Laurea Magistrale in QUATERNARIO, PREISTORIA E ARCHEOLOGIA

Master in QUATERNARIO e PREISTORIA

Il Popolamento dell'Europa

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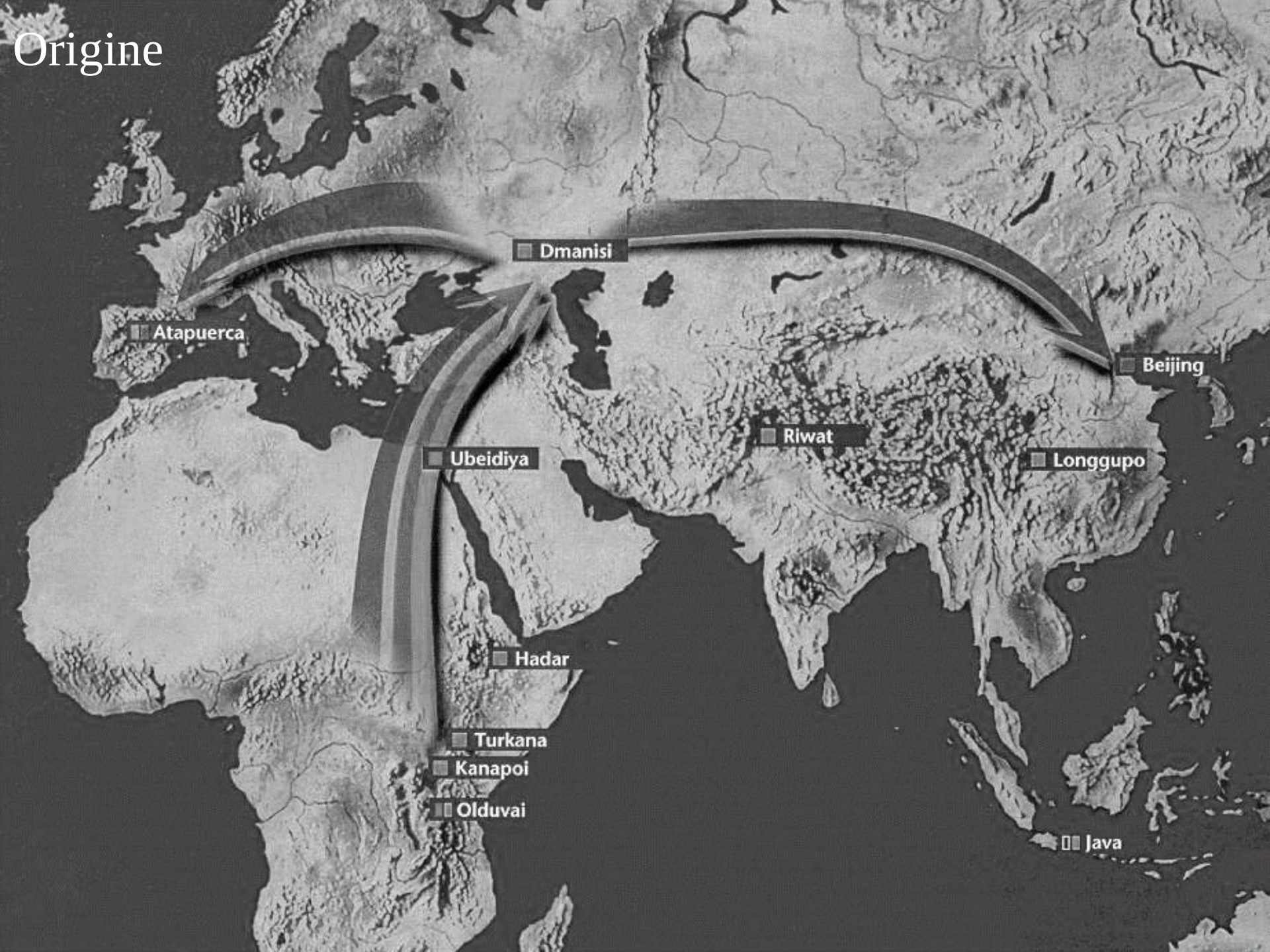
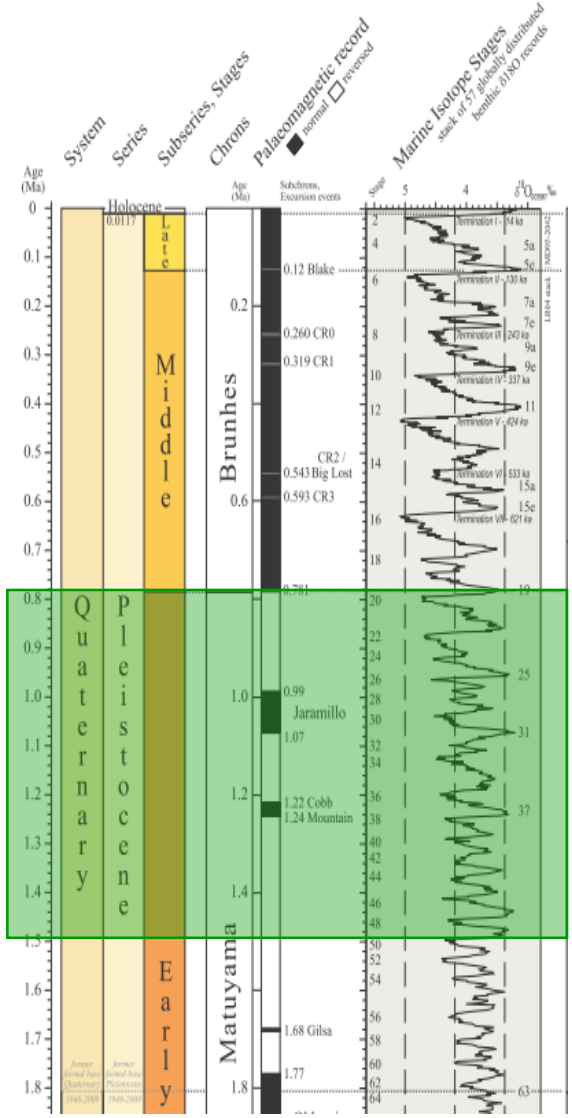
Origine


Dmanisi
Atapuerca
Beijing
Riwat
Ubeidiya
Longgupo
Hadar
Turkana
Kanapoi
Olduvai
Java

Origine : Prime testimonianze del popolamento europeo

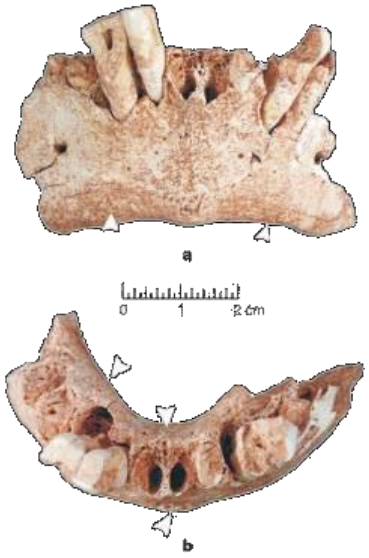


(Cohen & Cibbard, 2010)

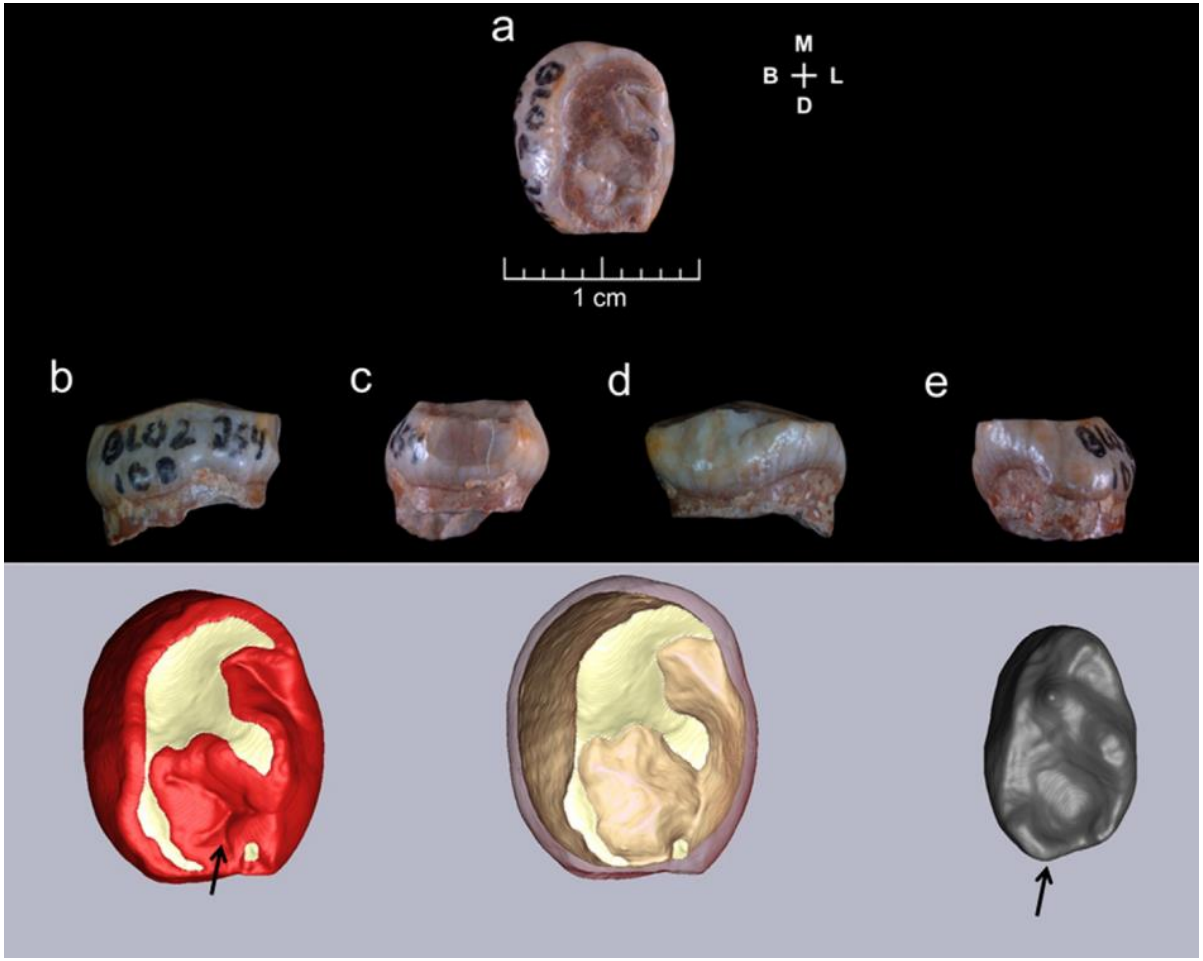
Origine : Il primo popolamento europeo

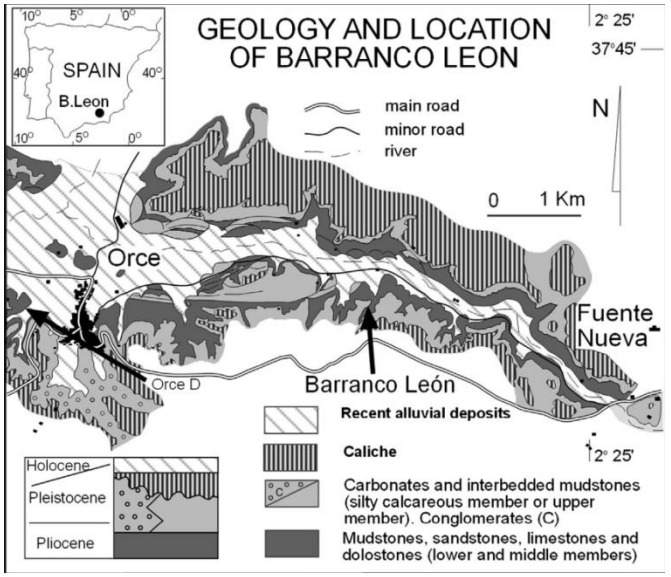
Anteneandertaliani : non hanno acquisito nessuna delle apomorfie dei neandertaliani
Ante-Neanderthals: they didn't acquired none of Neanderthals apomophies

Gran Dolina
Homo antecessor 0,8
Myr (TD6)



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





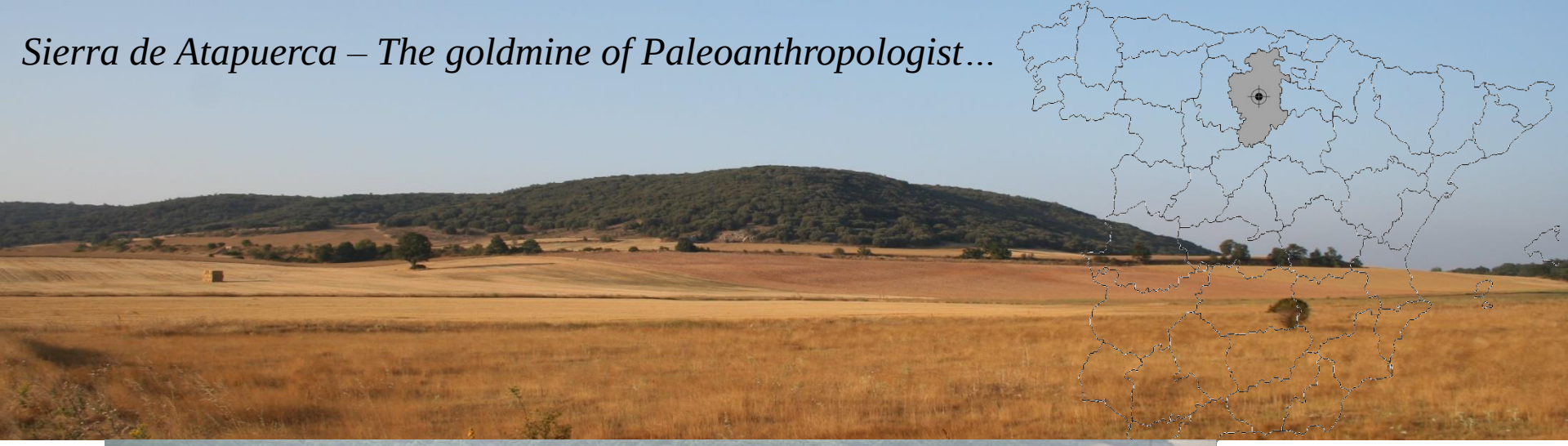
dm1 di Barranco Leon BL02-J54-100
ESR: 1.02 e 1.73 Ma
Paleomagnetismo: 1.07 – 1.77 Ma
Biocronologia: 1.4 Ma

Questo ritrovamento associato ad un importante insieme litico conferma che l'Europe occidentale è stata colonizzata poco dopo la prima espansione out of Africa, documentata da Dmanisi

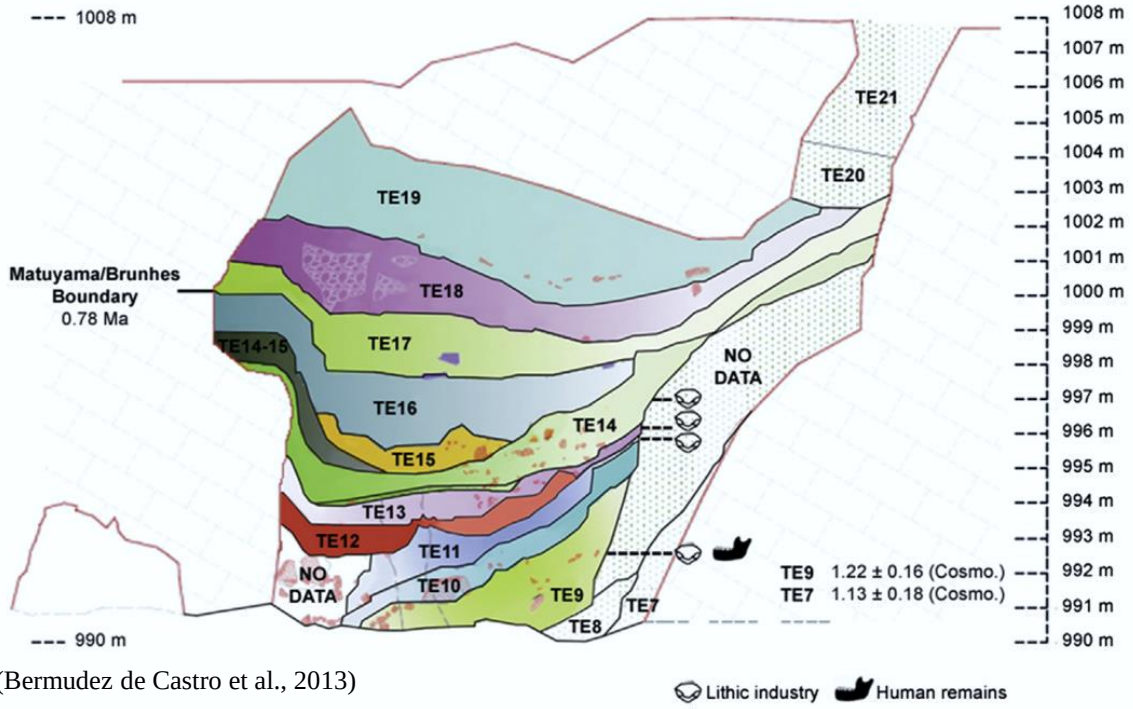
This finding combined with the important lithic tool assemblage confirms that Western Europe was colonized soon after the first expansion out of Africa, currently documented at the Dmanisi site.

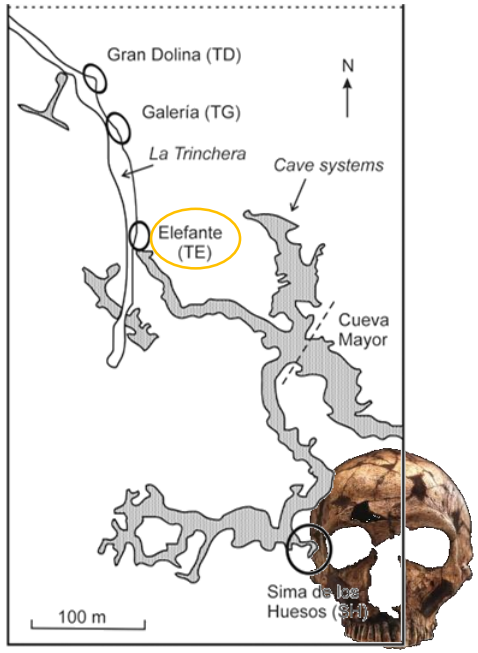
Toro-Moyano, 2013. JHE 65

Sierra de Atapuerca – The goldmine of Paleoanthropologist…

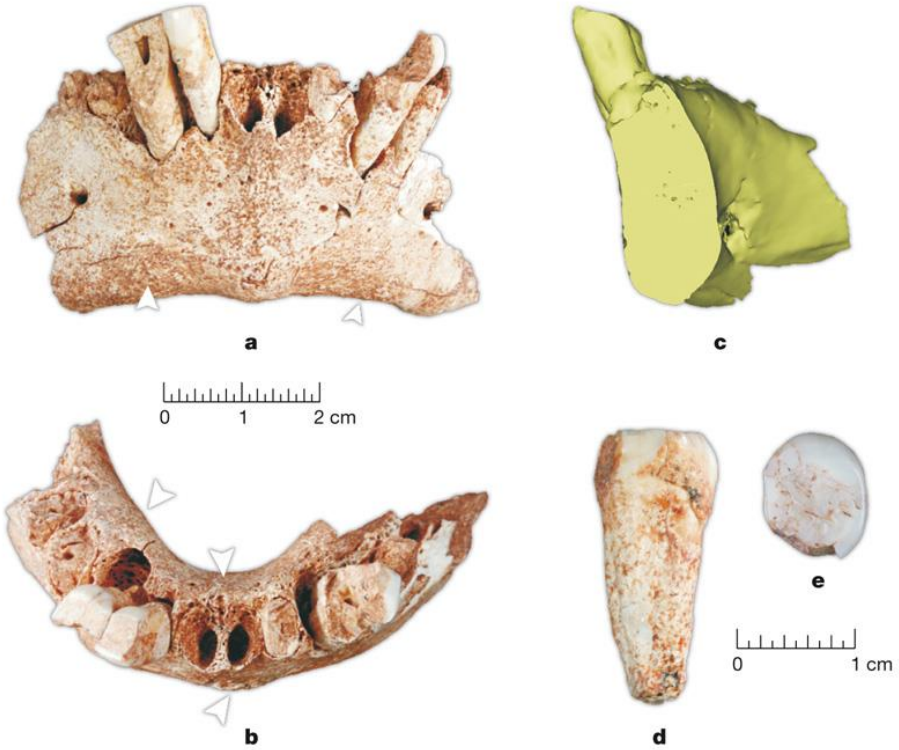


Sima del Elefante





(Bermudez de Castro et al., 2013)



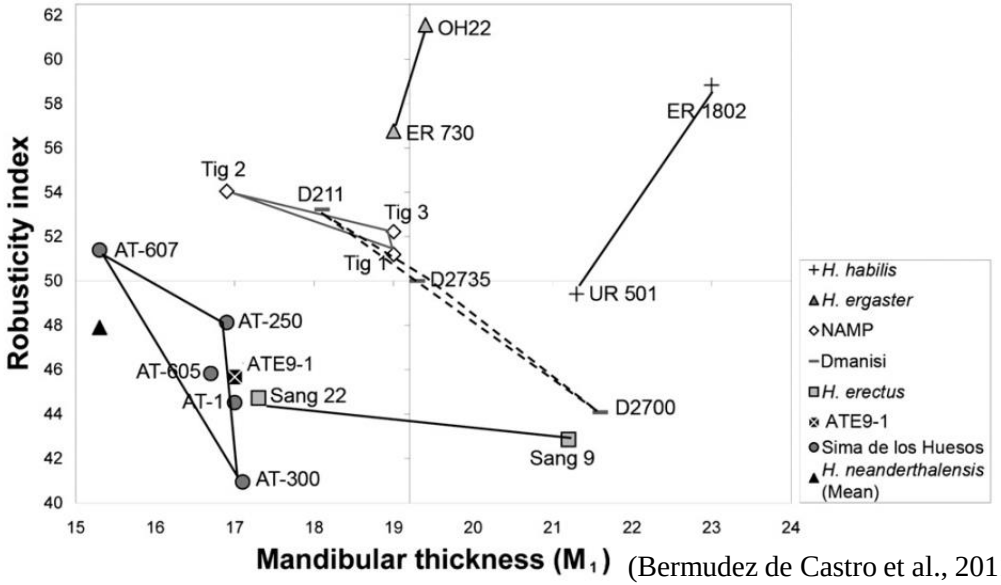
Primitive traits for the genus *Homo*:

- Anterior marginal tubercle below C/P3
- Weakly express mentum osseum
- Distinct mental trigone
- Presence of incisura submentalis
- Morphology of the premolars

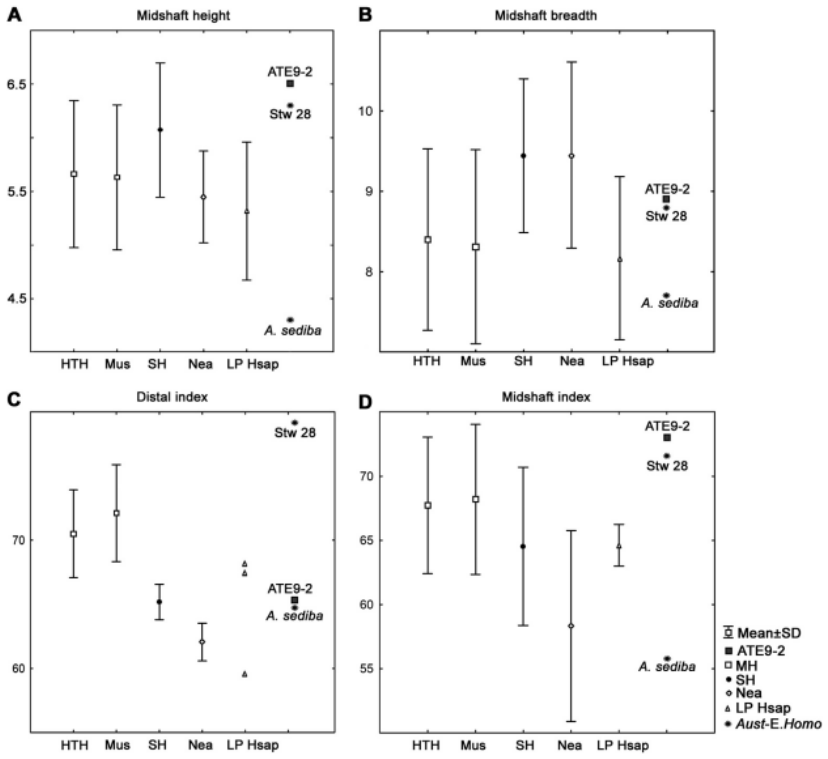
Derived traits relative to African early *Homo*:

- A minimal inclination of the planum alveolare
- Absence of the superior transverse torus
- Limited thickness of the mandibular body

ATE9-1 displays some morphological features that suggest a departure from the variability observed in the Dmanisi and African Pleistocene mandibles, suggesting the early appearance of a "European identity" in the hominin populations who settled this continent.

