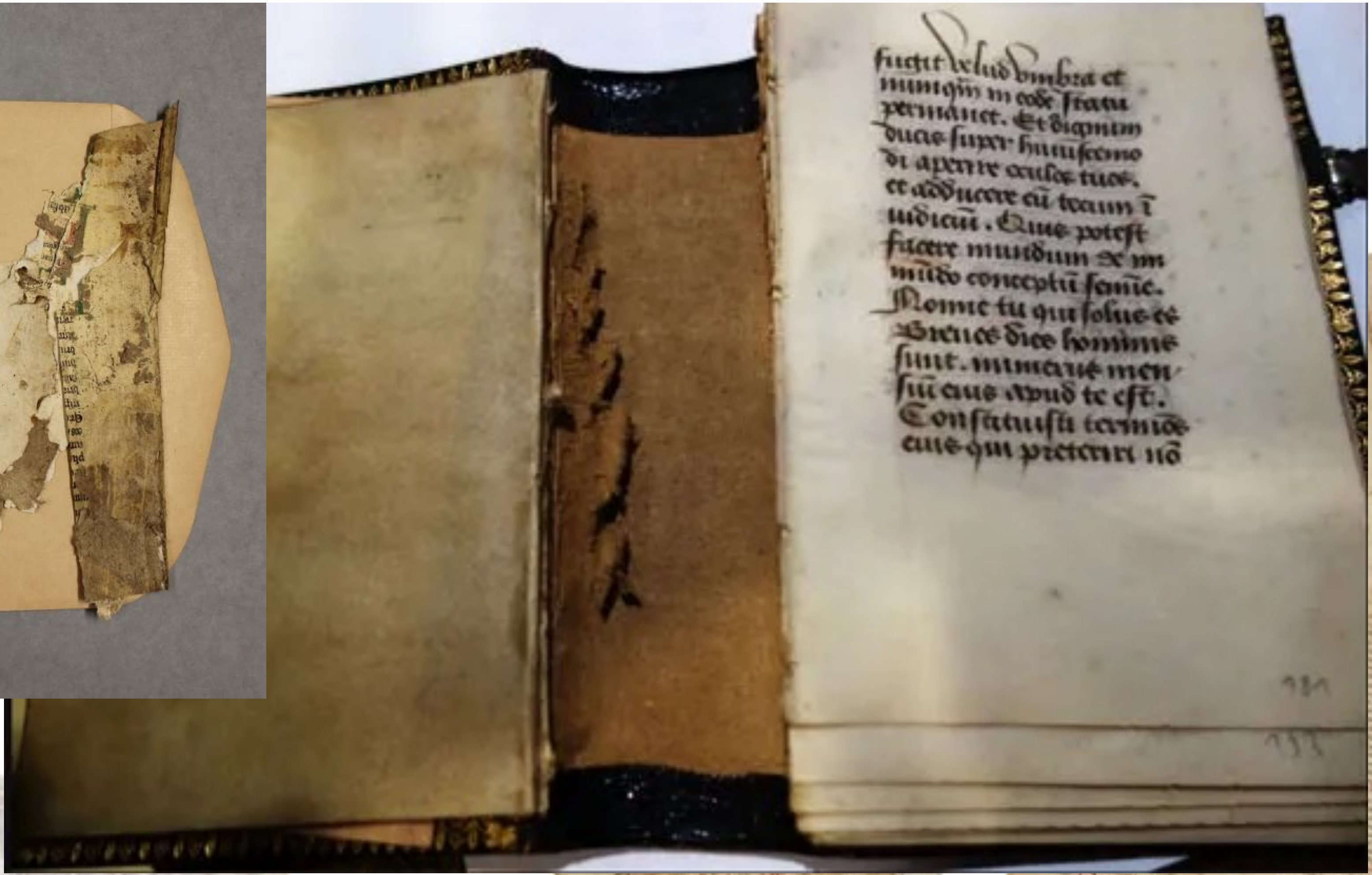
Assembling Stories of the Past


fugit velud umbra et
numquam in eode statu
permanet. Et dignum
ducis super huiuscemo
di aperire oculos tuos.
et adducere eu tecum i
iudicium. Quis potest
facere mundum de im
mundo conceptum semie.
Nonne tu qui solus es.
Breves dies hominis
sunt. numerus men
sium eius apud te est.
Constituisti termios
eius qui preteriri no

Edge of the Known World!

- Paleo-Indian, Archaic, Basketmaker, Ancestral Pueblo
- Tewa, Navajo, Ute, Comanche, Jicarillo Apache
- Spanish settler colonialists
- Spanish/Mexican/Indigenous mixed culture
- United States

