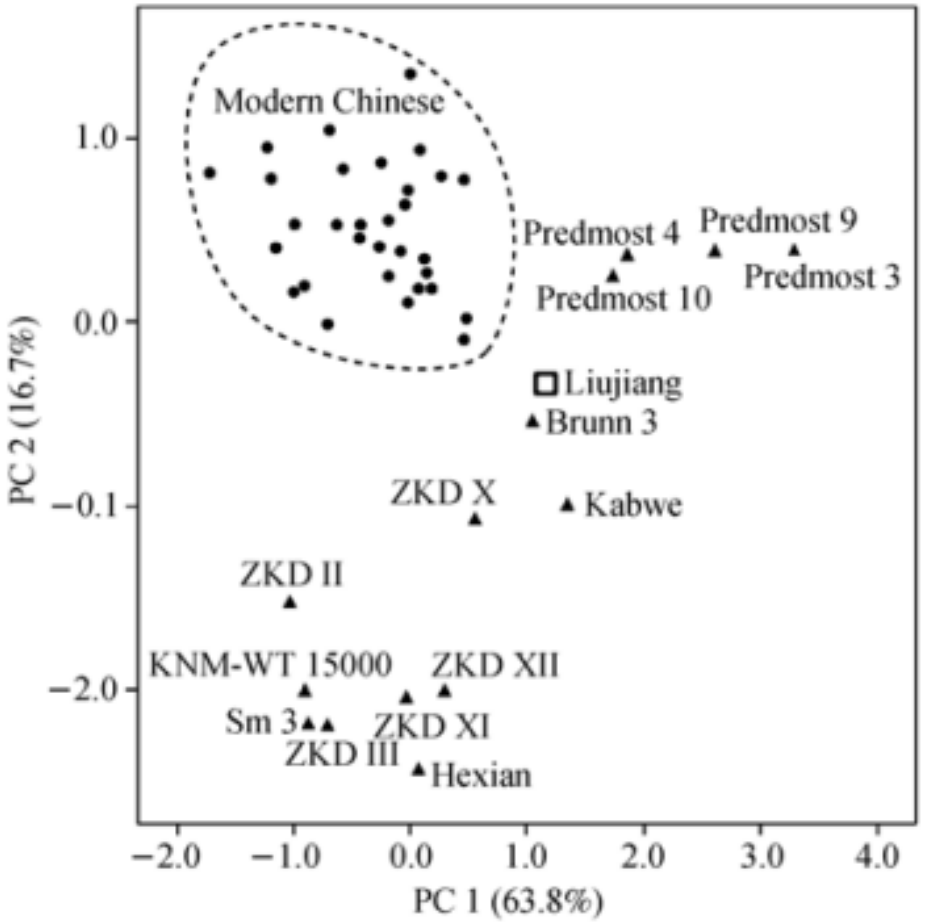
Fuyan Cave in Daoxian
47 denti umane
80 – 120 000 y BP
Più derivati che tutti i altri umani anatomicamente moderni, similarietà con il umani del Pleistocene medio, superiore e anche di tempi moderni.



"I risultati sono rilevanti per l'indagine sulle ragioni della relativamente tardiva entrata di *H. sapiens* in Europa. Degli umani moderni "completi" erano già presenti in Cina almeno 80.000 anni fa, non ci sono però evidenze dell'entrata in Europa prima di 45.000 anni fa. Questo potrebbe indicare che *H. neanderthalensis* fosse stato un'ulteriore **barriera ecologica** per gli uomini moderni, che sono potuti entrare in Europa solo quando la scomparsa dei Neanderthals era già iniziata".

Liujiang, China
60 – 100 000 y BP?





(Wu et al., 2008)

Zhoukoudian Upper Cave, China
20 – 30 000 y BP

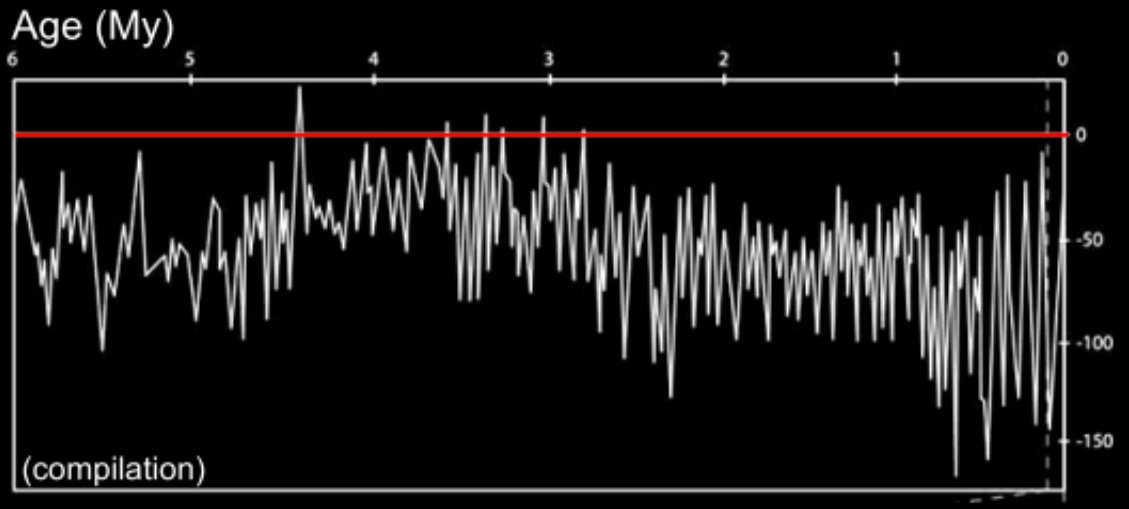
Toward Southeast Asia and Australia

How did they arrive ?

Homo erectus

Glacial / interglacial
=> Sea level changes

- insular periods



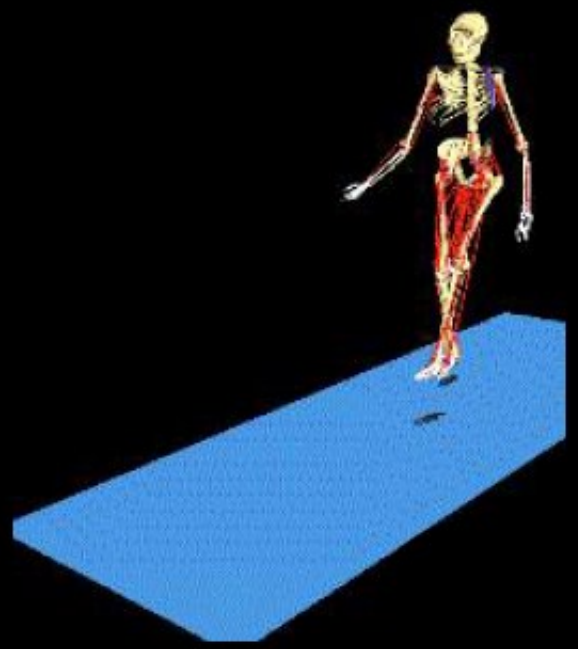
How did they arrive ?

