



# Il contesto degli australopiteci del Sudafrica alla luce delle più recenti scoperte

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1925 - Taung

30 Novembre 2015

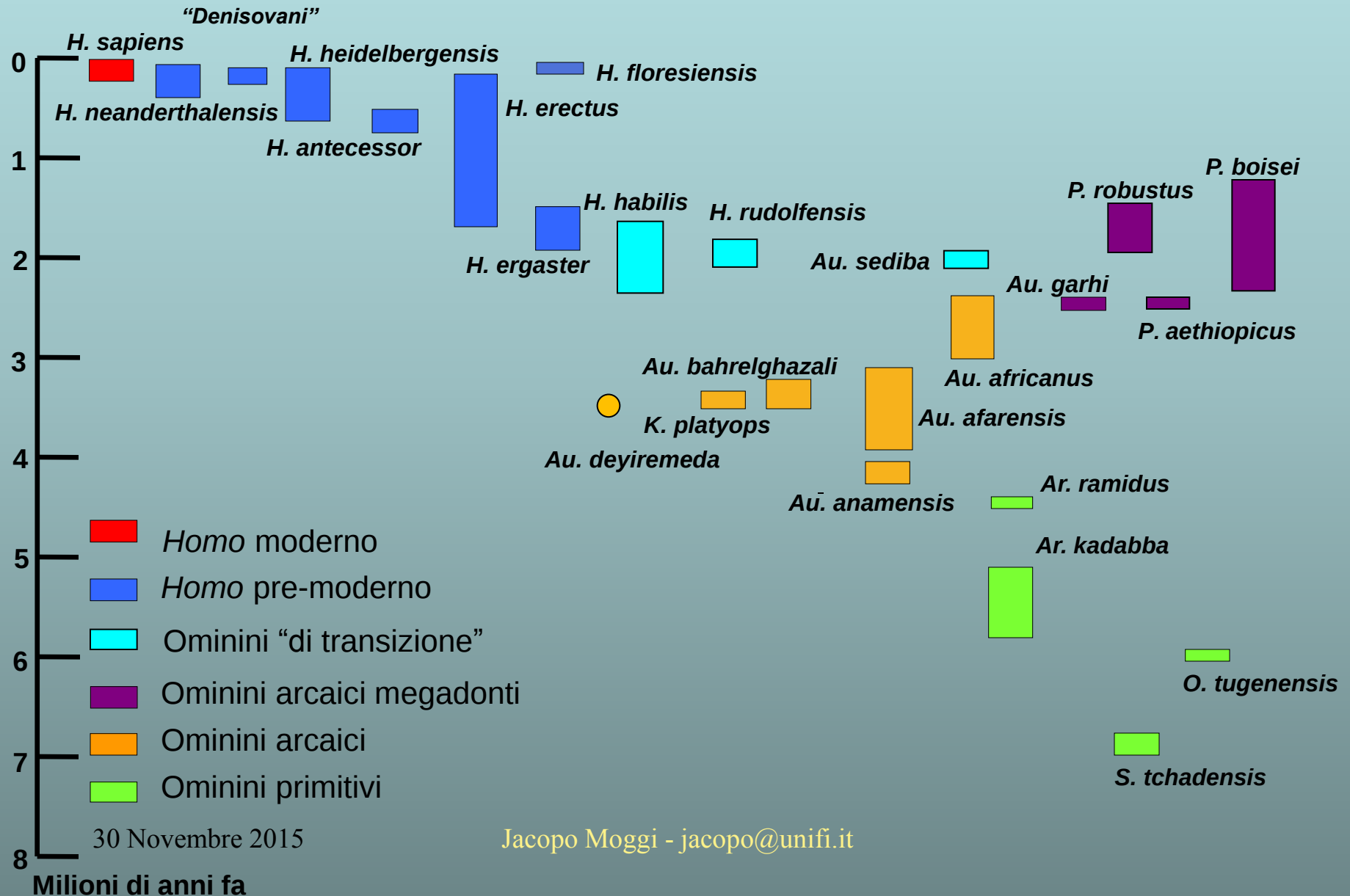


2015 - Dinaledi

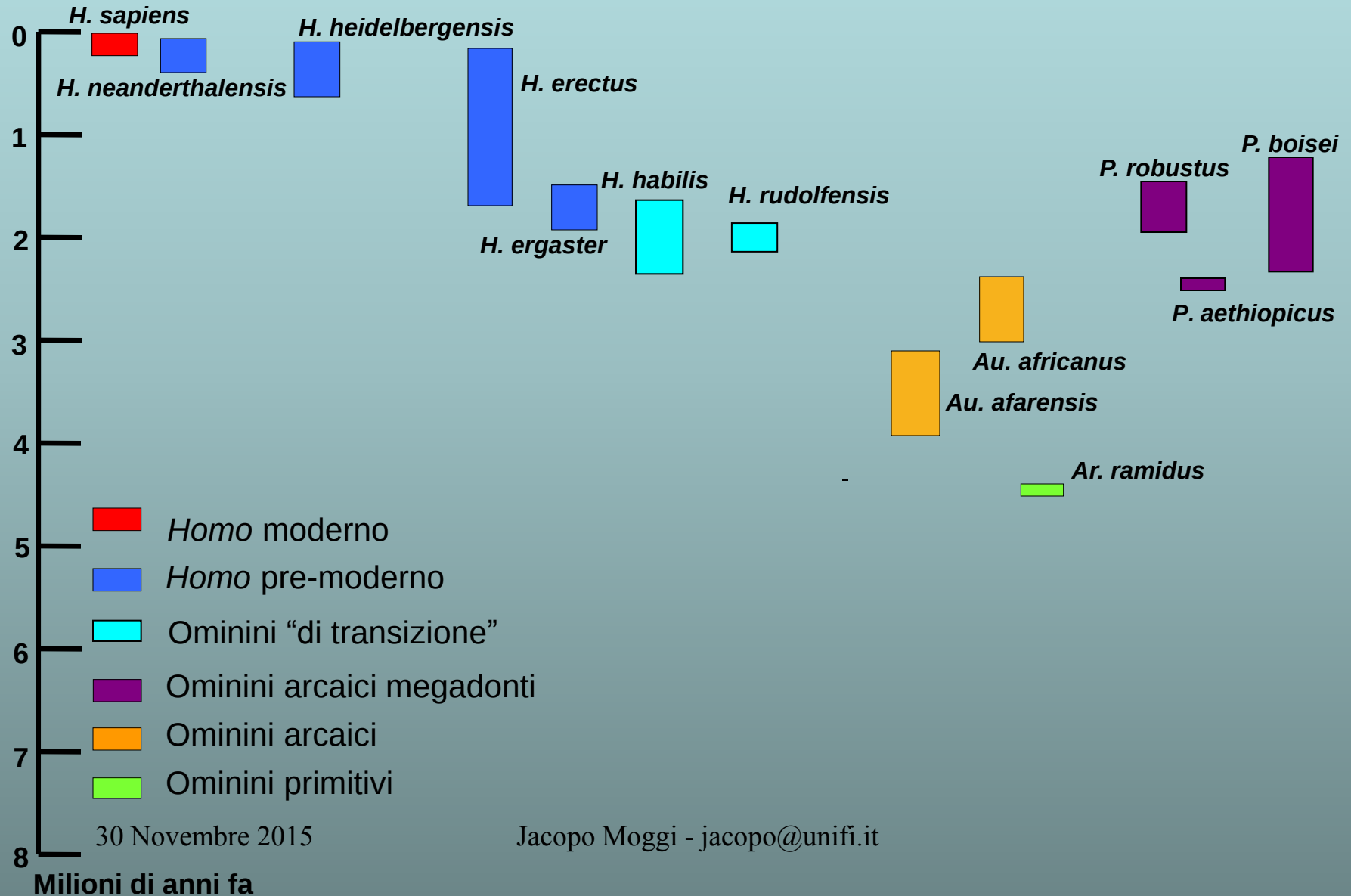
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- **Un po' di sistematica**
- **I siti Plio-Pleistocenici Sudafricani: inquadramento**
- **Specie di Ominini fossili in SA**
- **Altre considerazioni...**

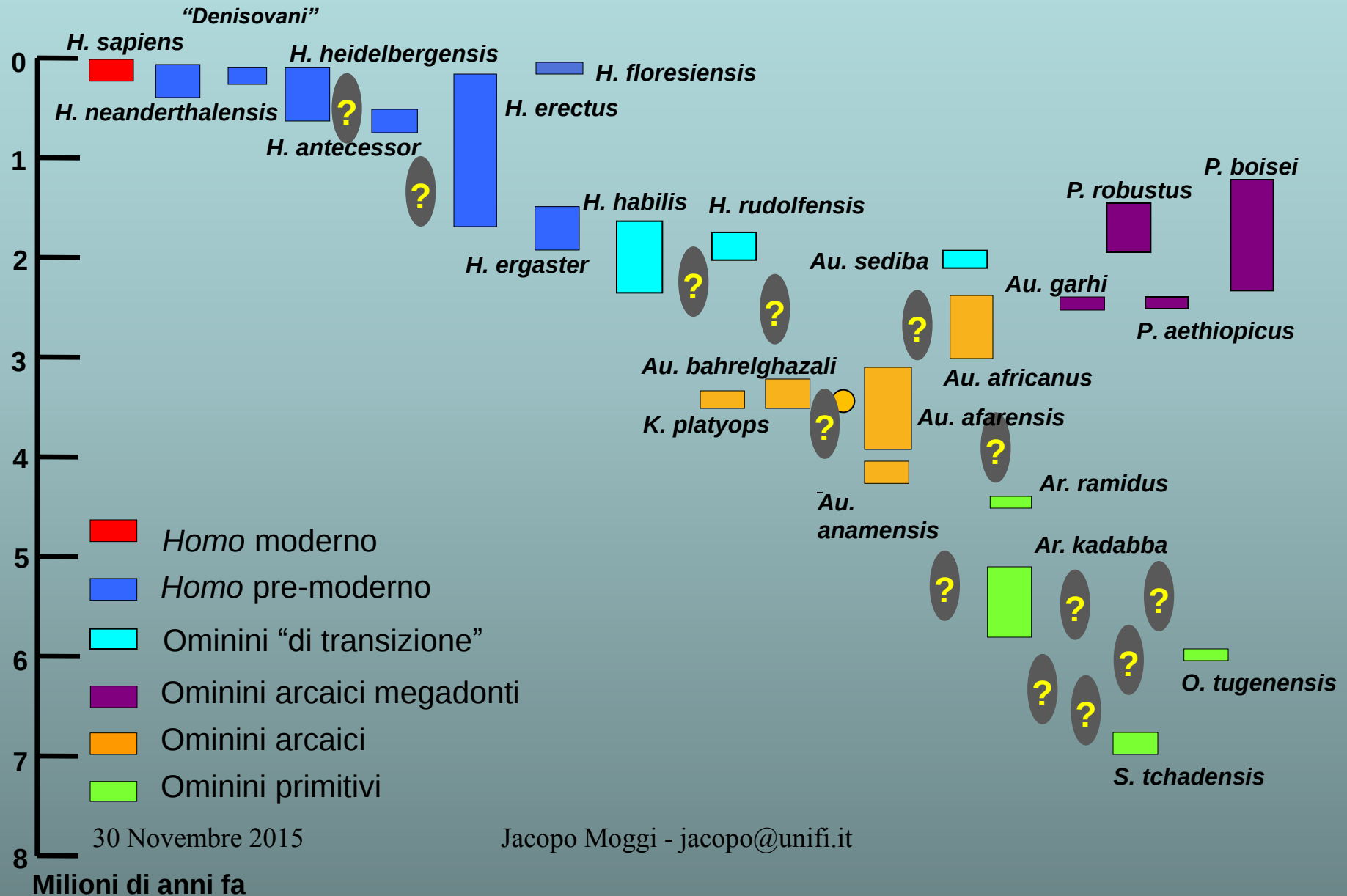
# Il nostro 'albero di famiglia'