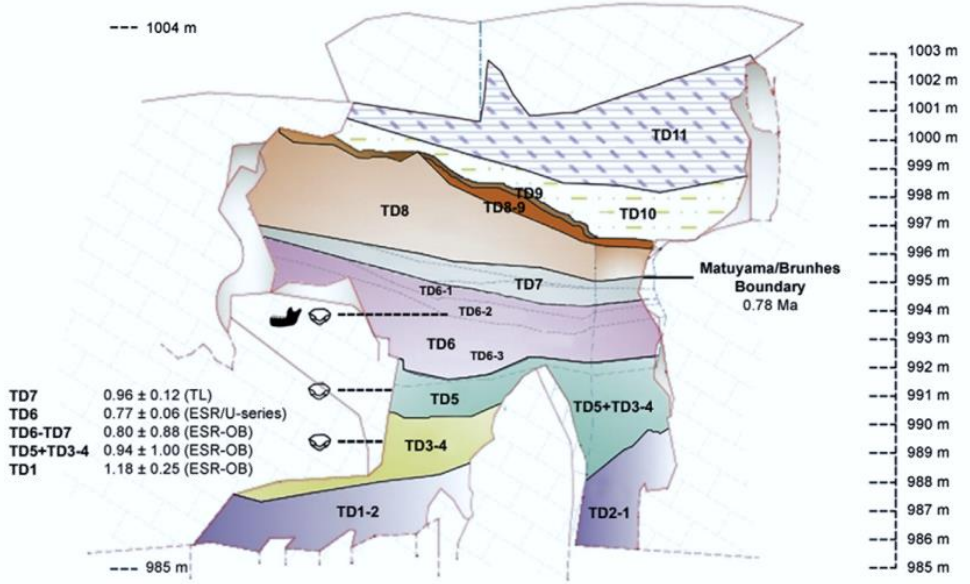


(Bermudez de Castro et al., 2011)

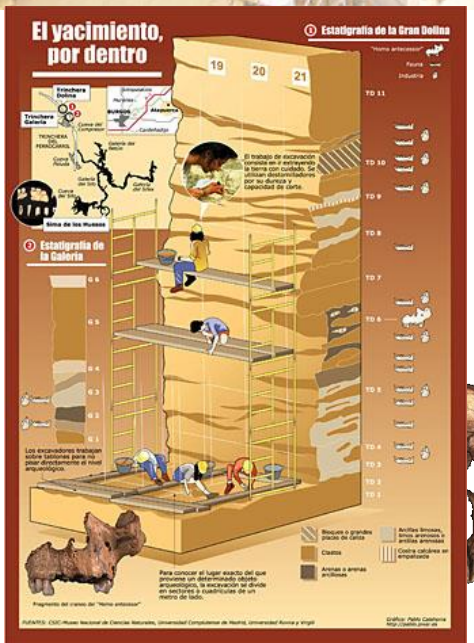


The hand phalanx ATE9-2, attributed to *Homo* sp. Show no essential differences between it and the reference collection (Neanderthals, Modern humans, Sima de los Huesos). This suggest that the morphology of the proximal hand phalanges and probably the entire hand could have remained stable over the last 1.2-1.3Ma. (Lorenzo et al., 2014)

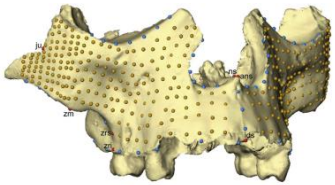
Gran Dolina and the *Homo antecessor* hypodigm

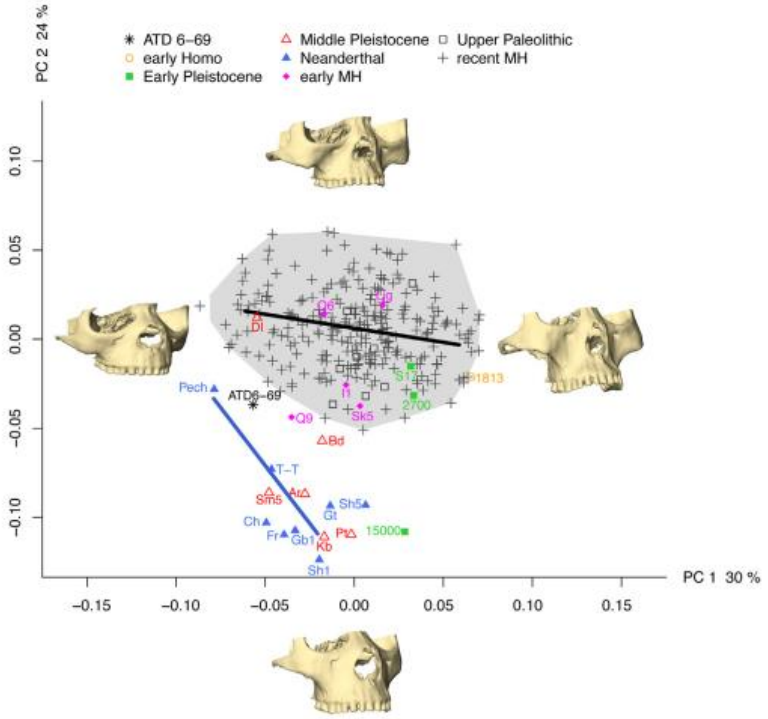


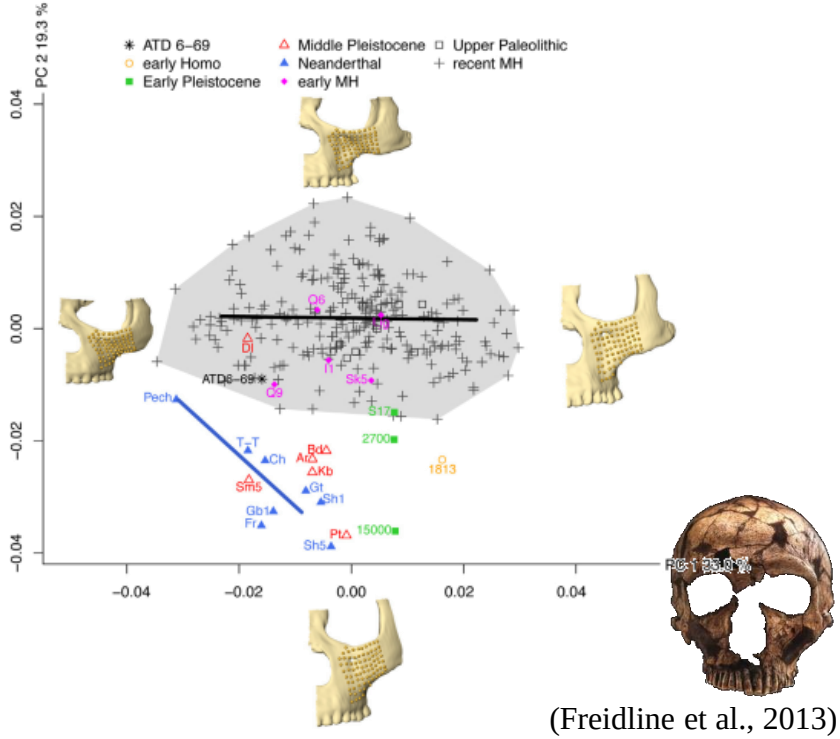
(Bermudez de Castro et al., 2013)



The fossil ATD6-69 has been suggested to mark the earliest appearance of modern human facial features. However, this specimen is a subadult and the interpretation of its morphology remains controversial, because it is unclear how developmental shape changes would affect the features that link ATD6-69 to modern humans.







(Freidline et al., 2013)

Origine : Il primo popolamento europeo

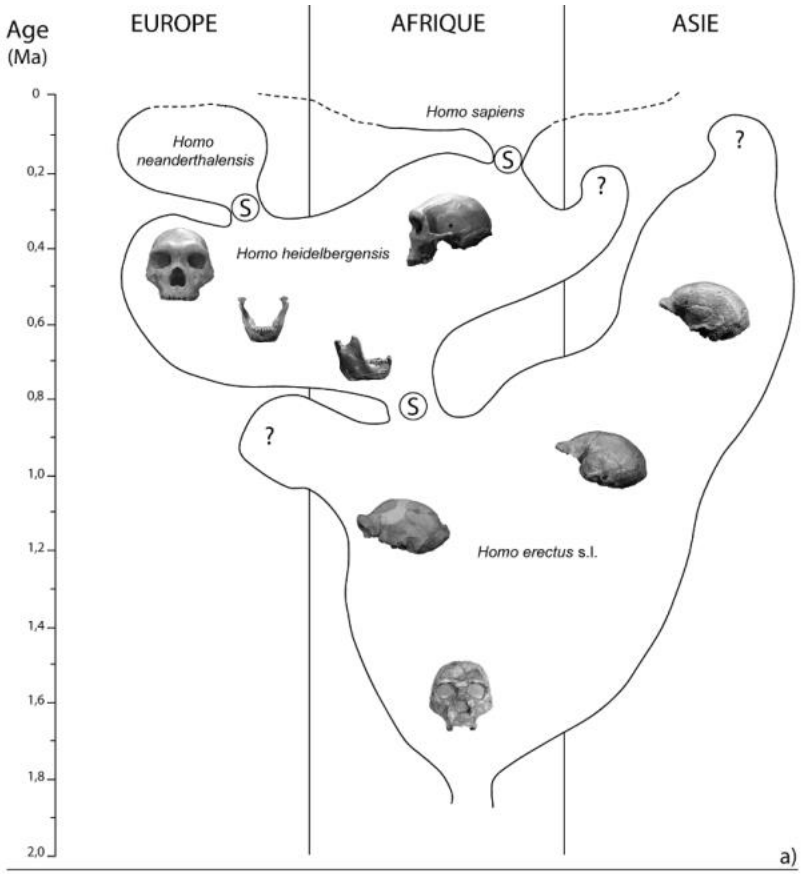
I Preneandertaliani : Si cominciano ad individuare alcune apomorfie.
Le prime caratteristiche morfologiche di tale popolazione si osservano attorno a 350-400.000 anni fa, sui fossili dell'Arago (Francia) e di Sima de los Huesos (Spagna).
Some apomorphies start to be individualized. The first morphological features of this kind of population are observed around 350-400 000 years.

Arago 21

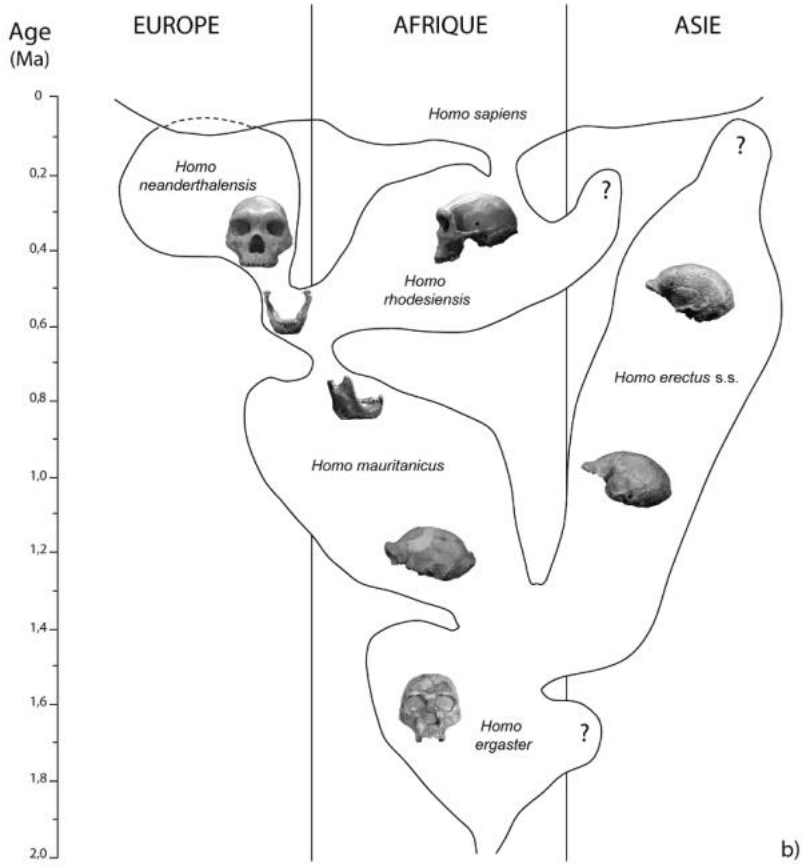
Atapuerca 5

L'Homo heidelbergensis presenta un mosaico di caratteri.
I caratteri derivati compaiono in un modo discontinuo, ma sono sistematicamente rappresentati negli ultimi Neanderthal.
The Homo heidelbergensis *presents a mosaic of features.*
The derived features appeared in an discontinued mode, but they are systematically represented in the last neandertal.

Ipotesi Evolutive: Origine Afro-europea

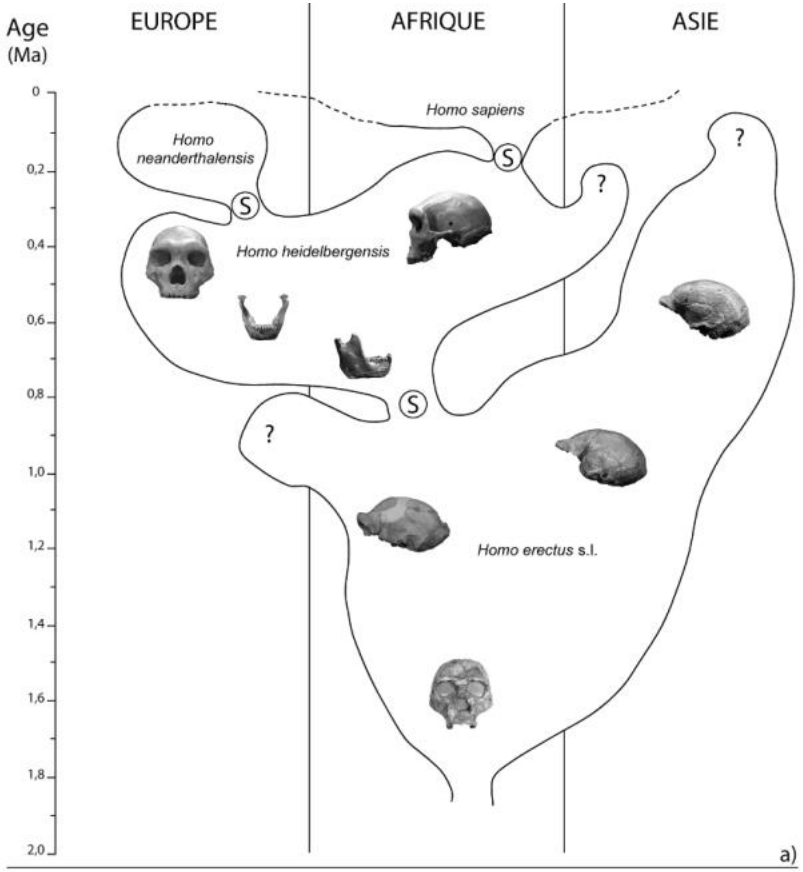


Esistenza nel P. medio di un taxa Afro-europeo ancestrali ai uomini moderni e ai Neandertaliani = basato sulle assomiglianza morfologiche tra Petralona Kabwe e Mauer. (Rightmire, 1998)

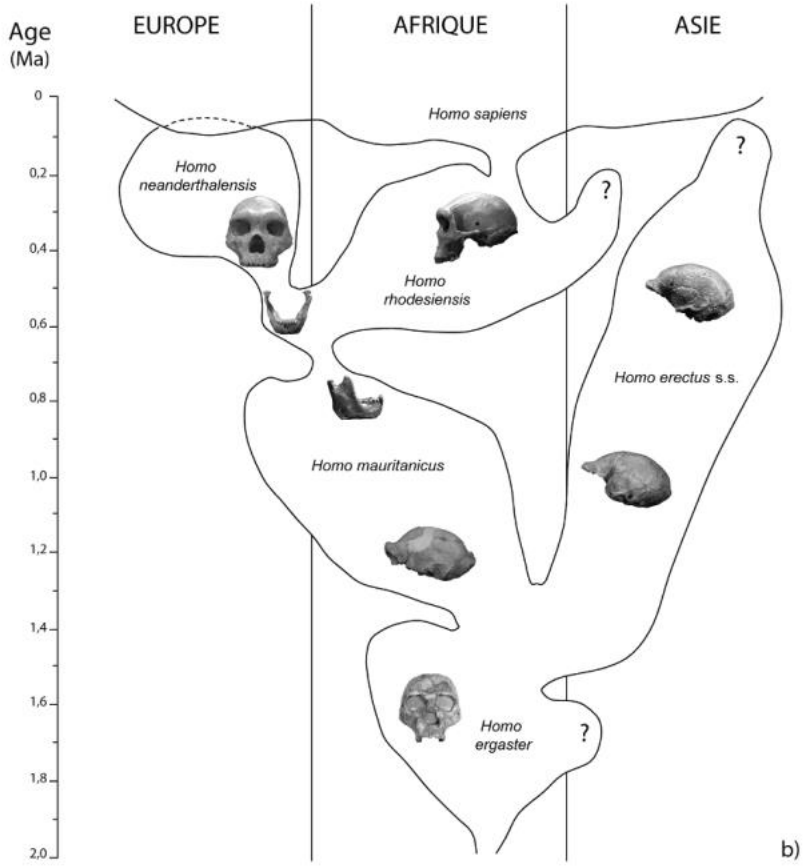


La presenza di caratteri Neandertaliani nella mandibola di Mauer giustifica la sua inclusione nella linea neandertaliana e quindi l'abbandono del nome *H. heidelbergensis* e l'introduzione del *H. mauritanicus* rappresentato dai resti di Tighenif e designato come l'ultimo antenato comune ai neandertaliani e i uomini moderni (Hublin, 2001)

Ipotesi Evolutive: Origine Afro-europea

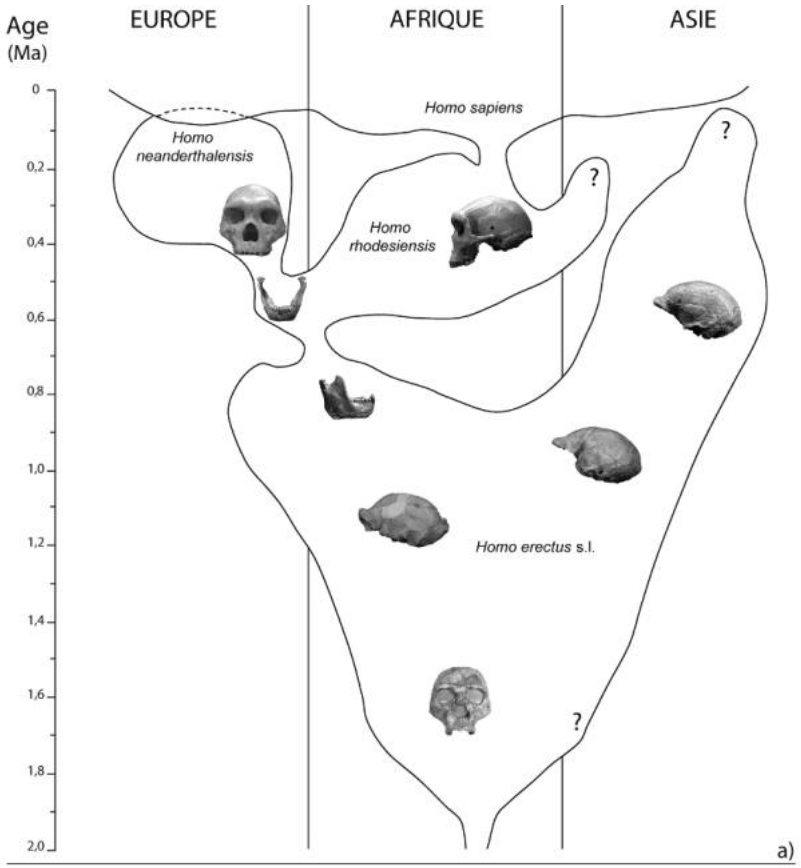


Existence in the Middle Pal. of a Afro-european taxon ancestral to modern human and Neanderthals = based on the morphological similarities between Petralona, Kabwe and Mauer (Rightmire, 1998)

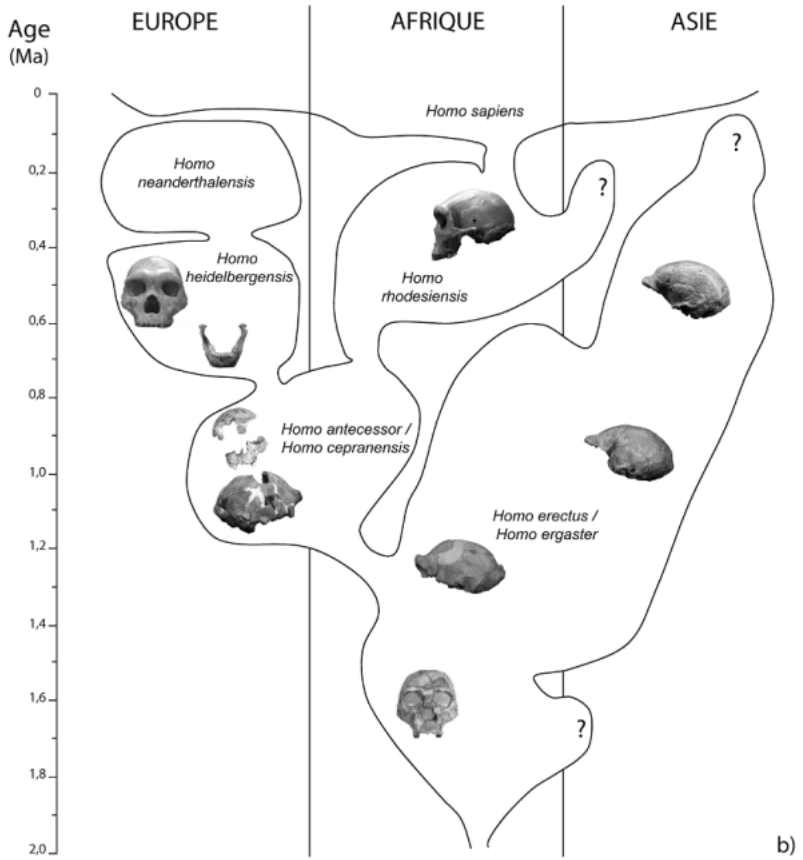


The presence of Neanderthals features on Mauer mandible justified his inclusion in Neanderthals lineage and then the abandon of the name H.heidelbergensis *and the introduction of H. mauritanicus represented by the remains of Tighenif and designed as the last common ancestors between Neanderthals and modern humans (Hublin, 2001)*

Ipotesi Evolutive: Origine esclusivamente Europea

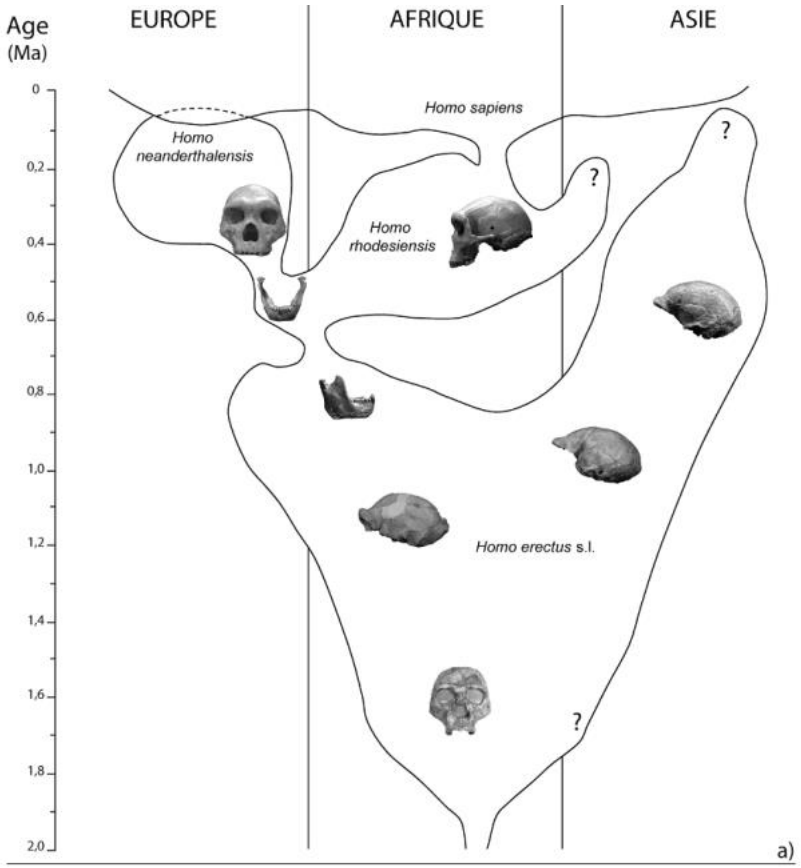


Teoria dell'accrezione (acquisizione graduale dei caratteri derivati neandertaliani

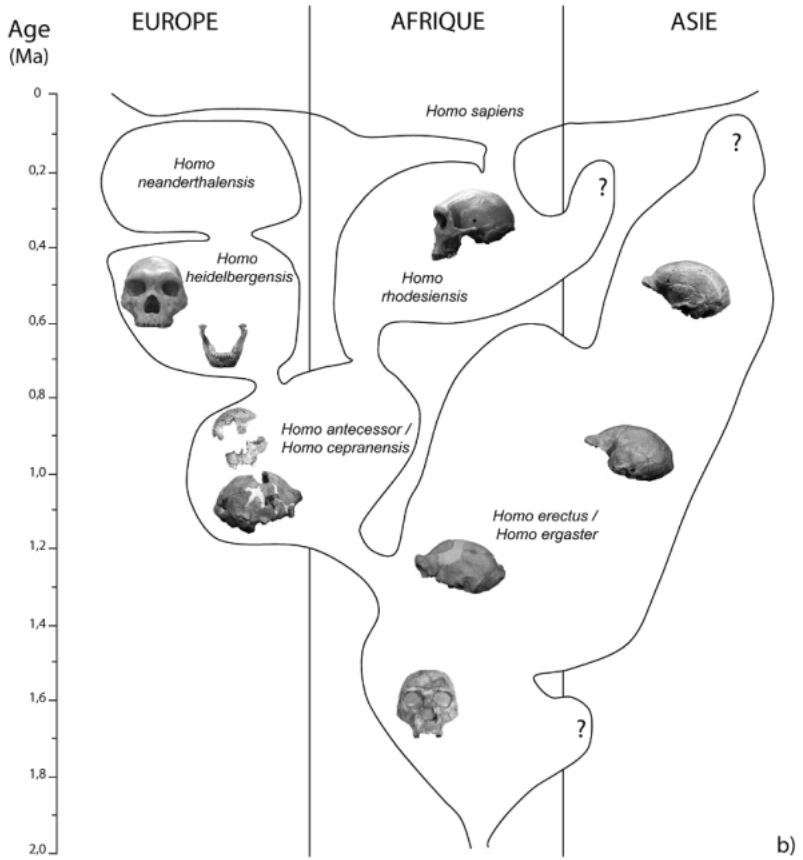


H. antecessor sarebbe l'ultimo antenato comune tra i neandertaliani e i uomini moderni (Bermudez de Castro et al., 1997; Mallegni et al., 2003)

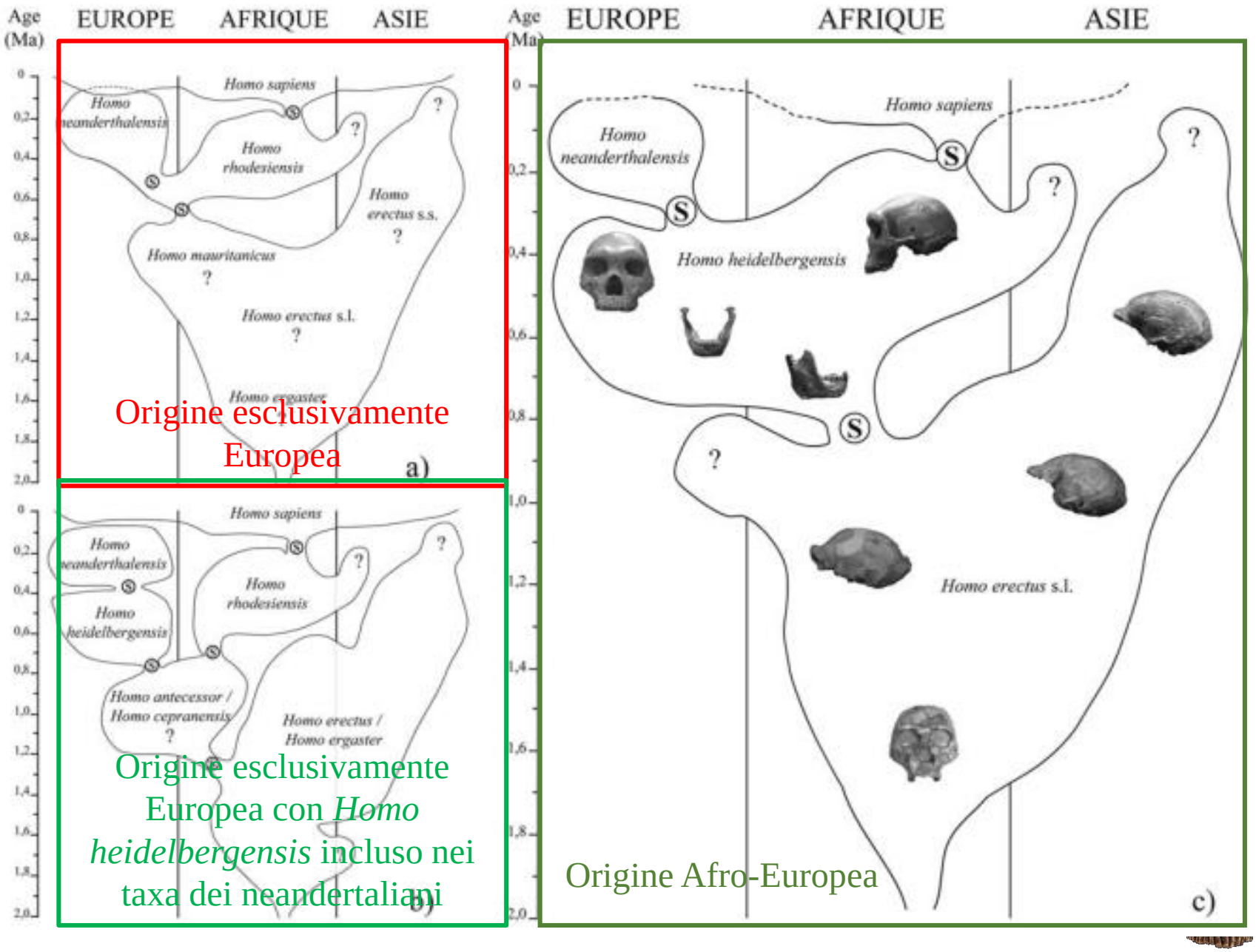
Ipotesi Evolutive: Origine esclusivamente Europea



Accretion theory (gradual acquisition of Neanderthals derivate features)



H. antecessor *is the last common ancestor between Neanderthals and modern humans (Bermudez de Castro* et al., *1997; Mallegni* et al., *2003)*


Age (Ma)
EUROPE
AFRIQUE
ASIE
Homo sapiens
Homo neanderthalensis
Homo rhodesiensis
Homo erectus s.s.
Homo mauritanicus
Homo erectus s.l.
Homo ergaster
a)
Origine esclusivamente Europea
Homo heidelbergensis
Homo antecessor / Homo cepranensis
Homo erectus / Homo ergaster
b)
Origine esclusivamente Europea con *Homo heidelbergensis* incluso nei taxa dei neandertaliani
c)
Origine Afro-Europea

Definizione dei Neandertaliani s.s.