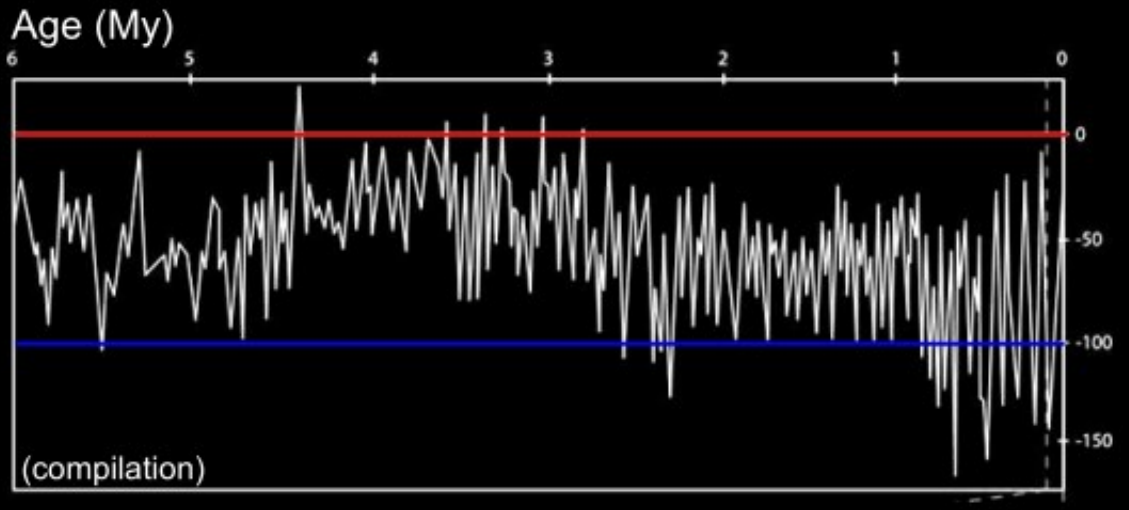
Homo erectus

Glacial / interglacial
=> Sea level changes

- insular periods

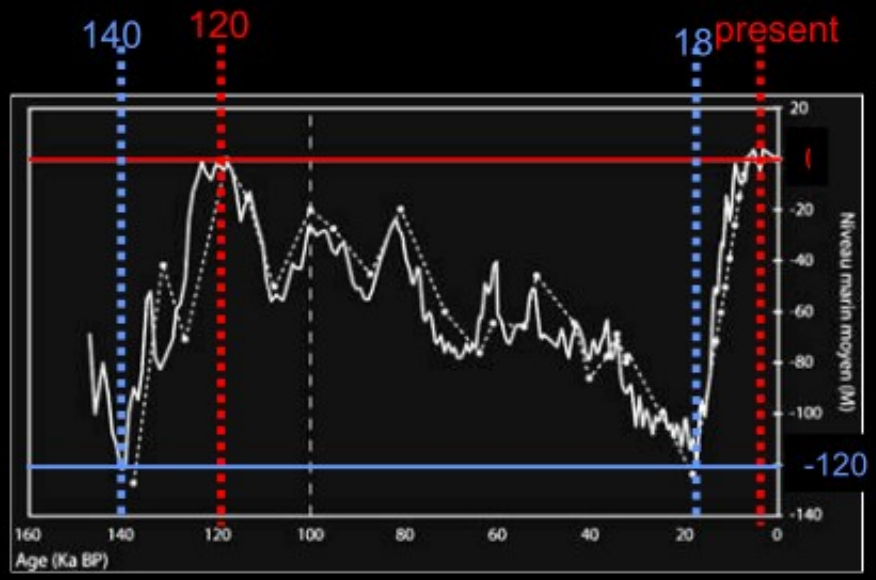
- continental periods



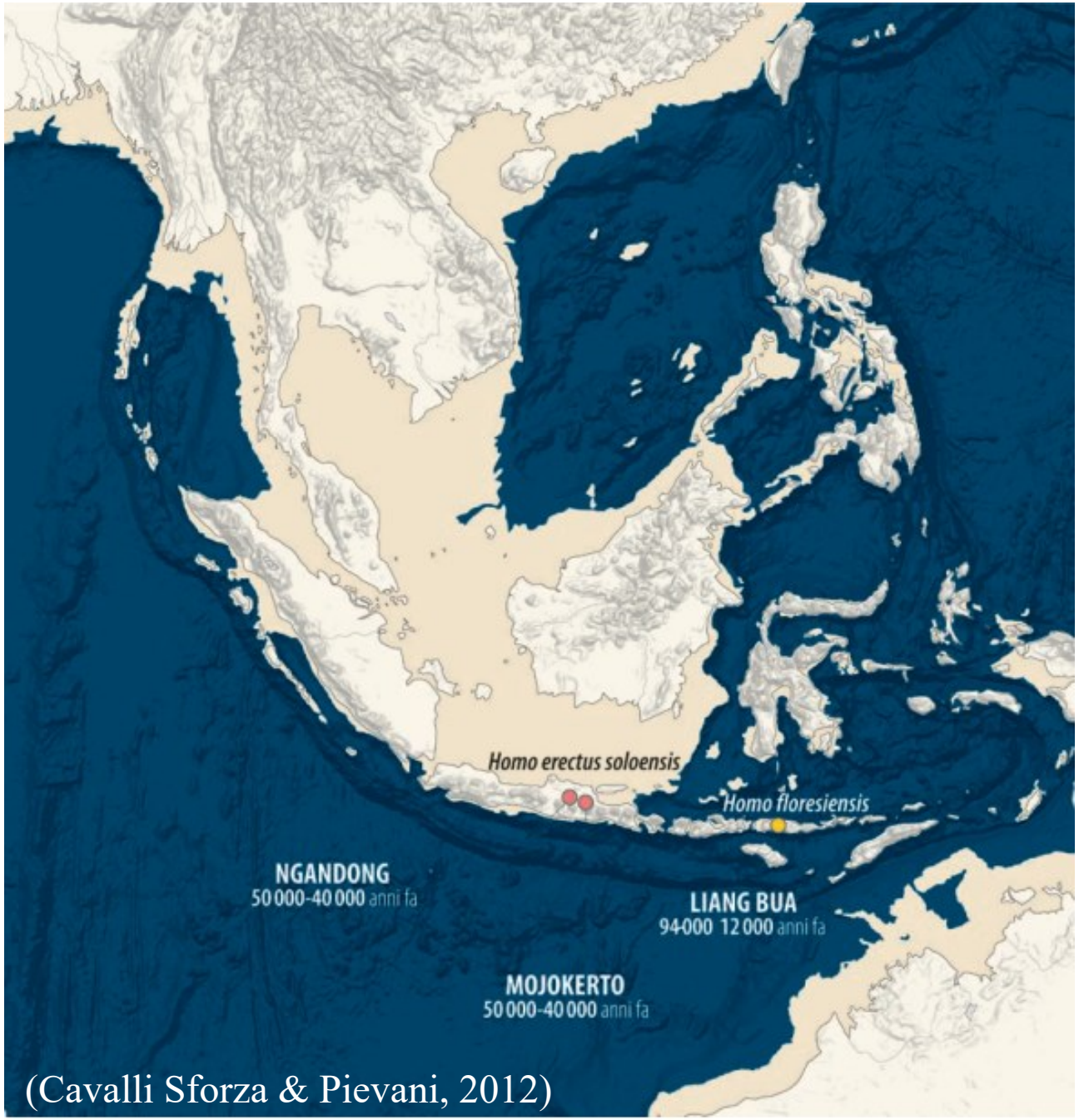


(Voris, 2000)

Homo sapiens is able to navigate for at least 60 000 years



d'après Chappell *et al.* (1996) ; Pillans *et al.* (1998) et Voris (2002)



(Cavalli Sforza & Pievani, 2012)

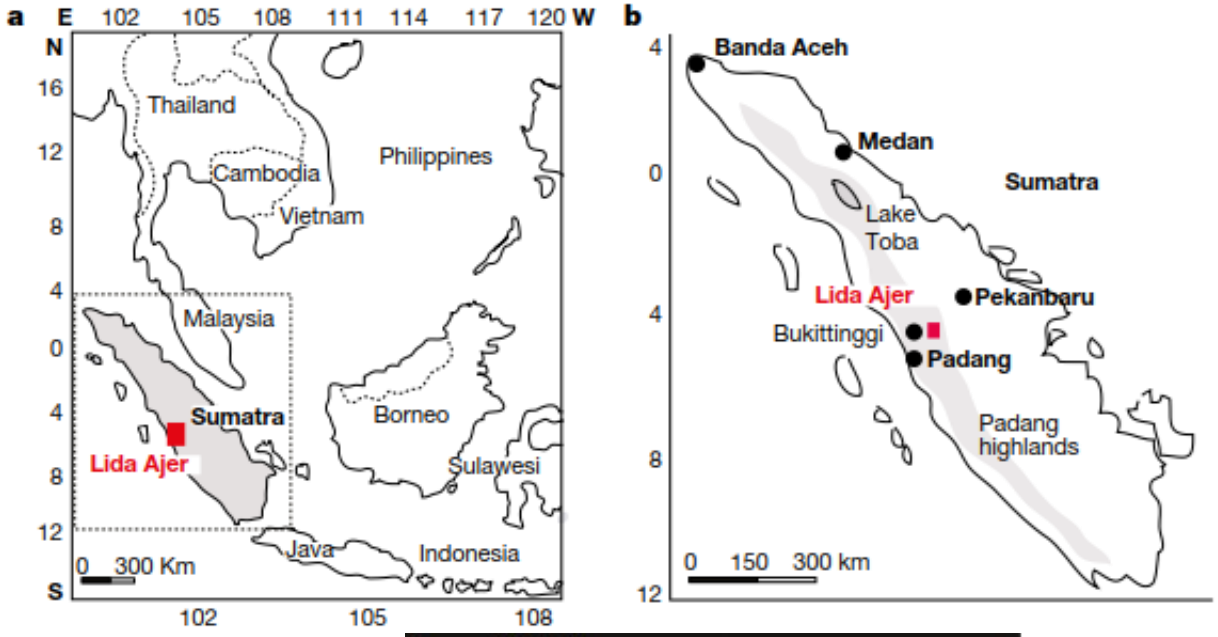
Homo species in Indonesia before the arrival of *Homo sapiens*