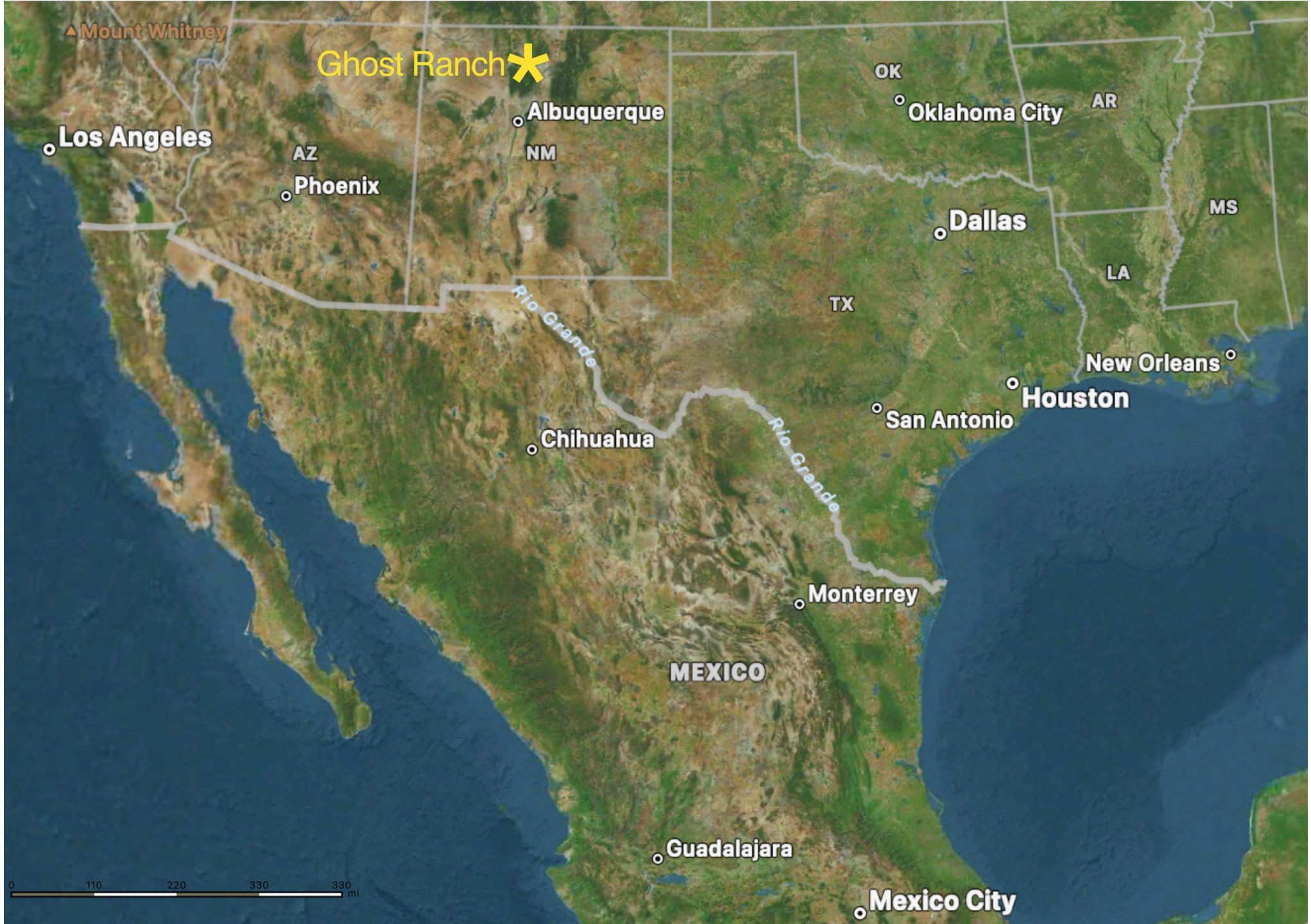
Valley of Conflict and War

Cerro Pedernal

Flint & Chert: critical materials for 500 generations of paleoindians


Placitas
Rio Chama
Ghost Ranch
Piedra Lumbre Basin
El Rito
Gallina
Abiquiú
Rio Chama
Coyote
"Valley of Shining Stone"
SANTA FE NATIONAL FOREST
SANTA CLARA PUEBLO
Rio Grande
112
110
280
84
554
96
285
126


Glen Canyon
National
Recreation Area
Colorado
Plateau
Ghost
Ranch
Rio Grande Rift
Wheeler Peak
Canadian River
Flagstaff
Albuquerque
Amarillo
NM
Pecos River
Lubbock
Gila River
Rio Grande
Tucson
El Paso
0
38
76
114
114
mi


Mount Whitney
Ghost Ranch
Albuquerque
Los Angeles
AZ
NM
Phoenix
OK
Oklahoma City
AR
MS
Dallas
LA
TX
Rio Grande
New Orleans
Houston
San Antonio
Chihuahua
Rio Grande
Monterrey
MEXICO
Guadalajara
Mexico City
0
110
220
330
330
mi

High Cultures of MesoAmerica

At the Height of Power Timeline

Olmec
- 1200 B.C. – 600 B.C.
- First known civilization to form in Latin America.

Maya
- 250 A.D. – 900 A.D.
- Developed in what is now called the Yucatan Peninsula.

Aztec
- 1200 A.D. – 1521 A.D.
- Built their capital on what is now Mexico City.

Inca
- 1438 A.D. – 1533 A.D.
- Developed in the Andes Mountains in what is now Peru.