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

The Neandertals are characterized by the presence of:

- **Caratteri arcaici / Plesiomorfie** : dei caratteri ancestrali che non si ritrovano in nessun fossile moderno.

  Archaic features / Plesiomorphies: These are ancestral features which are not found in the modern fossil.

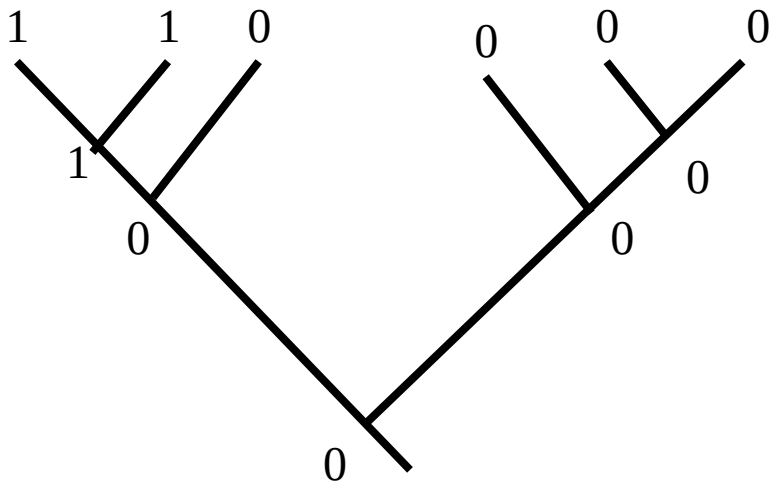
- **Caratteri condivisi** con *Homo sapiens.*

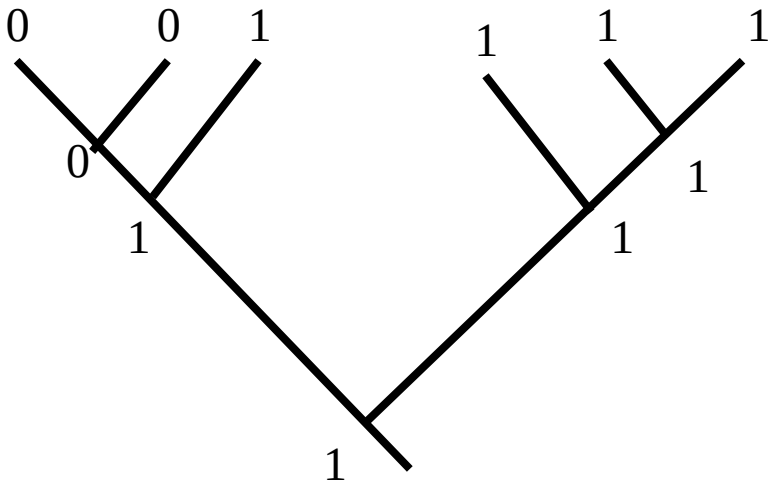
  Feature shared with Homo sapiens

- **Caratteri derivati / Apomorfie** : presenti solo nei Neandertaliani, peculiari ed identificativi di questa specie.

  Derivated features / Apomorphies: These are present only in the Neanderthals, and allow to identify this species.

Apomorfie/Plesiomorfie

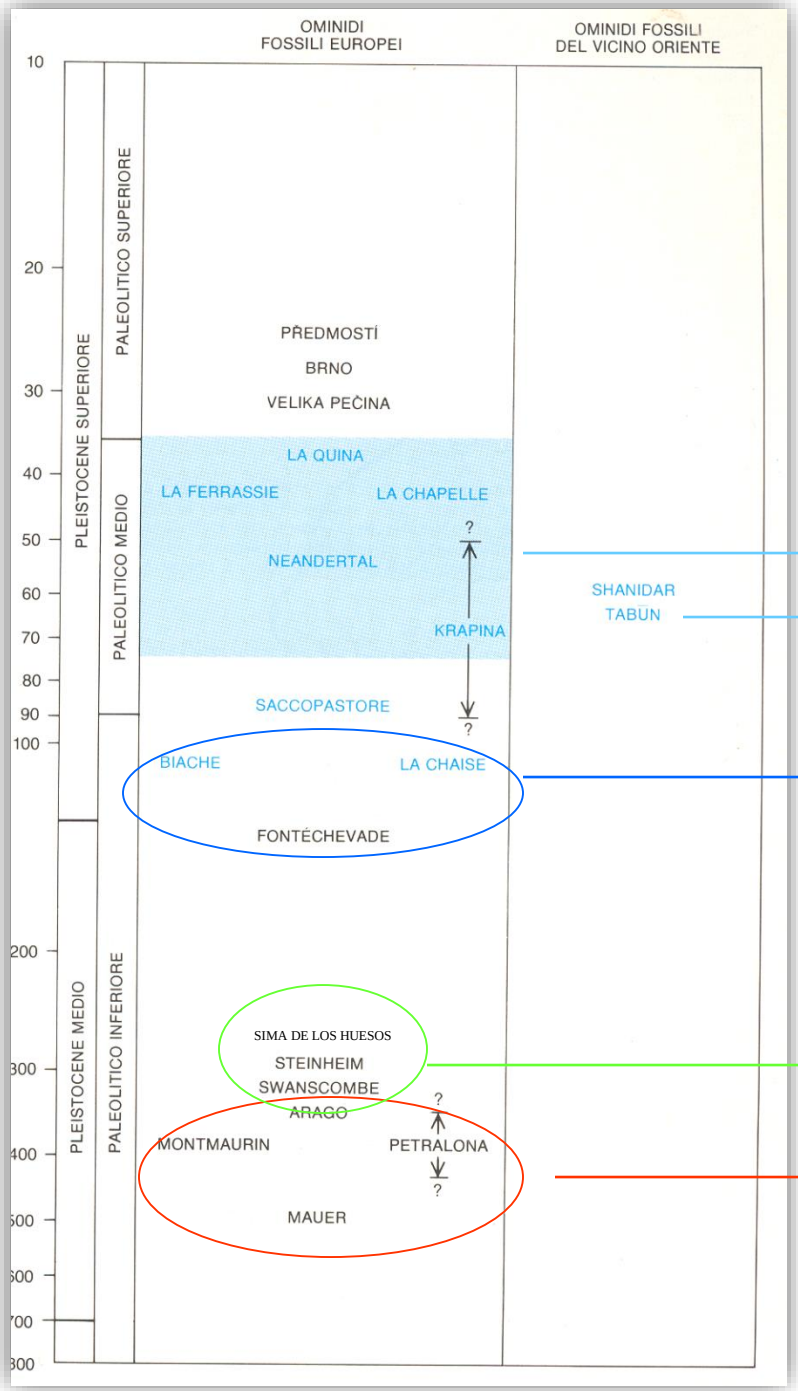




Apomorfie : un **carattere derivato** cioè un carattere nuovo, risultato della modificazione di un carattere *ancestrale* nel corso dell'evoluzione.
An apomorphy is a derived feature which is the result of a modification of a ancestral feature in the evolution.

Plesiomorfie : la presenza, in organismi appartenenti a specie diverse, di un carattere ancestrale che rappresenta una evoluzione innovativa in comune.
A plesiomorphy is the presence, in organism from various species, of an ancestral feature which represent a common innovative evolution

I Neandertaliani



Neandertaliani classici

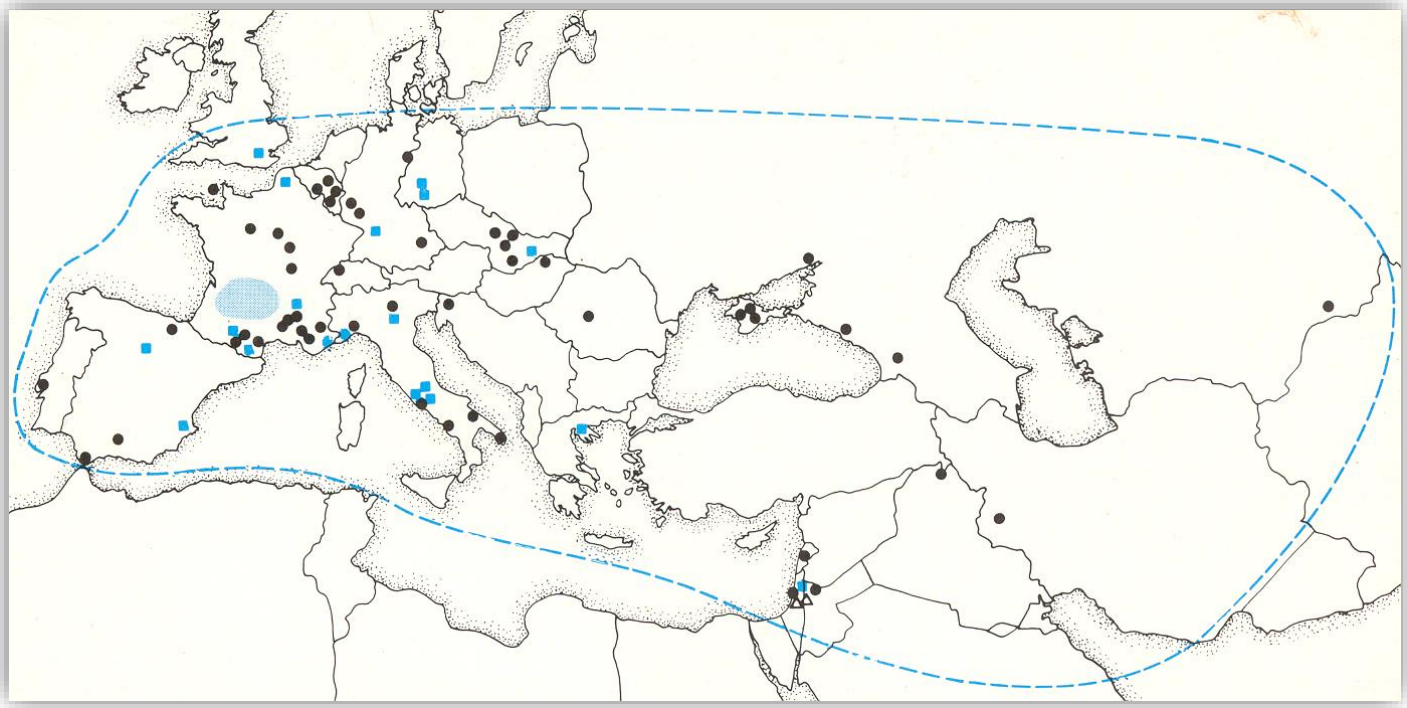
Neandertaliani orientali

III fase (250.000-130.000): stabilizzazione dei caratteri

II fase (400.000-250.000): regione nucale 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'Europea orientale.

A speciation of these features can be observed in time and space. In fact the derived features are more accentuated going toward Western Europe.
→ around 50 000 years in Western Europe, the neandertal present derived features more marked compared to the Neandertal from Eastern Europe.

Il Cranio

Grande capacità cranica 1500-1700 cm^3

Frontale sfuggente

Toro sopraorbitale

Glabella sporgente

Naso alto, e proiettato verso avanti = Prognatismo meso-facciale

Occipito-parietale piatto

Occipitale pinzato

Piano nucale e Piano occipitale formano un angolo chiuso

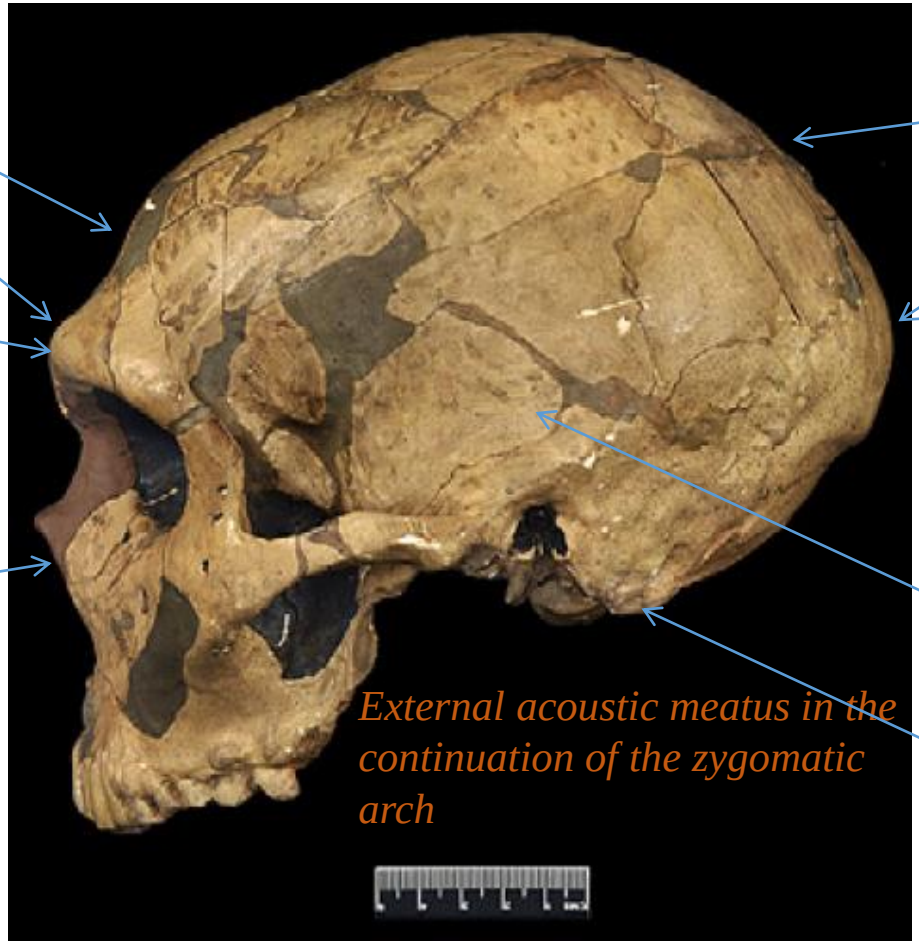
Temporale basso

Apofisi mastoidee piccole e poco sviluppate

Il cranio cerebrale è allungato per compensare la faccia voluminosa

La Ferrassie 1

CC 1500-1700 cm^3



Fleeing frontal

Sus-orbital torus

Protruding glabella

High nose and projected forward = mid-facial prognatism

Flat Occipito-parietal

Pinned Occipitale

Nuchal and occipital plan are forming a closed angle

Low temporal

Small Mastoid apophysis and under developed

External acoustic meatus in the continuation of the zygomatic arch

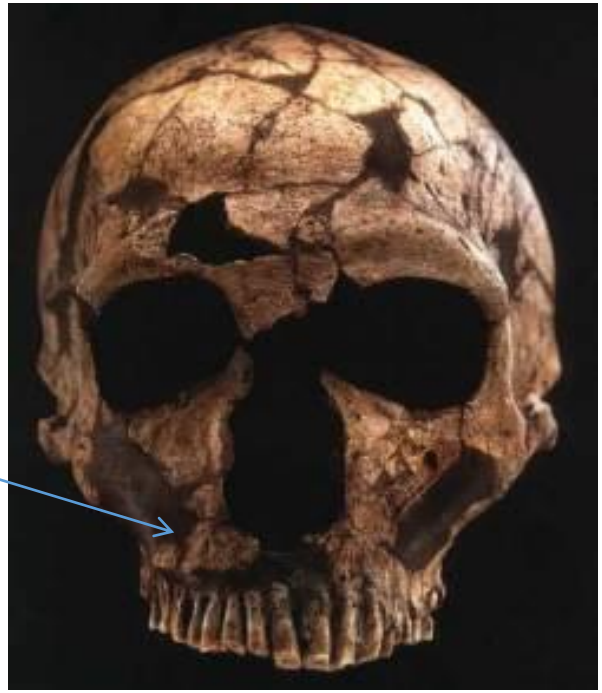
The cranium is elongated to balance the voluminous face

La Ferrassie 1

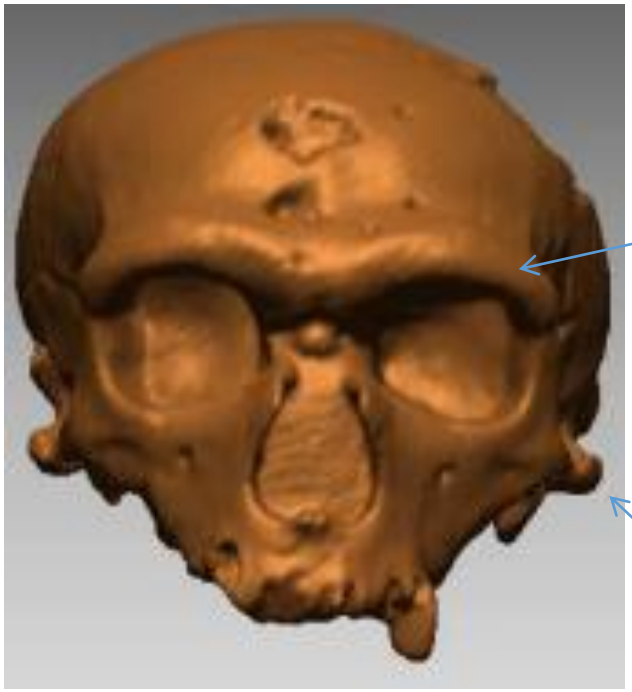
Orbite più large che alte, arrotondate e grandi