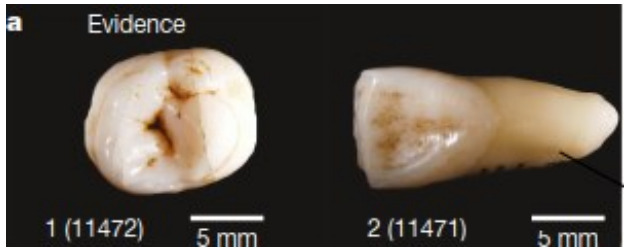
LETTER

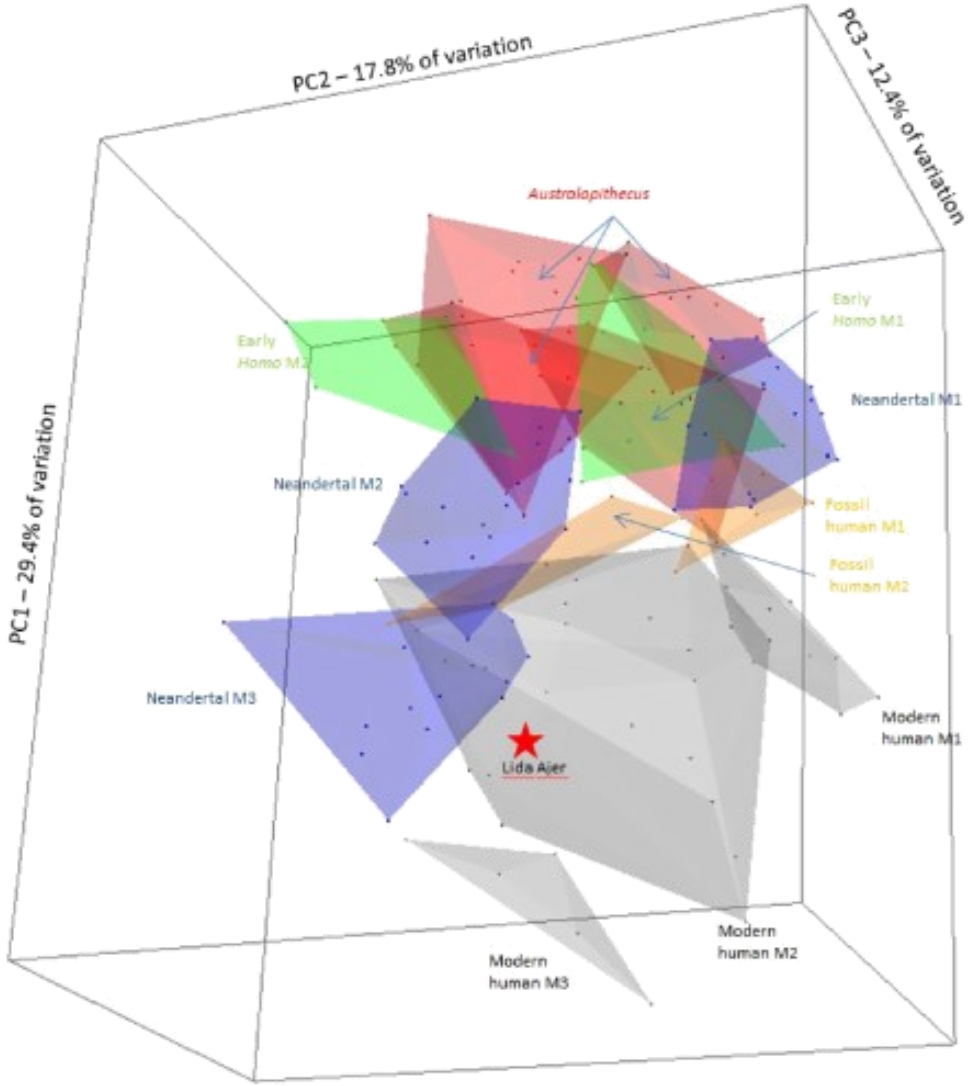
doi:10.1038/nature23452

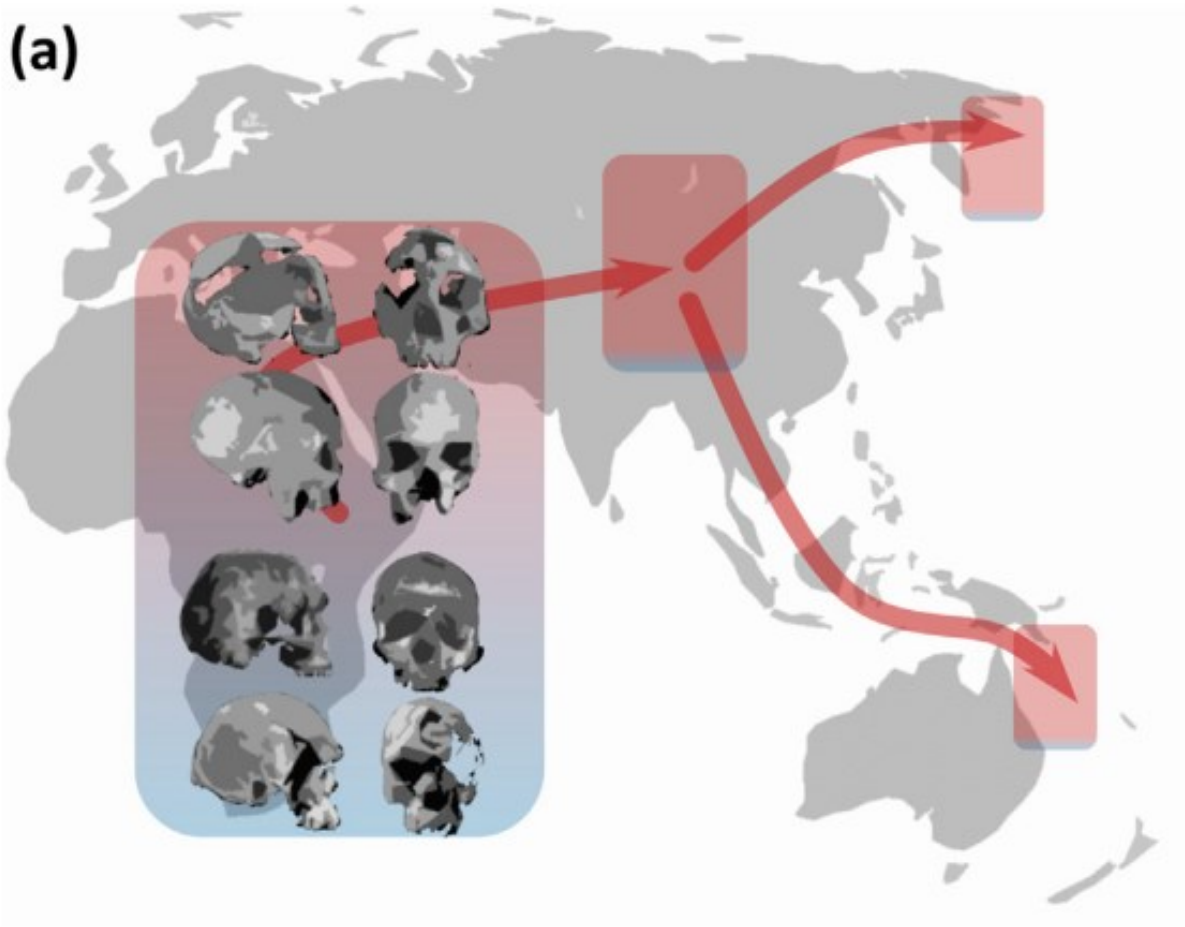
An early modern human presence in Sumatra 73,000–63,000 years ago

K. E. Westaway[1], J. Louys[2], R. Due Awe[3]‡, M. J. Morwood[4]‡, G. J. Price[5], J.-x. Zhao[5], M. Aubert[6], R. Joannes-Boyau[7], T. M. Smith[8,9], M. M. Skinner[10,11], T. Compton[12], R. M. Bailey[13], G. D. van den Bergh[4], J. de Vos[14], A. W. G. Pike[15], C. Stringer[12], E. W. Saptomo[3], Y. Rizal[16], J. Zaim[16], W. D. Santoso[16], A. Trihascaryo[16], L. Kinsley[17] & B. Sulistyanto[3]