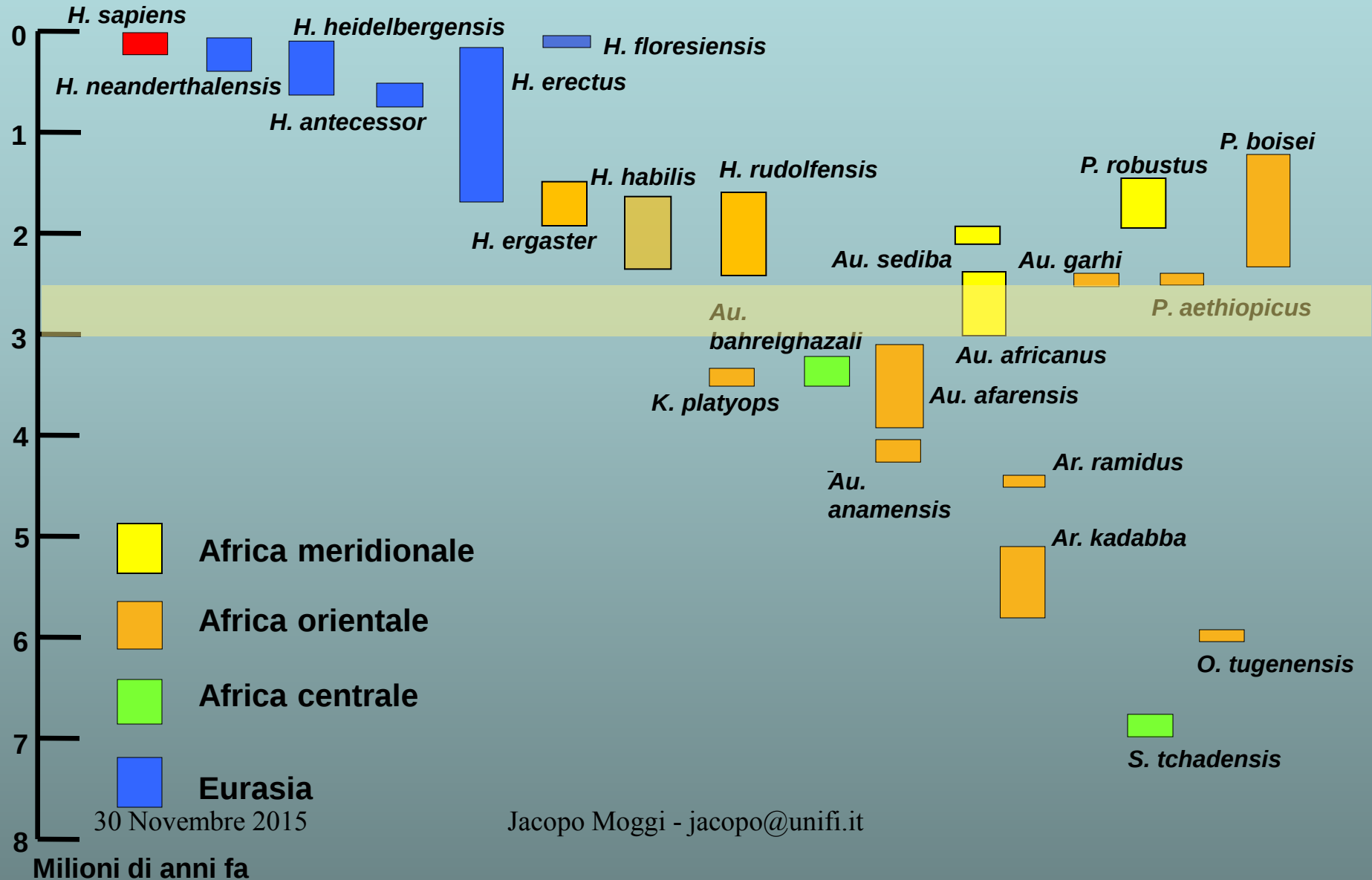
# Il nostro 'albero di famiglia' - 1994

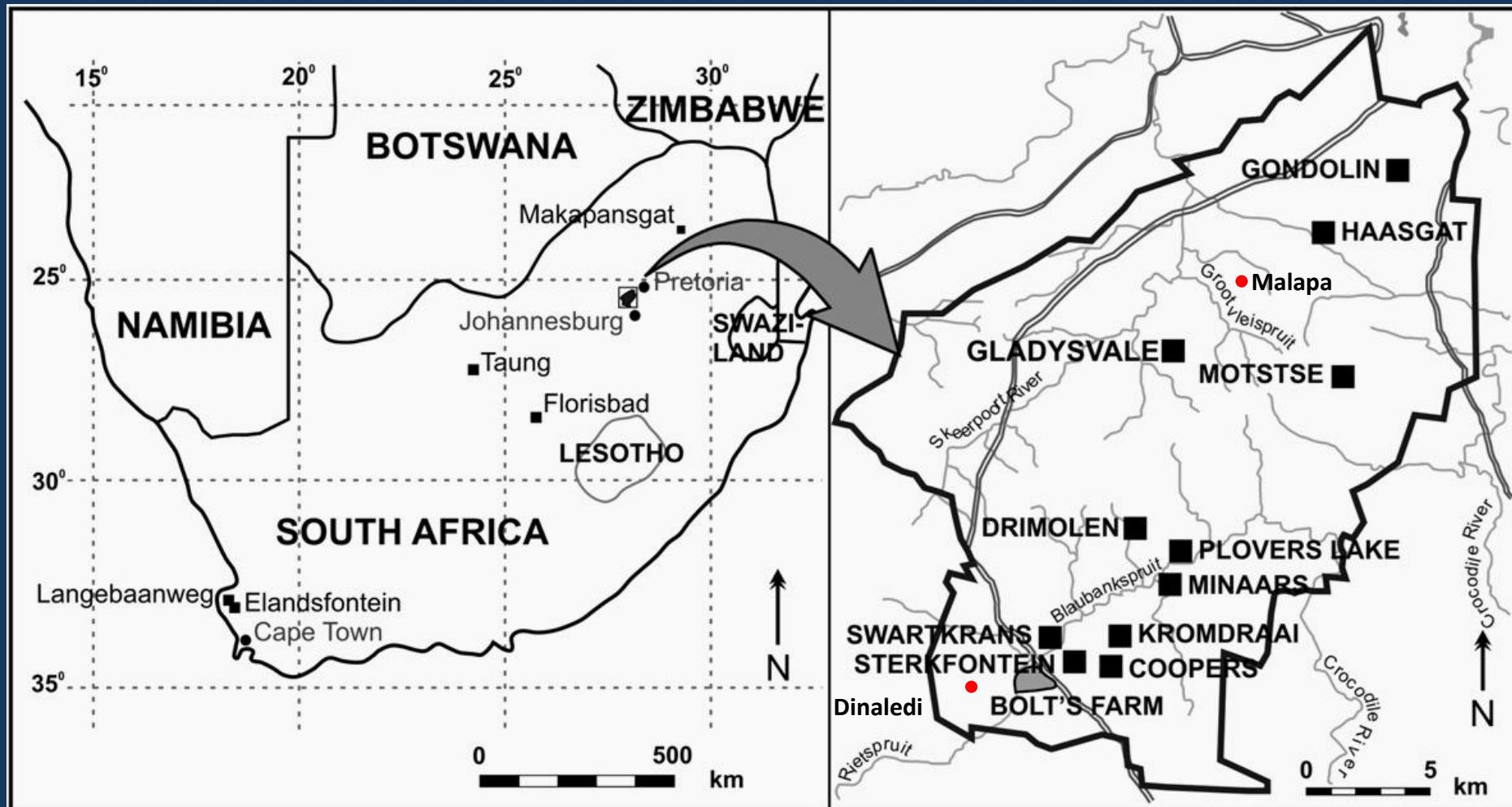


# Il nostro 'albero di famiglia'



# Distribuzione geografica degli Ominini fossili



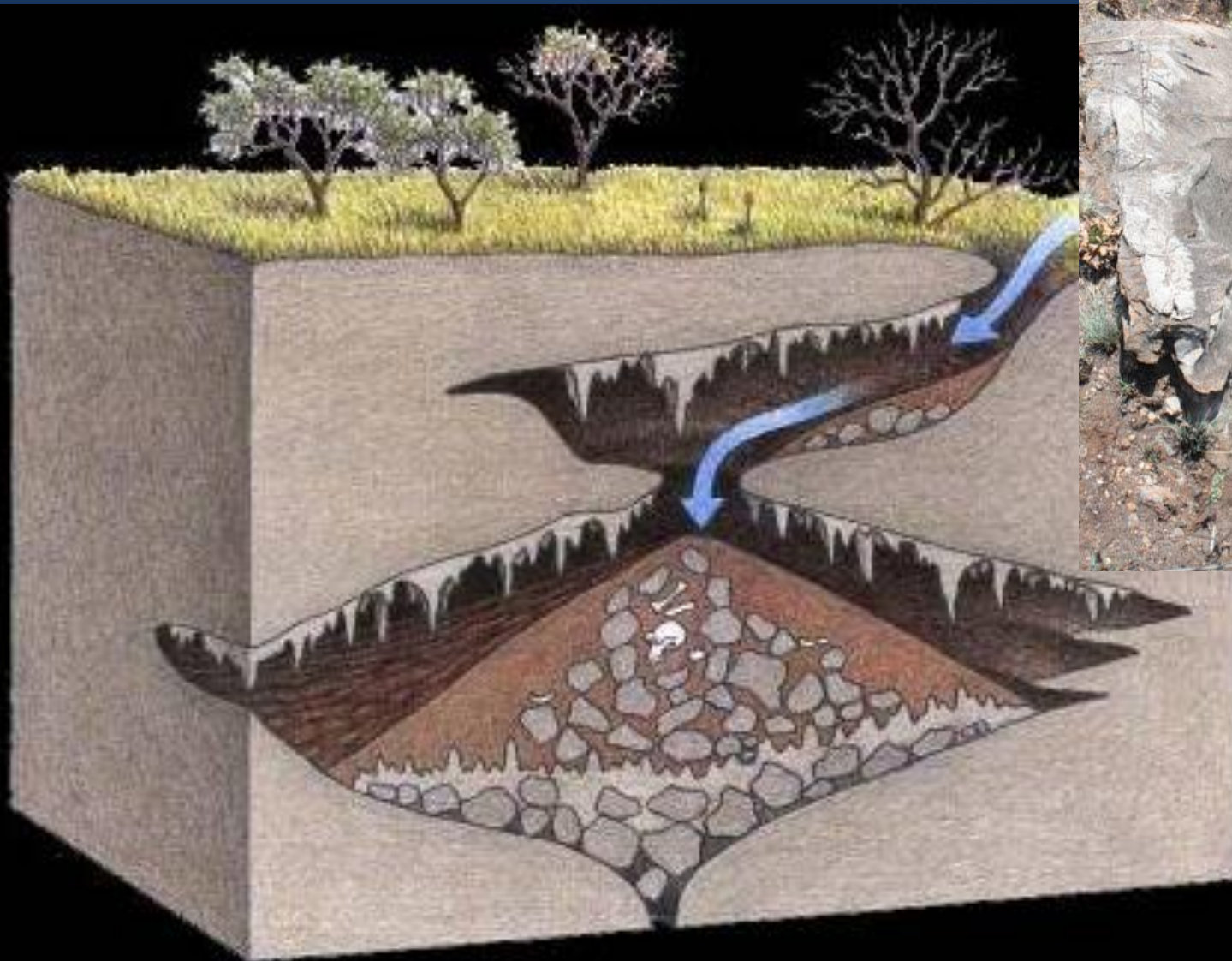


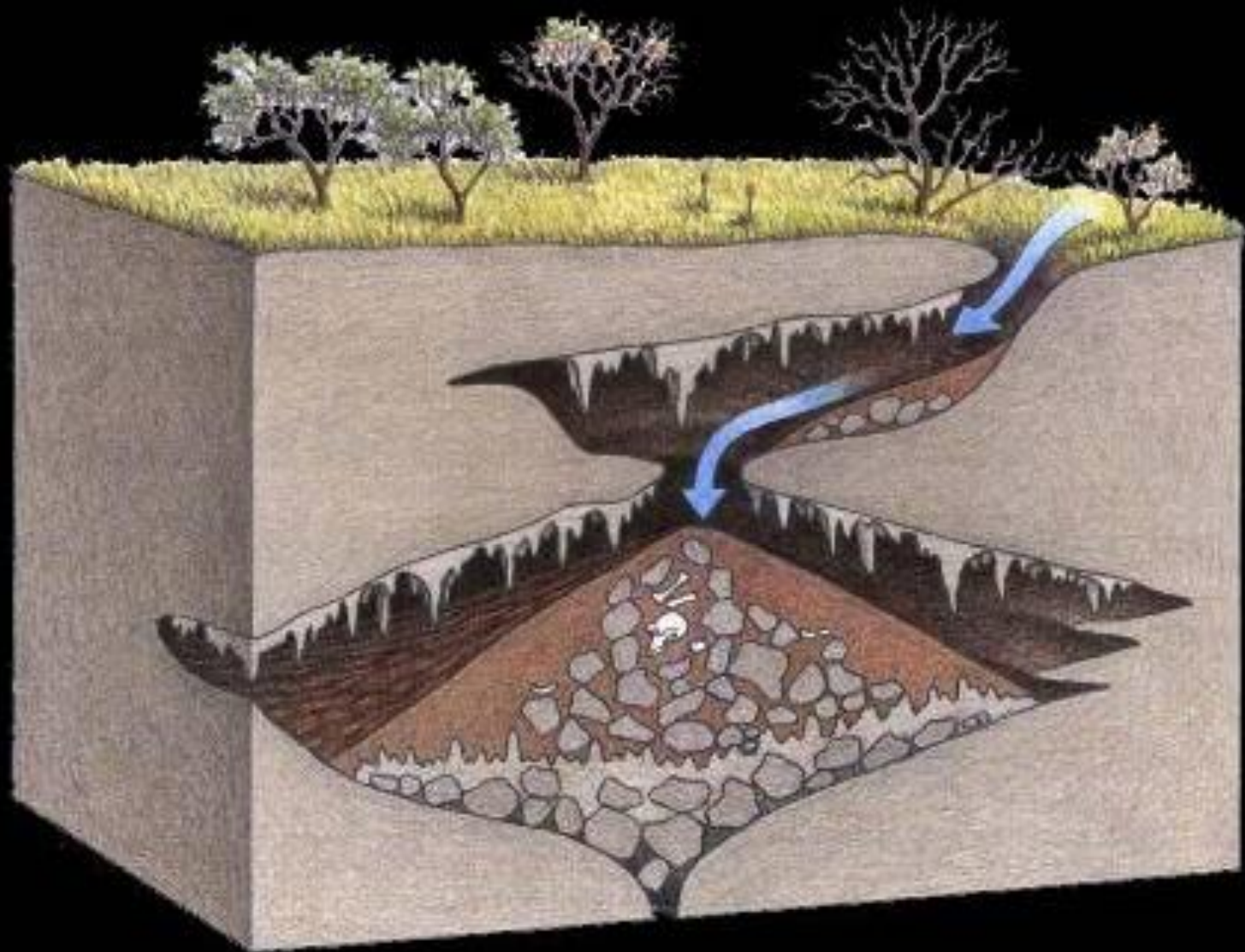


Sterkfontein

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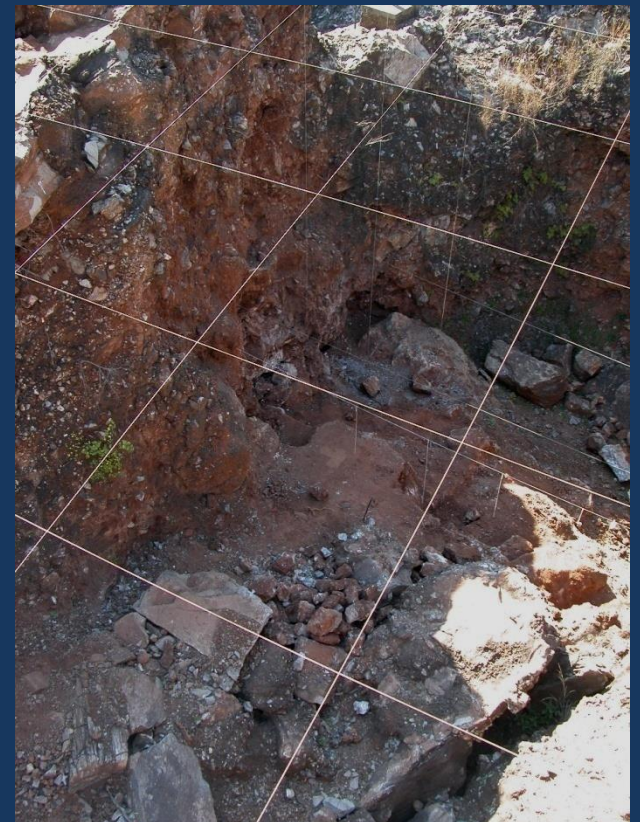


## Sterkfontein



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## Drimolen : 2.0 – 1.5 Ma



## Swartkrans - Member 1: 2.3 – 1.6 Ma







*Homo sp.*



*Australopithecus robustus*



*Papio robinsoni*



*Cercopithecoides williamsi*



*Felidae indet. (large)*



*Felis caracal*



*Canis sp.*



*Hyaenidae indet.*



*Dinofelis sp. aff. piveteaui*



*Herpestinae indet.*



*Gazella sp. aff. vanhoepini*



*Antidorcas recki*



*Megalotragus sp.*



*Oreotragus sp.*



*Pelea sp.*



*Damaliscus sp.*



*cf. Redunca sp.*



*Connochaetes sp.*



*Medium Alcelaphine*



*Neotragini indet.*



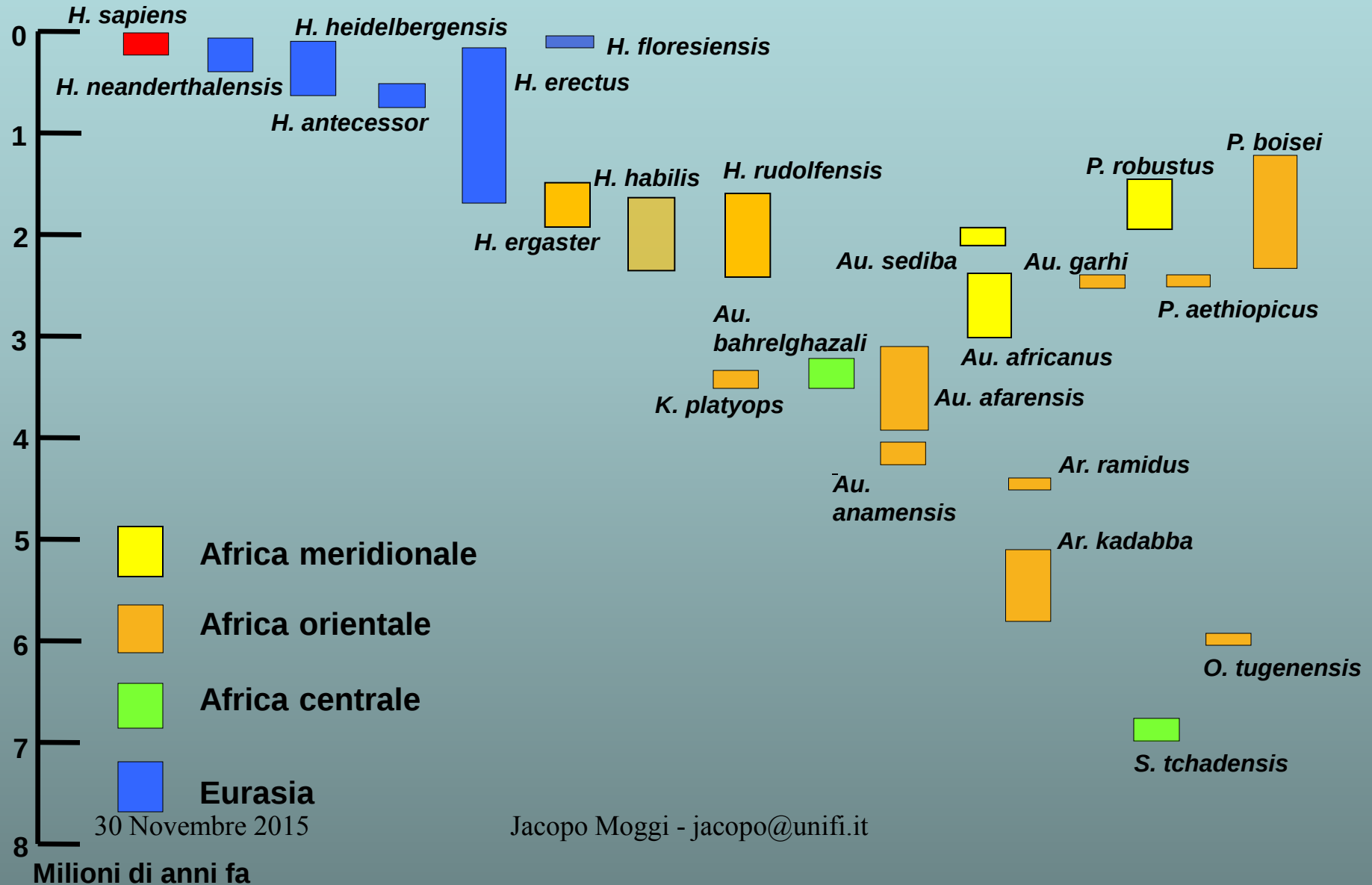
*Tragelaphus sp.*



Predation sites – Brain, 1981  
Accumulo di prede di carnivori



# Distribuzione geografica degli Ominini fossili



| Specie                            | Sito                                                        |
|-----------------------------------|-------------------------------------------------------------|
| <i>Australopithecus africanus</i> | Sterkfontein<br>Makapansgat<br>Taung<br>Gladysvale          |
| <i>Paranthropus robustus</i>      | Swartkrans<br>Drimolen<br>Kromdraai<br>Cooper's<br>Gondolin |
| <i>Homo sp.</i>                   | Swartkrans<br>Sterkfontein<br>Drimolen                      |
| <i>Australopithecus sediba</i>    | Malapa                                                      |
| <i>Homo naledi</i>                | Dinaledi Chamber - Rising Star System                       |
| 30 Novembre 2015                  | Jacopo Moggi - jacopo@unifi.it                              |

# *Datazioni siti Sudafricani*

Biostratigrafia

U – Pb

Nuclidi cosmogenici

Paleomagnetismo

***Australopithecus africanus* Sudafrica ca. 3.0 - 2.4 Ma**



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Sterkfontein  
'stratigraphy'