Ancestral Puebloan periods

Archaic–Early Basketmaker Era
7000–1500 BCE

Early Basketmaker II Era
1500 BCE–50 CE

Late Basketmaker II Era
50–500

Basketmaker III Era
500–750

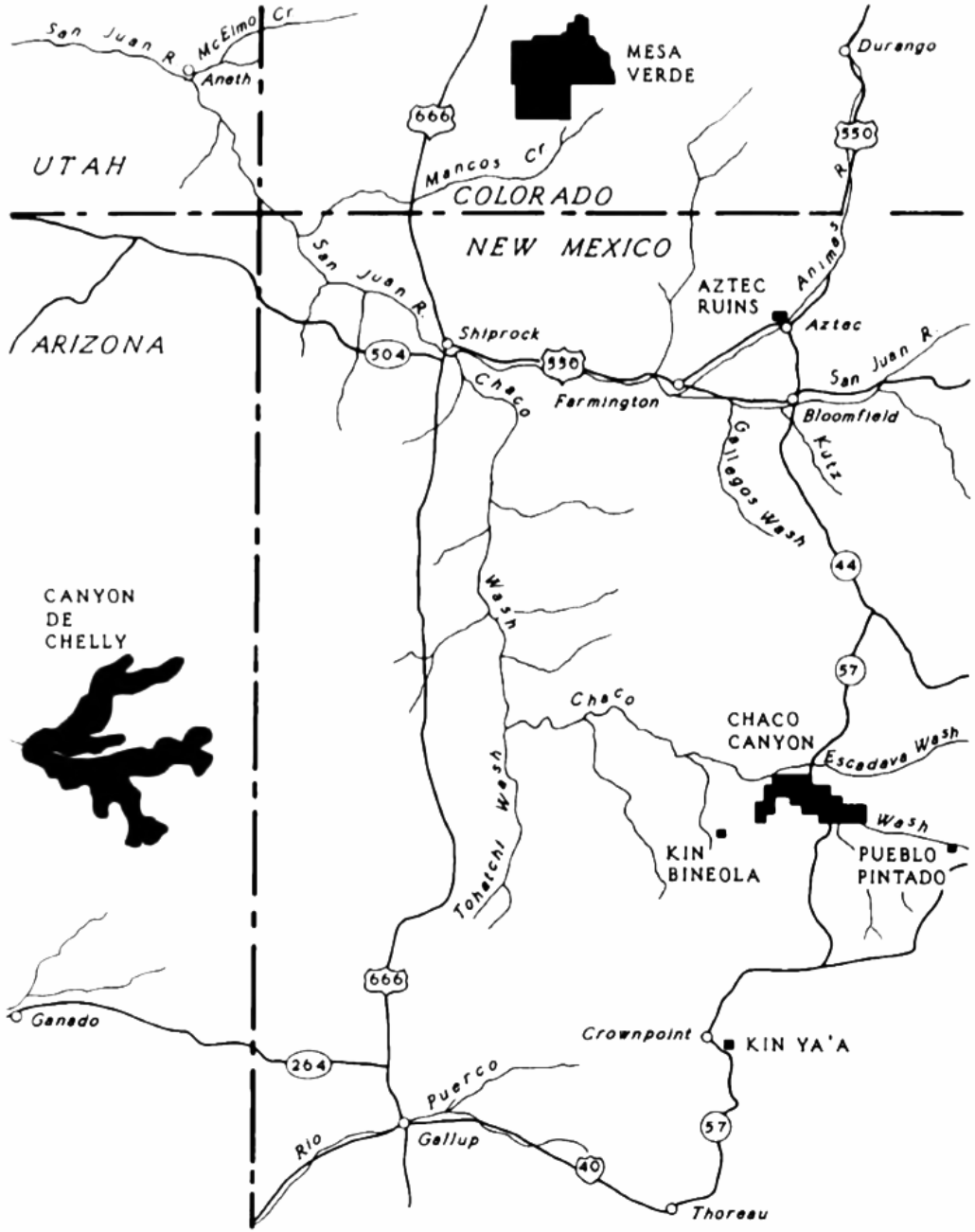
Pueblo I Period
750–900

Pueblo II Period
900–1150

Pueblo III Period
1150–1350

Pueblo IV Period
1350–1600

Pueblo V Period
1600–present


San Juan R
McElmo Cr
Aneth
UTAH
MESA VERDE
Durango
666
550
Mancos Cr
COLORADO
NEW MEXICO
San Juan R
Animas R
AZTEC RUINS
Aztec
ARIZONA
Shiprock
504
550
Chaco
Farmington
San Juan R
Bloomfield
Gallegos Wash
Kutz
44
CANYON DE CHELLY
Wash
57
Chaco
CHACO CANYON
Escadava Wash
Wash
Tohatchi Wash
KIN BINEOLA
PUEBLO PINTADO
666
Ganado
Crownpoint
KIN YA'A
264
Puerco
57
Rio
Gallup
40
Thoreau

Family Life at Mesa Verde

White House Ruin; Canyon de Celley

Pueblo Bonito; Chaco Canyon

Ancestral Puebloan Golden Age 700-1150

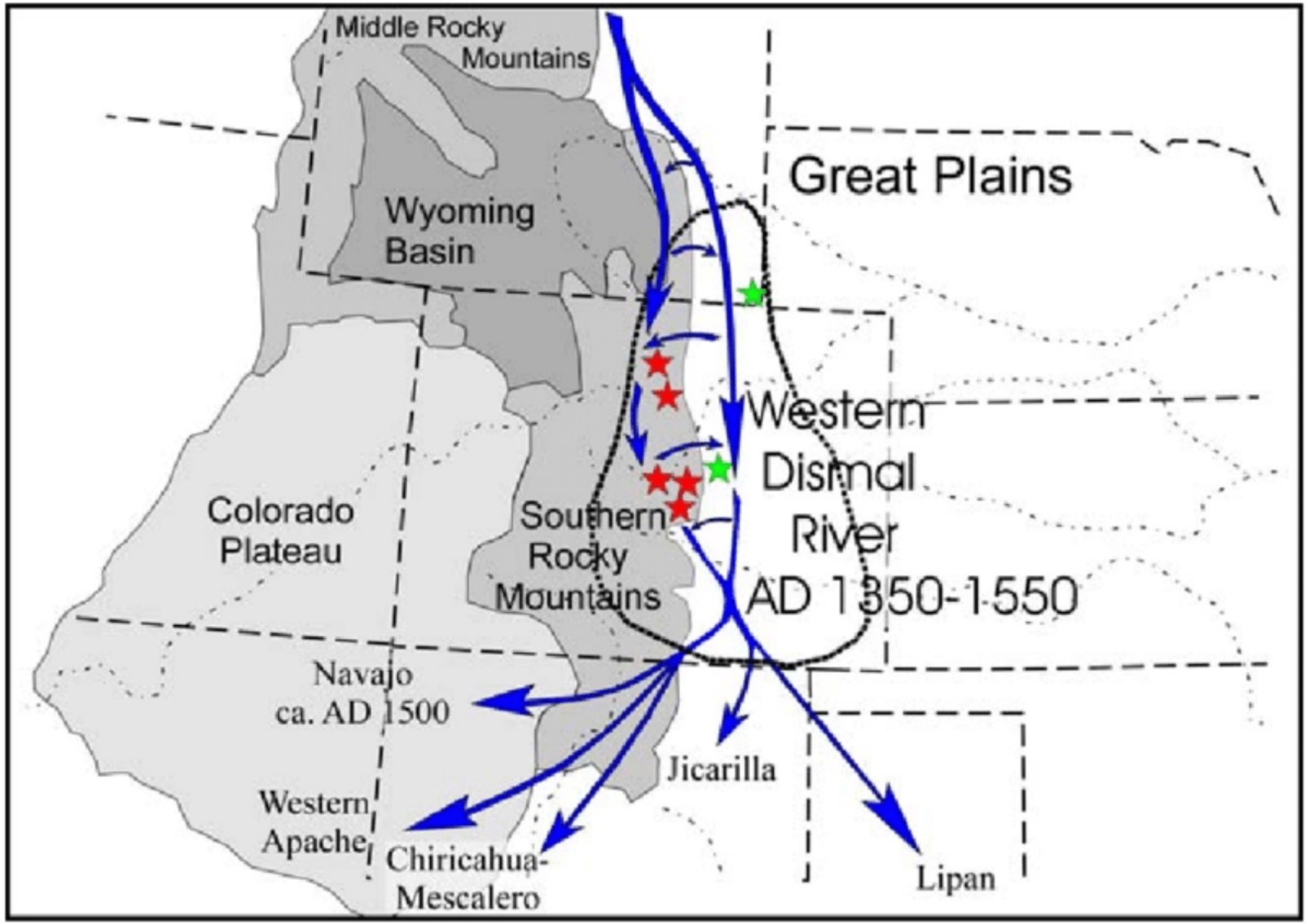
- Fast-growing population
- Good rainfall
- Many pueblos w/ thousands of people each
- Productive irrigated crops & food storage
- Fantastic pottery & crafts
- Road network linked to Maya & Aztec
- Trade goods: timber from distant lands, copper, Macaws, seashells, art

Decline from 1130 to 1450

- Persistent drought (Little Ice Age in Europe; also climate-related declines in South America)
- Relocated from canyons to high mesa tops during the late 13th century. Move so far from water & arable land may have been for defense against enemies
- Influx of nomadic peoples: **Utes, Shoshones, and Paiute people from** California; also arrival of the **Athapaskan-speaking** Diné who migrated from the north during this time and subsequently became the **Navajo and Apache tribes**