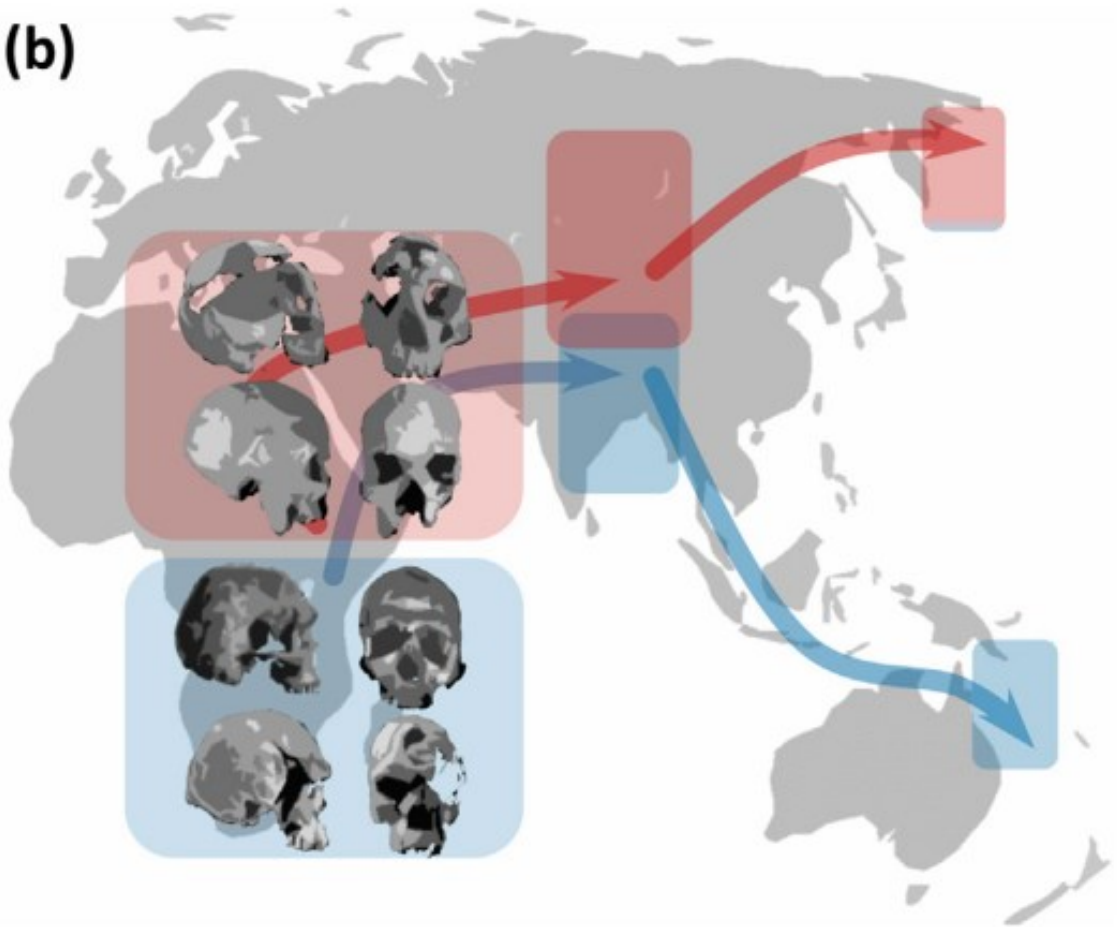








Single dispersal



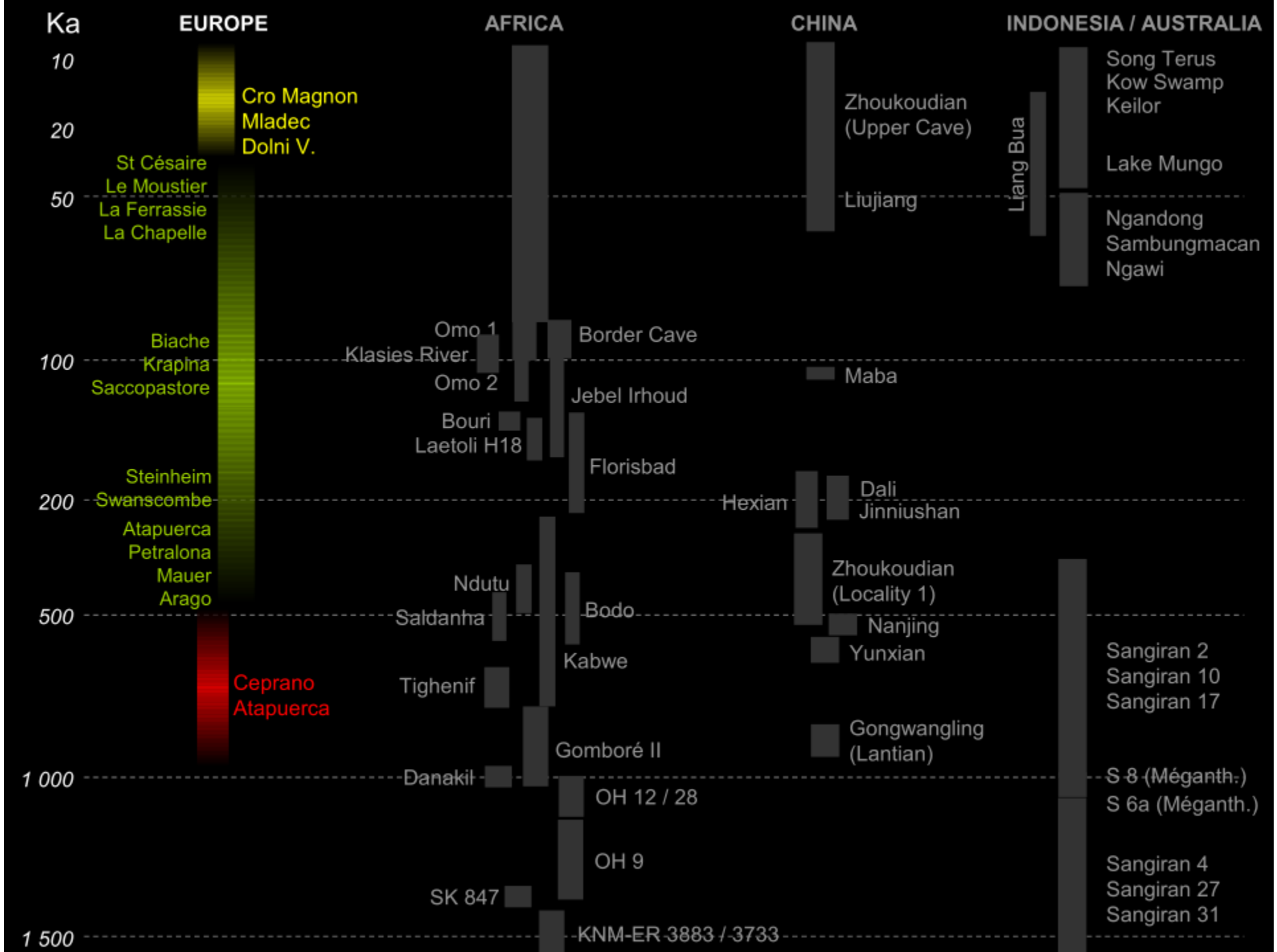
Multiple dispersal

(Reyes-Centeno et al., 2014)

Recent genetic studies and accumulating archaeological and paleontological evidence suggest a « southern route » dispersal into Asia in the late Middle Pleistocene, followed by a separate dispersal into northern Eurasia. Australo-Melanesian populations are descendants of an early dispersal whereas other Asian populations are descended from, or highly admixed with, members of a subsequent migration event.

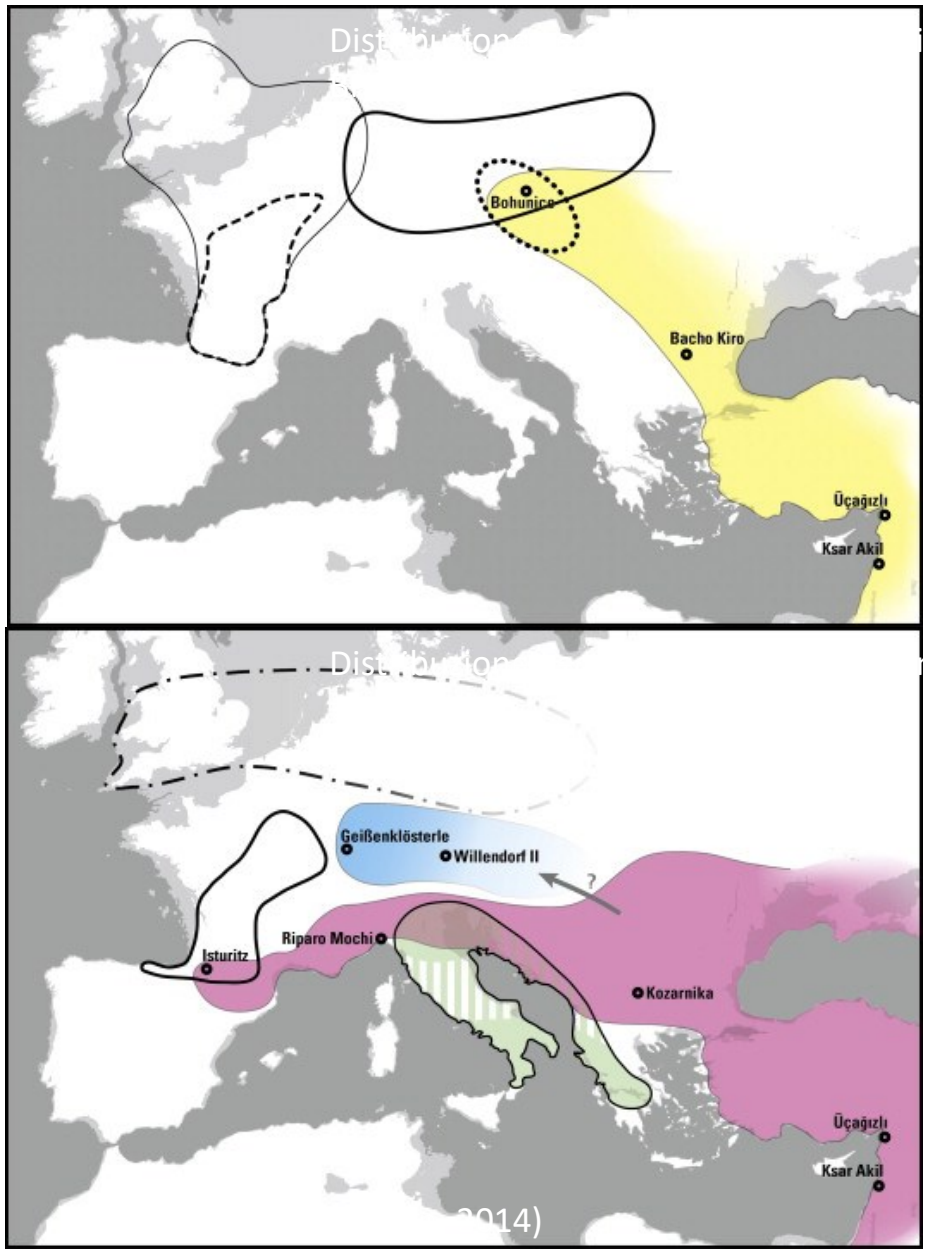
(Reyes-Centeno et al., 2014)

(Cavalli Sforza & Pievani, 2012)