Sterkfontein M4

2.8 – 2.4 Ma

U-Pb

2.6 – 2.0 Ma

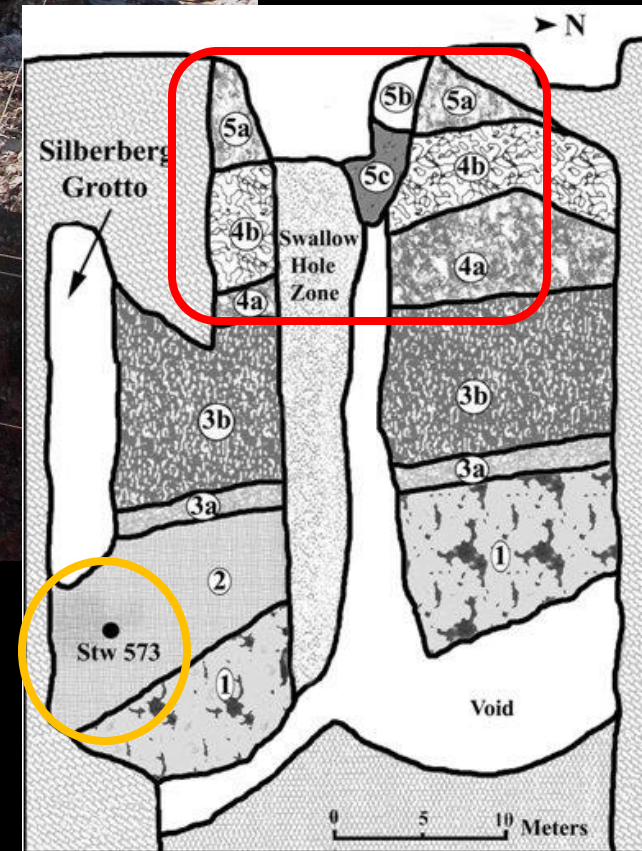
Sts 5

2.15 – 2.14 Ma



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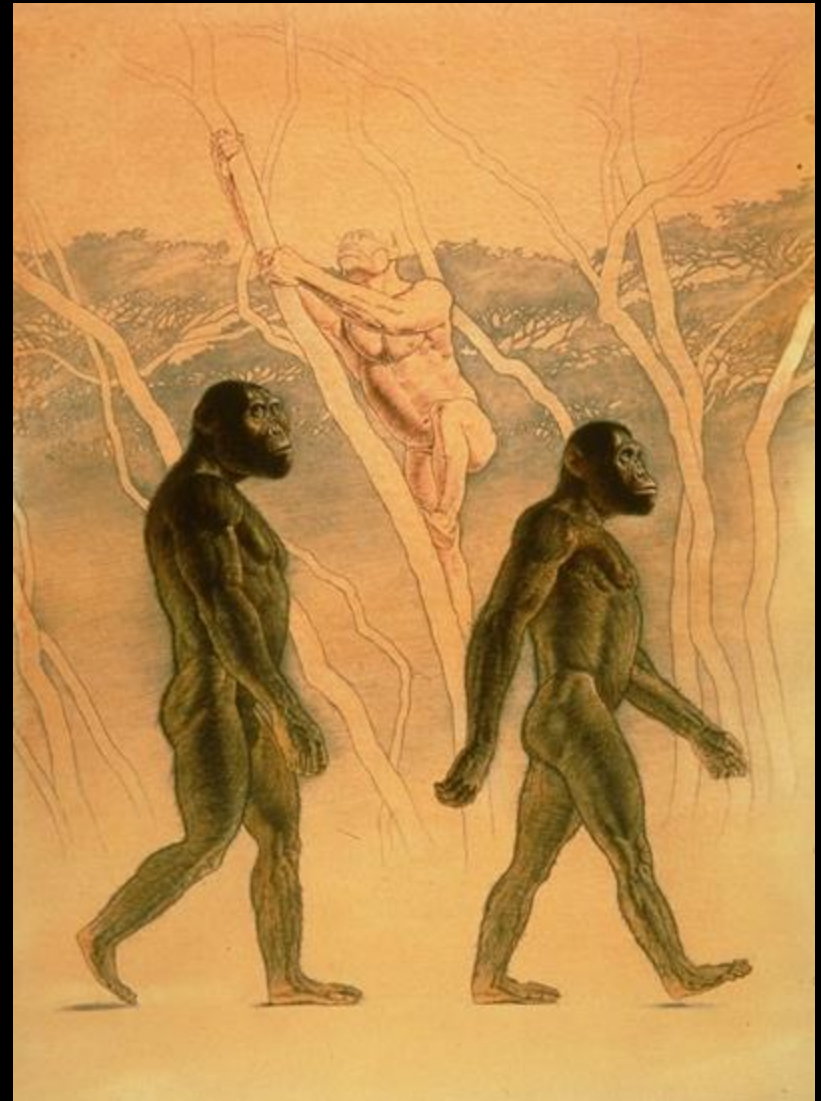
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***Australopithecus africanus* Sudafrica ca. 3.0 - 2.4 Ma**



Jacopo Moggi - jacop

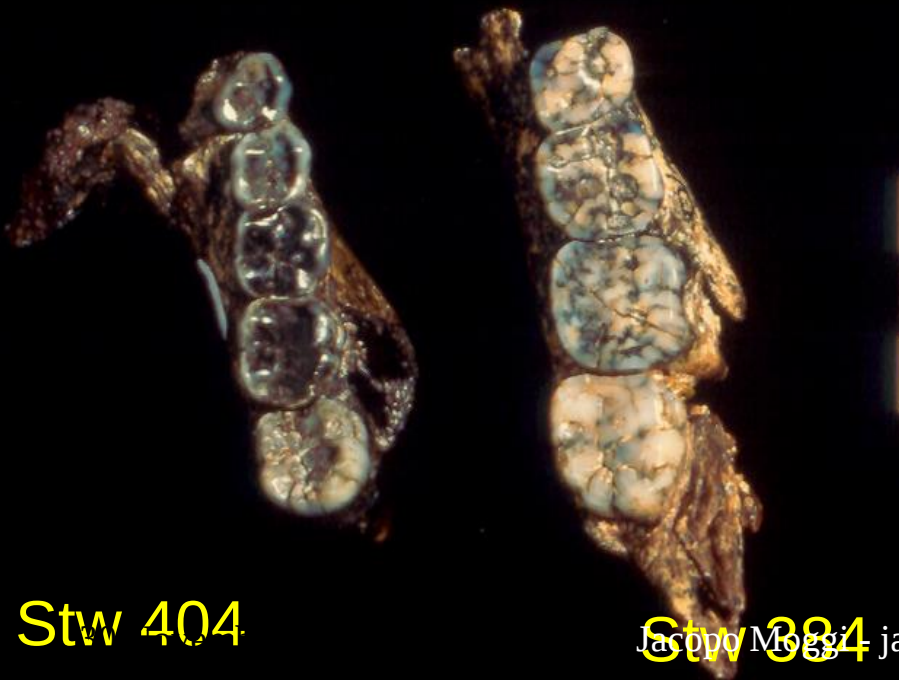


Dimorfismo sessuale ?



Sts 52

Stw 252



Stw 404

Stw 384

Due specie ?



Stw 573 – ‘Little Foot’



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# Stw 573: datazioni

Biostratigrafia

Paleomag

Cosmogenic nuclides

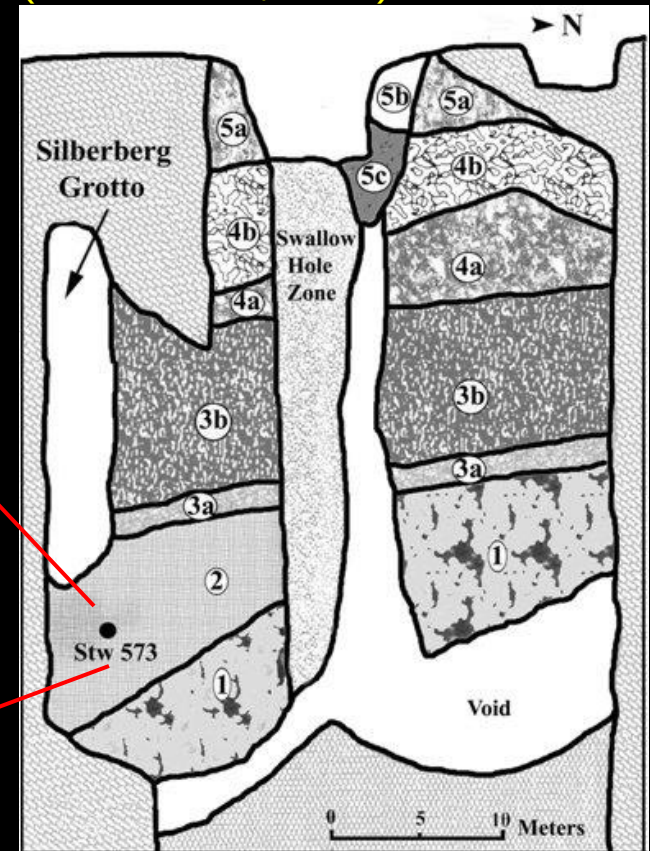
U – Pb isotopes

3.5 – 3.0 Ma (Clarke & Tobias, 1995)

~ 3.3 Ma (Partridge et al, 1999)

~ 4.29 Ma (Muzikar et al, 2006)

~ 2.2 Ma (Walker et al, 2006)



Stw 573 3.67 Ma

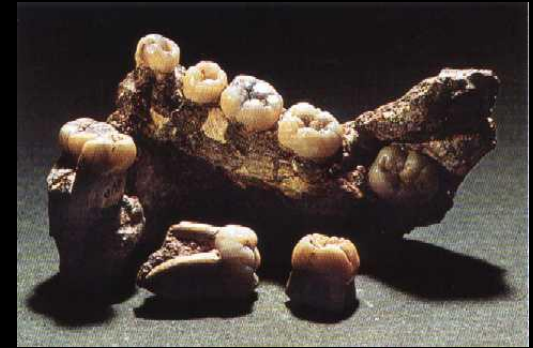
(Nuclidi cosmogenici)



**Figure 2 | Skull of StW 573 ('Little Foot').** The skull, recently extracted from the cave breccia. Photo by Jason Heaton.

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# ***Paranthropus robustus*, Sudafrica ca. 2.0 – 1.5 Ma**



## Swartkrans - Member 1: 2.3 – 1.6 Ma





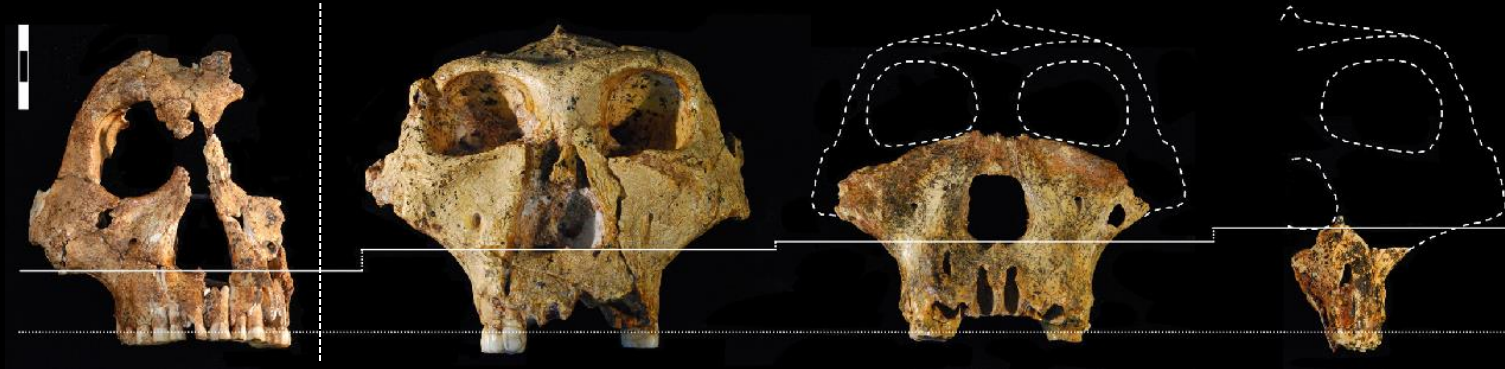
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Elevata numerosità dei reperti di Ominini  
fossili



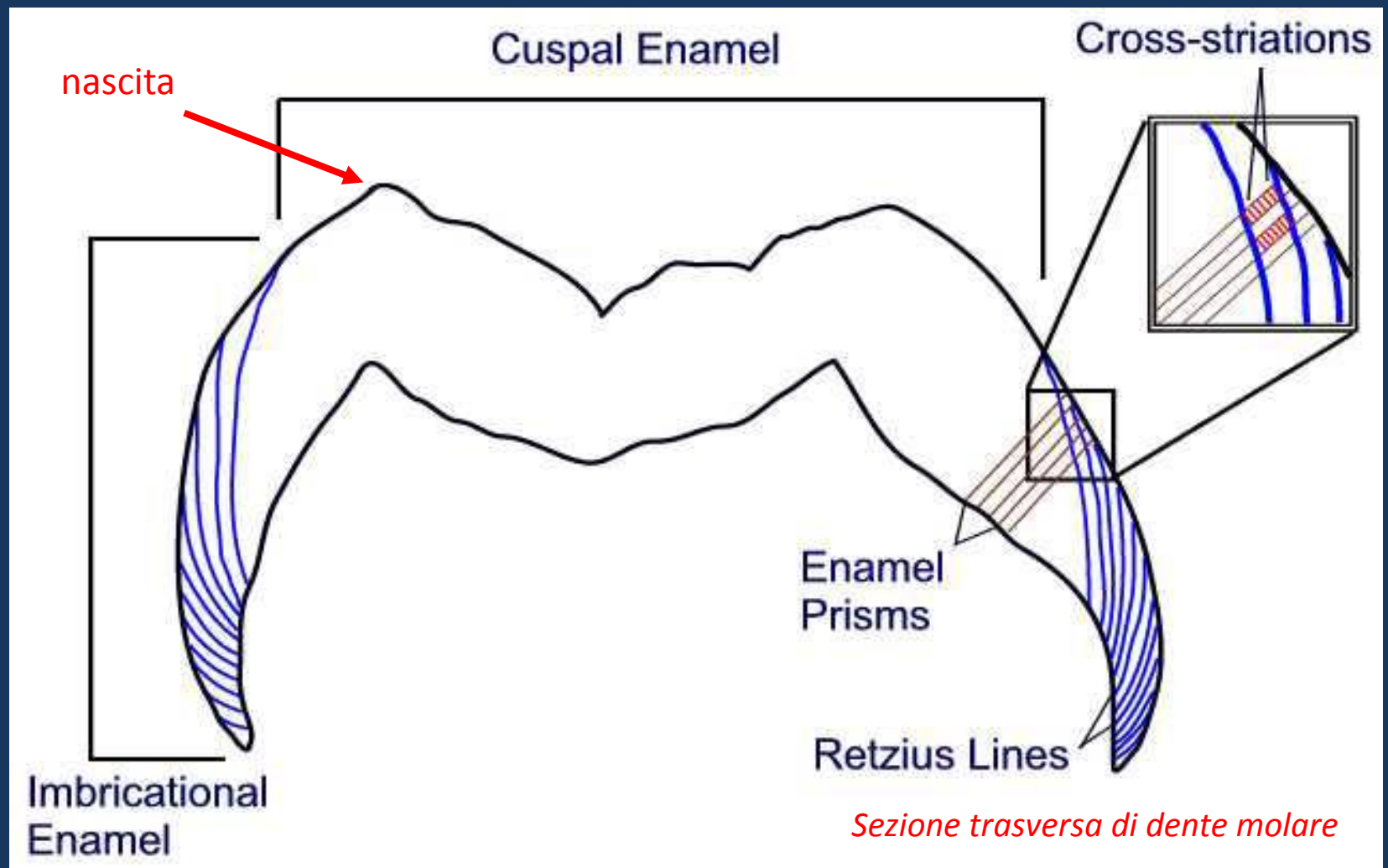
Dati ed informazioni sulla biologia e lo stile  
di vita di queste popolazioni