Puebloan Tewa people migrated south & east into Abiquiu & Piedra Lumbre

Athapascan Nomad Arrivals



Abiquiu & La Tierra de Guerra

- Tewa refugees from drought & conflict in the Colorado Plateau founded Chama Valley pueblos in 13th Century
- Abiquiu & Piedra Lumbre were contested borderlands between Puebloans & Nomads until Spanish arrival 1598
- Spanish conquerors assimilated & enslaved Tewa to fight Navajo and Apache; resettled Abiquiu Pueblo
- Pueblo Revolt of 1680 – alliance of Puebloans & Nomads 6000-strong defeated Spanish, besieged Santa Fe – greatest armed victory by indigenous ever in USA
- Spanish Reconquista in 1697 due to indigenous infighting

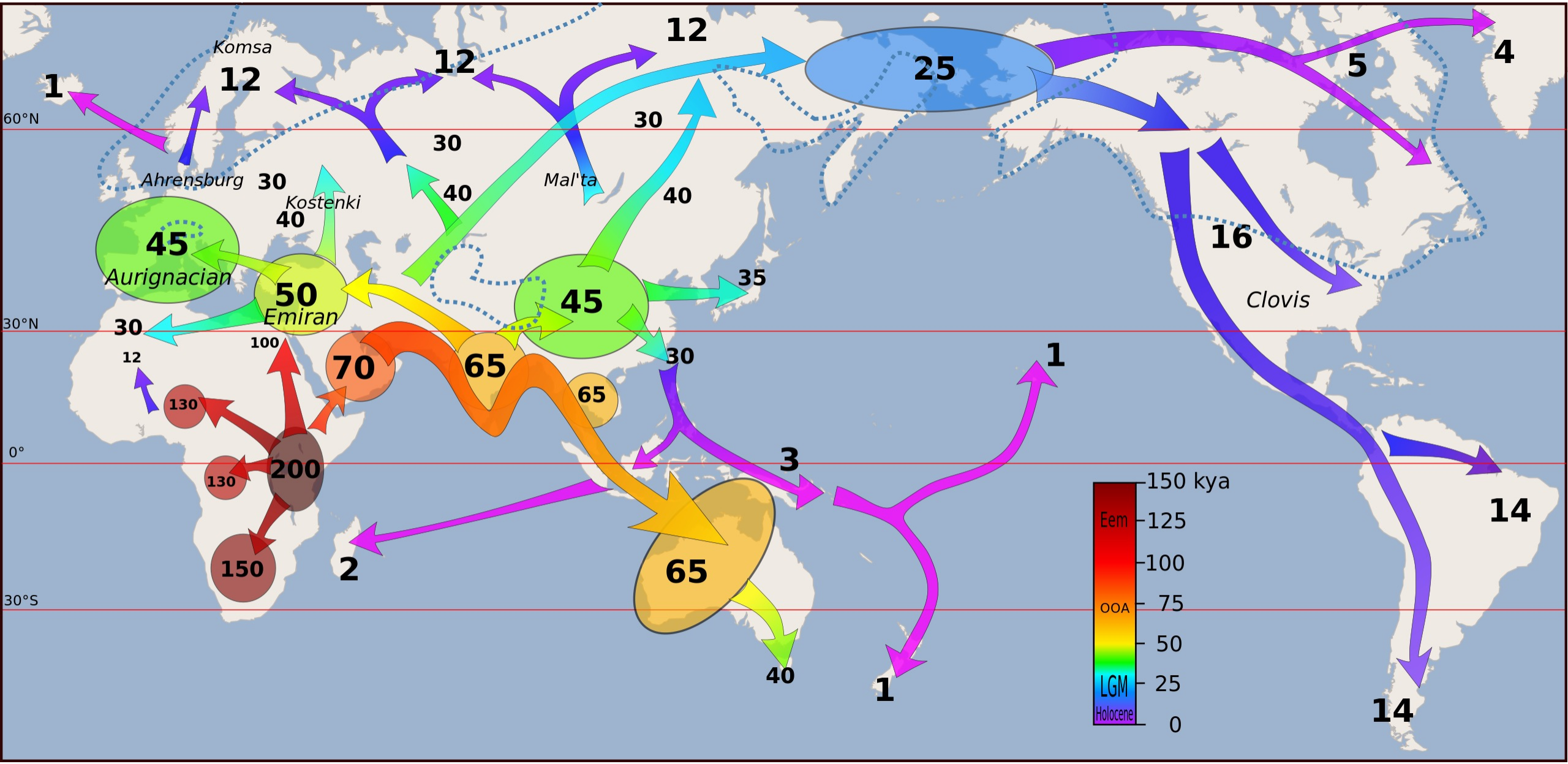
Slave Trade & *Genizaros*

- Spanish enslaved indigenous people for centuries
- Both nomadic & Puebloans also captured & held Spanish and later Anglos
- Captured young people were slave-soldiers, freed when they got older
- Word *Genizaros* derived from *Janissaries*, slave-soldiers of the Ottoman Turks who the Spanish were fighting at the other end of their empire
- In 1776, New Mexico was 1/3 *Genizaro!*
- Abiquiu became a multienthic, multicultural, multireligious fortified frontier town