Ka
EUROPE
AFRICA
CHINA
INDONESIA / AUSTRALIA
10
20
50
100
200
500
1 000
1 500
Cro Magnon
Mladec
Dolni V.
St Césaire
Le Moustier
La Ferrassie
La Chapelle
Biache
Krapina
Saccopastore
Steinheim
Swanscombe
Atapuerca
Petralona
Mauer
Arago
Ceprano
Atapuerca
Omo 1
Klasies River
Omo 2
Border Cave
Jebel Irhoud
Bouri
Laetoli H18
Florisbad
Ndutu
Saldanha
Bodo
Kabwe
Tighenif
Gomboré II
Danakil
OH 12 / 28
OH 9
SK 847
KNM-ER 3883 / 3733
Zhoukoudian
(Upper Cave)
Liujiang
Maba
Hexian
Dali
Jinniushan
Zhoukoudian
(Locality 1)
Nanjing
Yunxian
Gongwangling
(Lantian)
Liang Bua
Song Terus
Kow Swamp
Keilor
Lake Mungo
Ngandong
Sambungmacan
Ngawi
Sangiran 2
Sangiran 10
Sangiran 17
S 8 (Méganth.)
S 6a (Méganth.)
Sangiran 4
Sangiran 27
Sangiran 31


Estensione massima dei ghiacci
41 000-42 000 anni fa
Homo sapiens
41 000
anni fa
41 000-42 000
anni fa
Homo sapiens
41 000
anni fa
45 000-47 000
anni fa
prima ondata 120 000-100 000 anni fa
Homo sapiens
seconda ondata 50 000-45 000 anni fa
Homo sapiens
siti di Homo neanderthalensis
diffusione di Homo sapiens

The first modern human in Europe



Bacho Kiro (Bulgaria) (Aurignacian) – 45-43.000 y

Grotta del Cavallo (Italy) (Uluzzian) – 45-43.000 y

Kents Cavern (UK) – 44-41 000 y

El Castillo (Spain) (Aurignacian) – 37.000- 34.000 y

Mladec (Czech Republic) – 32.000 y

Dolni Vestonice, Pavlov (Czech Republic) – 25.000 y

Cro Magnon (France) – 30.000 y

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


Kents Cavern
Mladec
Brno
Predmost
Fontéchevade
Lagar Velho
La Ferrassie
Cro-Magnon
Isturitz
La Crouzade
Bacho Kiro
Homo sapiens (a.m.)
Néandertaliens

Article

Initial Upper Palaeolithic *Homo sapiens* from Bacho Kiro Cave, Bulgaria

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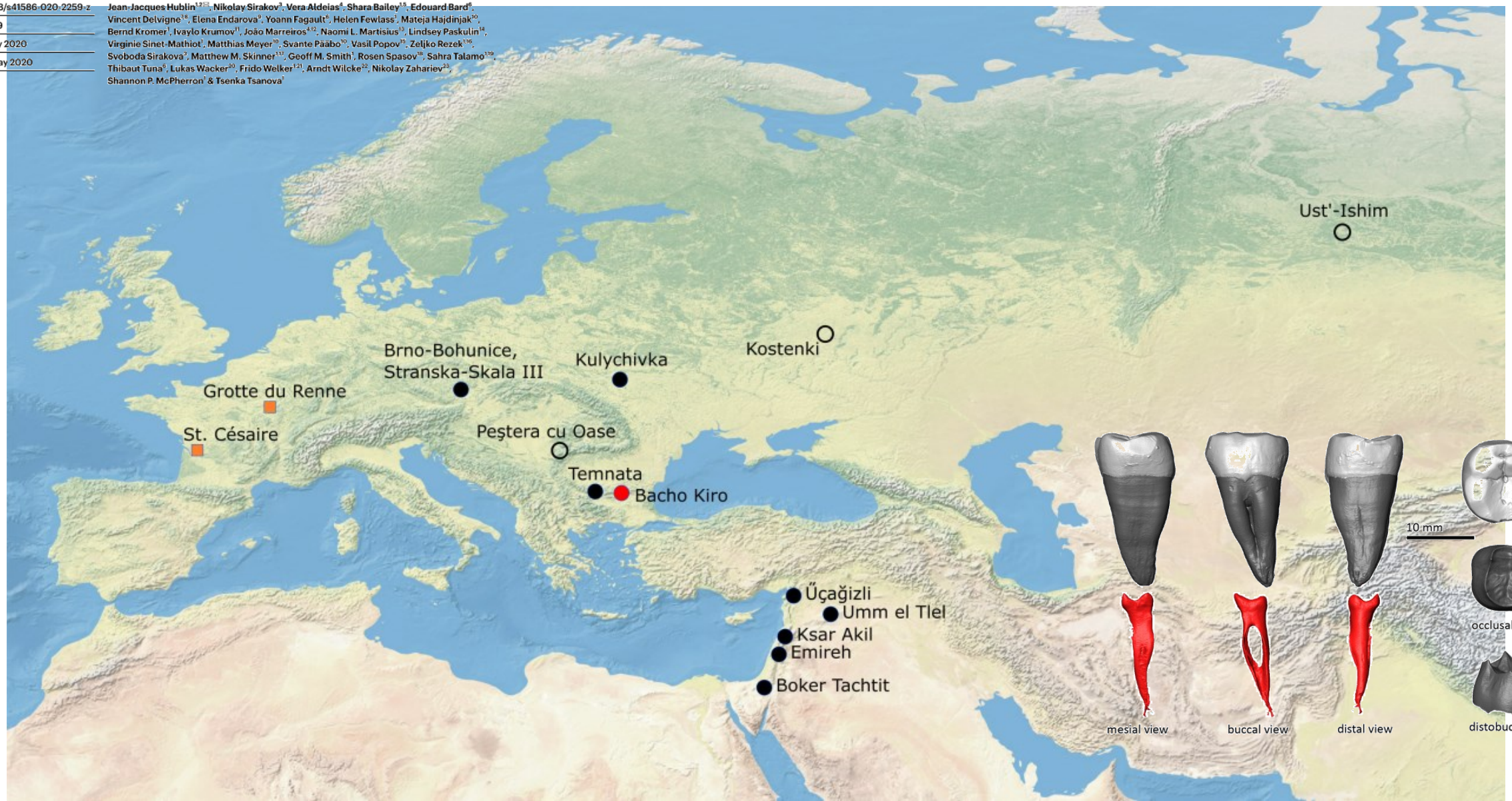
● Initial Upper Palaeolithic sites
○ Directly dated early *H. sapiens* predating 37 ka cal. BP
■ Directly dated late Neanderthals associated with Châtelperronian



LETTER

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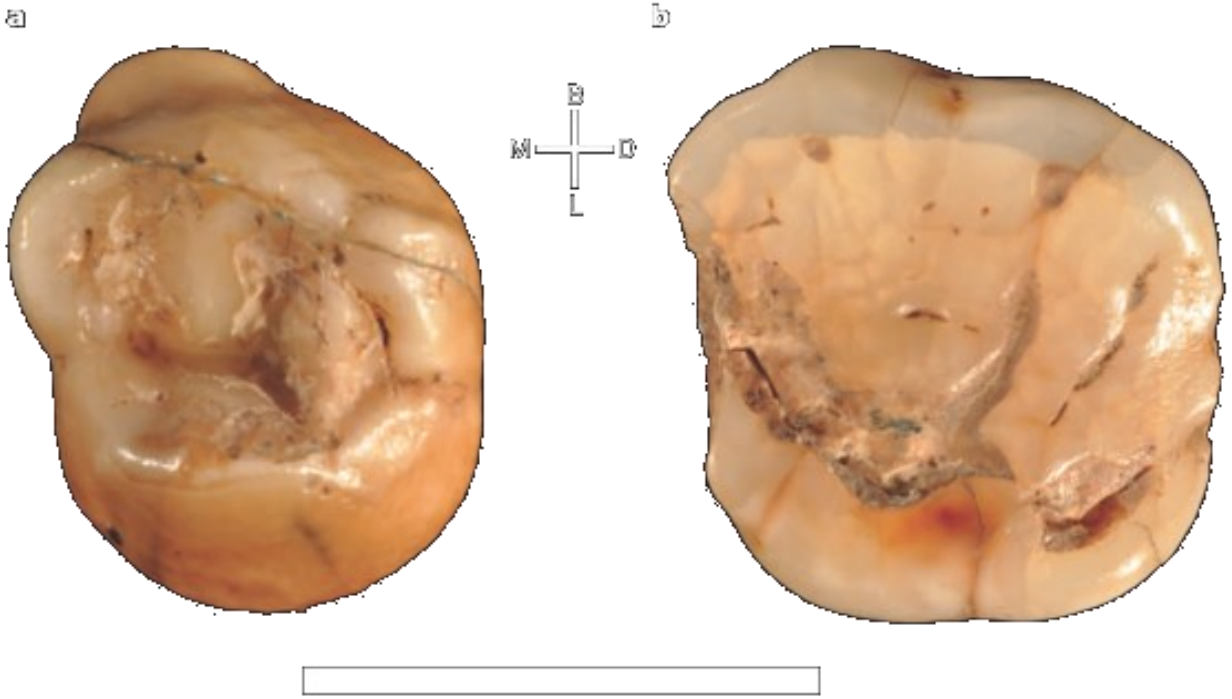
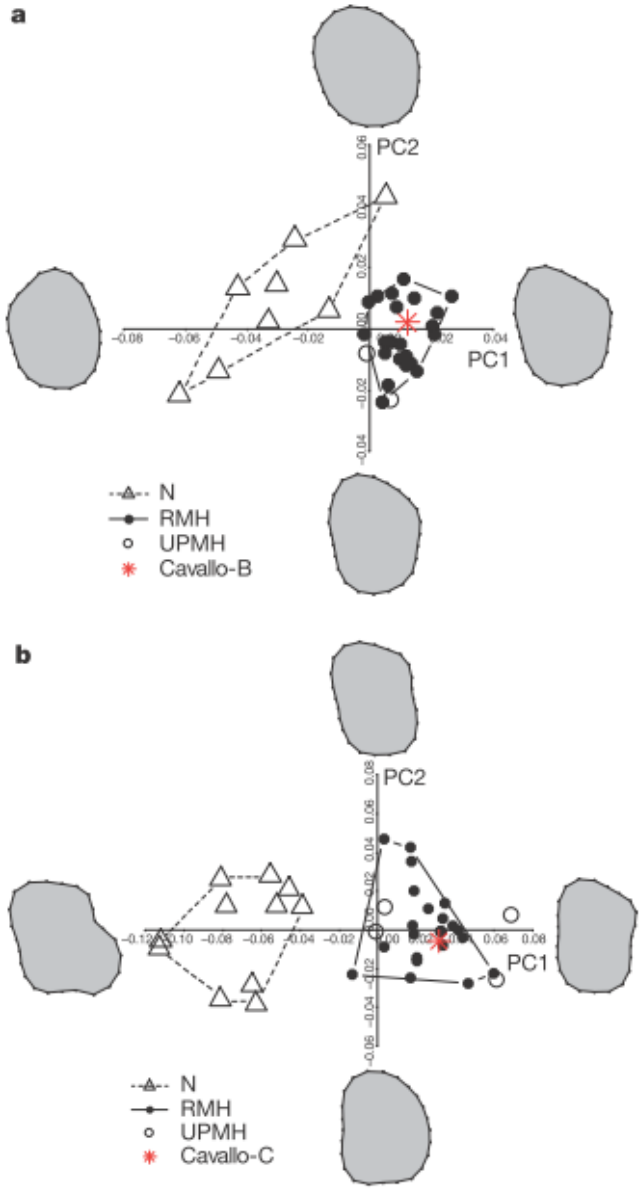
Early dispersal of modern humans in Europe and implications for Neanderthal behaviour