- Dimorfismo sessuale marcato
- Sviluppo somatico prolungato nei maschi

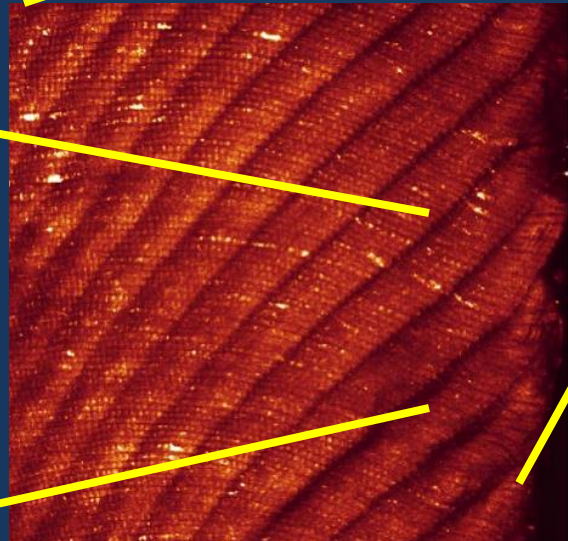
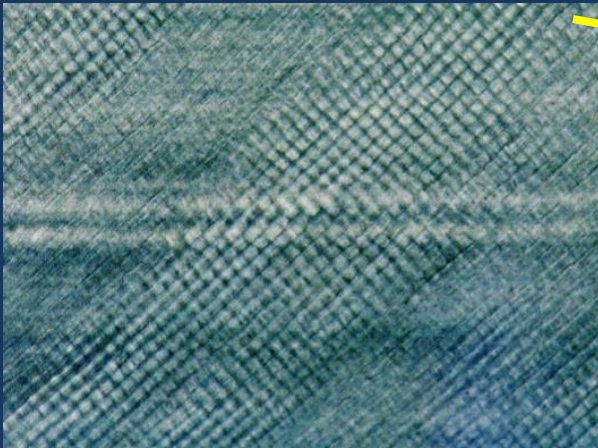
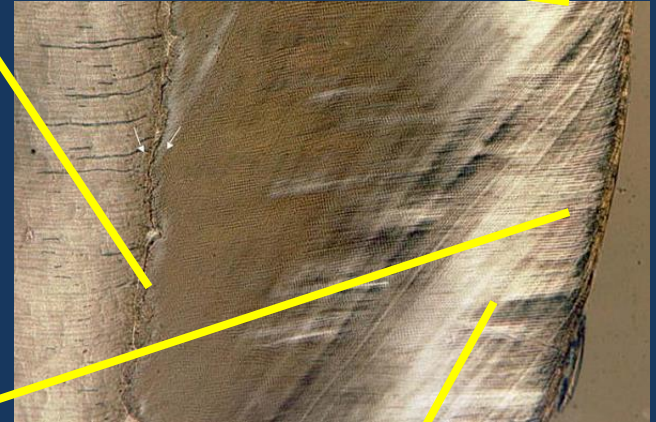
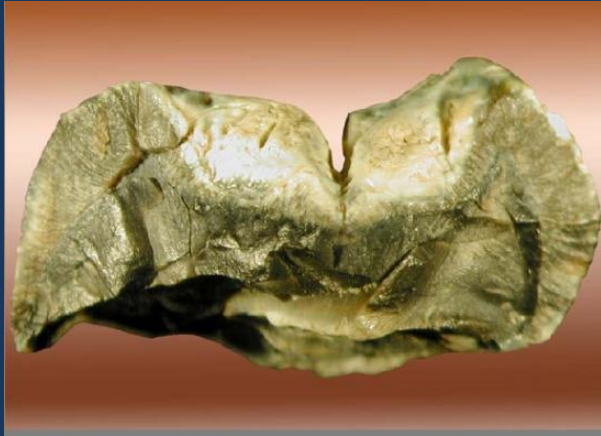


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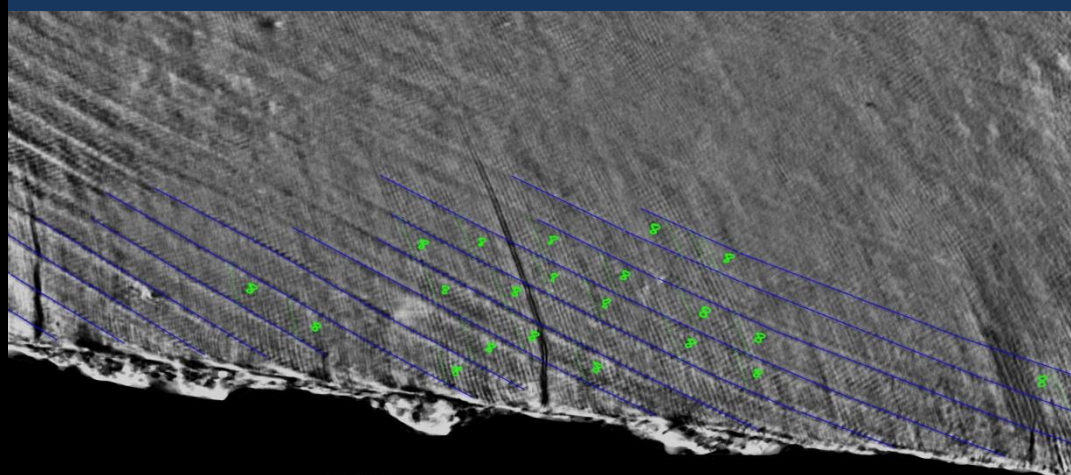
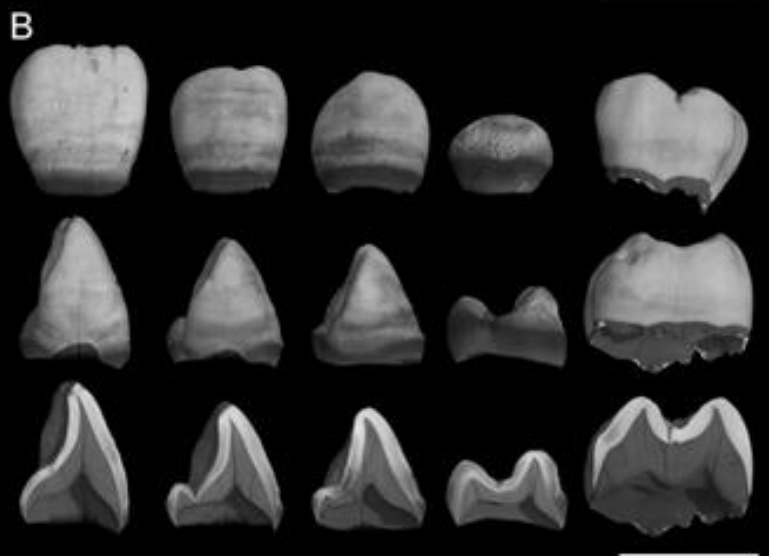
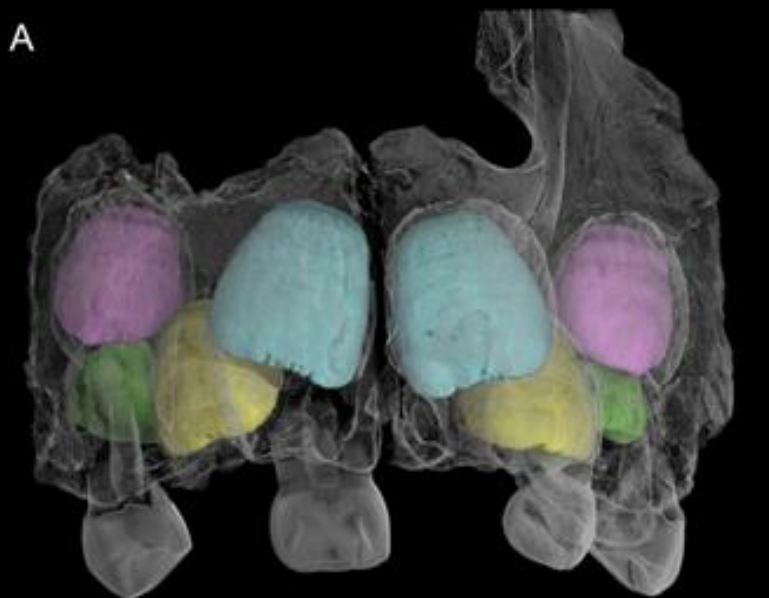
Retzius Lines: marcatori interni dei tempi di formazione dei denti → tempi di sviluppo somatico