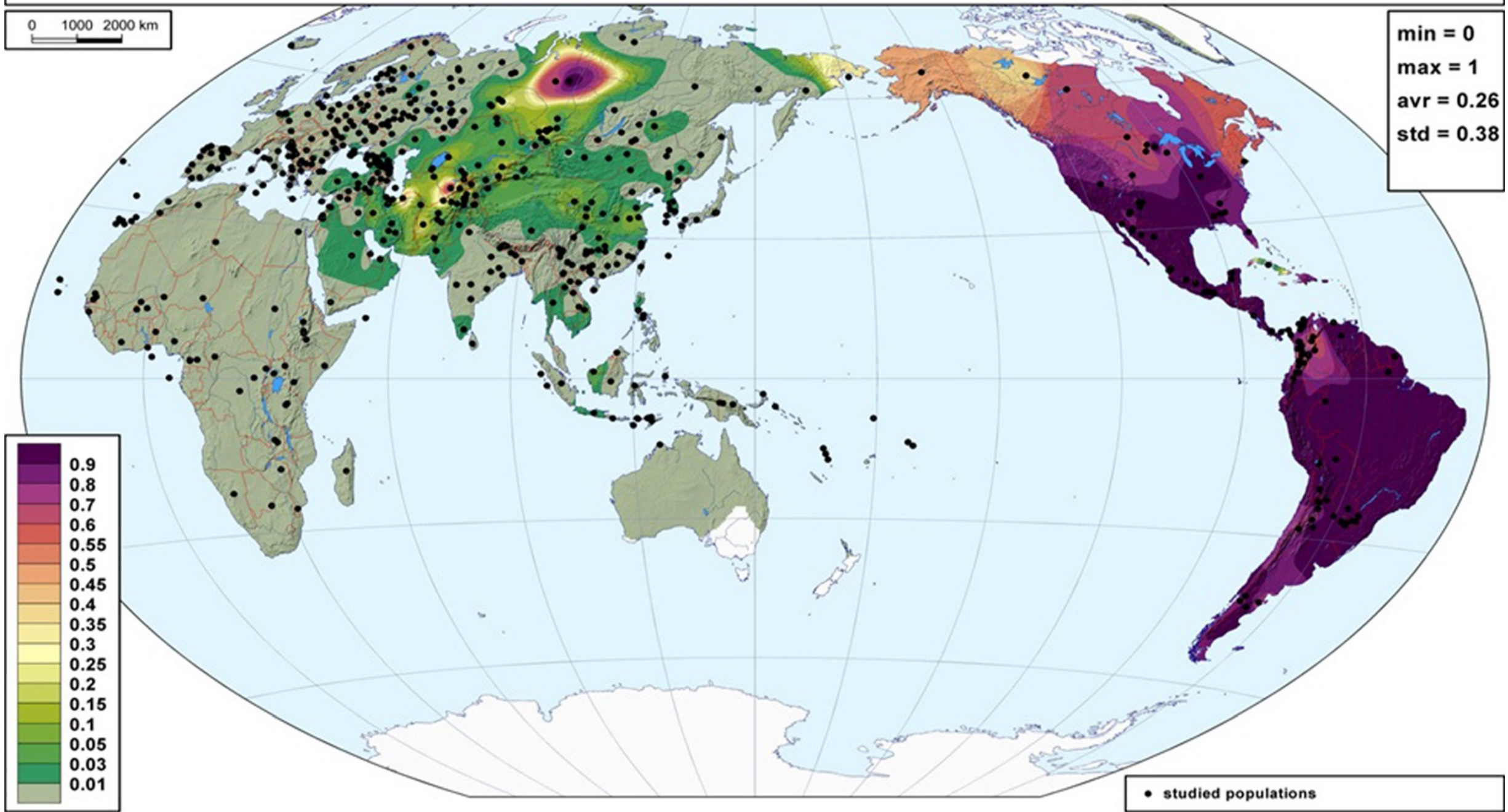
New Spain -> New Mexico -> USA

- News of Mexican independence from Spain in 1820 took many months to reach the hinterlands of Santa Fe
- Biggest change with new regime was trade with the US
- Lots of traders from the east along the Santa Fe Trail from Independence Missouri
- Abiquiu became the trailhead for trade between New Mexico and California "Old Spanish Trail"
- US invaded New Mexico in 1846
- Railroad arrived in 1870 – ended centuries of isolation
- An avalanche of cash & manifest destiny followed

First People in North America


Komsa
Ahrensburg
Kostenki
Mal'ta
Aurignacian
Emiran
Clovis
60°N
30°N
0°
30°S
150 kya
125
100
75
50
25
0
Eem
OOA
LGM
Holocene