Stefano Benazzi[1], Katerina Douka[2], Cinzia Fornai[1], Catherine C. Bauer[3], Ottmar Kullmer[4], Jiří Svoboda[5,6], Ildikó Pap[7], Francesco Mallegni[8], Priscilla Bayle[9], Michael Coquerelle[10], Silvana Condemi[11], Annamaria Ronchitelli[12], Katerina Harvati[3,13] & Gerhard W. Weber[1]



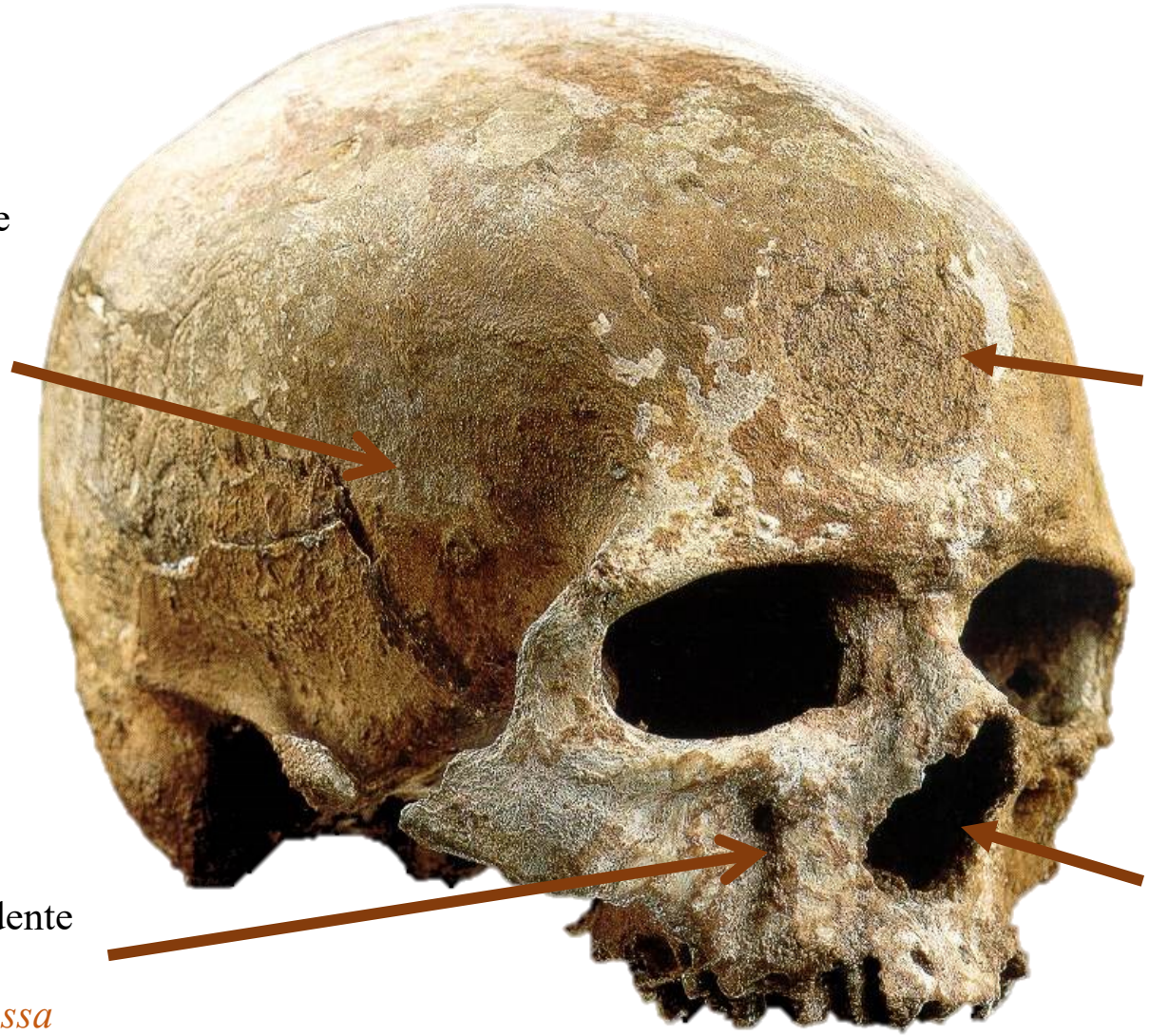
Grotta del Cavallo, Italia (45 000 – 43 000 y BP)



Cro-Magnon, France
27 680 +/- 270 BP (Henry-Gambier et al, 2002)

Cro-Magnon 1

Cro-Magnon 2



Parietali espansi e occipitale arrotondato / *Parietals expanded and rounded occipitals*

Fronte verticale / *Vertical frontal bone*

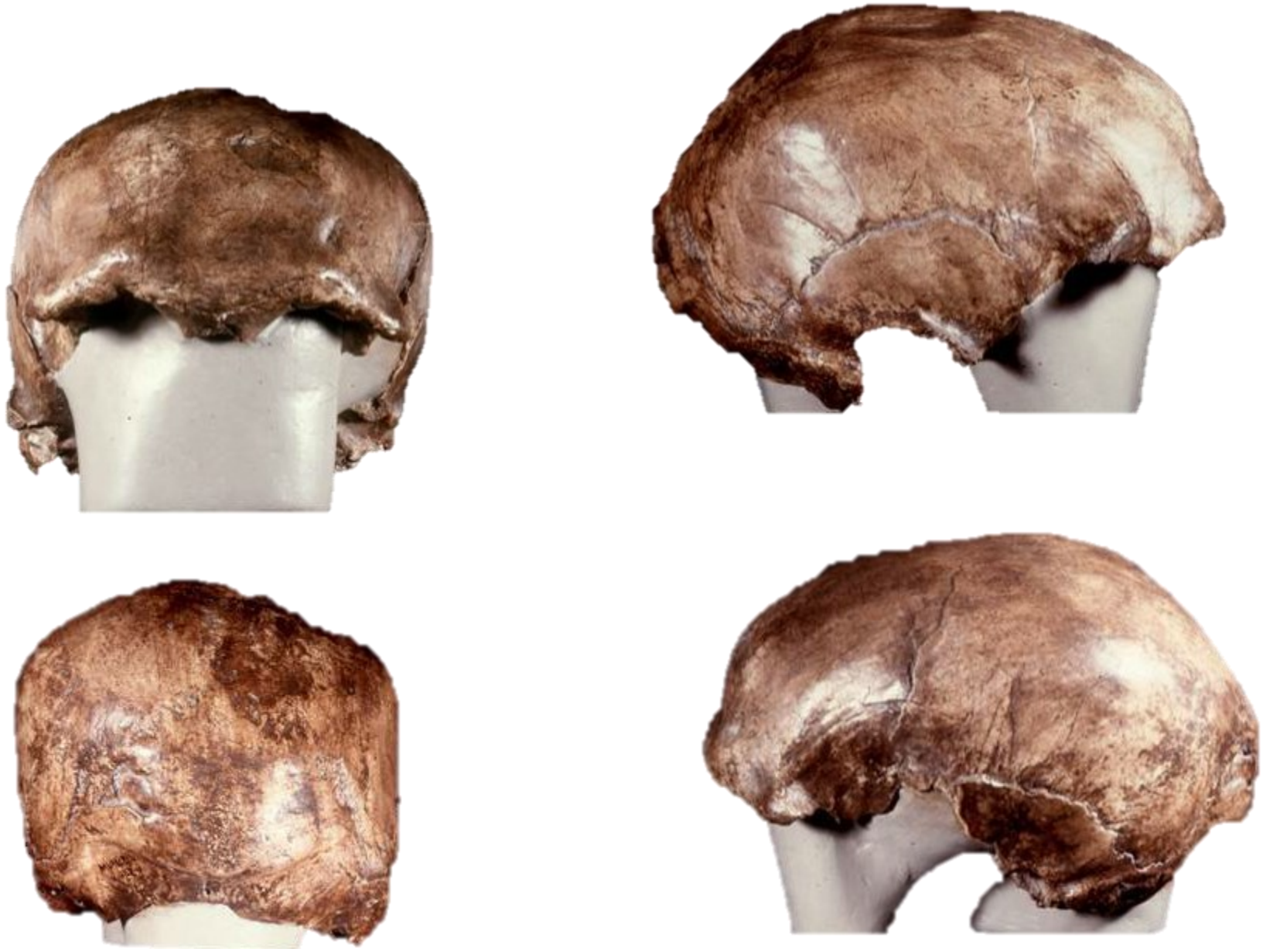
Fossa canina evidente / *Evident canine fossa*