Cavità nasale alta e voluminosa

Assenza di fossa canina



La Ferrassie 1



Toro sopraorbitale continuo

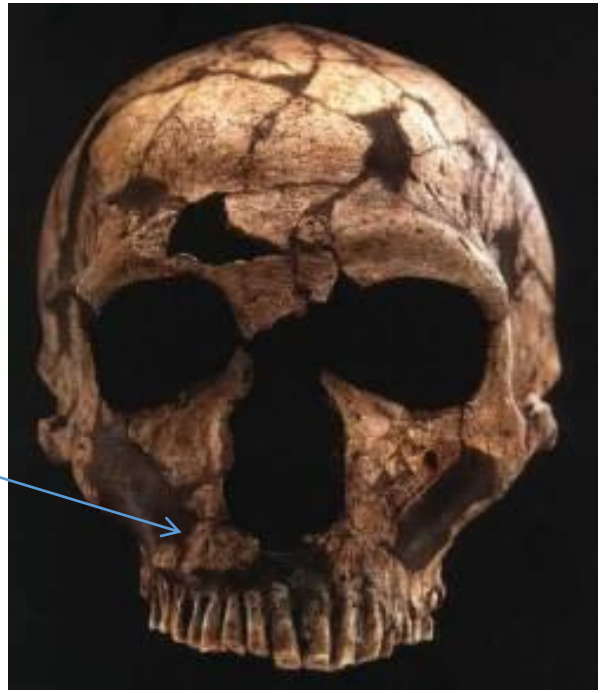
Arcata zigomatica sporgente

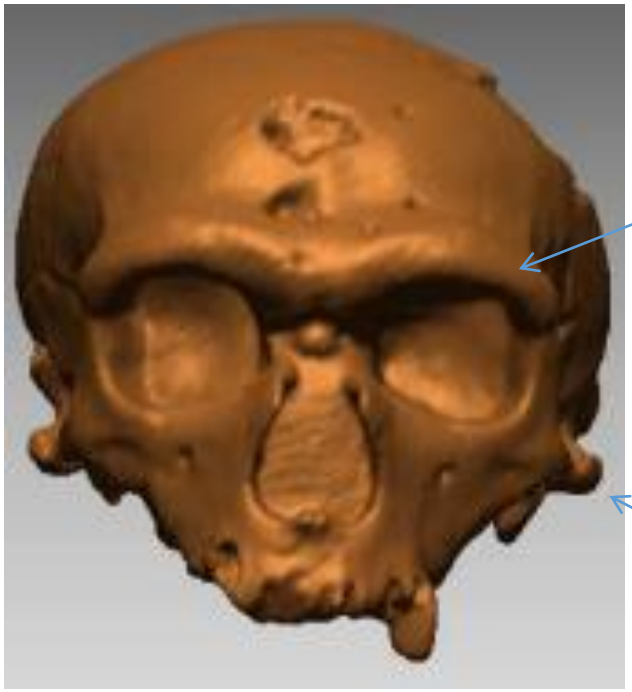
La Chapelle-aux-Saints 1

Larger than higher orbit, rounded and wide

Nasal cavity high and voluminous

Absence of canine fossa





Sus-orbital torus continuous

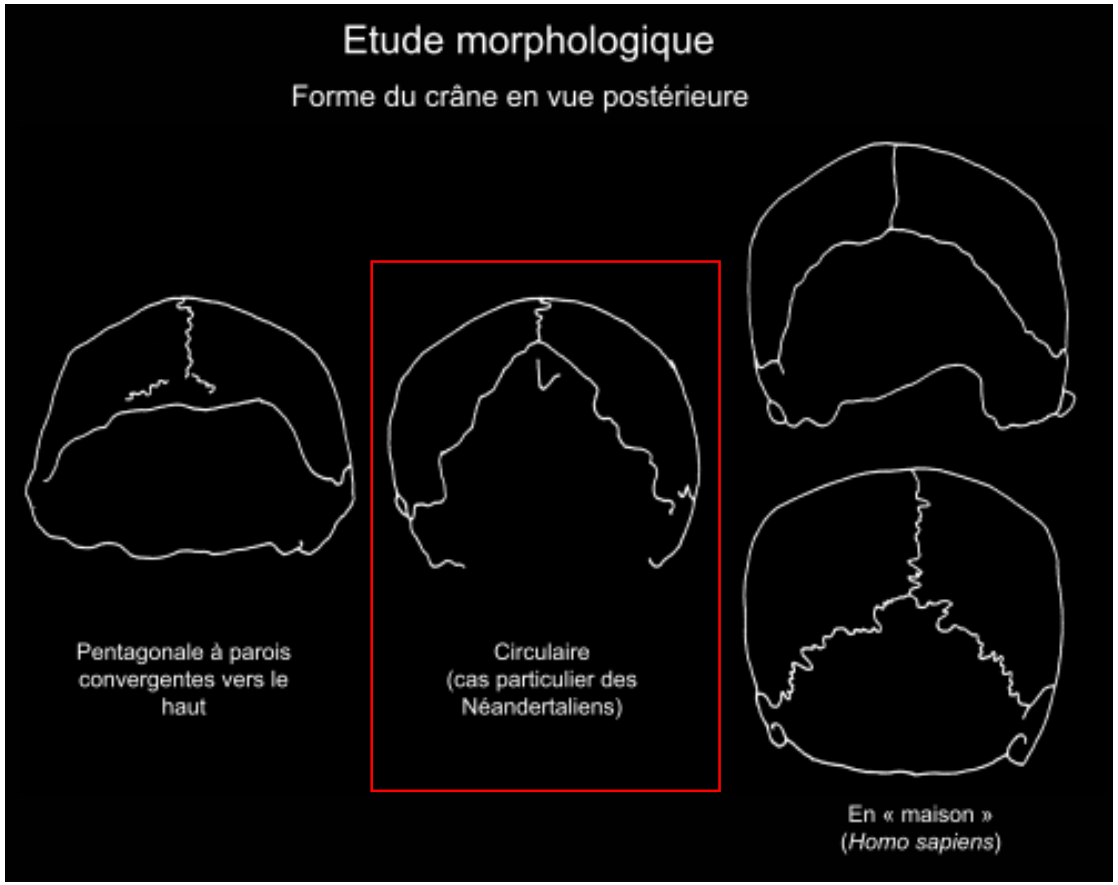
Projected zygomatic arch

La Ferrassie 1

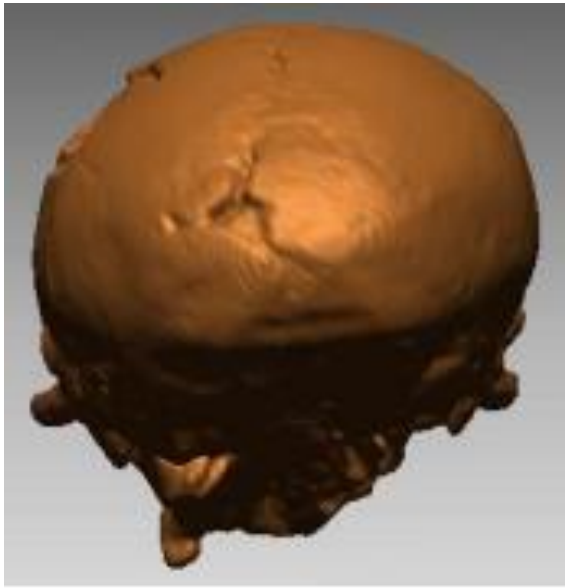
La Chapelle-aux-Saints 1

Forma circolare del cranio in vista posteriore

Cicular shape of the cranium in posterior view

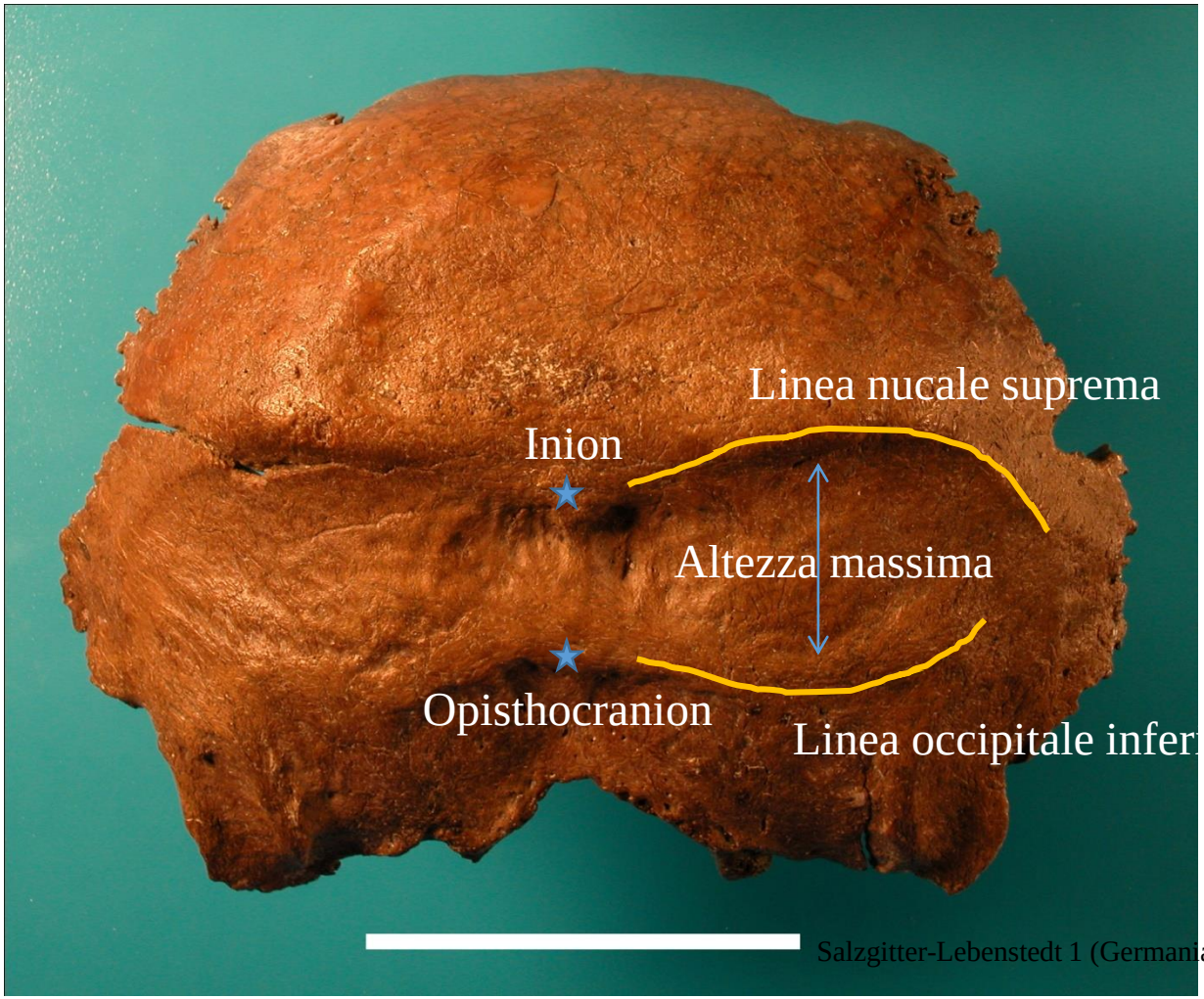


Chignon occipitale

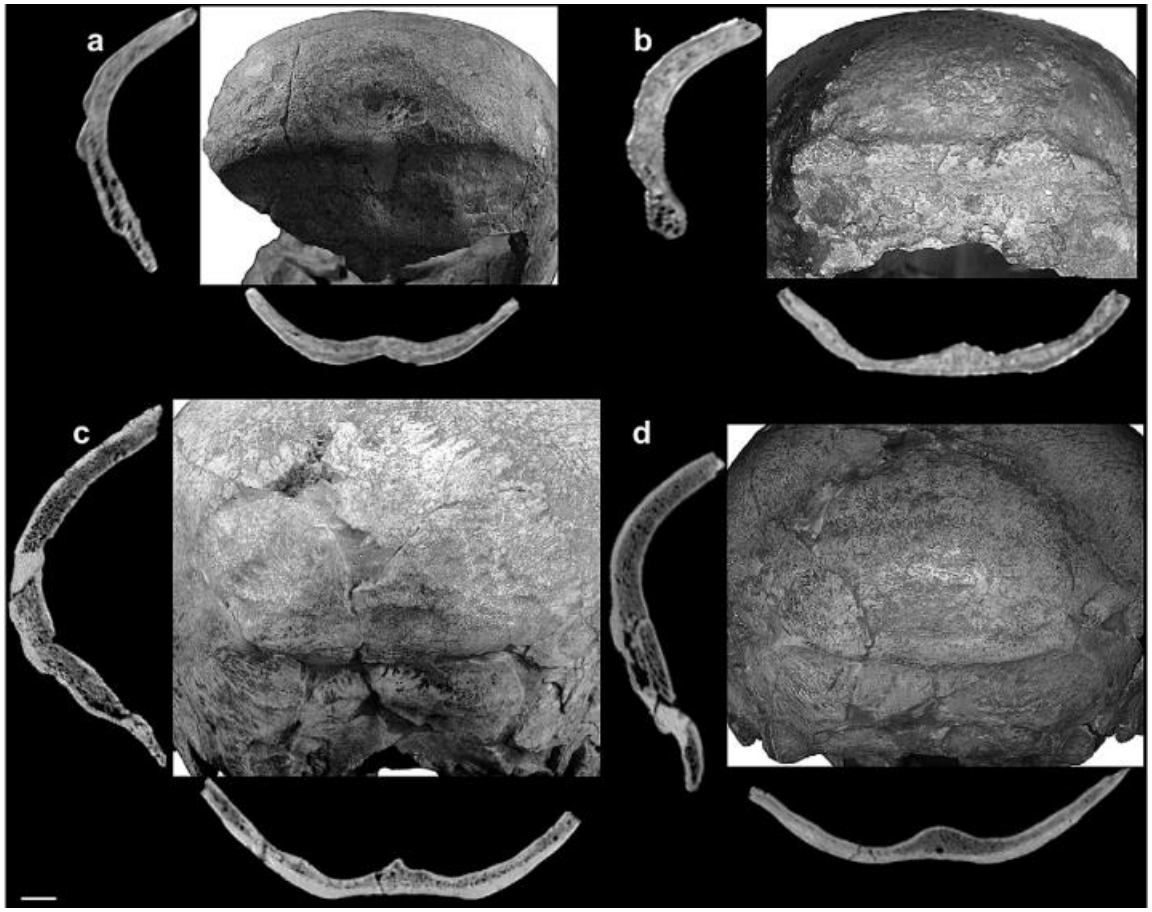


La Chapelle-aux-Saints (Francia)

Fossa soprainiaca / *suprainiac fossa*



Salzgitter-Lebenstedt 1 (Germania)

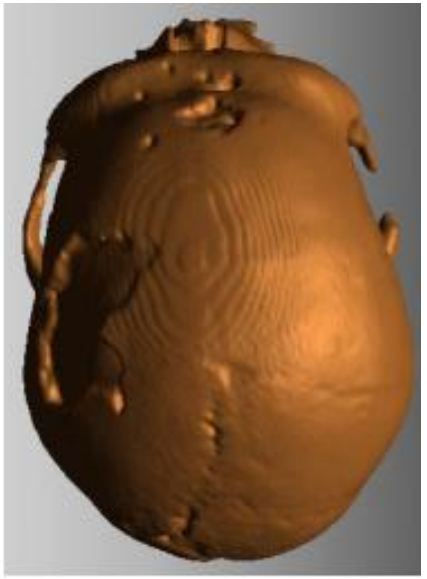


a: Gibraltar 1
b: Guattari 1
c: La Chapelle-aux Saints 1
d: La Ferrassie 1

(Balzeau, 2010)

La fossa soprainiaca è un carattere derivato dei neandertaliani che si ritrova in tutti i campioni, si individua già durante i primi stadi di sviluppo ed è presente presto nella differenziazione della linea.
Corrisponde ad un assottigliamento della diploe.

The suprainiac fossa is a derived feature of the Neandertals which is found in all the samples, and is already observed in the first development stage and is present early in the differentiation of the line. This correspond to a thinning of the diploe.



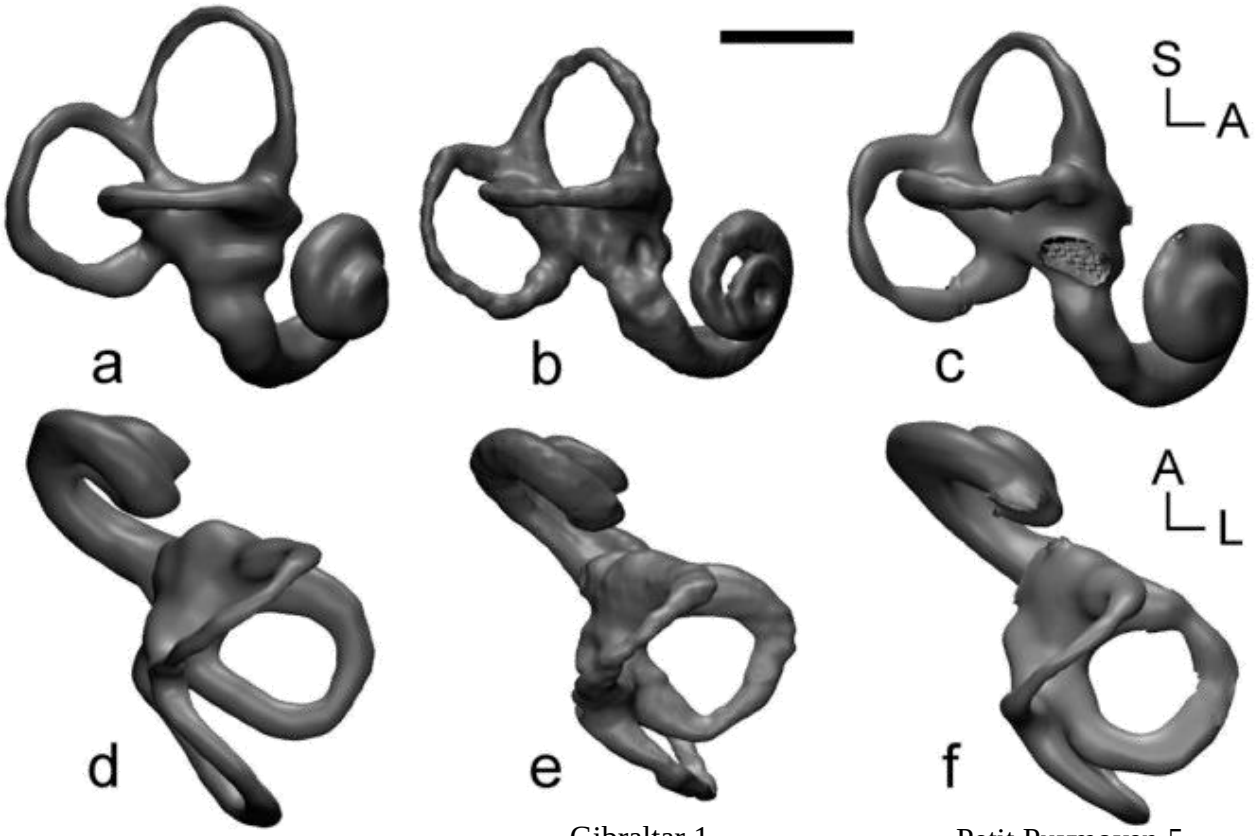
Homo neanderthalensis
(La Chapelle-aux-Saints 1)

Cranio allungato / *elongated cranium*

Zigomi sporgenti / *prominent zygomatic*

Larghezza massima in posizione bassa /
maximum width in a low position

(Spoor, 2003)



Uomo moderno Gibraltar 1 Petit Puymoyen 5

Fig. 2. Lateral (a)–(c) and superior (d)–(f) aspects of the right bony labyrinths of a Holocene human (a), (d), and the Neanderthal specimens Gibraltar 1 (b), (e) and Petit Puymoyen 5 (c), (f), reconstructed from sagittal CT scans. The lateral views are aligned according to the plane of the lateral semicircular canal. S. superior, A, anterior, and L, lateral. Scale bar is 5 mm.

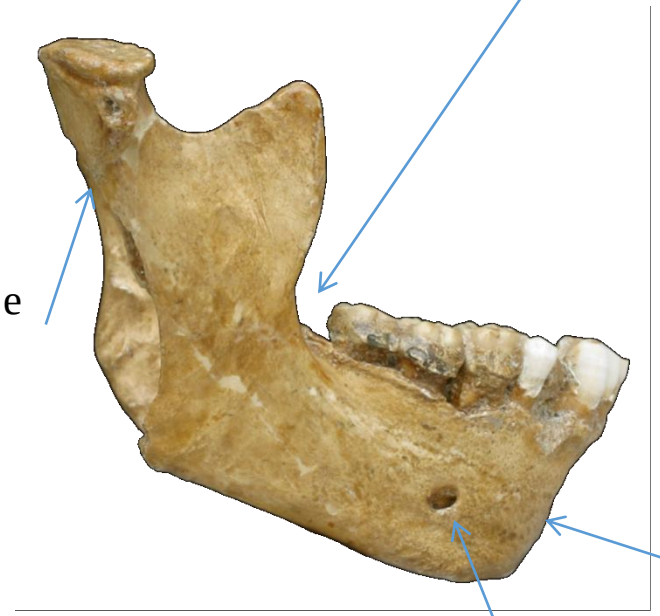
Rispetto all'uomo moderno l'orecchio interno del Neanderthal è caratterizzato da un arco del canale semicircolare anteriore più piccolo nel valore assoluto e relativo, abbastanza appuntito e con più torsioni.

Compared with Holocene humans the bony labyrinth of Neanderthals can be characterized by an anterior semicircular canal arc which is smaller in absolute and relative size, is relatively narrow, and shows more torsion.

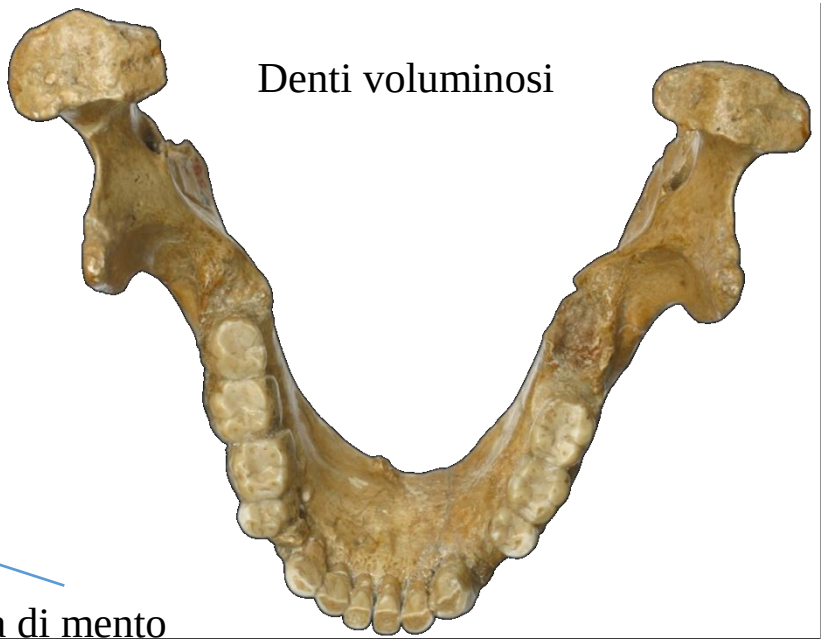
La mandibola

Spazio retro-molare

Ramo largo e divergente



Denti voluminosi



Assenza di mento

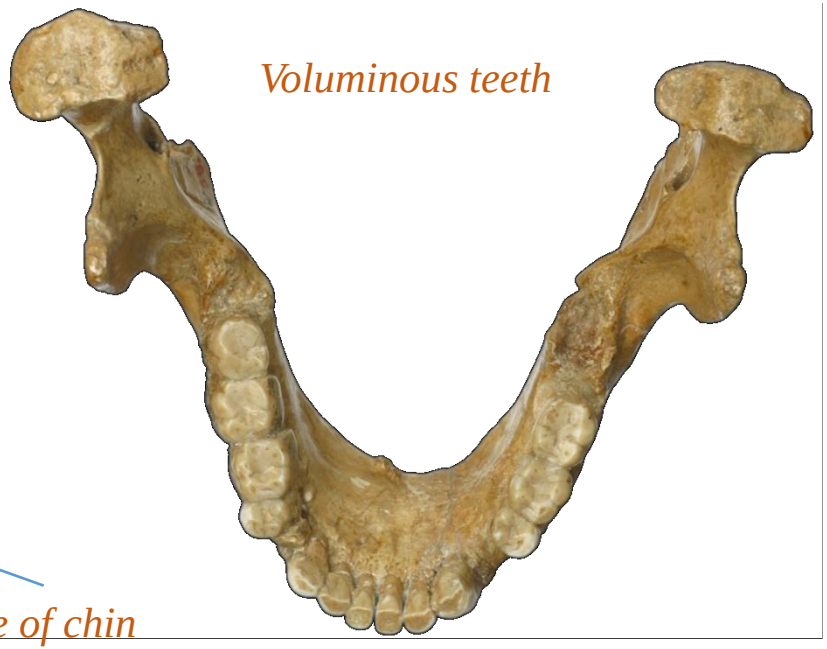
Foramen mentoniero spostato indietro

Krapina 59 (Croazia)

Retromolar space

Large and divergent ramus

Voluminous teeth

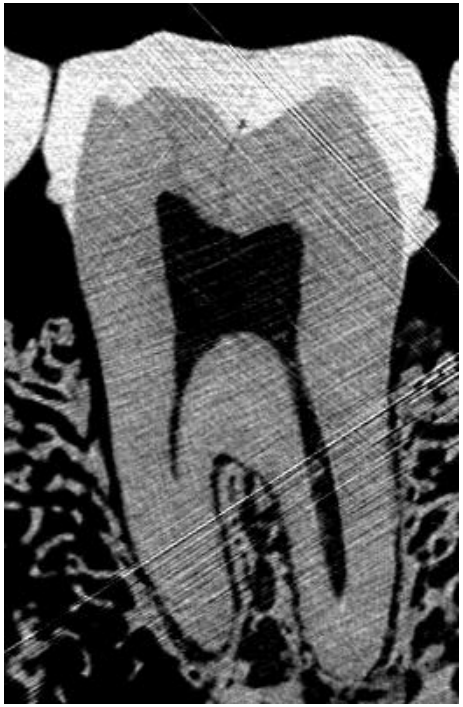


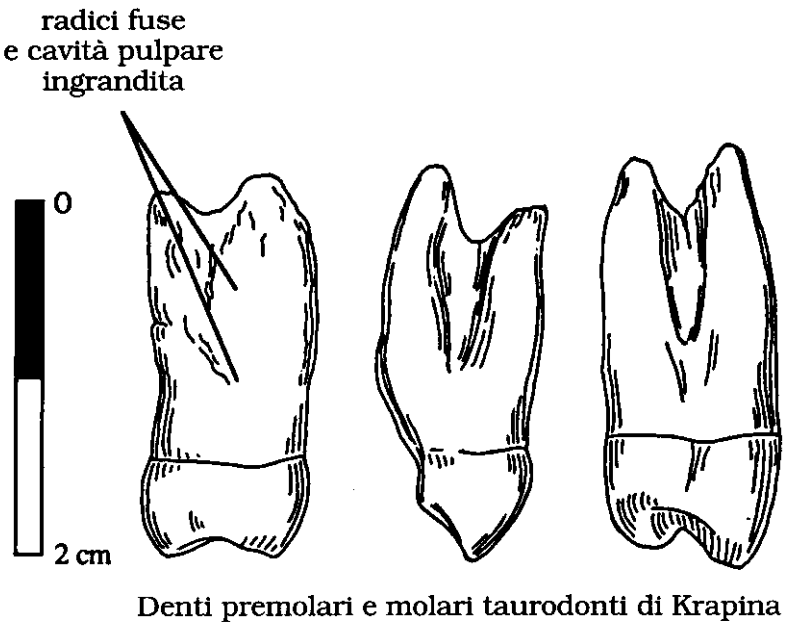
Absence of chin

Mental foramen backward

Krapina 59 (Croazia)

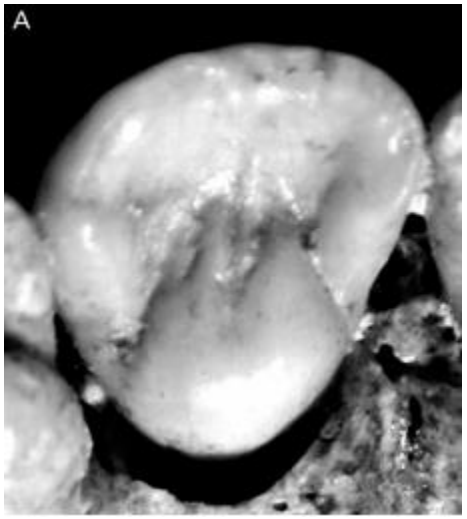
Dentizione





Denti premolari e molari taurodonti di Krapina

Taurondontismo: Grande cavità pulpare
Taurondothism: Big pulp cavity



Incisivo con una forma di spatola e con una convessità labiale e un tubercolo linguale
Incisive shovel-shaped, with a labial convexity and a lingual tubercle

Elementi post-craniali

1,65m – 1,55m

Scheletro robusto con inserzioni muscolari robuste.
Robust skeletton with powerful muscular insertion

Vertebre cervicali che denotano un collo corto e tozzo
Cervical vertebra induce a short and squat neck

Muscolatura dorsale molto sviluppata
Dorsal musclulature well developped

Torace largo, sviluppato lateralmente e verso l'avanti
Large thorax, lateraly and frontward developped

Il radio presenta una curvatura che denota una grande capacità di movimento.
The radius is curved which indicate an importante mouvement capacity.

Clavicola grande e gracile
Large and gracile clavicle

Mani grandi ma con dita corte: presa potente ed efficace
Large hand with short finger: powerful and effective handle

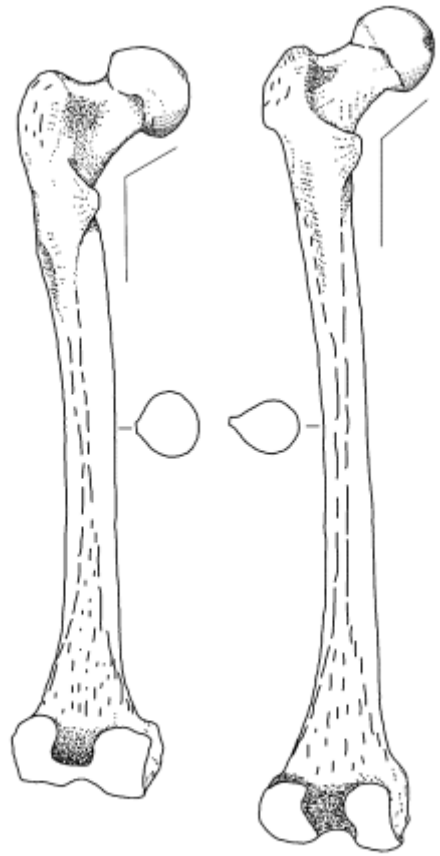
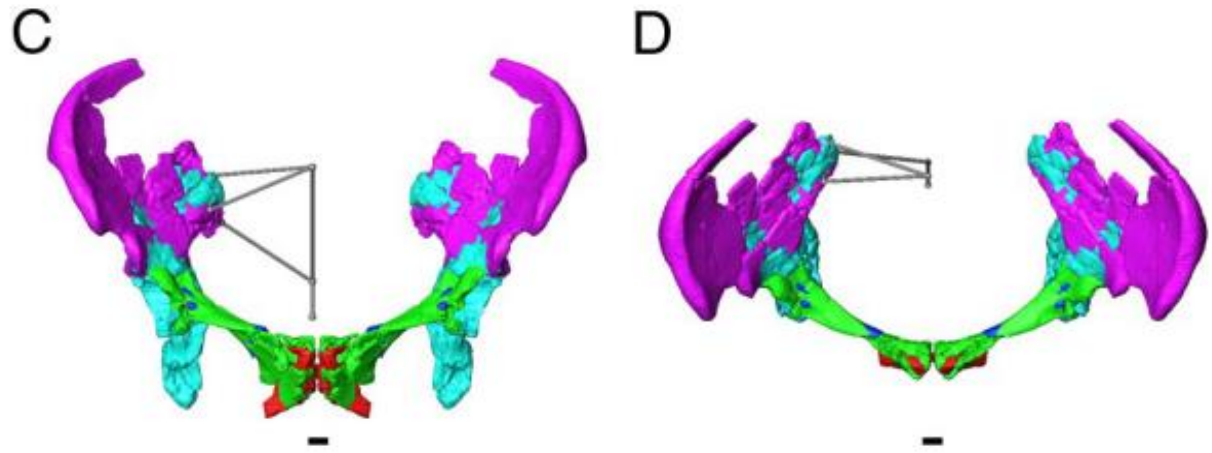


Fig. 1. Distinctive features of the Neandertal femur. (*Left*) The Neandertal 1 (Feldhofer Cave Neandertal) femur. (*Right*) The Skhul IV near-modern human femur. Relative to near-modern humans, the Neandertal femur has larger articulations (head and distal end), a thicker and rounder shaft, and a lower neck-shaft angle. Adapted from McCown and Keith (9).

(Weaver, 2003)

Allungamento mesio-laterale della branca orizzontale dell'osso pubico. Il pube risulta molto alto e gracile.