The distribution of the Y-chromosomal haplogroup Q-M242



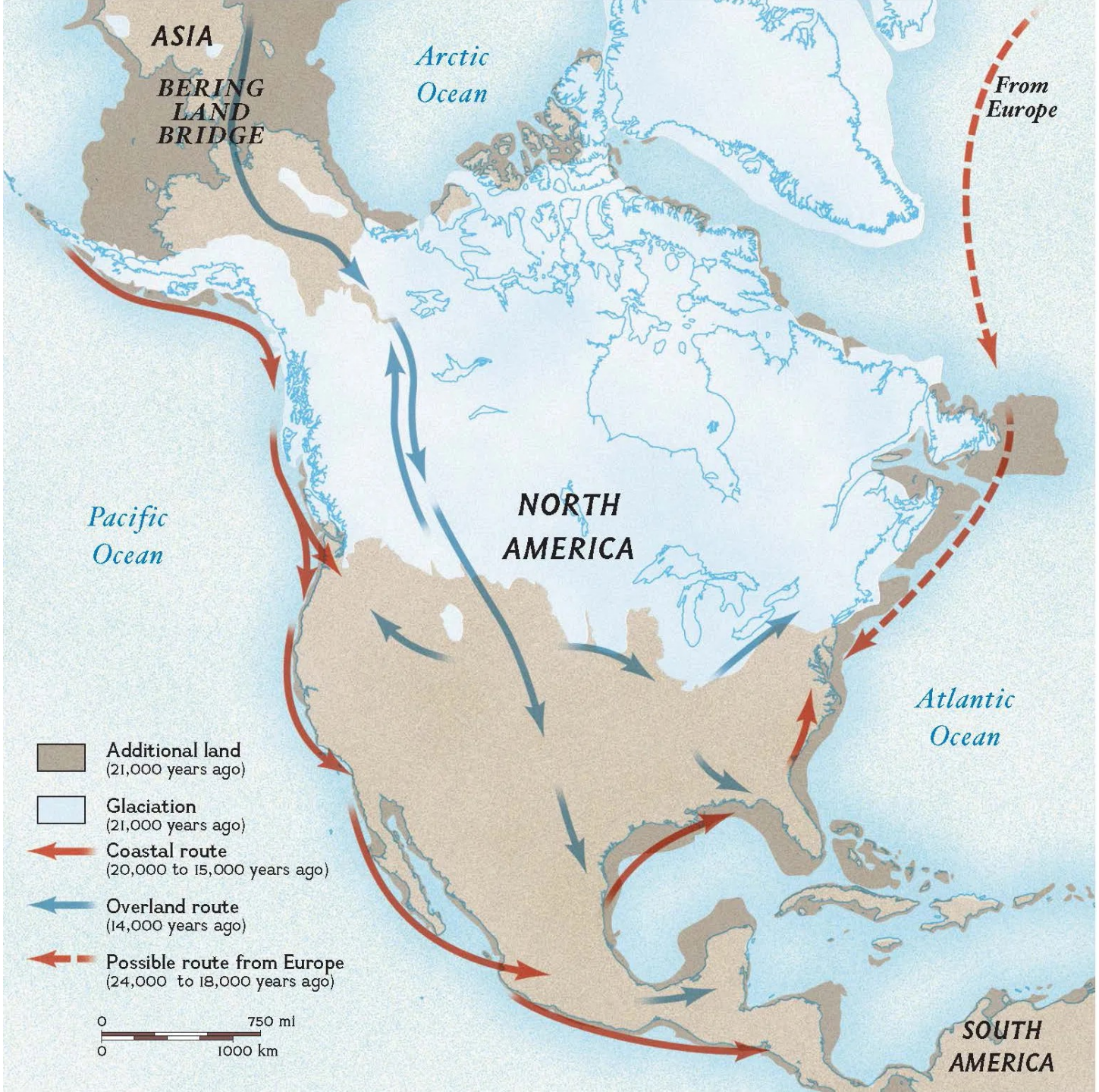
White Sands, NM 23k to 21k years ago

HUMAN EVOLUTION

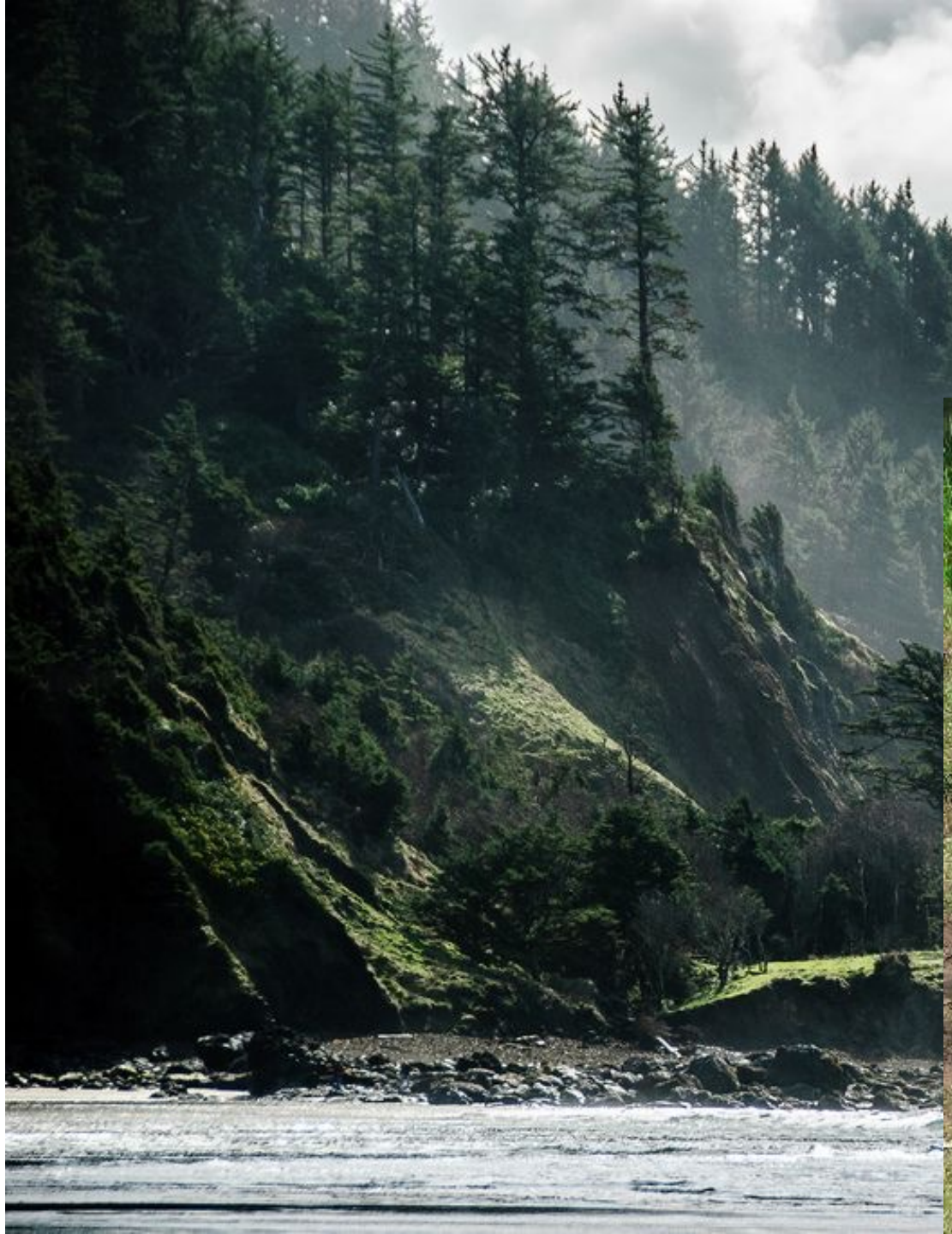
Independent age estimates resolve the controversy of ancient human footprints at White Sands

Jeffrey S. Pigati[1]*†, Kathleen B. Springer[1]*†, Jeffrey S. Honke[1], David Wahl[2,3], Oct 2023
Marie R. Champagne[2], Susan R. H. Zimmerman[4], Harrison J. Gray[1], Vincent L. Santucci[5],
Daniel Odess[6]‡, David Bustos[7], Matthew R. Bennett[8]

Human footprints at White Sands National Park, New Mexico, USA, reportedly date to between ~23,000 and 21,000 years ago according to radiocarbon dating of seeds from the aquatic plant *Ruppia cirrhosa*. These ages remain controversial because of potential old carbon reservoir effects that could compromise their accuracy. We present new calibrated ^{14}C ages of terrestrial pollen collected from the same stratigraphic horizons as those of the *Ruppia* seeds, along with optically stimulated luminescence ages of sediments from within the human footprint–bearing sequence, to evaluate the veracity of the seed ages. The results show that the chronologic framework originally established for the White Sands footprints is robust and reaffirm that humans were present in North America during the Last Glacial Maximum.


ASIA
BERING LAND BRIDGE
Arctic Ocean
From Europe
Pacific Ocean
NORTH AMERICA
Atlantic Ocean
SOUTH AMERICA
Additional land (21,000 years ago)
Glaciation (21,000 years ago)
Coastal route (20,000 to 15,000 years ago)
Overland route (14,000 years ago)
Possible route from Europe (24,000 to 18,000 years ago)
0 750 mi
0 1000 km


“You go first!”