*Sezione trasversa di dente molare,  
ad ingrandimenti crescenti*



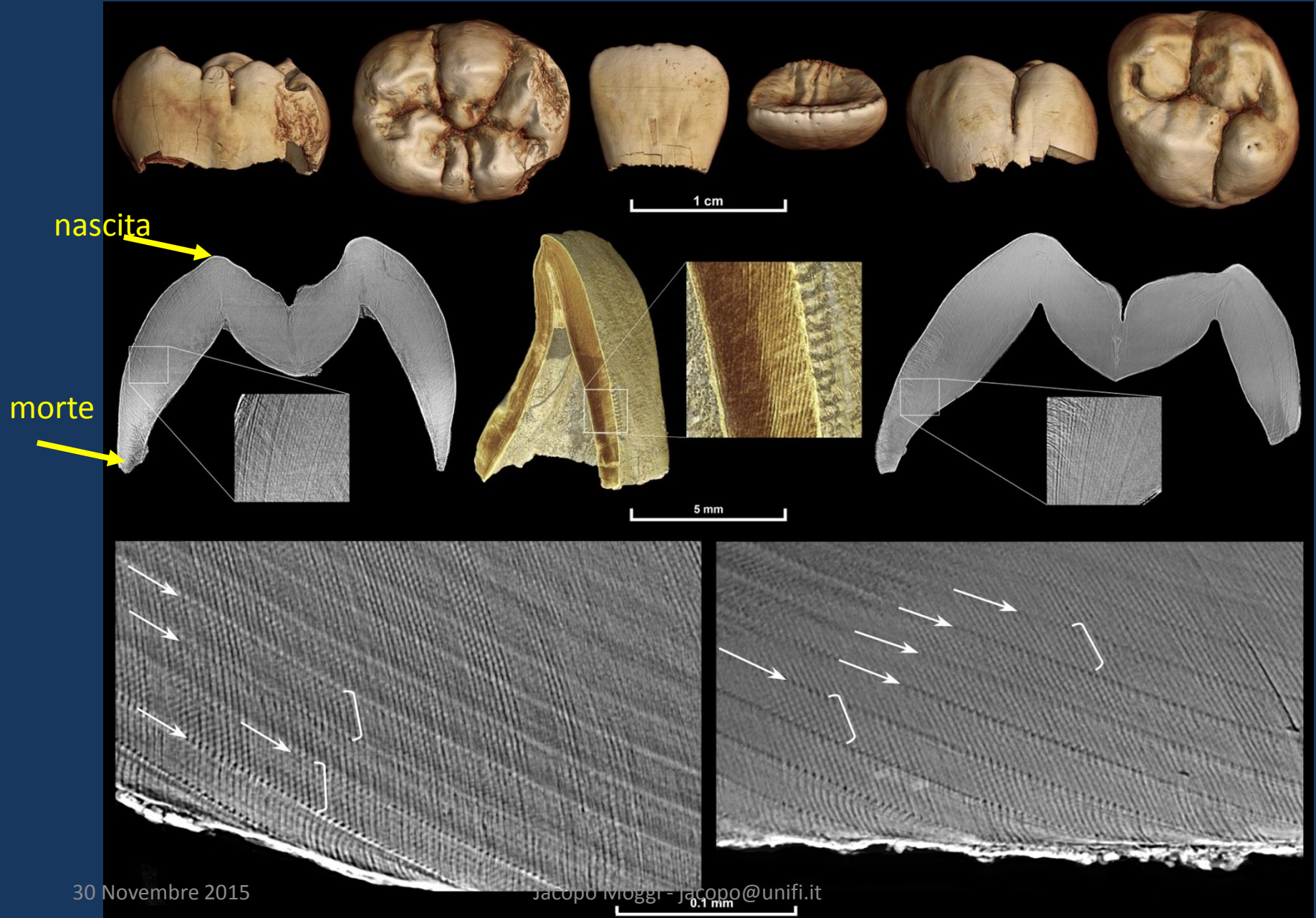


**European Synchrotron Radiation Facilities**



500  $\mu$ m

# Drimolen – Istologia dentale ‘virtuale’- DNH 67: 3.12 anni



RESEARCH ARTICLE

# Dental Ontogeny in Pliocene and Early Pleistocene Hominins

Tanya M. Smith<sup>1\*†</sup>, Paul Tafforeau<sup>2\*†</sup>, Adeline Le Cabec<sup>1,2,3</sup>, Anne Bonnin<sup>1,2,4</sup>, Alexandra Houssaye<sup>1,2,5</sup>, Joane Pouech<sup>2,6</sup>, Jacopo Moggi-Cecchi<sup>7</sup>, Fredrick Manthi<sup>8</sup>, Carol Ward<sup>9</sup>, Masrour Makaremi<sup>10</sup>, Colin G. Menter<sup>11</sup>

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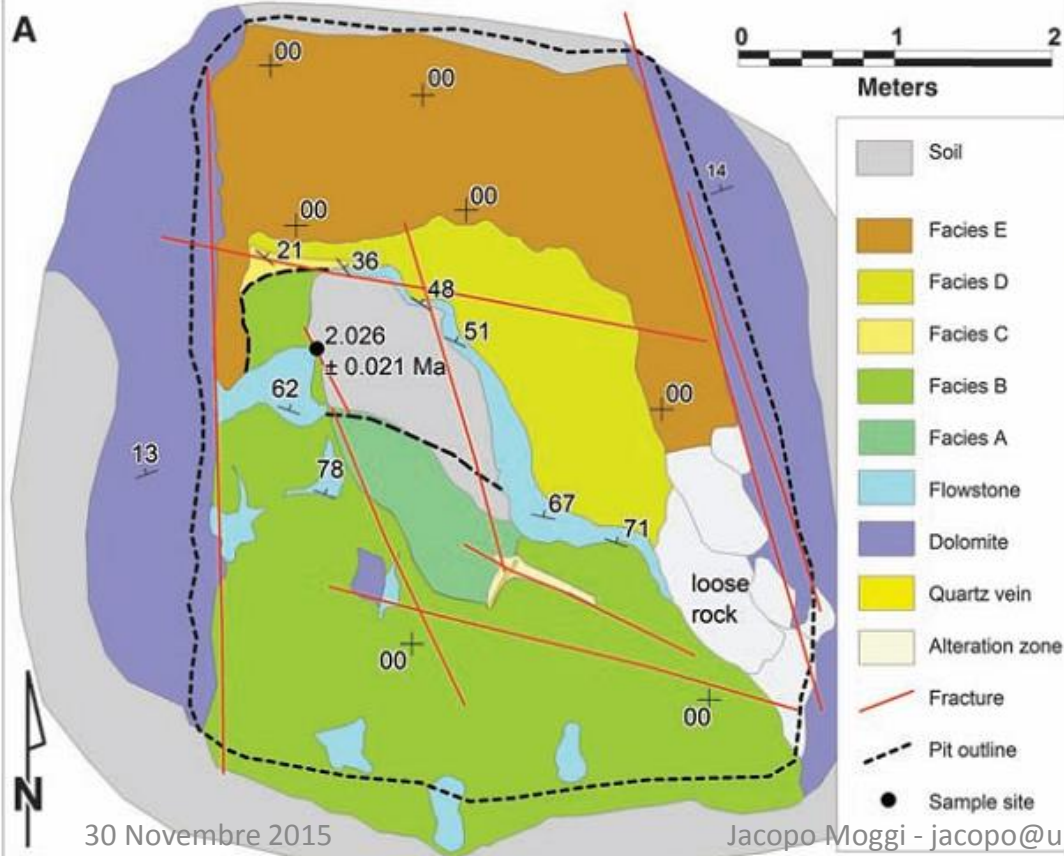
- Tempi di sviluppo somatico rapidi
- In *Homo sapiens* tempi di sviluppo lenti

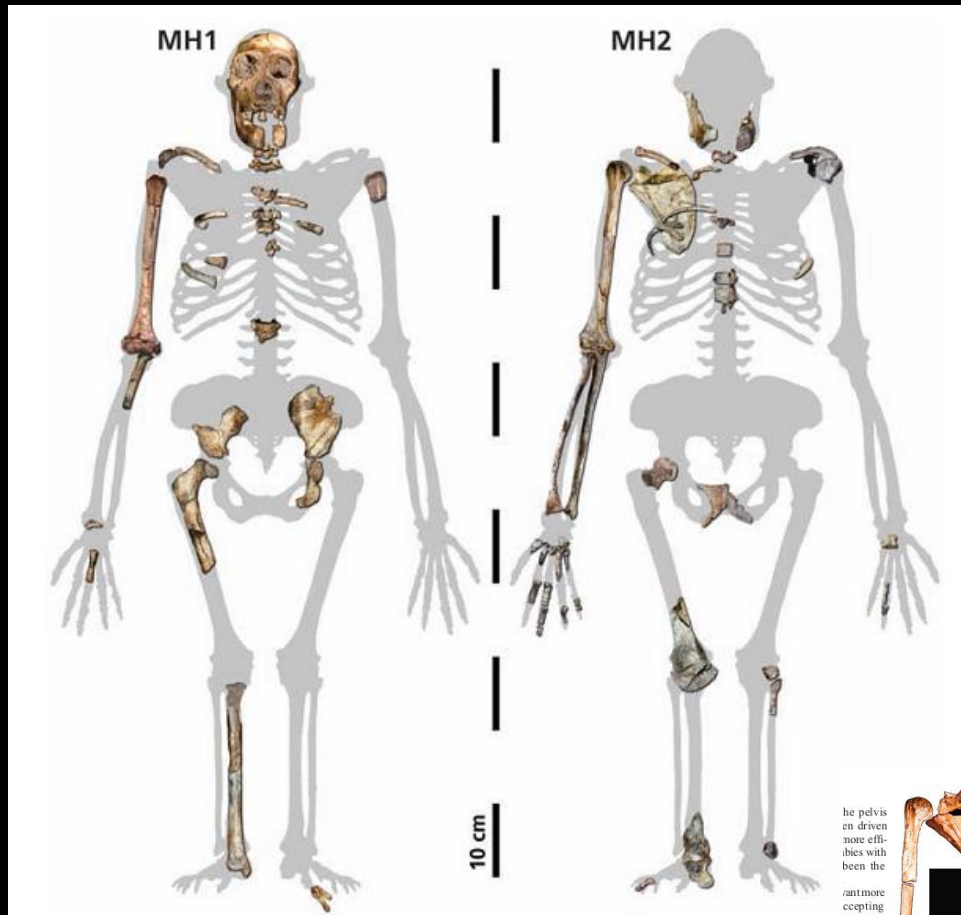


*Homo* sp. Sudafrica, ca 1.8 – 1.5 ma

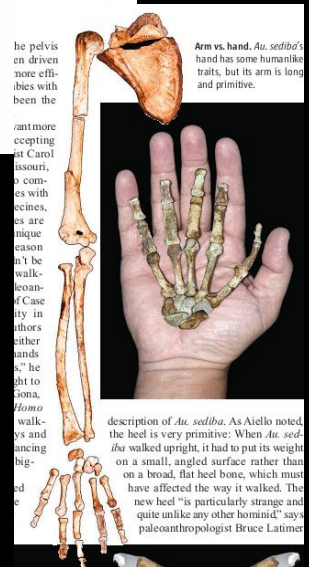
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# Malapa





## A. sediba, 1.97 Ma



he pelvis  
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more effi-  
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been the

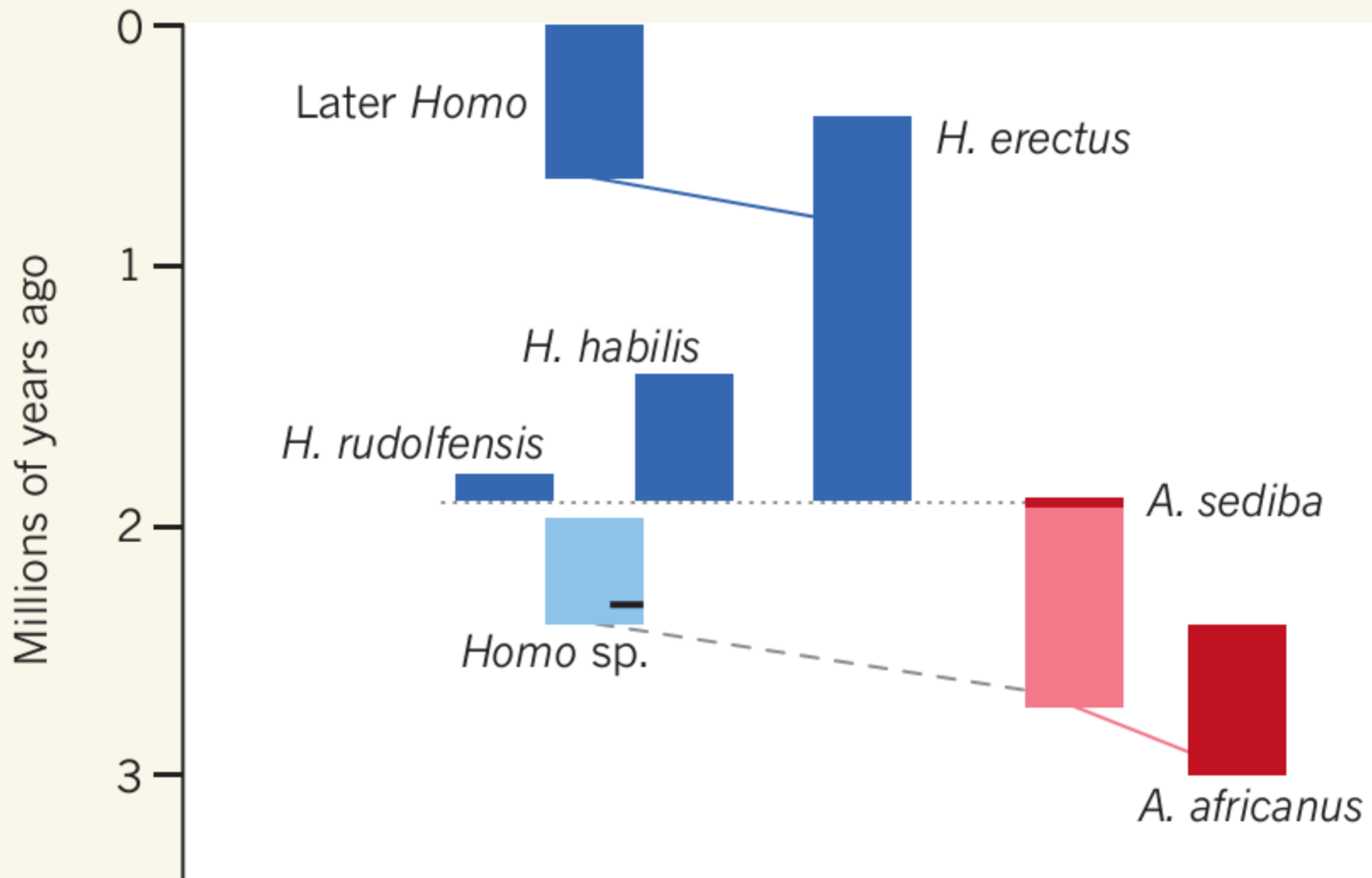
Arm vs. hand. *Au. sediba*'s  
hand has some humanlike  
traits, but its arm is long  
and primitive.