Extension meso-lateral of the horyzontal crest of the pubic bone. This bone is high and gracile.



Ricostruzione virtuale delle pelvi del neandertal di Tabun (Weaver & Hublin)

Femore corto e curvo. L'epifisi è voluminosa e la diafisi presenta una sezione cilindrica.

L'angolo tra la testa e la diafisi è piccolo.

The femur short and curved. The epiphysis is voluminous and the diaphysis present a cylindrical section.

The angle between the femoral head and the diaphysis is small.

Significato della morfologia

Evoluzione della linea neandertaliana

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

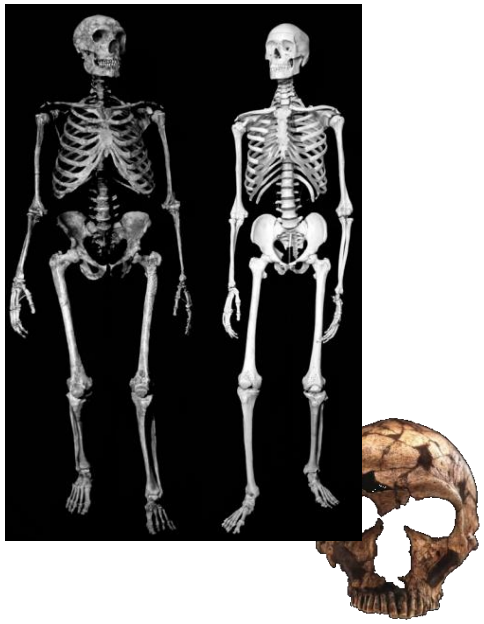
Questo sviluppo è il risultato di un accumulazione graduale di tratti morfologici distintivi delle popolazioni Europee.

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

Larga cavità nasale

Robustezza

Morfologia tarchiata



Evolution of Neanderthal lineage

The evolution model of Neanderthal is ad accretion: this hominid group evolved in a partial or complete isolation from the rest of the humanity

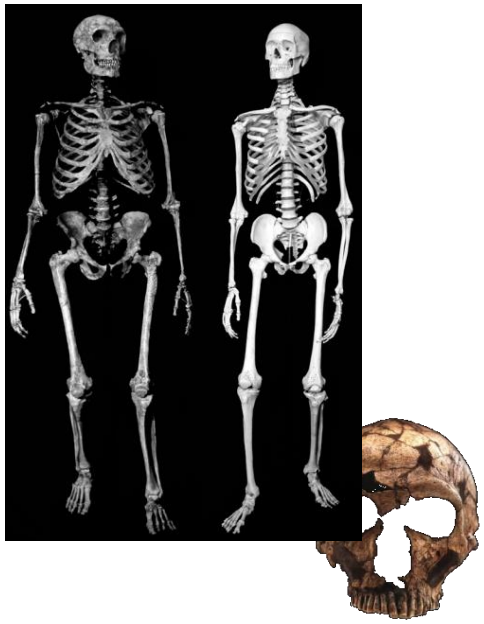
This development is the result of a gradual accumulation of morphological features, distinct from European population

Some researchers hypothesized that Neanderthals features have been developed following an adaptation to cold climatic conditions:

Large nasal cavity

Robustness

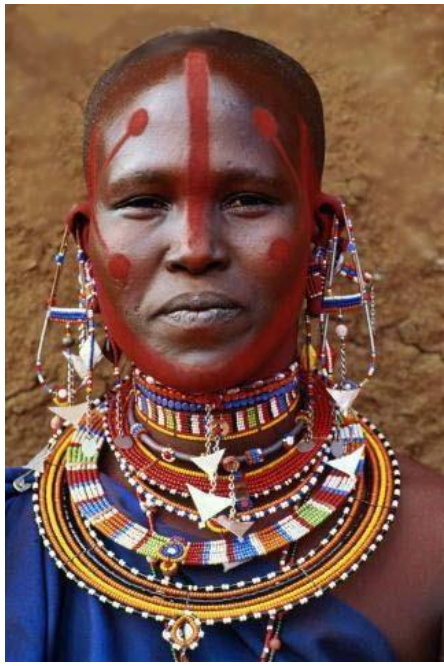
Stocky morphology

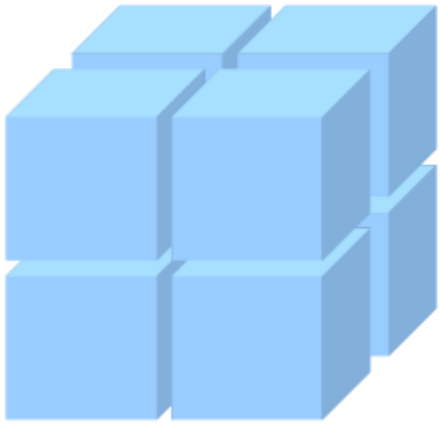


Adattamento al freddo

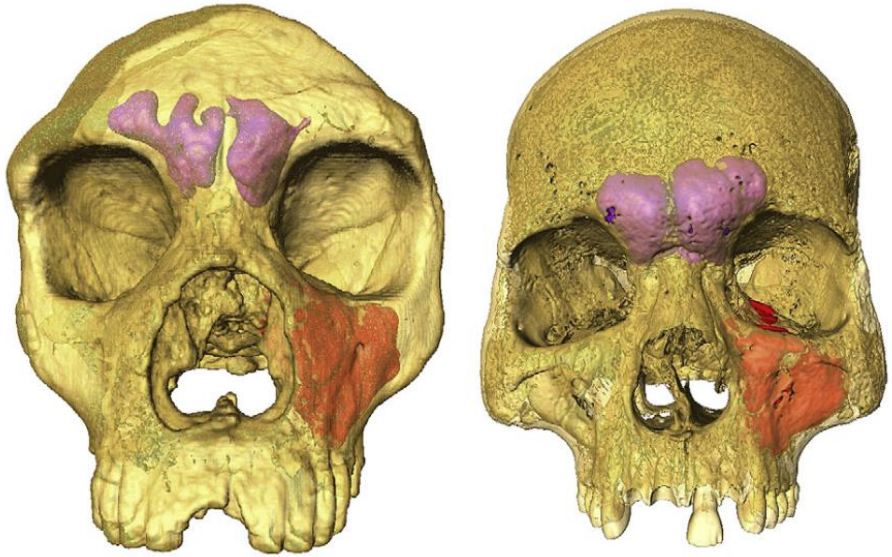
Regola di Allen : In un clima freddo, gli individui tendono ad essere piu larghi e ad avere degli arti più corti rispetto a quelli che vivono in un clima temperato, poiché in questo modo la ritenzione del calore è più efficace (rapporto massa corporea/superficie esposta)

In cold climat, individuals tends to have shorter limbs than the one from warmer climates, in this way the heat rentention is more effective (ratio corporeal mass/exposed surface)





Adattamento al freddo



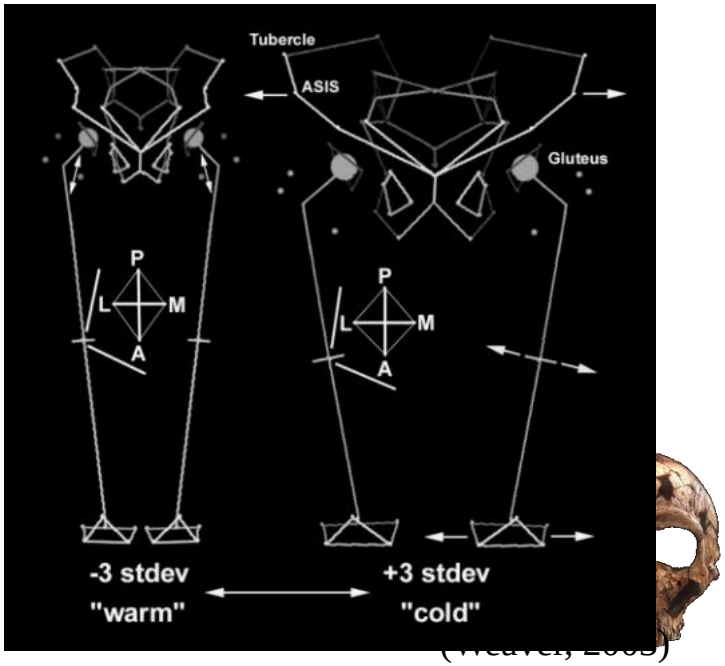
(Rae, 2011)

L'apertura nasale è importante ma in rapporto alla larghezza massima del cranio, essa è più stretta che negli uomini moderni: conseguenza di un adattamento a un clima freddo.

The nasal aperture is importante but in confront with the maximum width of the cranium, this is narrower than the modern human : consequence of an cold climate adaptment.

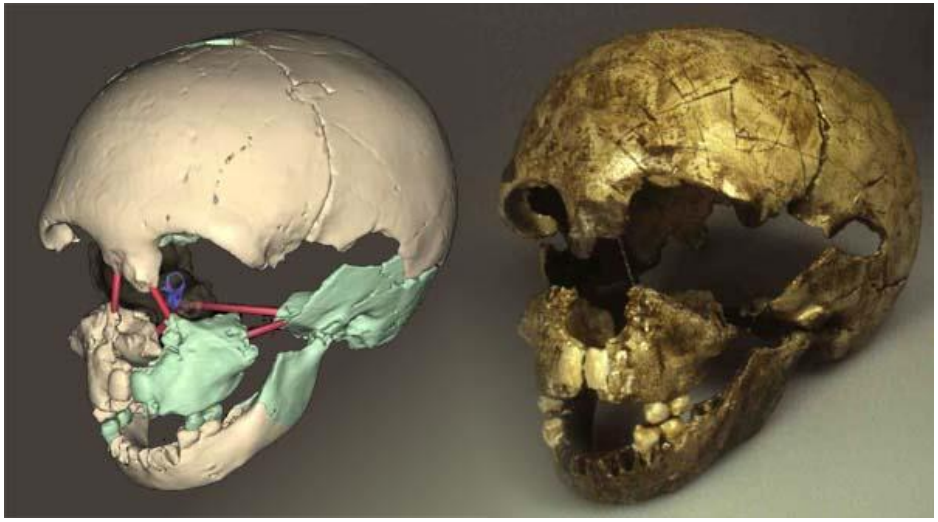
Le caratteristiche del femore sono delle conseguenze meccaniche secondarie delle proporzioni del corpo indotte dal clima.

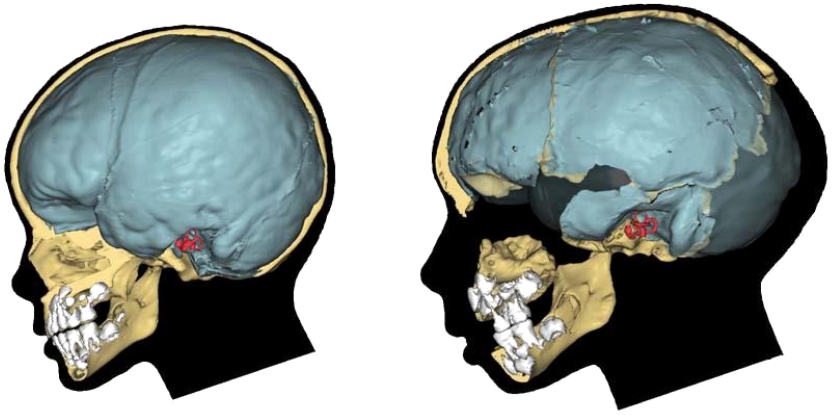
The femur's features are secondary mechanical consequences in the body proportions induced by the climate.



(Weaver, 2003)

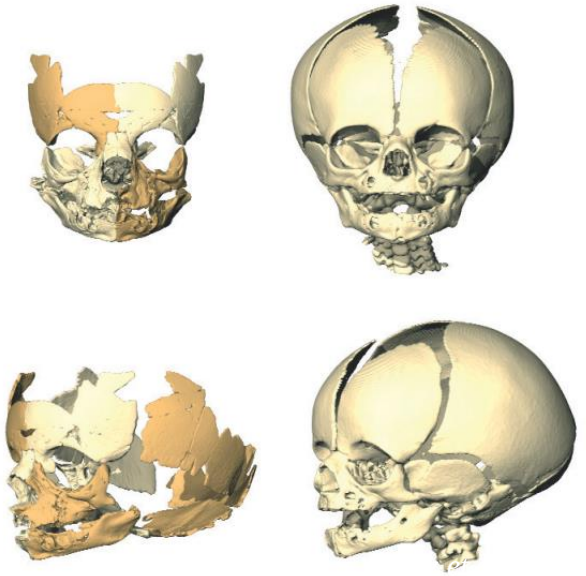
Ontogenesi



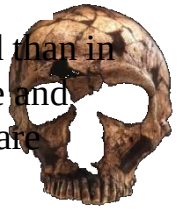


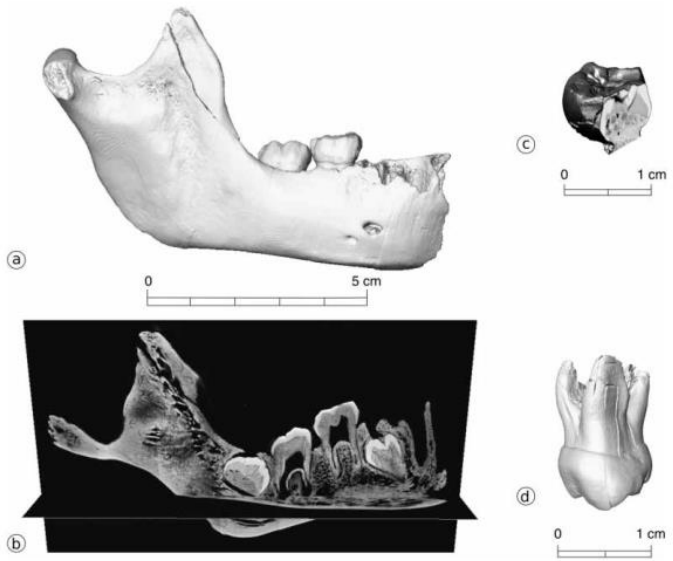
Gibraltar 2, Devil's Tower

Dederiyeh, Syria

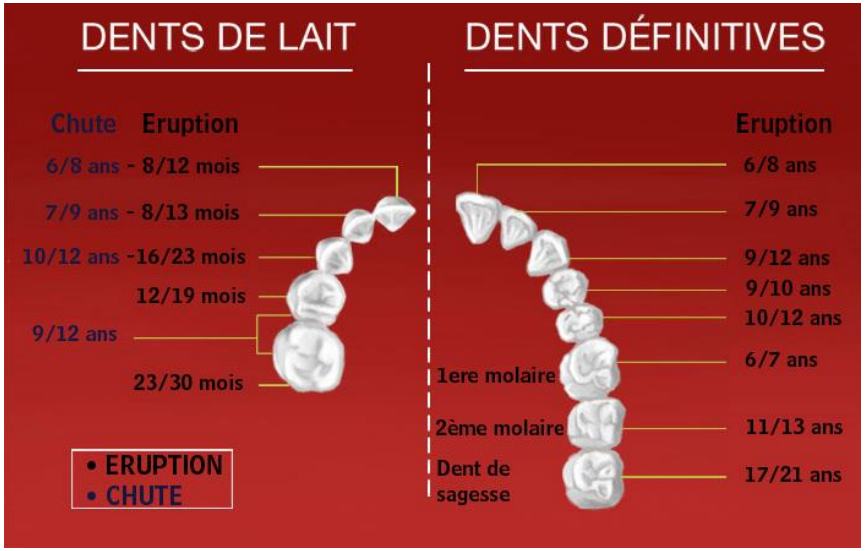


Le Moustier 2 is larger and more projected than in the modern human. Orbital, nasal shape and infraorbital surface of Le Moustier 2 are characteristic for Neanderthals





(a and b) Right hemi-mandible from Scladina (Scla 4A-1). (c) Probable Neandertal deciduous molar from Couvin. (d) deciduous second upper molar from Engis 2



Eruzione dei denti in *Homo sapiens*

Sequenze d'eruzione dei denti permanenti: differenze tra *sapiens* e *Neanderthal*

Homo sapiens: M1 – I1- I2 – P1 – C-P2-M2-M3

Homo neanderthalensis: M1-I1-I2-C-M2-P1-P2-M3

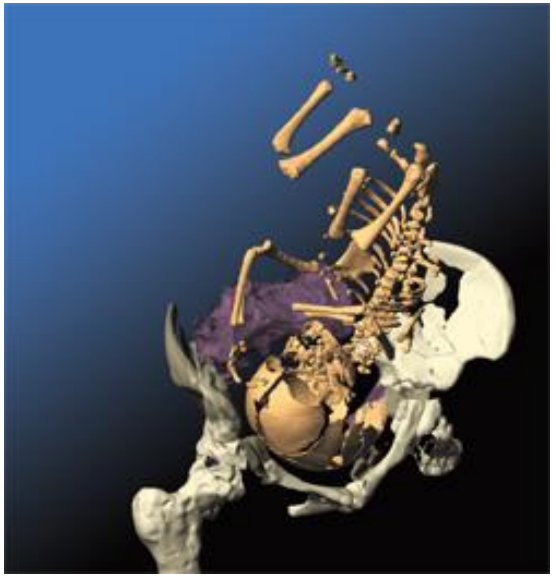
Crescita pre-natale

Le caratteristiche del pube sono state messe in relazione con un aumento possibile del diametro ostetricale. Si possono fare due ipotesi che implicano le stesse conseguenze dal punto di vista biomeccanico: una gestazione più lunga o una crescita più veloce in utero.

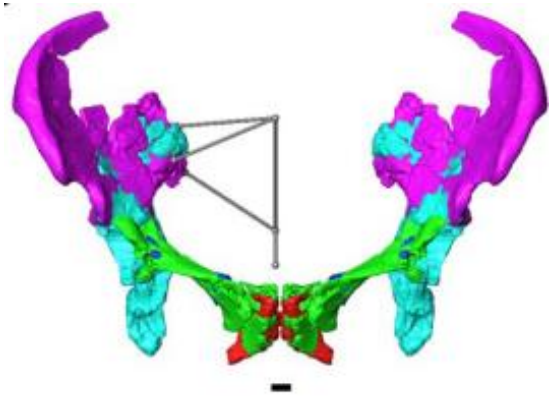
The pubis' features can be in relation with the theorical increase of the obstetric diameter. Two theory can be made which have the same consequences in a biomechanical point of view : A longer gestation or a faster growth in utero.

La sopravvivenza dei bambini neandertaliani risulta dall'insieme di due fenomeni: relativa precocità del giovane neandertaliano alla nascita e una crescita post-natale più veloce. Il giovane neandertaliano avrebbe acquisito più presto i mezzi per resistere ad un ambiente più ostile, nonché una veloce indipendenza dalla madre.

The survival of the Neandertal child result of two phenomenon: the precocity of the young Neandertal at the birth and a faster post-natal growth. The young Neandertal should have acquired earlier the means to resist to the environmental aggression, and the independence from the mother.



Ricostituzione dei processo di nascita (Ponce de Leon, 2008)



Confronti

Definizione dei Neandertaliani s.s.

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

The Neandertals are caracterized by the presence of:

- **Caratteri arcaici / Plesiomorfie** : dei caratteri ancestrali che non si ritrovano in nessun fossile moderno.

  Arcaic features / Plesiomorphies: These are ancestral features which are not found in the modern fossil.

- **Caratteri condivisi** con *Homo sapiens.*

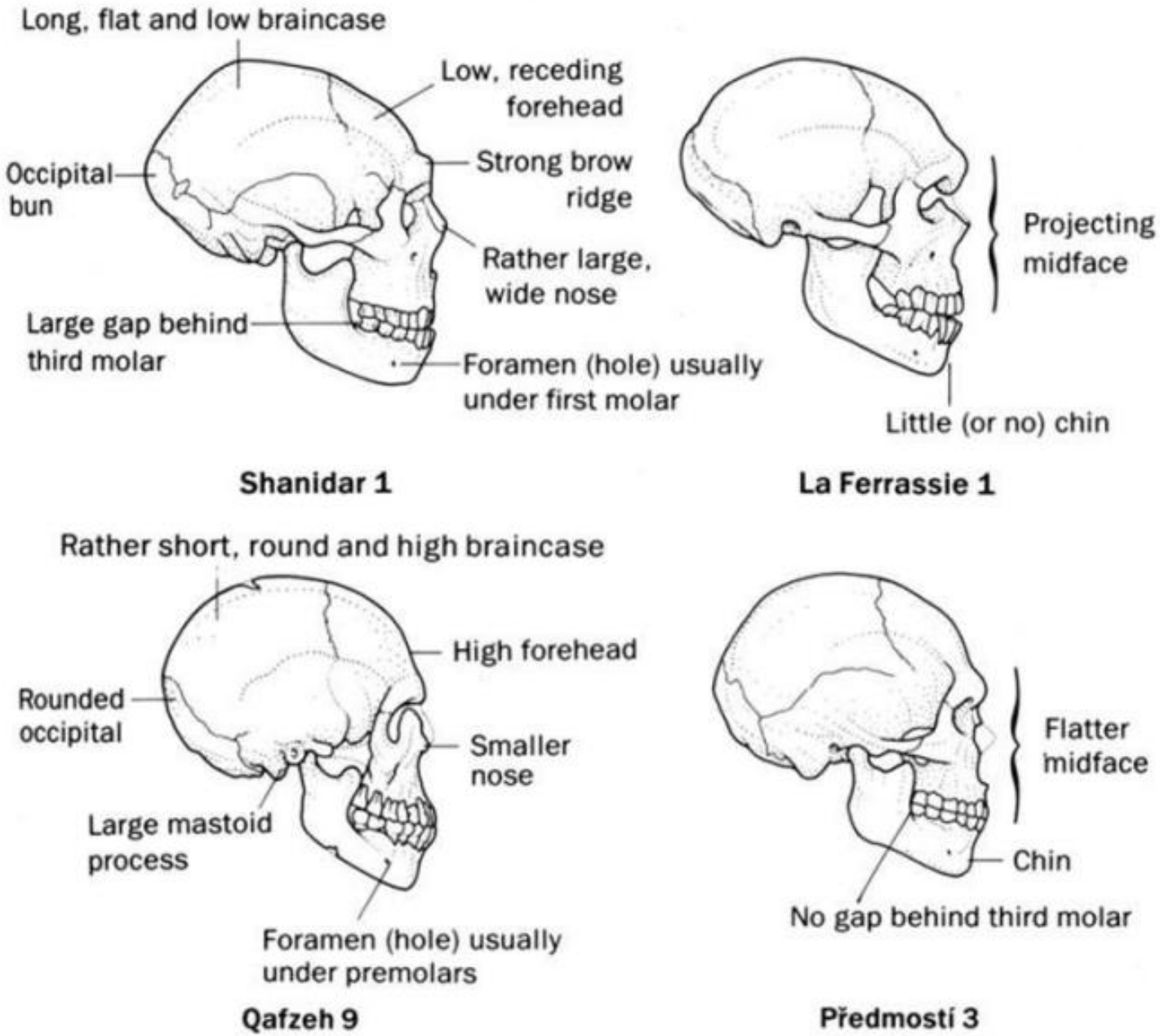
  Feature shared with Homo sapiens

- **Caratteri derivati / Apomorfie** : presenti solo nei Neandertaliani, peculiari ed identificativi di questa specie.

  Derivated features / Apomorphies: These are present only in the Neanderthals, and allow to identify this species.

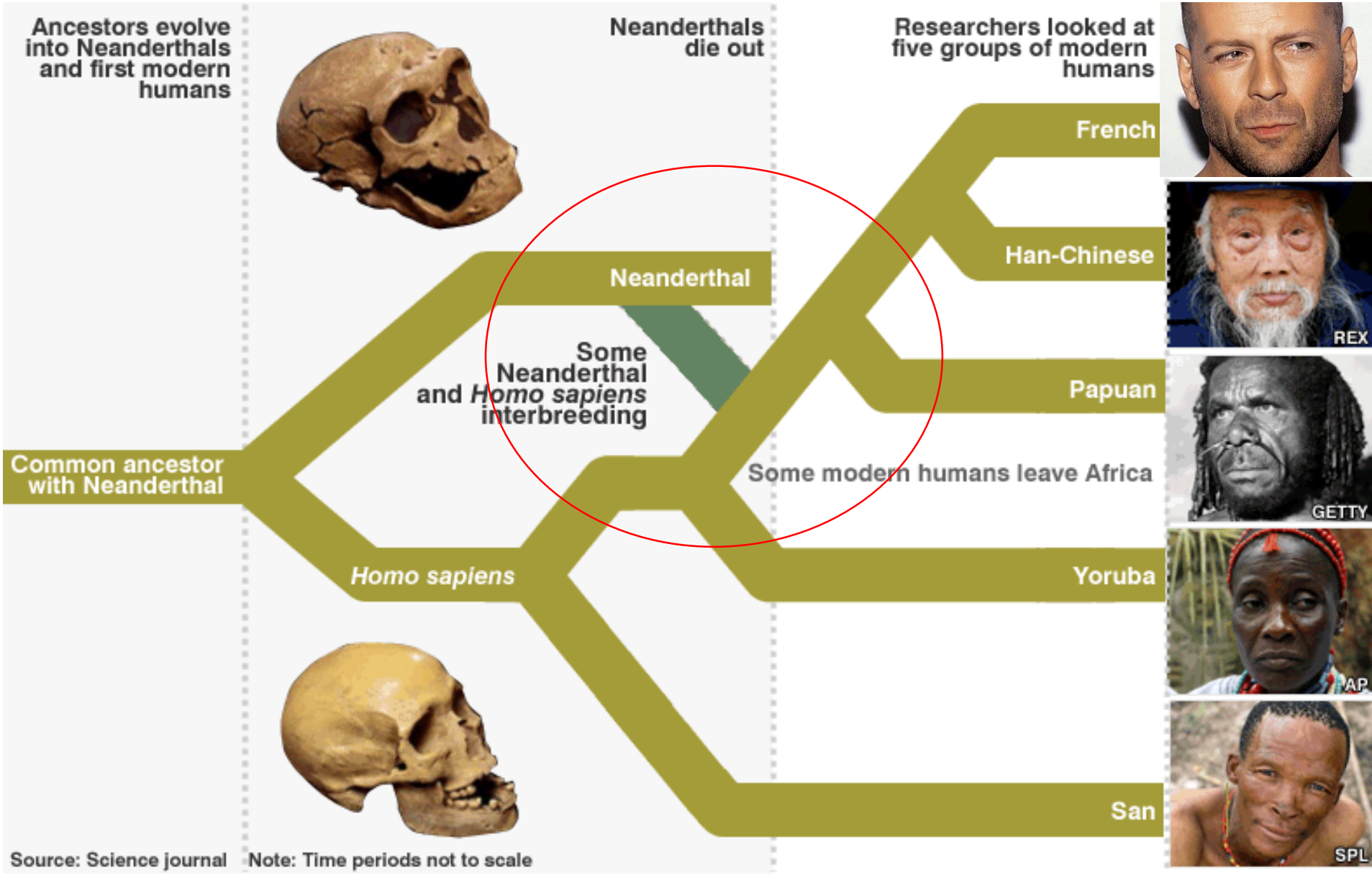
Homo neanderthalensis VS *Homo erectus*

Homo neanderthalensis VS *Homo sapiens*



Genetica

Uno di noi?