Tagish
Gitksan
Nisga'a
Tsimshian
Haida
Kwakiutl
Nuxalk
Coast Salish
Nuu-chah-nulth
Northwest Coast
Native Territory

Kelp Forest Community

1. Norris Top Snail
2. California Sheephead
3. Giant Kelpfish
4. Sea Mussels
5. Sea Otter
6. Giant Kelp
7. Kelp Bass
8. Rockfish
9. Garibaldi Fish
10. Pacific Jack Mackerel
11. California Sea Lion
12. Brittle Star
13. Red Algae
14. Abalone
15. Sea Urchin
16. Sunflower Sea Star
17. Sea Hare
18. Polychaete Worm

LETTER

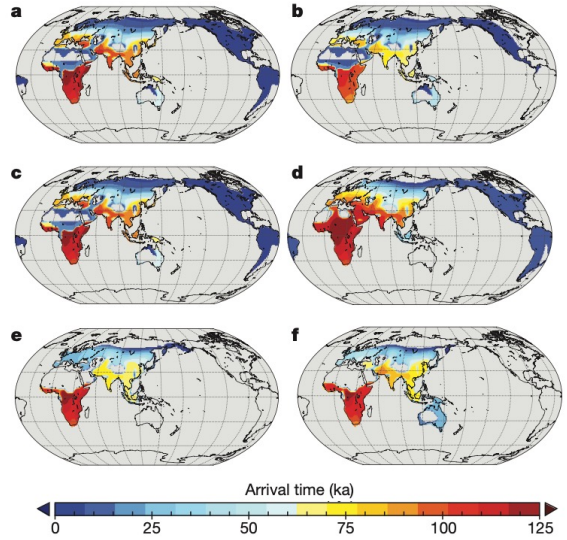
Nature, 2016

doi:10.1038/nature19365

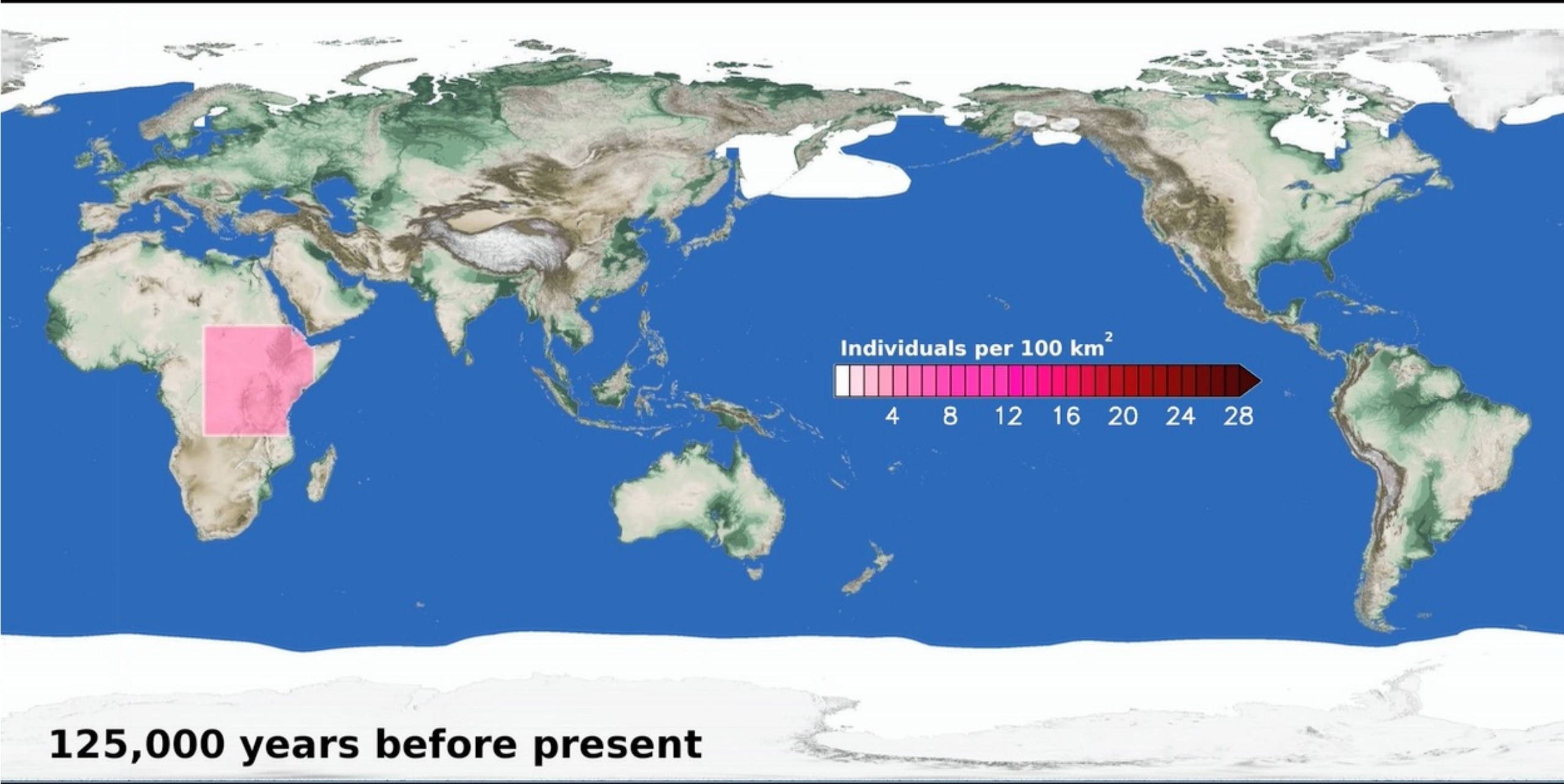
Late Pleistocene climate drivers of early human migration

Axel Timmermann[1,2] & Tobias Friedrich[1]