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description of *Au. sediba*. As Aiello noted,  
the heel is very primitive. When *Au. sed-  
iba* walked upright, it had to put its weight  
on a small, angled surface rather than  
on a broad, flat heel bone, which must  
have affected the way it walked. The  
new heel "is particularly strange and  
quite unlike any other hominid," says  
paleoanthropologist Bruce Latimer

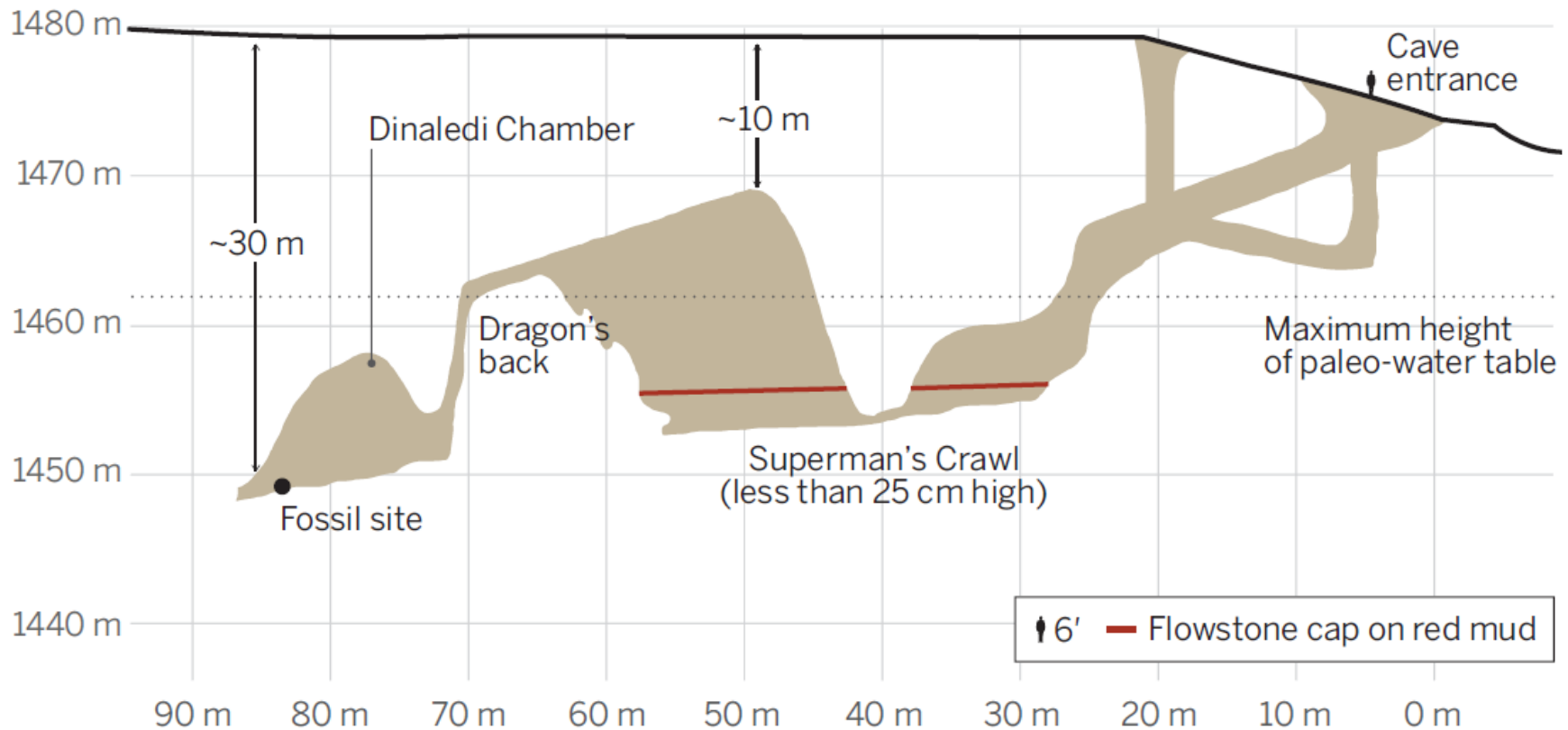
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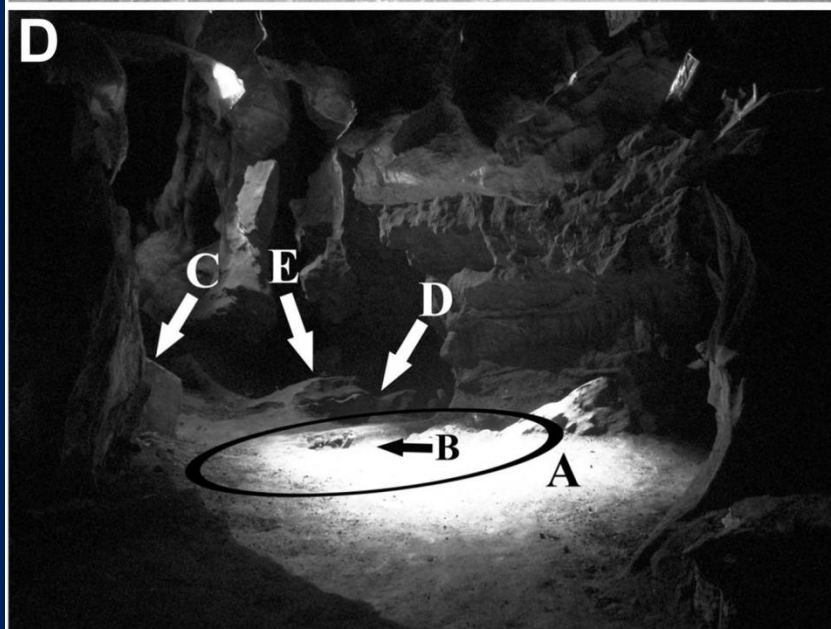
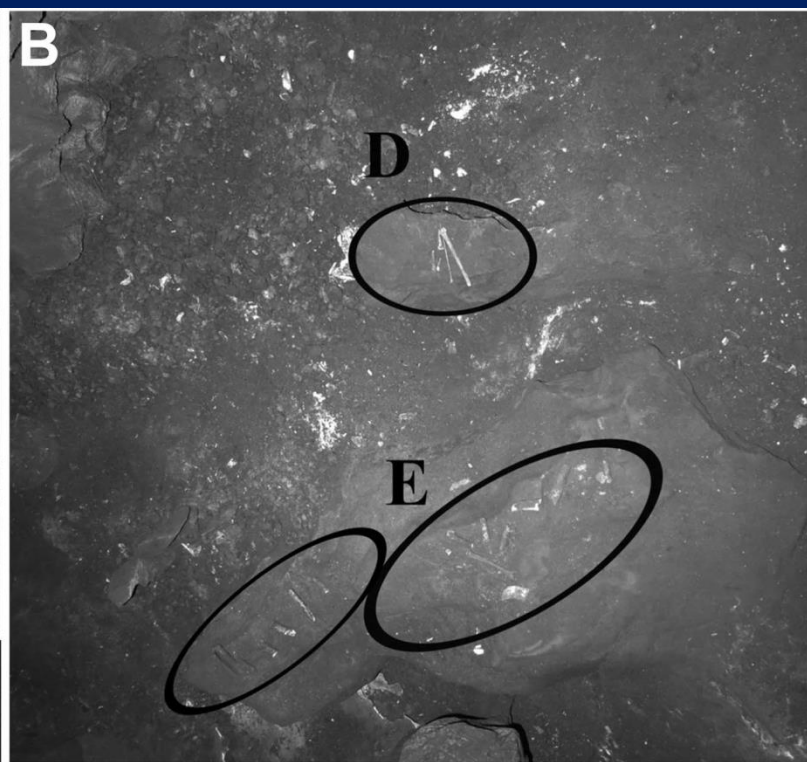
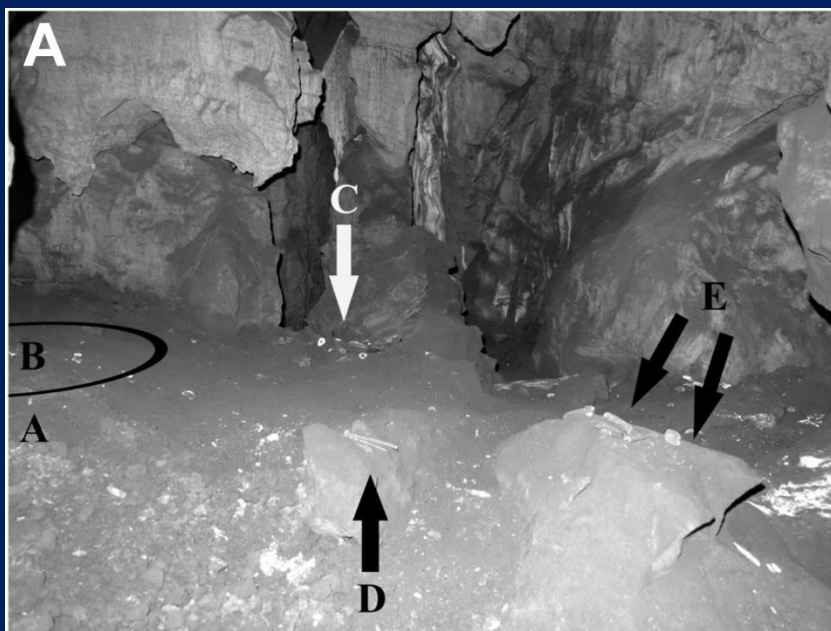
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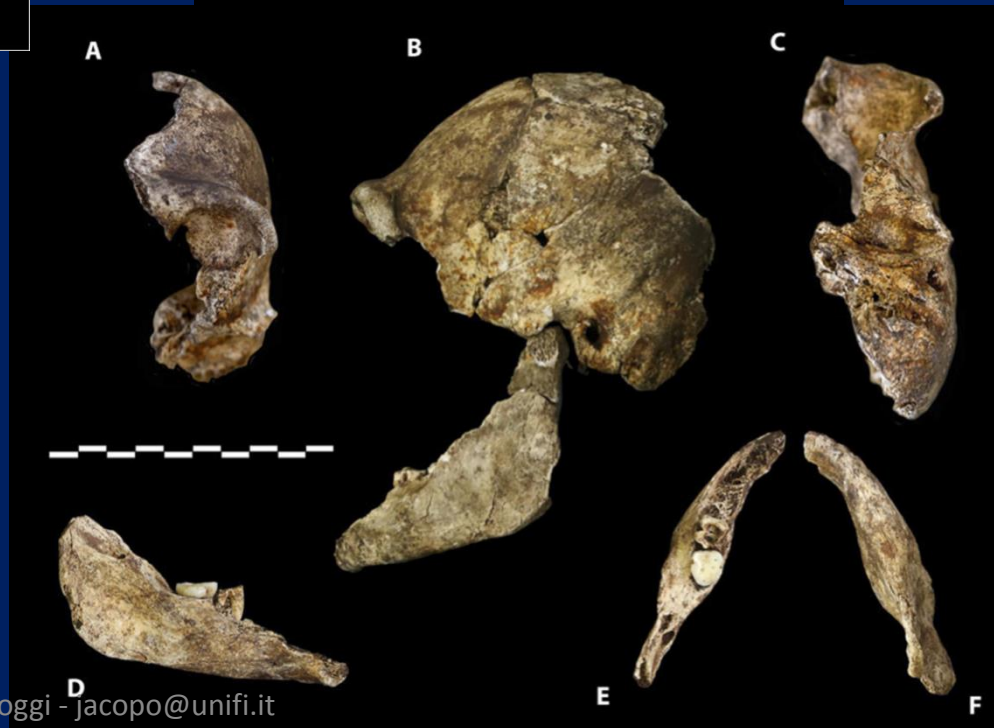
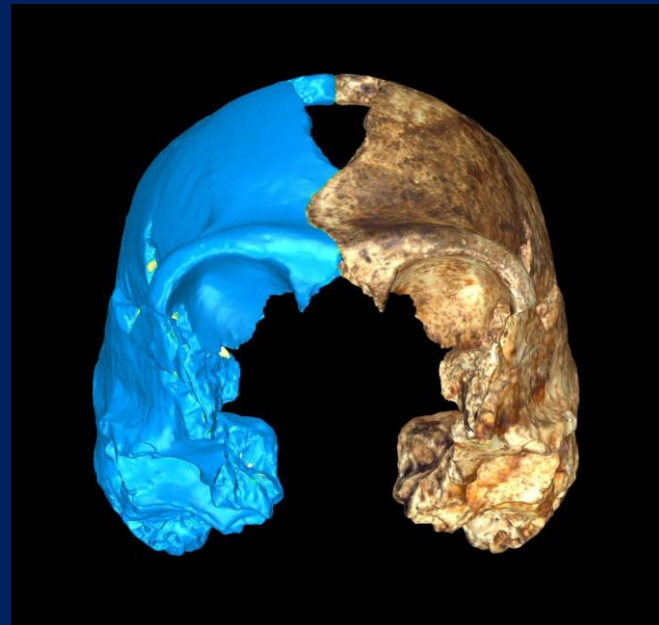
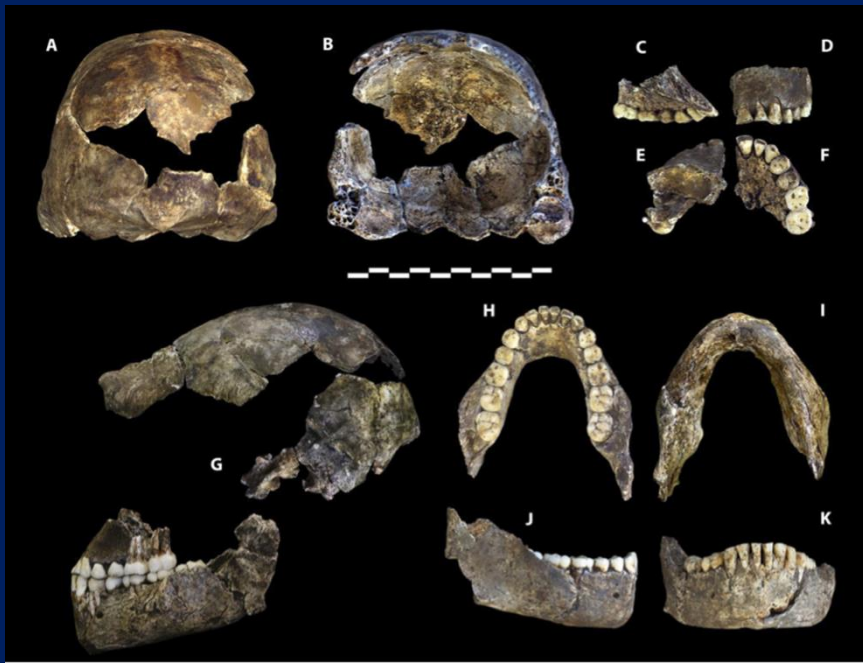
## Treasure map