Faccia piccola e piatta / *Short and flat face*

H. sapiens, Cro-Magnon


Mladec
Brno
Predmost
Fontéchevade
La Ferrassie
Lagar Velho
Cro-Magnon
Isturitz
La Crouzade
Homo sapiens (a.m.)
Néandertaliens

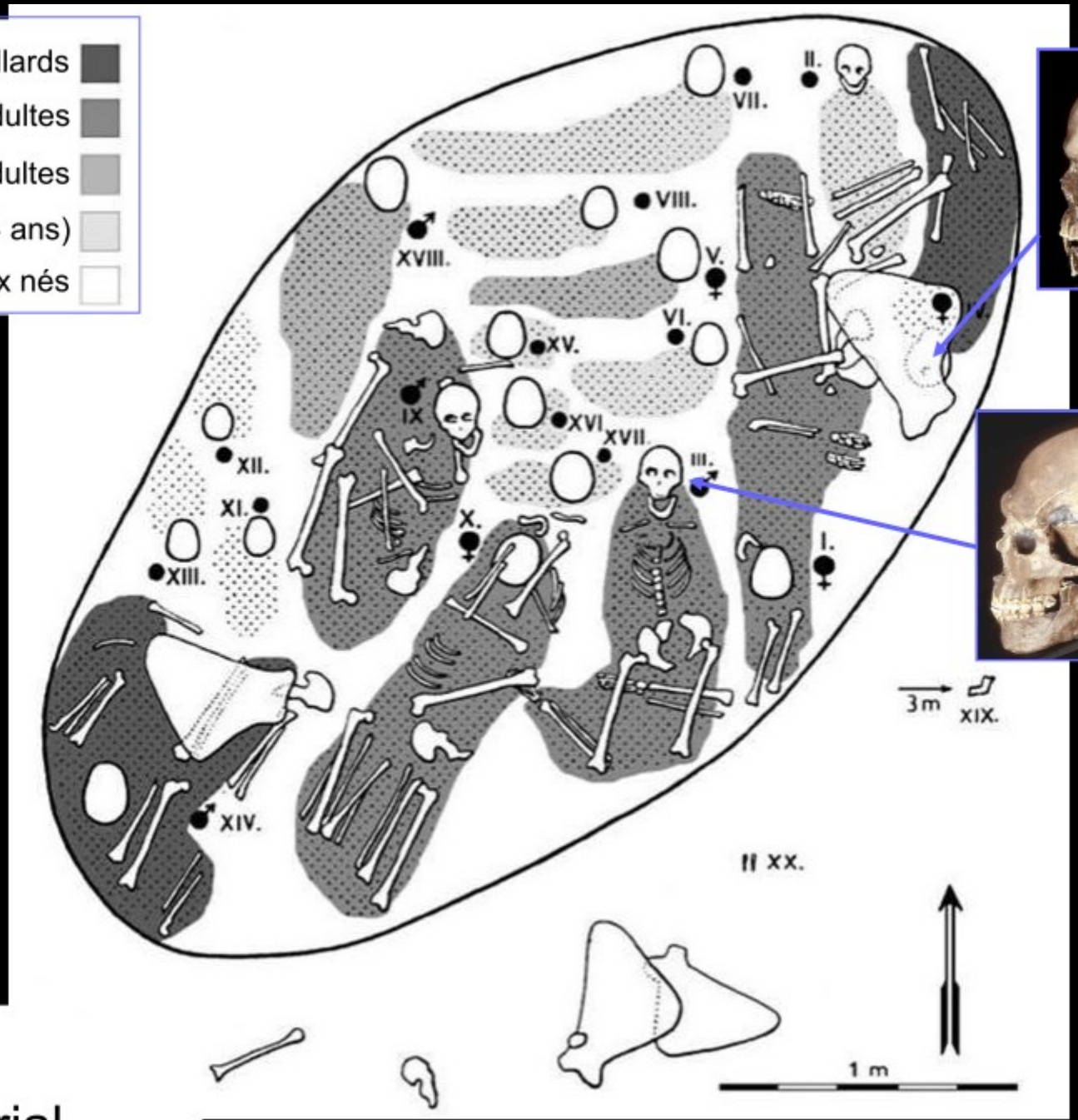
Mladec V, Czech Republic
34-35 000 y BP?



Triple burial (Mladec 5, 6 and 46)

Predmost III, Czech Republic
28 – 20 000 y BP

2 vieillards
2 “couples” adultes
2 jeunes adultes
7 enfants (2-14 ans)
3 nouveaux nés



Predmost
Multiple burial

(d’après Klima, 1991; *in* Trinkaus & Zilhao, 2002)

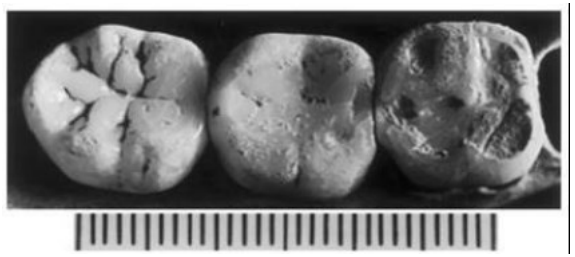

Mladec
Brno
Predmost
Fontéchevade
La Ferrassie
Lagar Velho
Cro-Magnon
Isturitz
La Crouzade
Pestera Cu Oase
Homo sapiens (a.m.)
Néandertaliens

Pestera cu Oase, Romania
34 290 +/- 900 BP

Conclusion

The 2002 discovery of a human mandible at the Peştera cu Oase in southwestern Romania indicates that the earliest "modern" Europeans combined a variety of archaic *Homo*, derived early modern human, and possibly Neandertal features in their cranio-facial skeletal and dental morphology. Although compatible with some degree of admixture between regional Neandertal populations and in-dispersing early modern humans, the Oase 1 mandible is particularly relevant for emphasizing the degree to which early modern humans were not particularly modern.

(Trinkaus, 2003)



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News and Views

Early modern human cranial remains from the Peştera cu Oase, Romania

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Keywords: Human paleontology; Early modern humans; Europe; Late Pleistocene

Pestera cu Oase, Romania
34 290 +/- 900 BP

Conclusion

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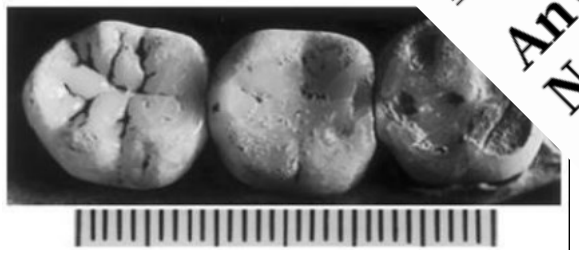

LETTER

doi:10.1038/nature14558

An early modern human from Romania with a recent Neanderthal ancestor

Qiaomei Fu[1,2,3]*, Mateja Hajdinjak[3]*, Oana Teodora Moldovan[4], Silviu Constantin[5], Swapan Mallick[2,6,7], Pontus Skoglund[2], Nick Patterson[6], Nadin Rohland[2], Iosif Lazaridis[2], Birgit Nickel[3], Bence Viola[3,7,8], Kay Prüfer[3], Matthias Meyer[3], Janet Kelso[3], David Reich[2,6,9] & Svante Pääbo[3]