Ancestors evolve into Neanderthals and first modern humans
Neanderthals die out
Researchers looked at five groups of modern humans
French
Han-Chinese
Papuan
Neanderthal
Some Neanderthal and Homo sapiens interbreeding
Common ancestor with Neanderthal
Some modern humans leave Africa
Homo sapiens
Yoruba
San
REX
GETTY
AP
SPL
Source: Science journal
Note: Time periods not to scale

Green et al. (2010)

- Quando le popolazioni ancestrali Neandertaliane e umane moderne hanno subito una divergenza evolutiva? *Divergence time between the ancestral Neandertal population and the modern human :*

  tra 270,000 e 440,000 anni fa

- Da 1 a 4 % del genoma della popolazione Euroasiatica è derivato dai Neandertaliani. Il flusso genetico tra uomini moderni e Neandertaliani è avvenuto prima della divergenza tra gli europei , gli asiatici, e i papuani, tra 50,000 e 80,000 anni fa, in concordanza con i ritrovamenti archeologici.

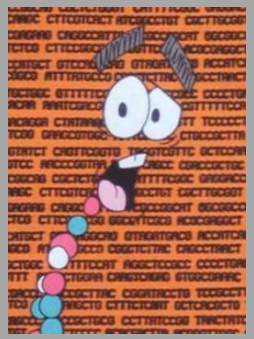
  From 1 to 4 % of the Eurasiatic population's genoma derives from the Neandertal. The genetic flow between modern human and Neandertal occurred before the divergence between European, Asiatic and Papuan populations, between 50,000 and 80,000 years, in correspondence with the archeological discoveries.

- L'incontro è stato puntuale da un punto di visto cronologico e localizzato solo nel Vicino Oriente.

  The encounter was punctual in a chronological point of view and localized only in a the Nearest.

L’incontro in Europa

Peștera cu Oase, Romania
40 000 anni BP



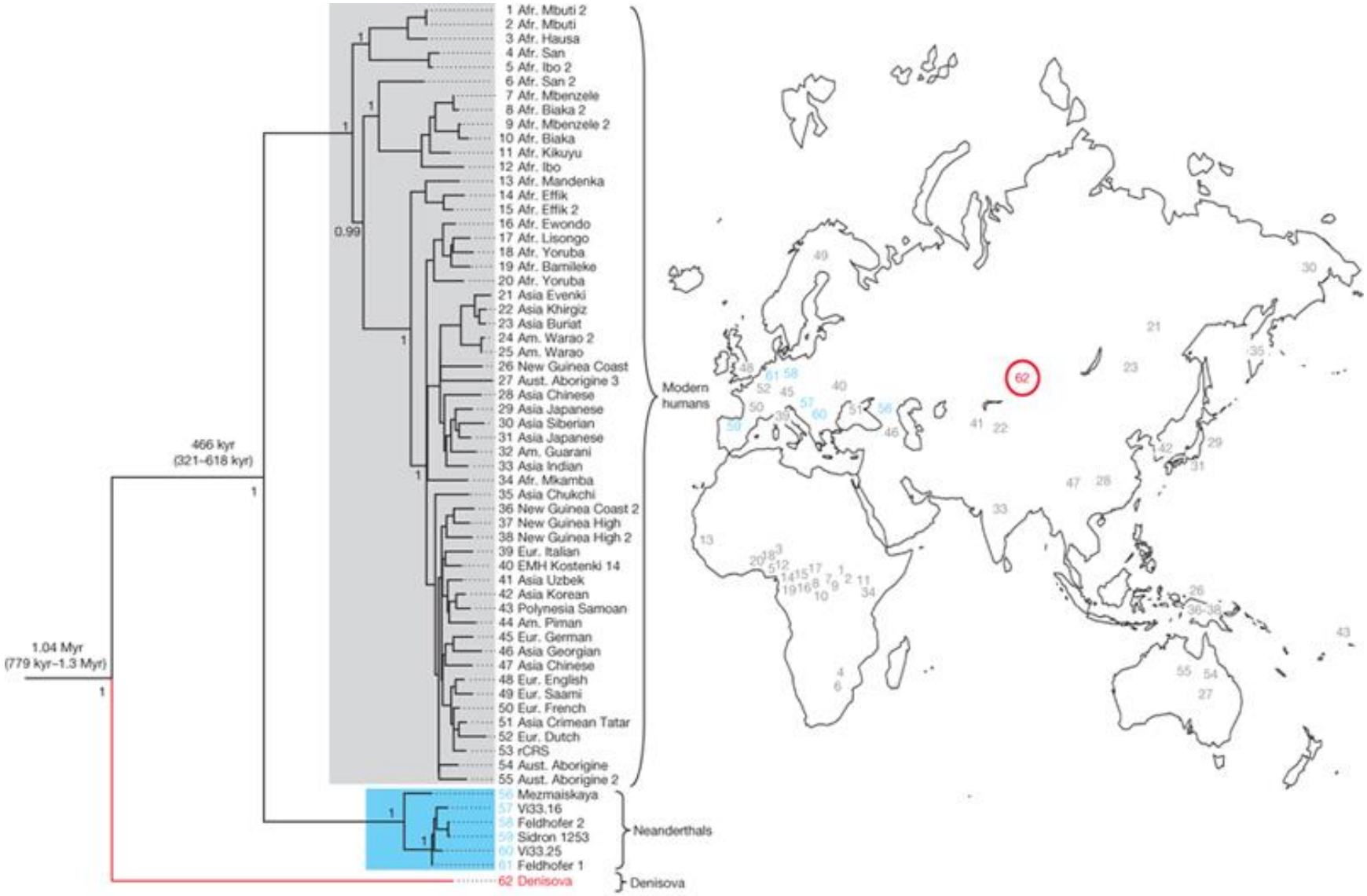
(Fu et al., 2015)

Problematiche

Denisova

Replica of the finger bone fragment from the ancient Denisovan human who lived about 30-50 000 years ago. Scientists have obtained its complete genome. © Max Planck Institute for Evolutionary Anthropology

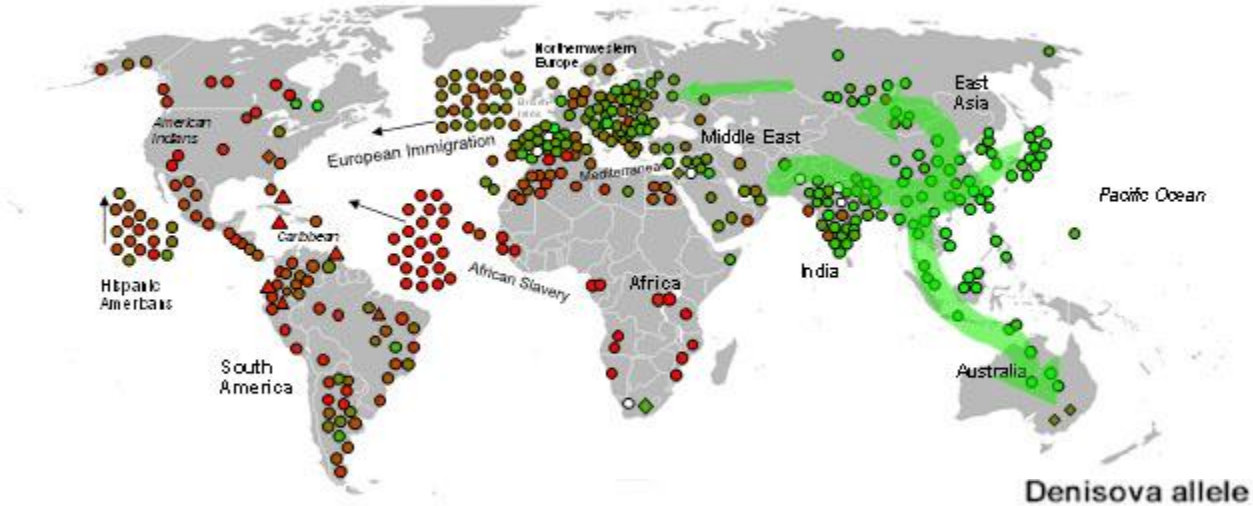
Phylogenetic tree of complete mtDNAs.



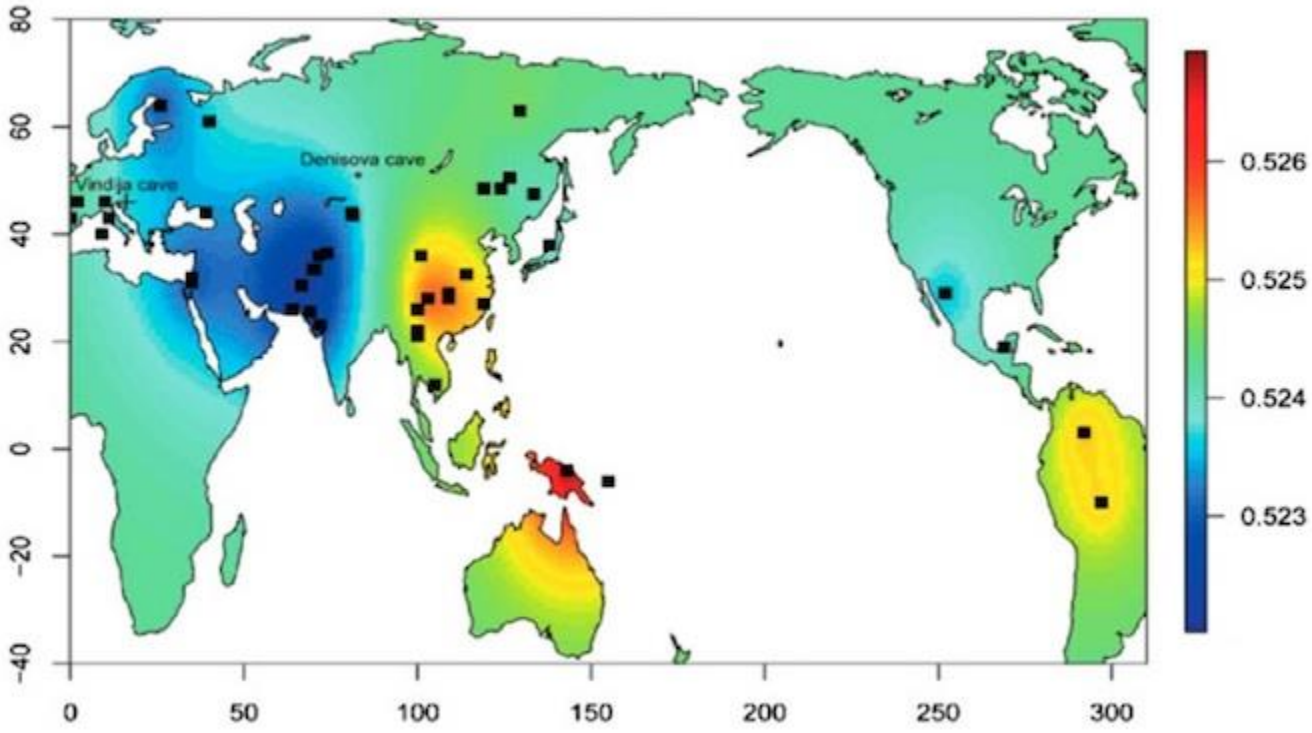
J Krause *et al. Nature* **464**, 894-897 (2010) doi:10.1038/nature08976

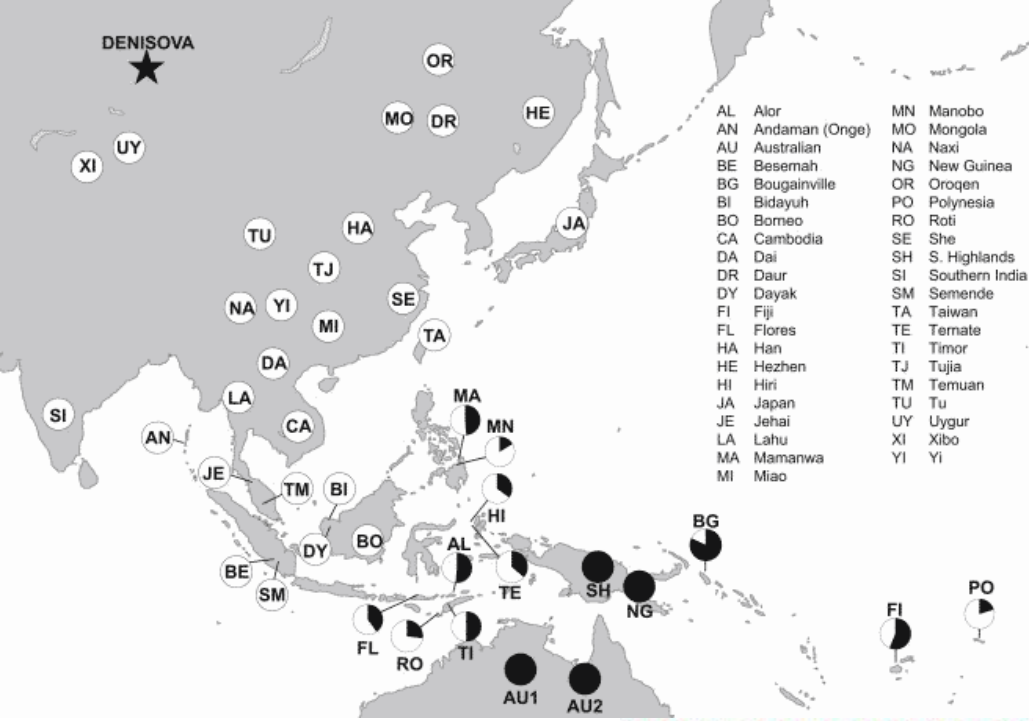
nature

World Ancestry of the Denisovan Gene

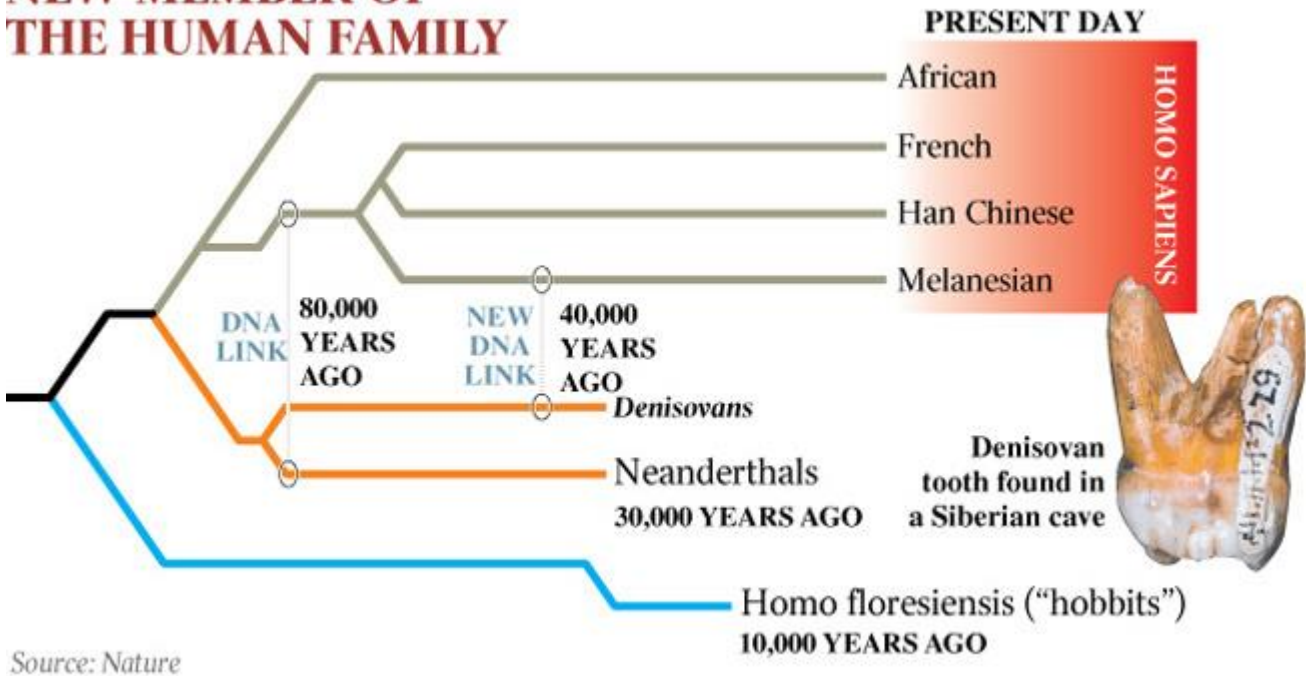


Denisova allele frequency



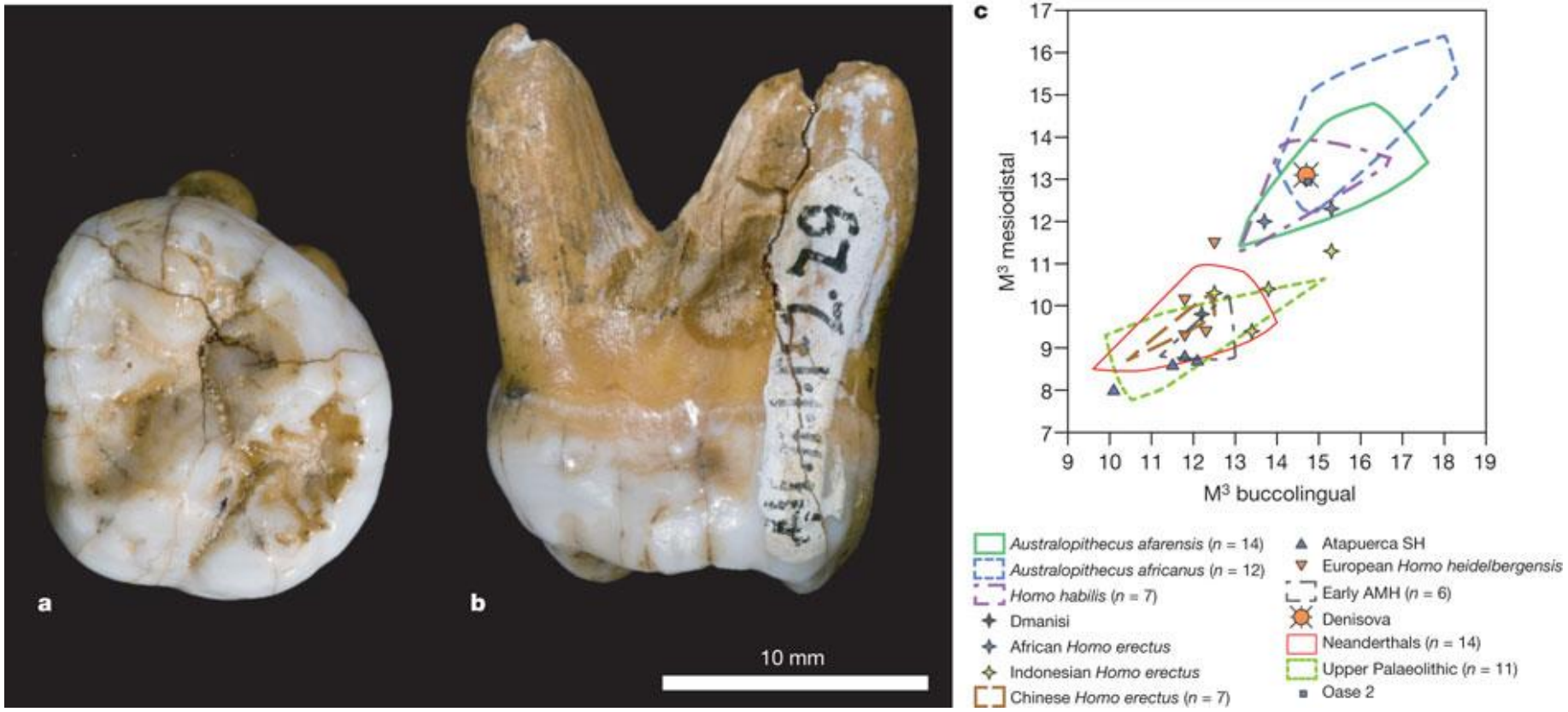


NEW MEMBER OF THE HUMAN FAMILY



Source: Nature

Morphology of the Denisova molar.



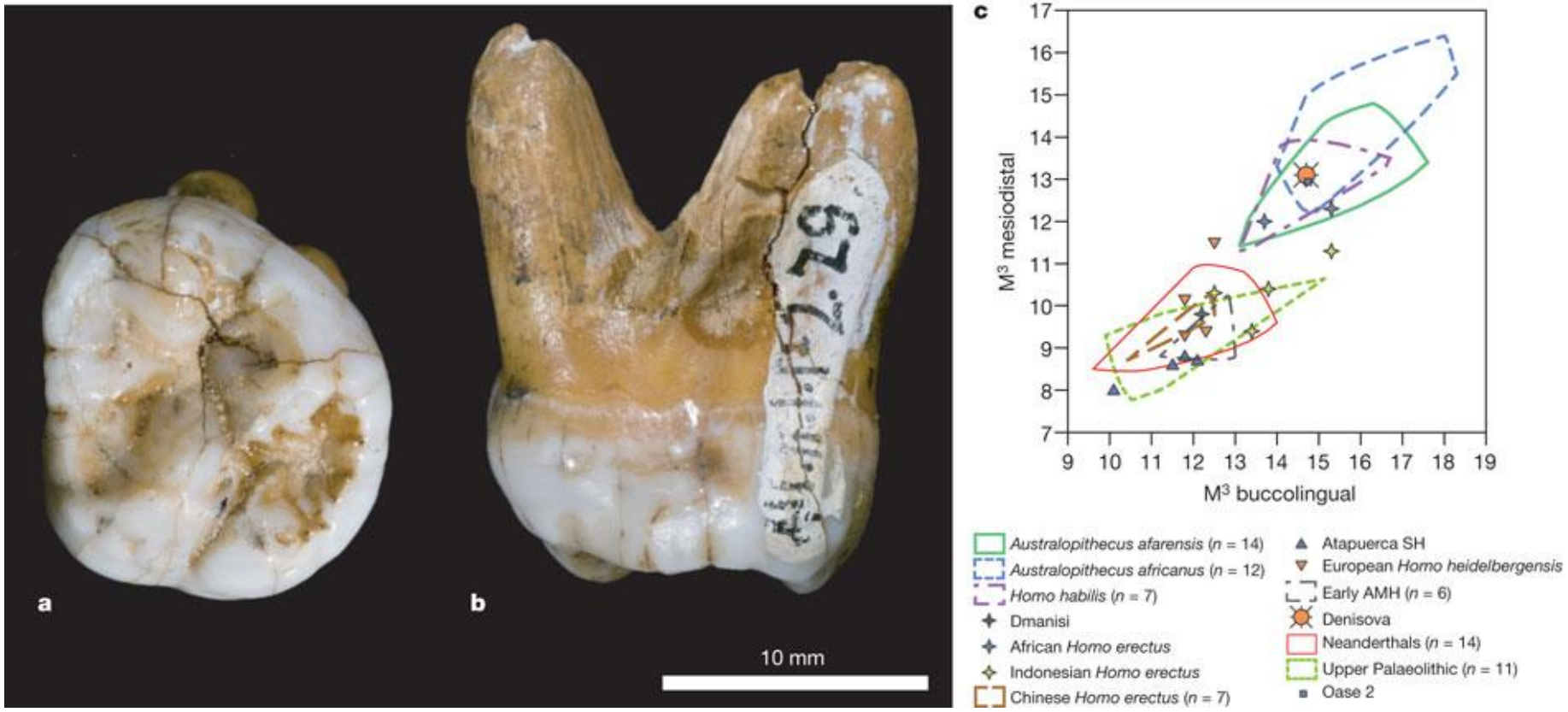
D Reich *et al. Nature* **468**, 1053-1060 (2010) doi:10.1038/nature09710

Il M3 o M2 ritrovato a Denisova presenta delle dimensione al di fuori della variabilità dei taxa del genere *Homo* ed entra in quella dei Autralopitecine.

Questo molare appoggia le evidenze del DNA: La popolazione di Denisova era distinta dei Neandertaliani tardivi e dei uomini moderni. In effetti, i tratti primitive del dente suggeriscono che i Denisoviani potrebbero essersi separati della linea neandertaliana prima dei dati che abbiamo sui tratti dentari Neandertaliani in Europa occidentale (>300 ka). Non escludiamo pero la possibilità che questa morfologia sia dovuta ad una regressione.

Morphology of the Denisova molar.

nature



D Reich *et al. Nature* **468**, 1053-1060 (2010) doi:10.1038/nature09710

Third left molar or secondo upper molar. Molar outside the range of normal size variation of all fossil taxa of the genus Homo, with exception of H. habilis et H. rudolfensis,and comparable to Australopithecine.

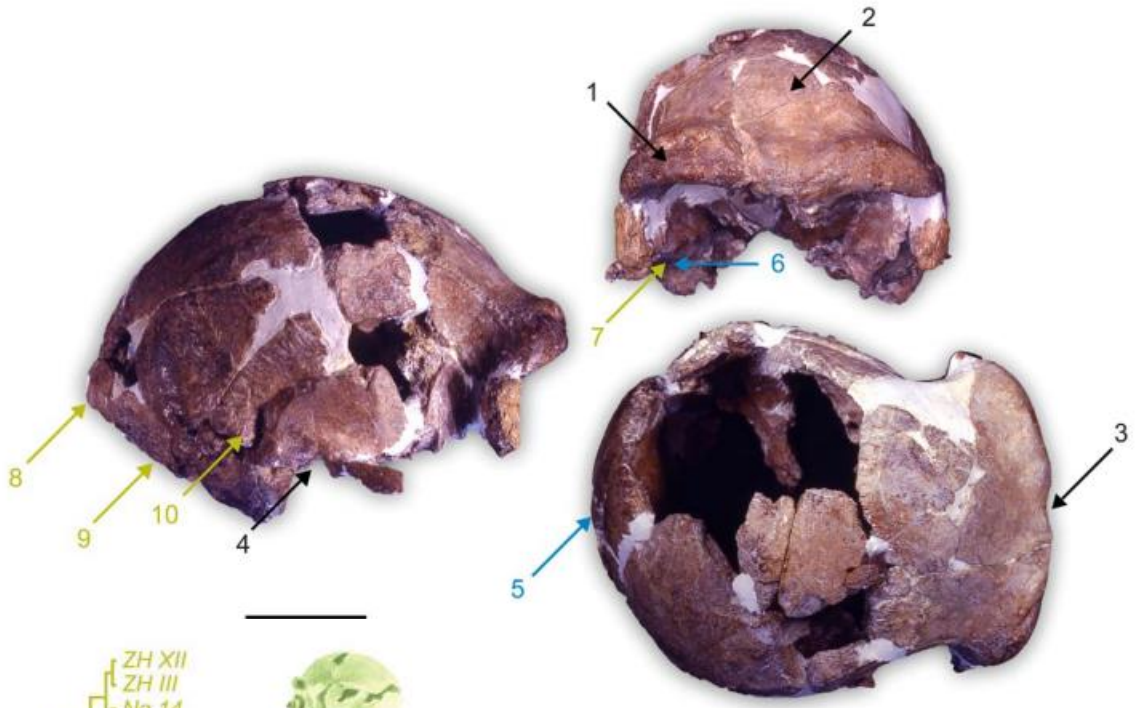
The Denisova molar supports the DNA evidence that the Denisovan population is distinct from late Neanderthals as well as from modern humans. In fact, the primitive traits of the Denisova tooth suggest that Denisovans may have been separated from the Neanderthal lineage before Neanderthal dental features are documented in Western Eurasia (>300,000 years BP) although we cannot exclude the possibility that the Denisovan dental morphology results from a reversion.