South Africa's Rising Star Cave yielded a trove of bones from what turned out to be a new *Homo* species. Excavating them was a task for small, slim cavers.









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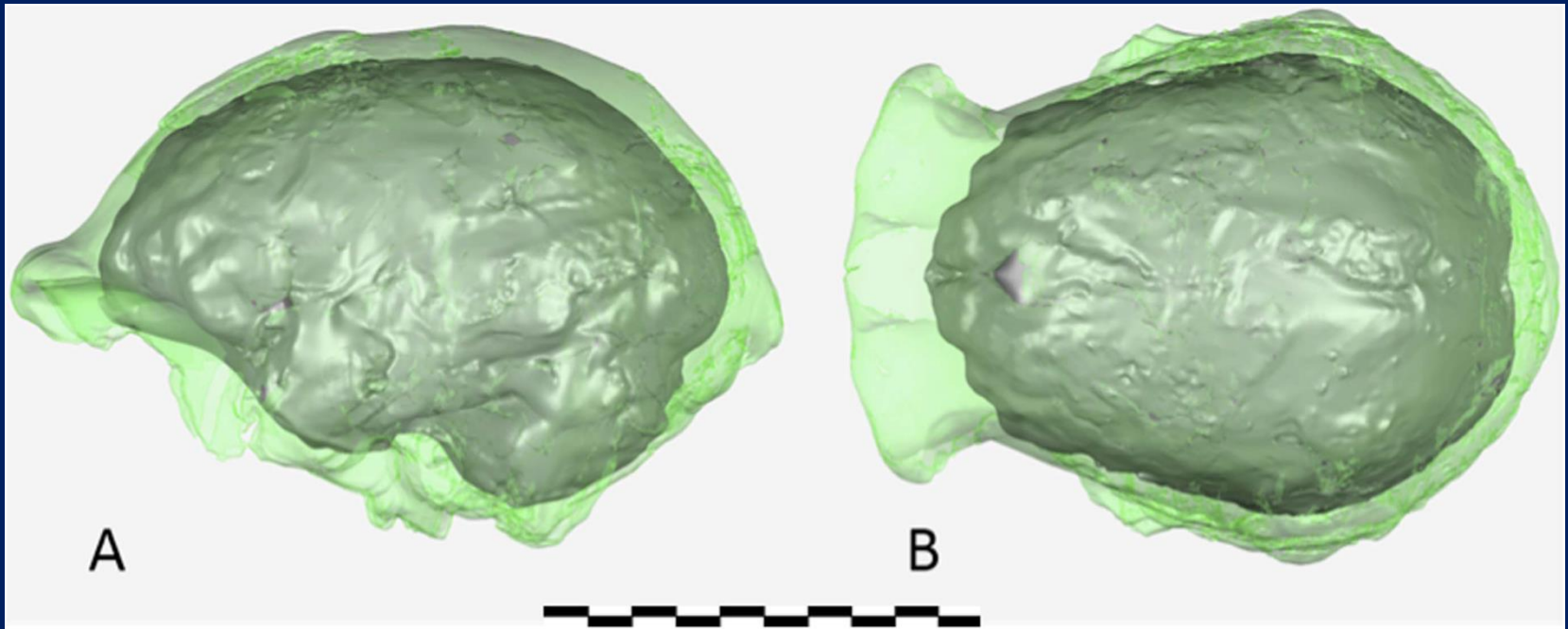


Figure 11. Virtual reconstruction of the endocranium of the larger composite cranium from DH1 and DH2 overlaid with the ectocranial surfaces. (A) Lateral view. (B) Superior view. The resulting estimate of endocranial volume is 560cc. Scale bar = 10 cm.



# Caratteri di *Homo naledi*

## HOMO FEATURES

### Humanesque skull

The general shape of *H. naledi*'s skull is advanced, though the braincase is less than half of a modern human's.

### Versatile hands

*H. naledi*'s palms, wrists, and thumbs are humanlike, suggesting tool use.

### Long legs

The leg bones are long and slender and have the strong muscle attachments characteristic of a modern bipedal gait.

### Humanlike feet

Except for the slightly curved toes, *H. naledi*'s feet are nearly indistinguishable from ours, with arches that suggest an efficient long-distance stride.



## AUSTRALOPITHECINE FEATURES

### Primitive shoulders

*H. naledi*'s shoulders are positioned in a way that would have helped with climbing and hanging.

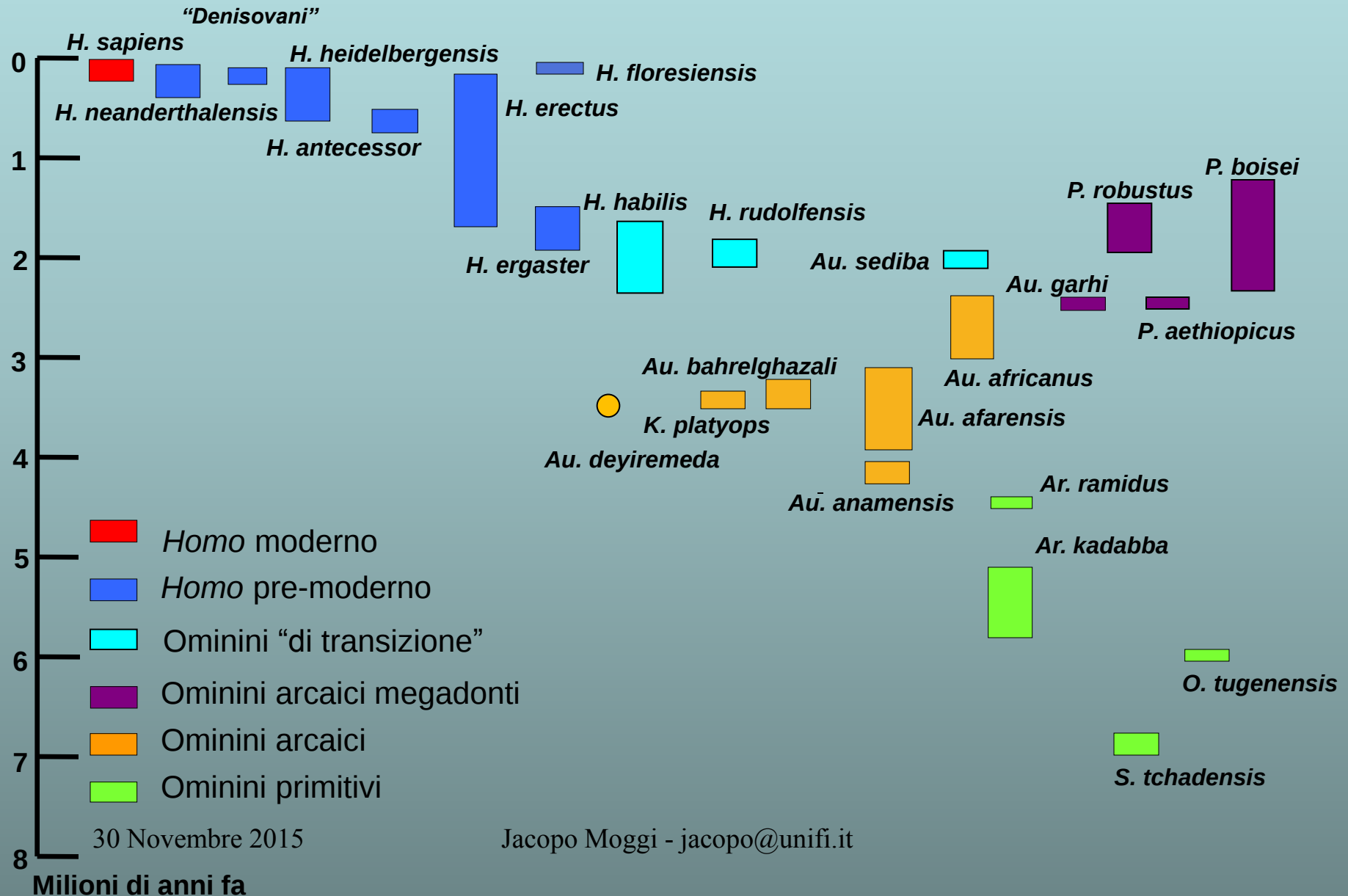
### Flared pelvis

The hip bones of *H. naledi* flare outward—a primitive trait—and are shorter front to back than those of modern humans.

### Curved fingers

Long, curved fingers, useful for climbing in trees, could be a trait retained from a more apelike ancestor.

# Il nostro 'albero di famiglia'



Depositi sudafricani coprono un arco temporale critico, da circa 3 a circa 1.5 MA

Quadro evoluzione umana più complesso

Sediba e Naledi

Reperti completi che indicano mosaico di modalità e tempi evolutivi dei vari distretti scheletrici

Evoluzione in SA diversa da EA – distanza in km