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Evolution 45 (2003) 245–253

Views

ins from the Peştera cu

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ington University, St. Louis, MO 63130, USA
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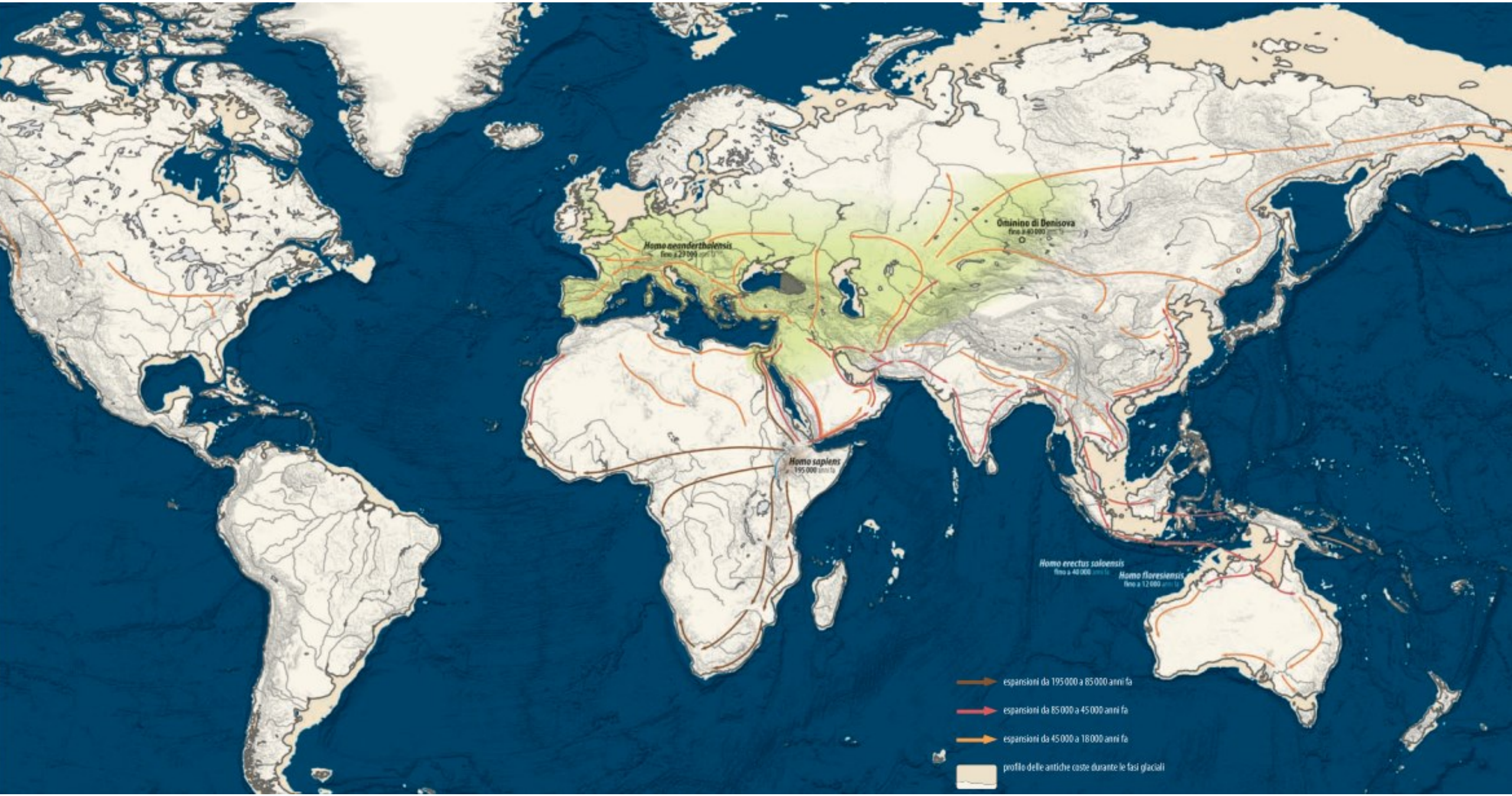
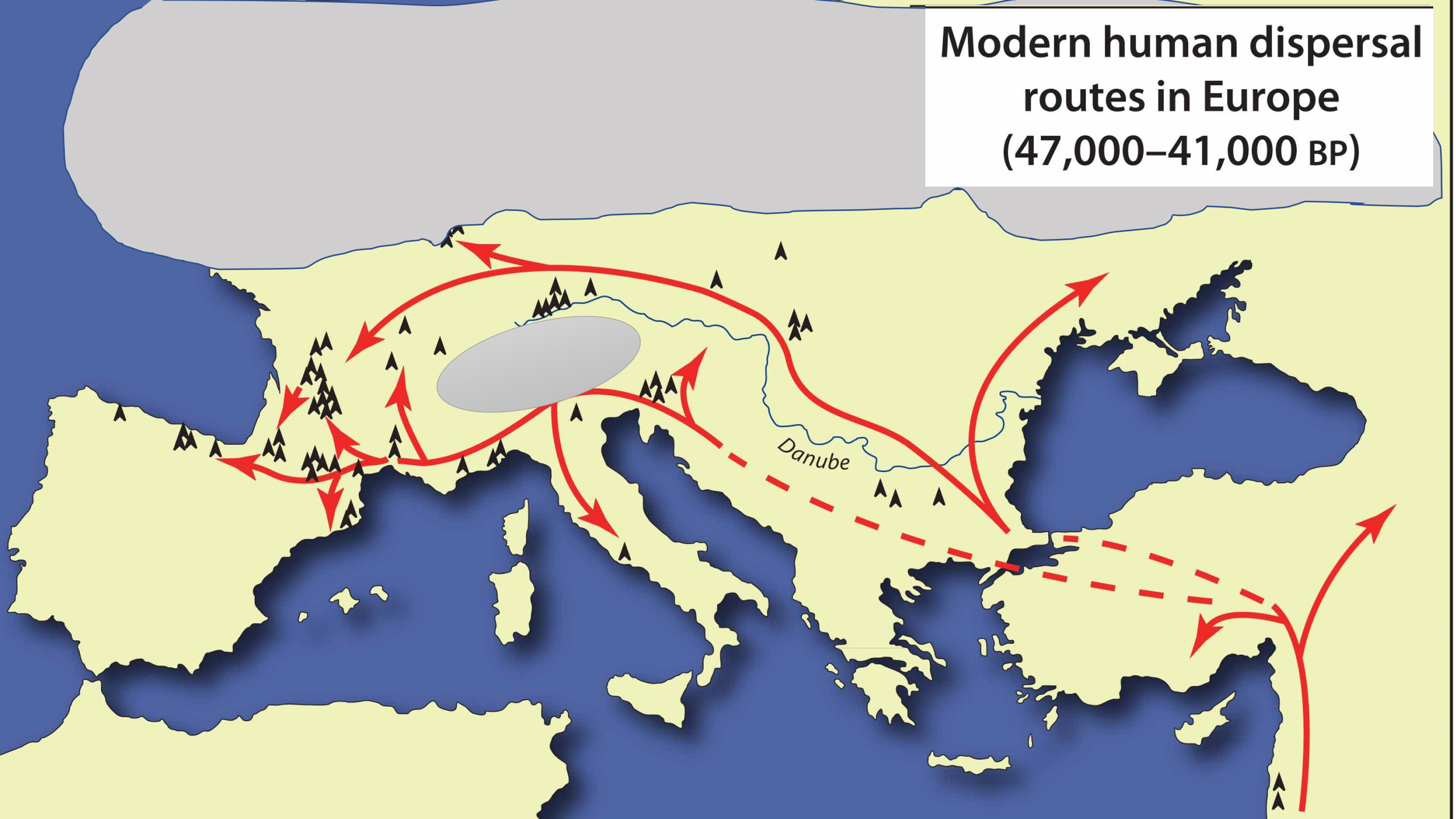
ans; Europe; Late Pleistocene


Homo neanderthalensis
fino a 29 000 anni fa
Ominino di Denisova
fino a 40 000 anni fa
Homo sapiens
195 000 anni fa
Homo erectus soloensis
fino a 40 000 anni fa
Homo floresiensis
fino a 12 000 anni fa
espansioni da 195 000 a 85 000 anni fa
espansioni da 85 000 a 45 000 anni fa
espansioni da 45 000 a 18 000 anni fa
profilo delle antiche coste durante le fasi glaciali


Estensione massima dei ghiacci
Estensione massima dei ghiacci
41 000-42 000 anni fa
Homo sapiens
41 000
anni fa
41 000
anni fa
41 000-42 000
anni fa
Homo sapiens
41 000
anni fa
45 000-47 000
anni fa
prima ondata 120 000-100 000 anni fa
Homo sapiens
seconda ondata 50 000-45 000 anni fa
Homo sapiens
siti di Homo neanderthalensis
diffusione di Homo sapiens
profilo delle antiche coste durante le fasi glaciali

Modern human dispersal routes in Europe (47,000–41,000 BP)



Homo sapiens dispersal toward America


espansioni da 195 000 a 85 000 anni fa
espansioni da 85 000 a 45 000 anni fa
espansioni da 45 000 a 18 000 anni fa
espansioni da 18 000 anni fa e recenti
profilo delle antiche coste durante le fasi glaciali
CRO-MAGNON
CLOVIS
MEADOWCROFT
CACTUS HILL
TAIMA TAIMA
MONTE VERDE
YÁMANA
GAFZEH CAVE, SKHUL
ABDUR
HEXTO BOURI
OMO VALLEY
KLASIES RIVER CAVE
BLOMBOS CAVE
ERUZIONE DEL TOBA
ZHOUKOUDIAN
DYUKTAI
JOMON
SARAWAK
BOBONGARA
MUNGO LAKE