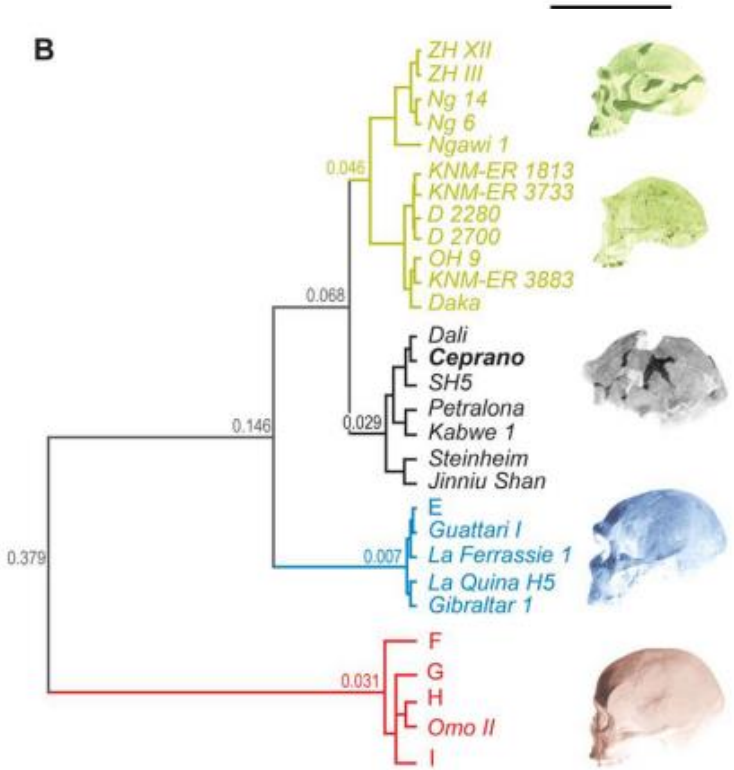
Ceprano : 430 - 385 ka

1 a 4
Tratti esclusivamente trovati nei specimen del P. medio

5 & 6
Tratti derivati

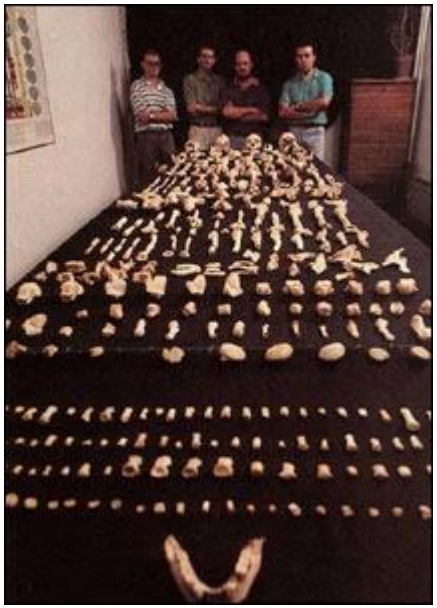
7 a 10
Tratti primitivi





PlosOne : Mounier, 2012

Sima de los Huesos: 400 – 350 ka



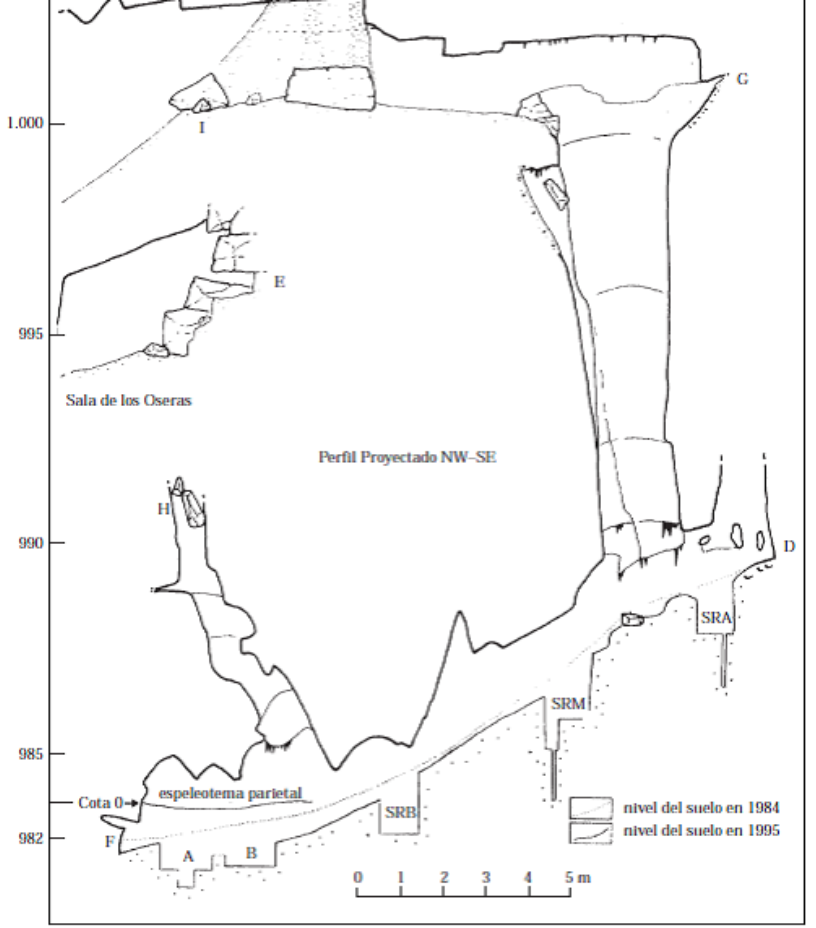


Figure 9. Sima de los Huesos profile (by C. E. Edelweiss, 1992–1996). Projection as in Figure 5. "Tapón de margas" indicates a cone of Neogene white marls coming from the outside. The levels of 1984 and 1995 floors are indicated, as well as a wall speleothem. The blind chimney in Sima de los Huesos behind (to the right of) the shaft, has not been completely drawn.

Sima de los Huesos: 350 – 300 ka

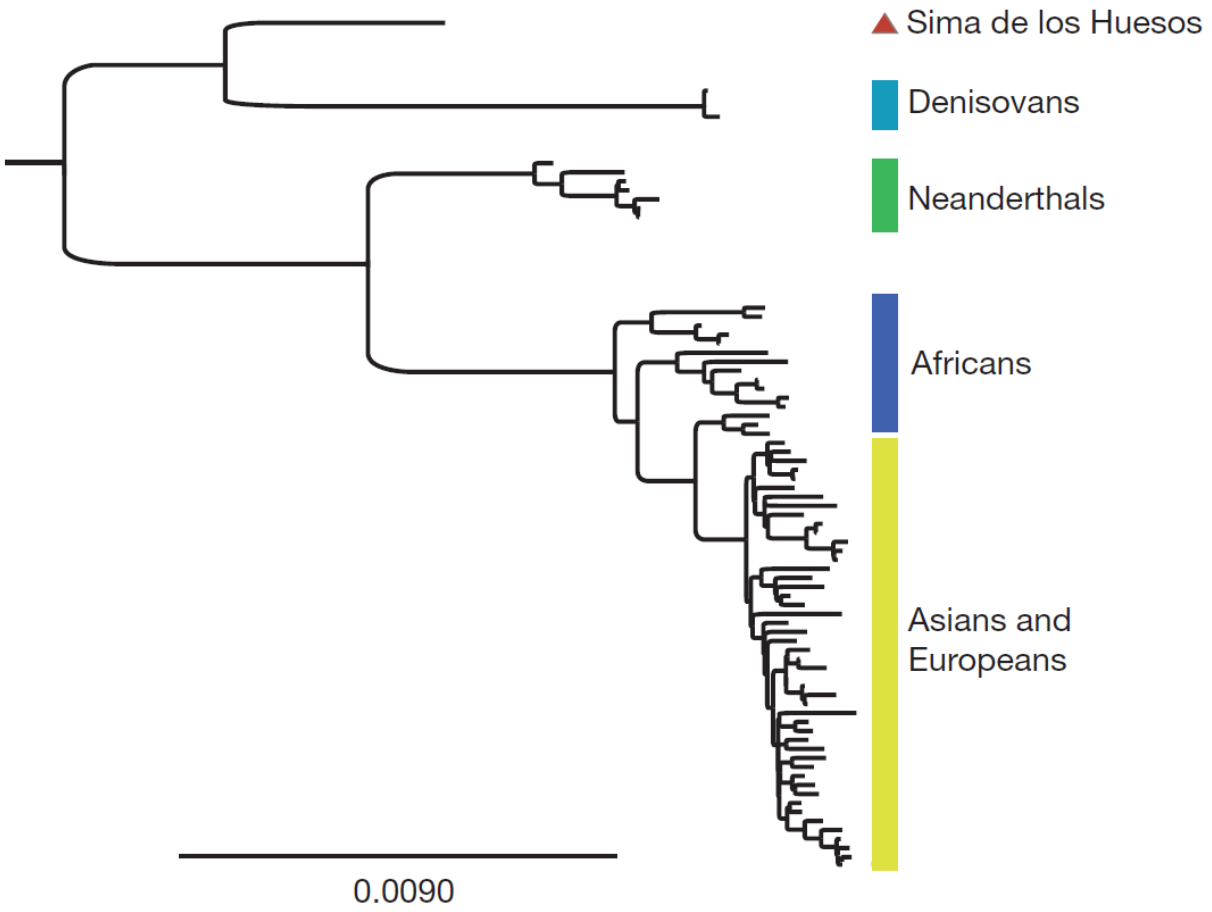


Figure 4 | Bayesian phylogenetic tree of hominin mitochondrial relationships based on the Sima de los Huesos mtDNA sequence determined using the inclusive filtering criteria. All nodes connecting the denoted hominin groups are supported with posterior probability of 1. The tree was rooted using chimpanzee and bonobo mtDNA genomes. The scale bar denotes substitutions per site.

Matthias Meyer et al. in Nature (2013)

Siti Neandertaliani

La scoperta

Il primo fossile considerato come Neanderthal è stato scoperto nel 1856 nella valle di Neander, nella grotta di Feldhofer.

The first fossil considered as a Neanderthal was discovered in 1856 in the Neander Valle, in Feldhofer cave.

Al momento della scoperta gli operai trovarono sul suolo un cranio robusto, delle ossa lunghe, delle coste, un frammento di bacino e di scapola. Queste ossa, considerate dagli operai come i resti ossei di un orso delle caverne, furono portate a J.C. Fuhlrott, il maestro della regione appassionato naturalista. Fin dall'inizio Fuhlrott considerò queste ossa come quelle di un « nuovo » uomo.

When the site was discovered, the workers found a robust skull and some bones. First these bones was considered as bears bones. Later, J.C.Fuhlrott did some study and found that they were bones from a « new » Homo.

La scoperta

H. neandertalensis
(Spy, Belgio)

Questo fossile non fu il primo Neandertaliano portato alla luce. Altri due fossili erano già stati trovati : uno a Engis in Belgio in 1929 e uno in Spagna a Gibraltar in 1848. Ma il fossile scoperto nella valle di Neander ha confermato l'esistenza di un Uomo fossile.

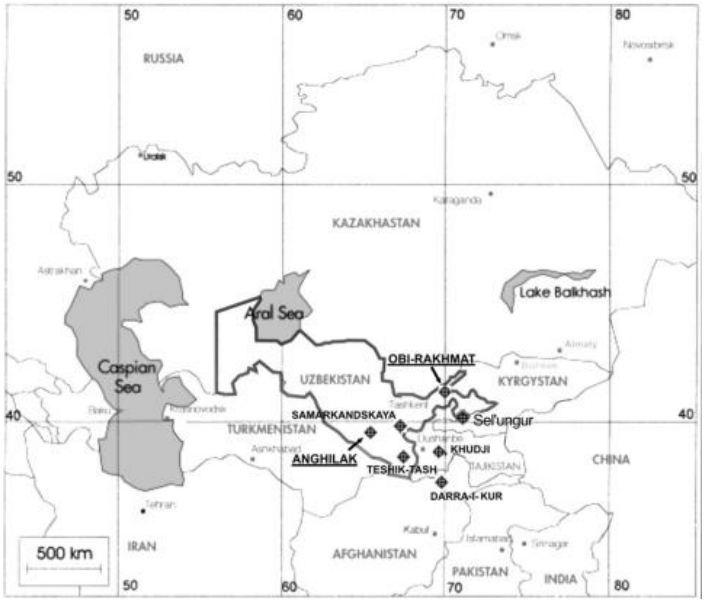
This fossil weren't the first Neanderthal highlight. Two other fossil were already found: One in Engis (Belgium) in 1929 and one at Gibraltar (Spain) in 1848. But with the discovery of the Neander Valle, the existance of a human fossil was confirmed.

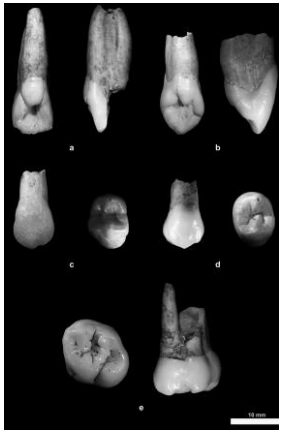
Altre scoperte di altri fossili in Belgio a la Naulette e a Spy nel 1966 e 1886 confermarono la presenza dei Neandertaliani in Europa.

Other discoveries in Belgium at La Naulette e a Spy in 1966 e 1886 has confirmed the presence of Neanderthal in Europa.

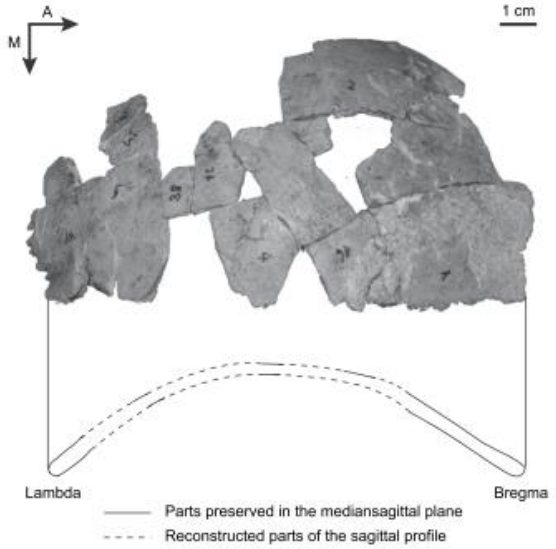
Mandibola
H. neandertalensis
(La naulette, Belgio)

Uzbekistan: Grotta Obi-Rakhmat 60-90000 BP

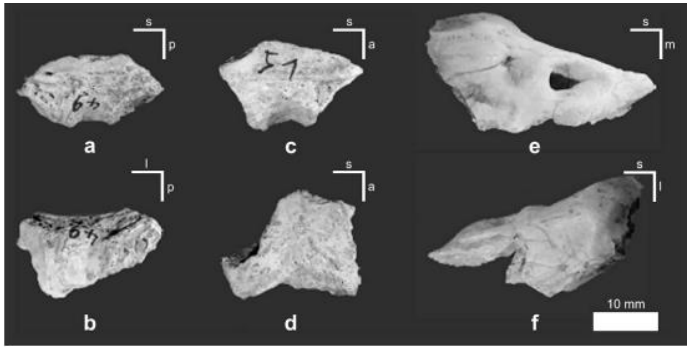




OR 1 : Denti permanenti superiori sinistri



Ricostruzione del parietale di OR 1.



Frammenti di temporale

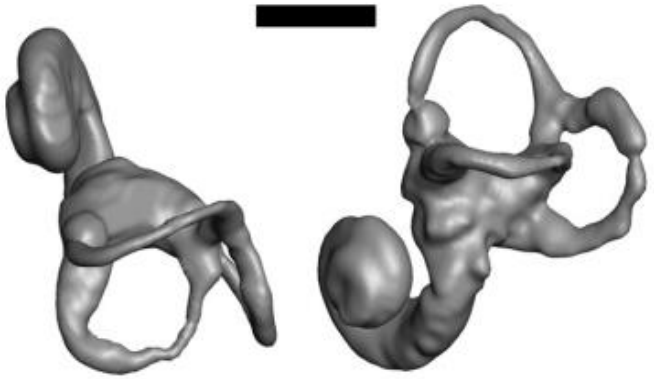
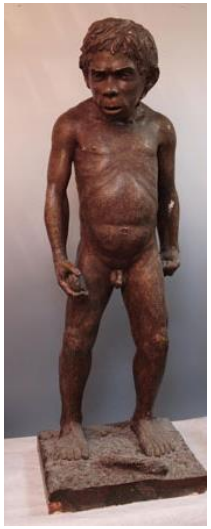
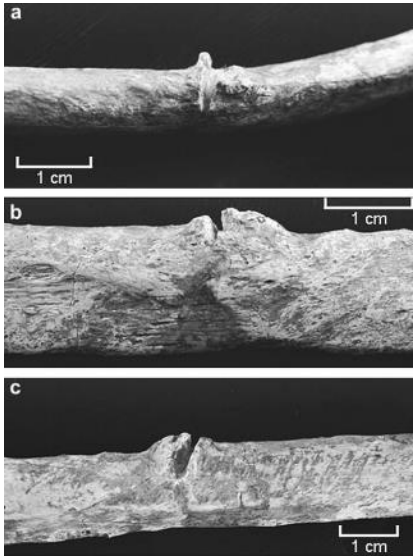


Fig. 9. Left semicircular canal of OR-1.

Uzbekistan: Teshik Tash 70000 anni

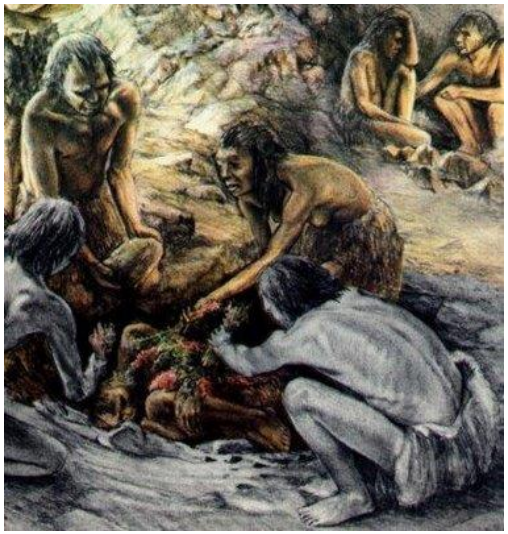


Iraq : Shanidar 50000 BP



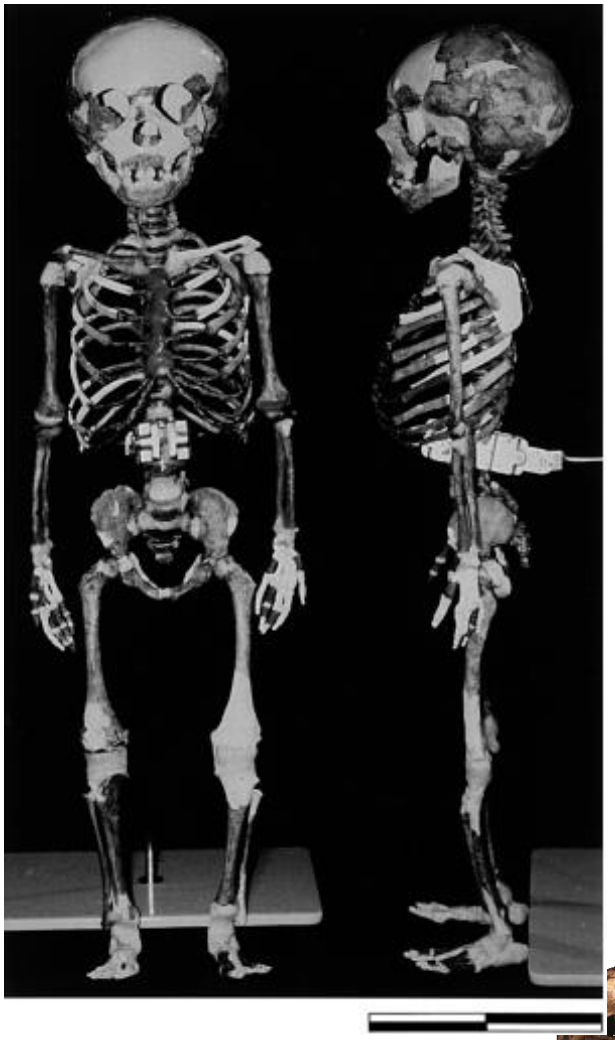
Shanidar 3: Lesione sulla 9 costa.

Shanidar 1



Syria : Dederyheh 50-60000 BP

Prima sepoltura di bambini



Ricostruzione dello scheletro immaturo di 2 anni.

Israël: Kebara 48-60000 BP

Sepolture Kebara II *Moshe*

Osso ioide di Kebara II

Ricostruzione dello scheletro di Kebara II

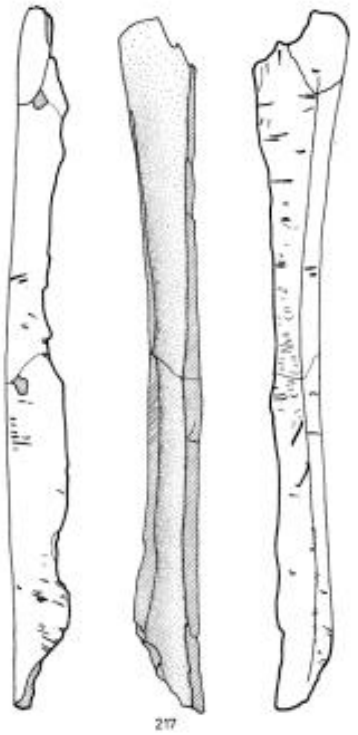
Israël: Amud 47000 BP

Amud 1 circa 47.000 anni, il Neandertaliano più alto (174 cm) e con maggiore cc (1640 cm^3)

Croazia: Krapina 130 000 BP

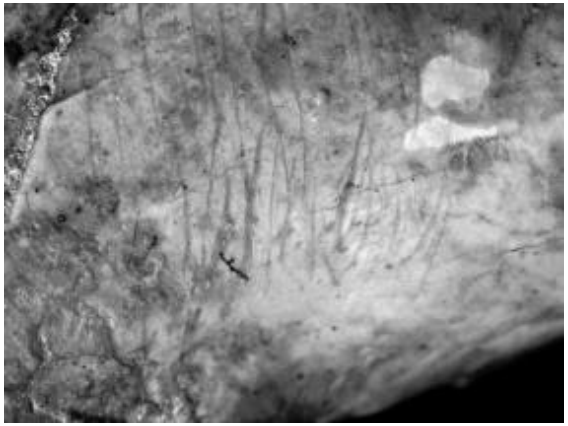
Krapina 12 : Frammento di osso occipitale giovanile

Krapina 59 : Mandibola



Tibia spaccata in 2 con tante cut marks.

emi-endocranio destro di Krapina 3

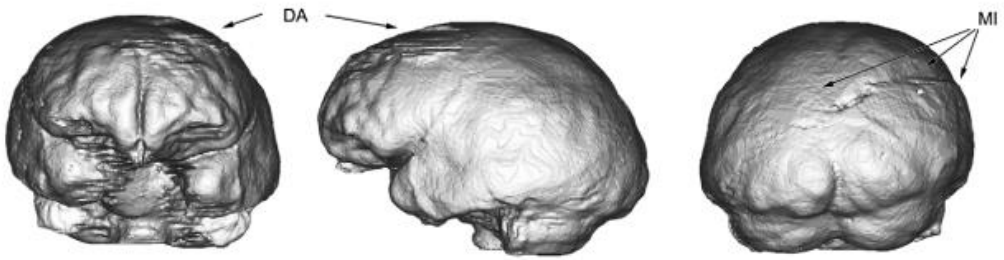


Cut marks nella sinfisi interna di K53.

Italia : Saccopastore 120-130 000 BP

Saccopastore 1 e 2

Saccopastore 1

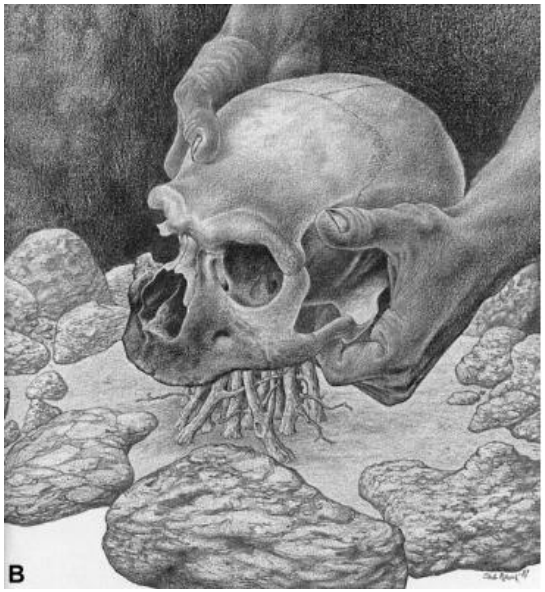


Replica digitale dell’endocranio di SCP1

Italia : Guattari 51-57 000 BP

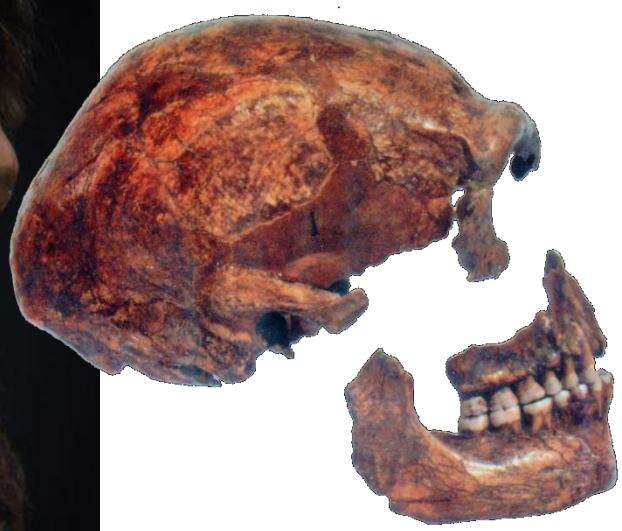
Guattari 1

Guattari 2



Ricostruzione ipotetica del culto del cranio

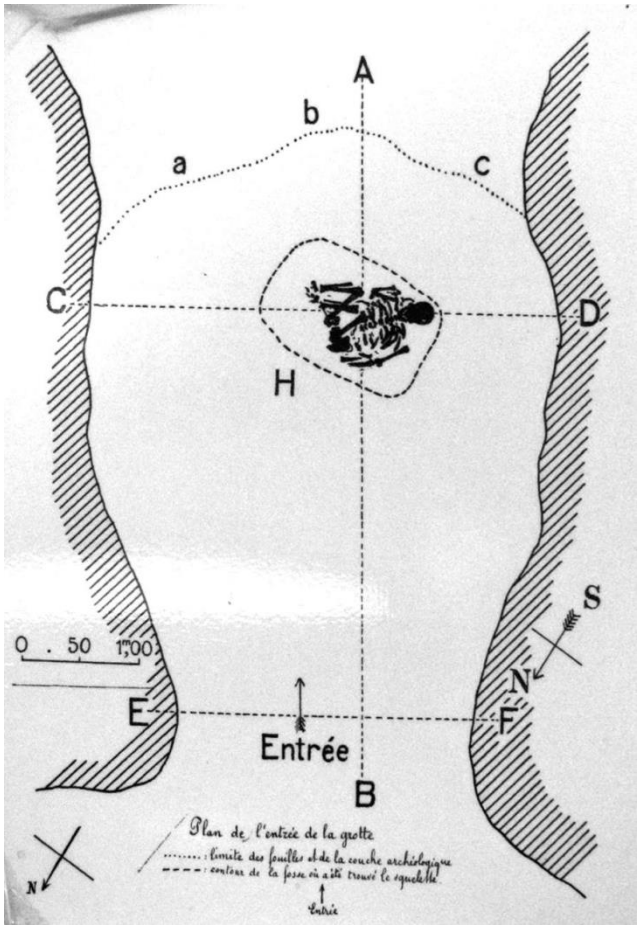
Belgium : Spy 40 000 BP



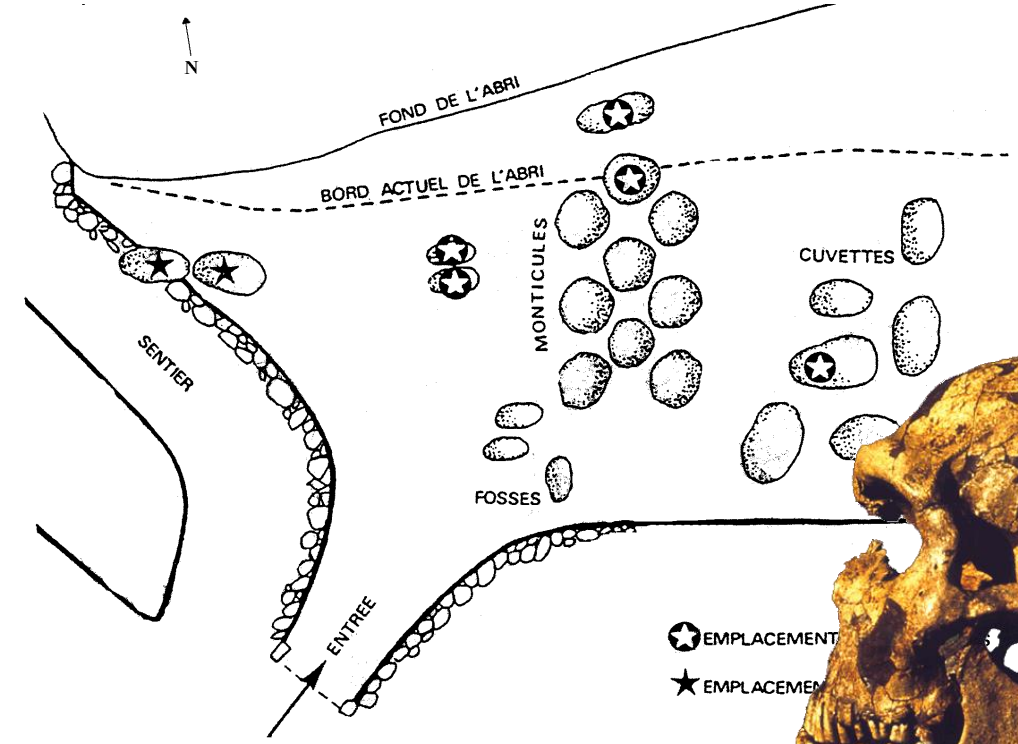
Engis 70 000 BP

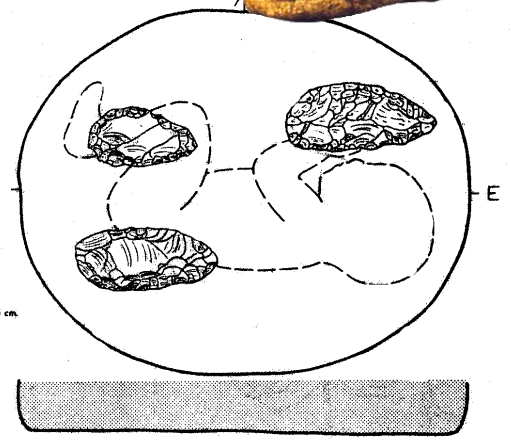
Engis 2

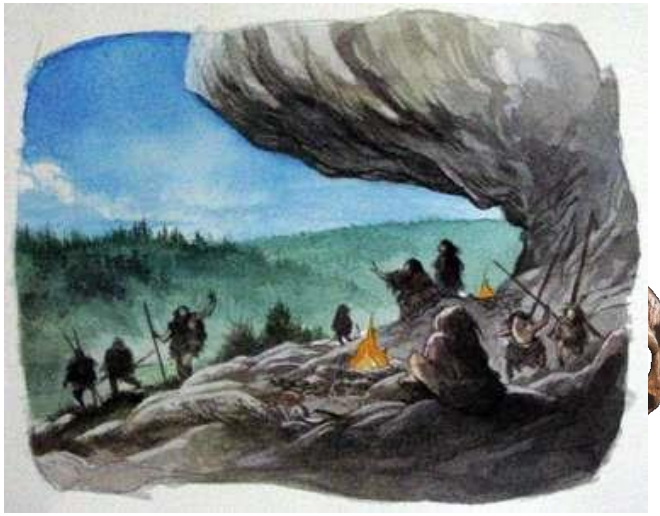
La Chapelle-aux-Saints (50 000 anni, Francia)



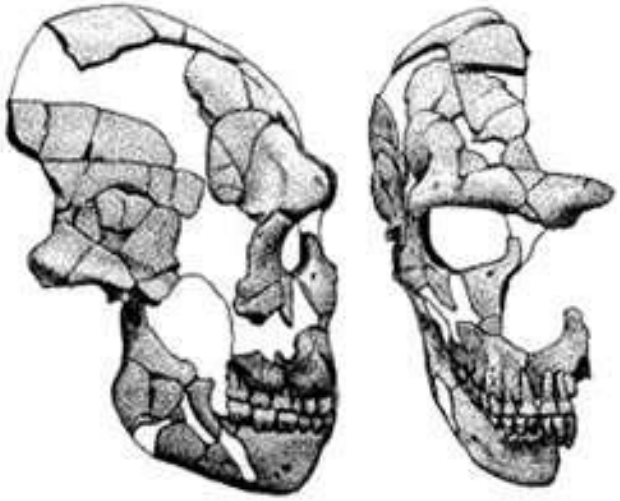
La Ferrassie (55 000 anni, Francia) – « Necropoli « di 8 schelettri





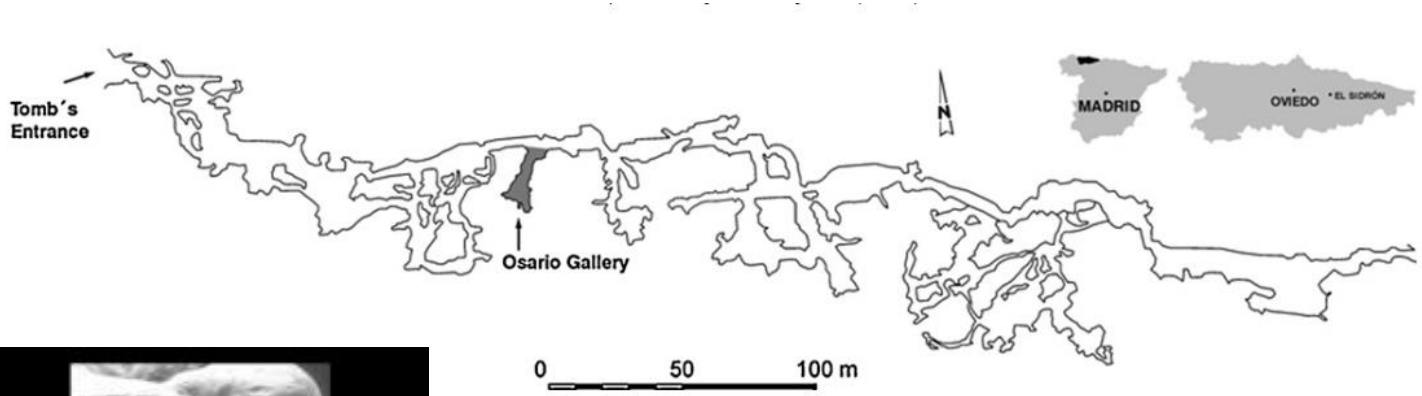


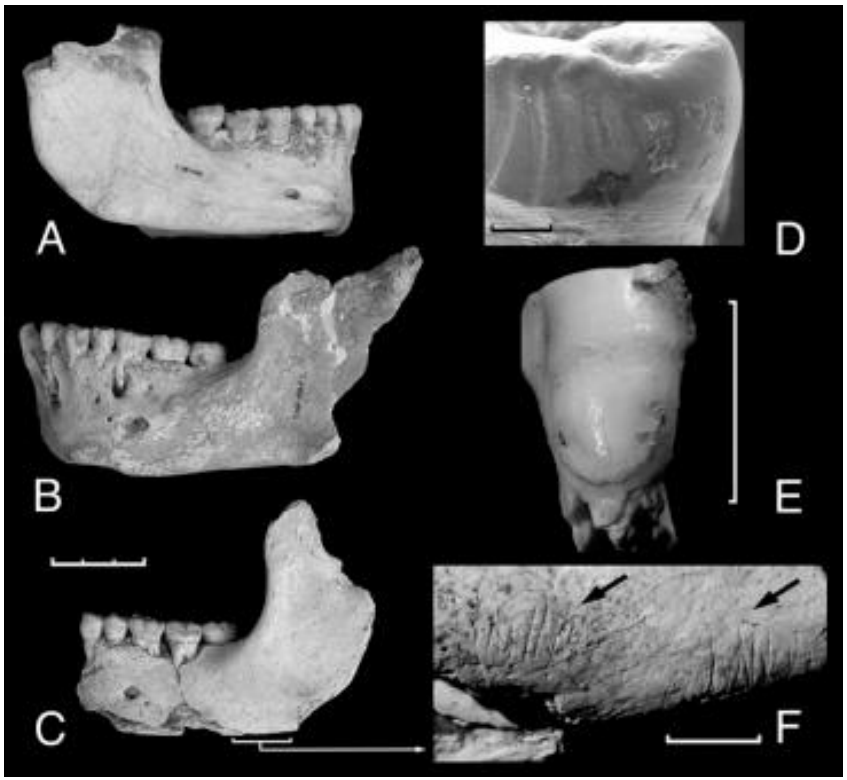
Francia : Saint-Césaire 36 000 BP



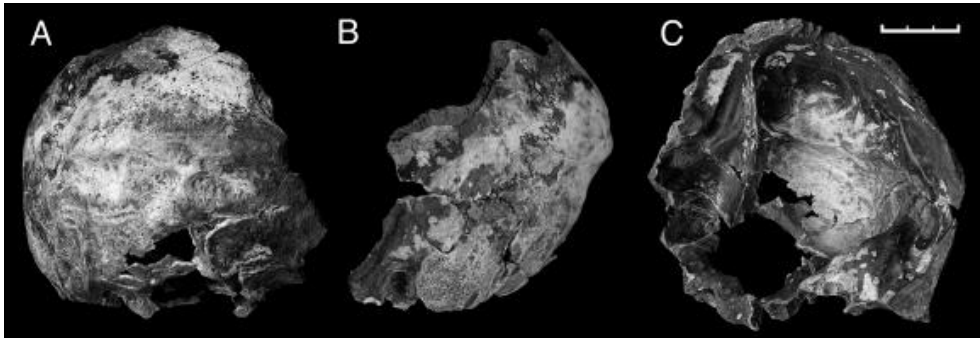
Cranio di Saint-Césaire 1

Spagna : El Sidron 43 000 BP



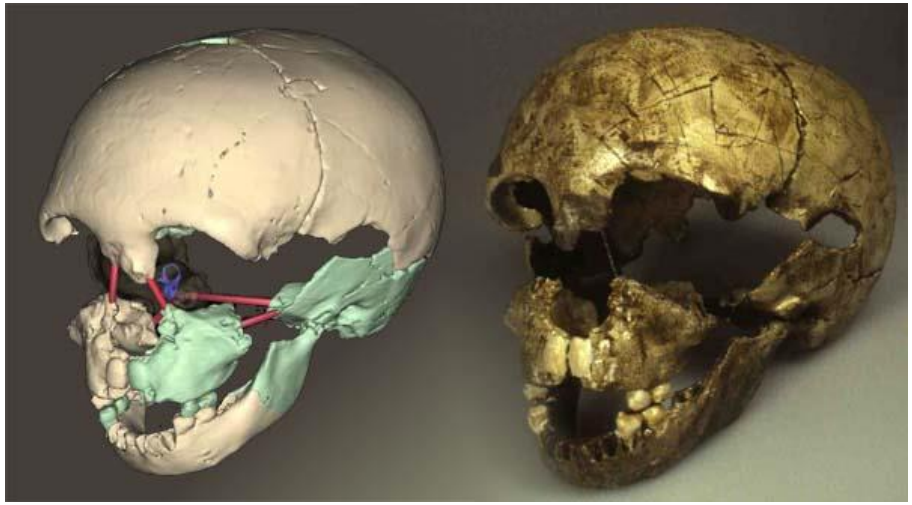


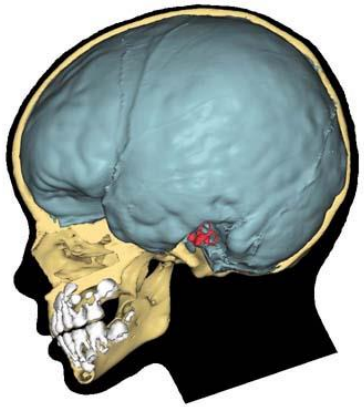
Mandibole con un'ipoplasia dello smalto e delle cut marks sul bordo basale (F)

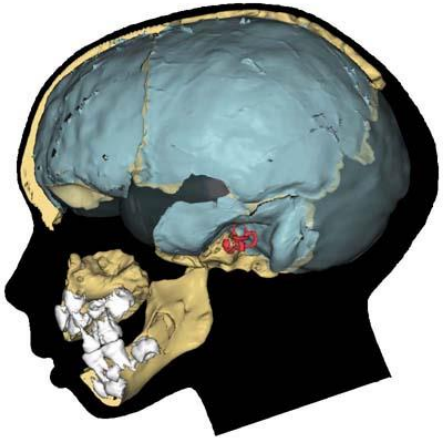


SD-1219. Regione Occipitomastoide

Spagna : Gibralatar Devil’s Tower 30 000 BP

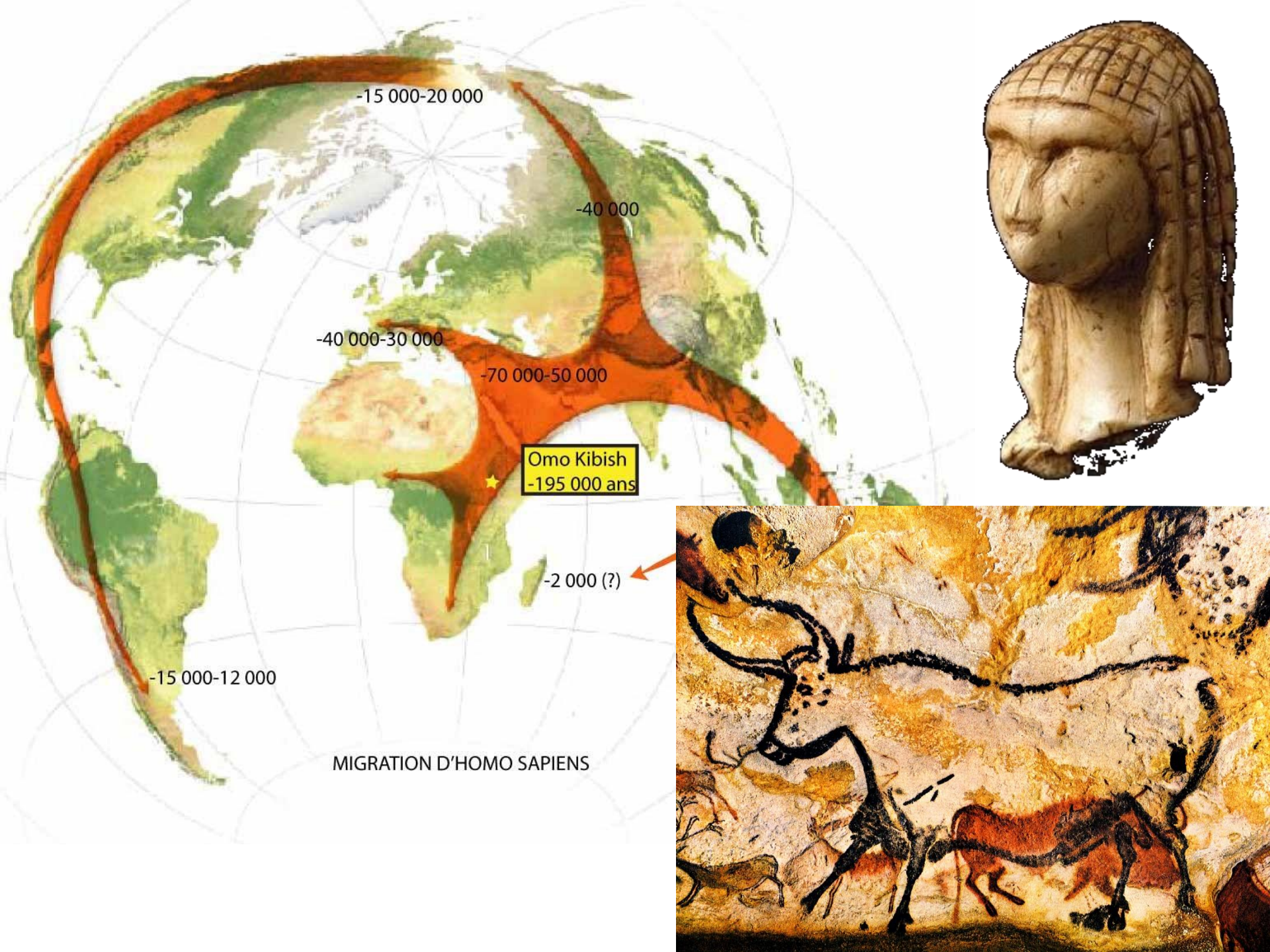




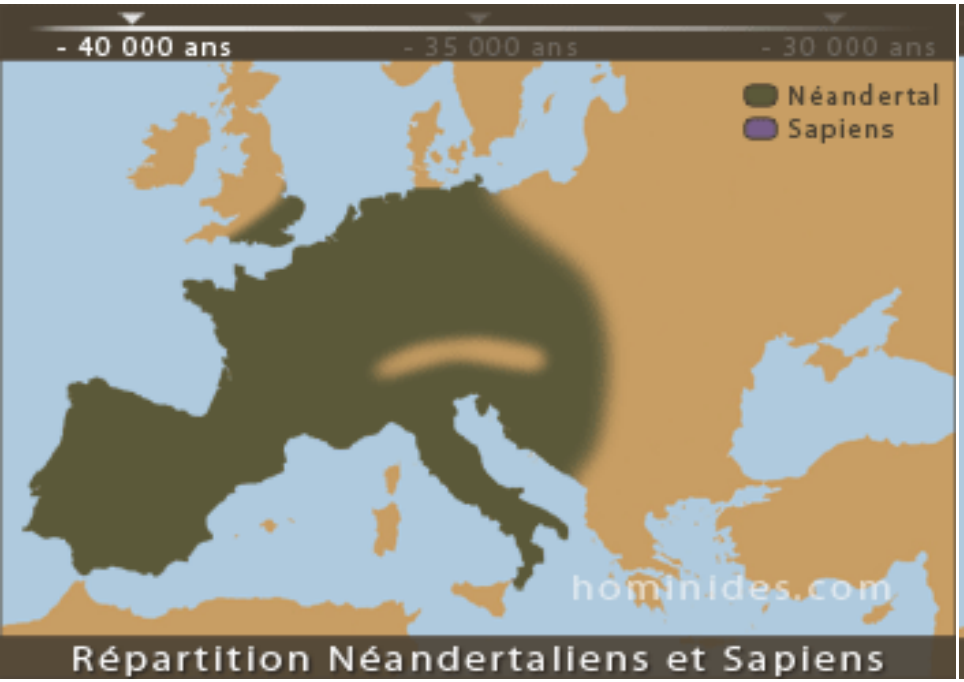


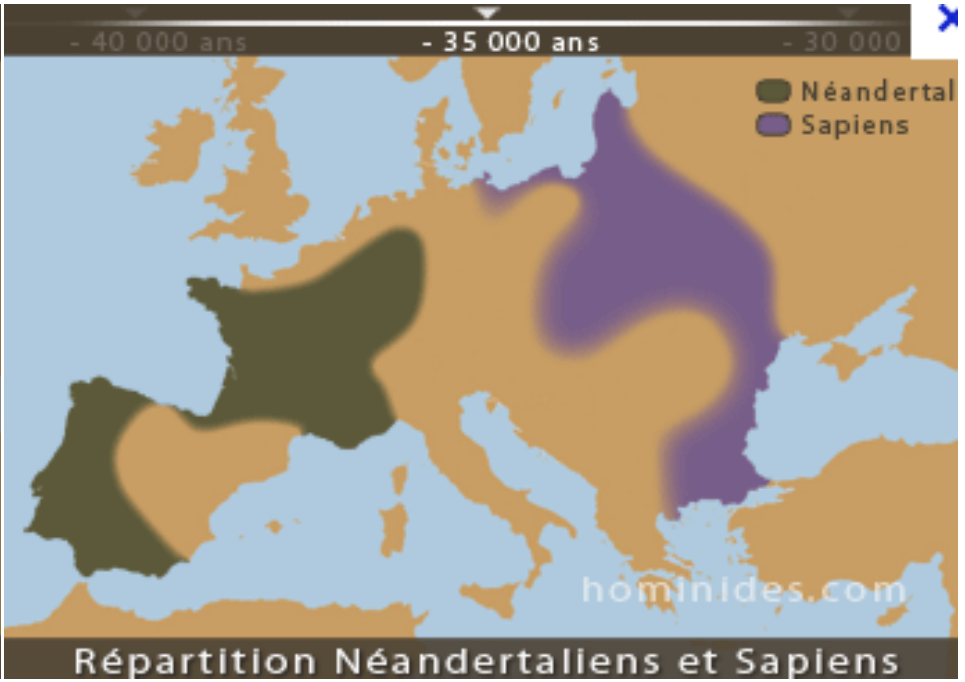
Gibraltar 2 : Cranio e ricostruzione

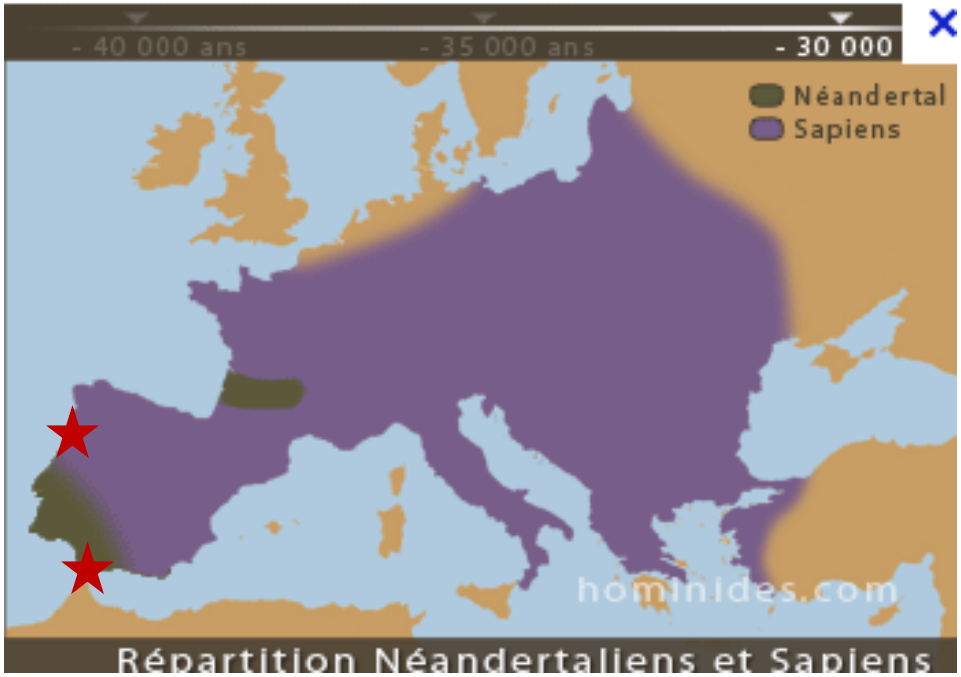
Estinzione



MIGRATION D'HOMO SAPIENS







nam's Cave
000 anni,
ibilterra)

Ipotesi…

Concorrenza con *Homo sapiens* che ha conquistato tutte le nicchie ecologiche.
The competition with Homo sapiens *who has colonized all the ecological niche.*

Homo sapiens è riuscito a estendere la caccia a vari tipi di prede
Homo sapiens *was able to extend the hunting to various types of prey..*

Combattimento tra *H.sapiens* e *H.neandertalensis* che si indeboliva.
Fight between H. sapiens *and* H.neanderthalensis *who get weaker.*

Genocidi dei Neandertaliani da parte dei *sapiens.*
Genocide of the Neandertal from the sapiens.

Fuga dei Neandertaliani che rifiutavano il confronto con i Cro-Magnon. Questa cultura pacifica e la mortalità infantile elevata sarebbe all'origine della loro scomparsa.
Escape of the Neandertal who refused the confrontation with the Cro-Magnon. *This pacific culture and the child mortality could have been the reason to their extinction.*

Malattie *Deseases*

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