RESEARCH LETTER

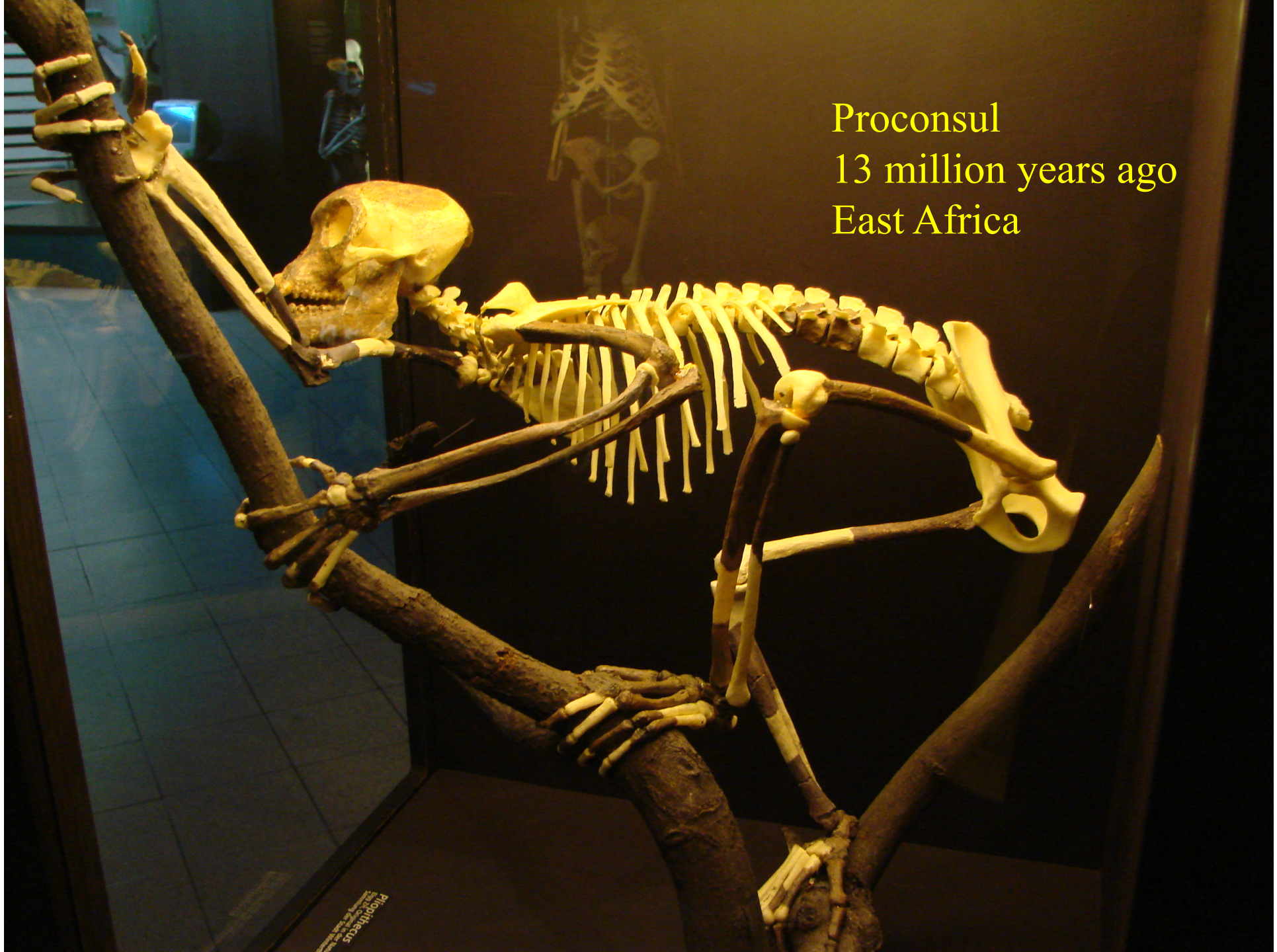


- Climate models of the late ice age and deglaciating world
- Predict seasonal temperature and precipitation in each grid cell
- Use T & precipitation to estimate plant productivity
- People start in East Africa (5 people per 6x6 miles!)
- People can only move through grid cells where there's food


Individuals per 100 km²
4
8
12
16
20
24
28
125,000 years before present

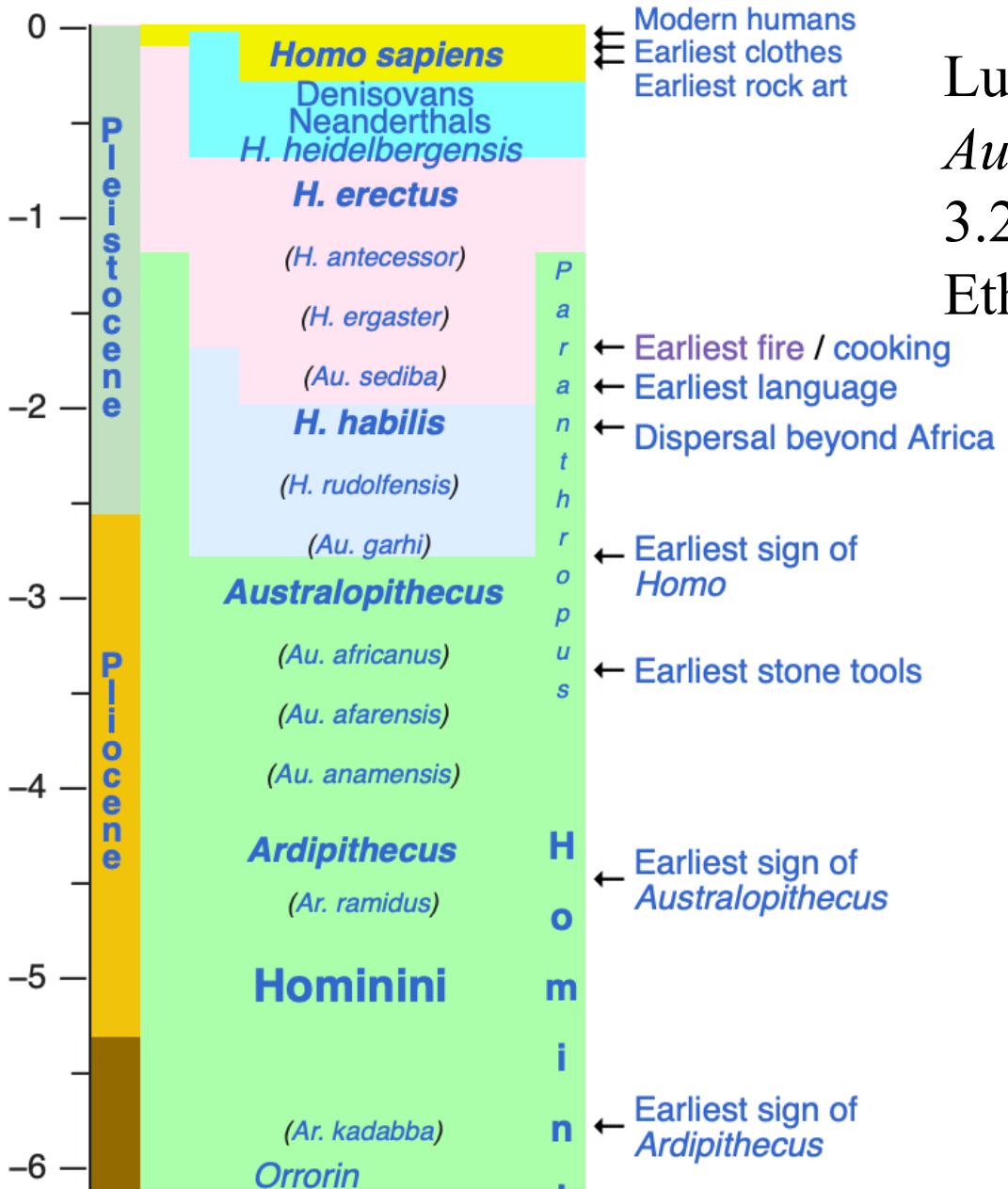
Today's Hominoids Share a Common Ancestor

Gibbon Human Chimpanzee Gorilla Orangutan

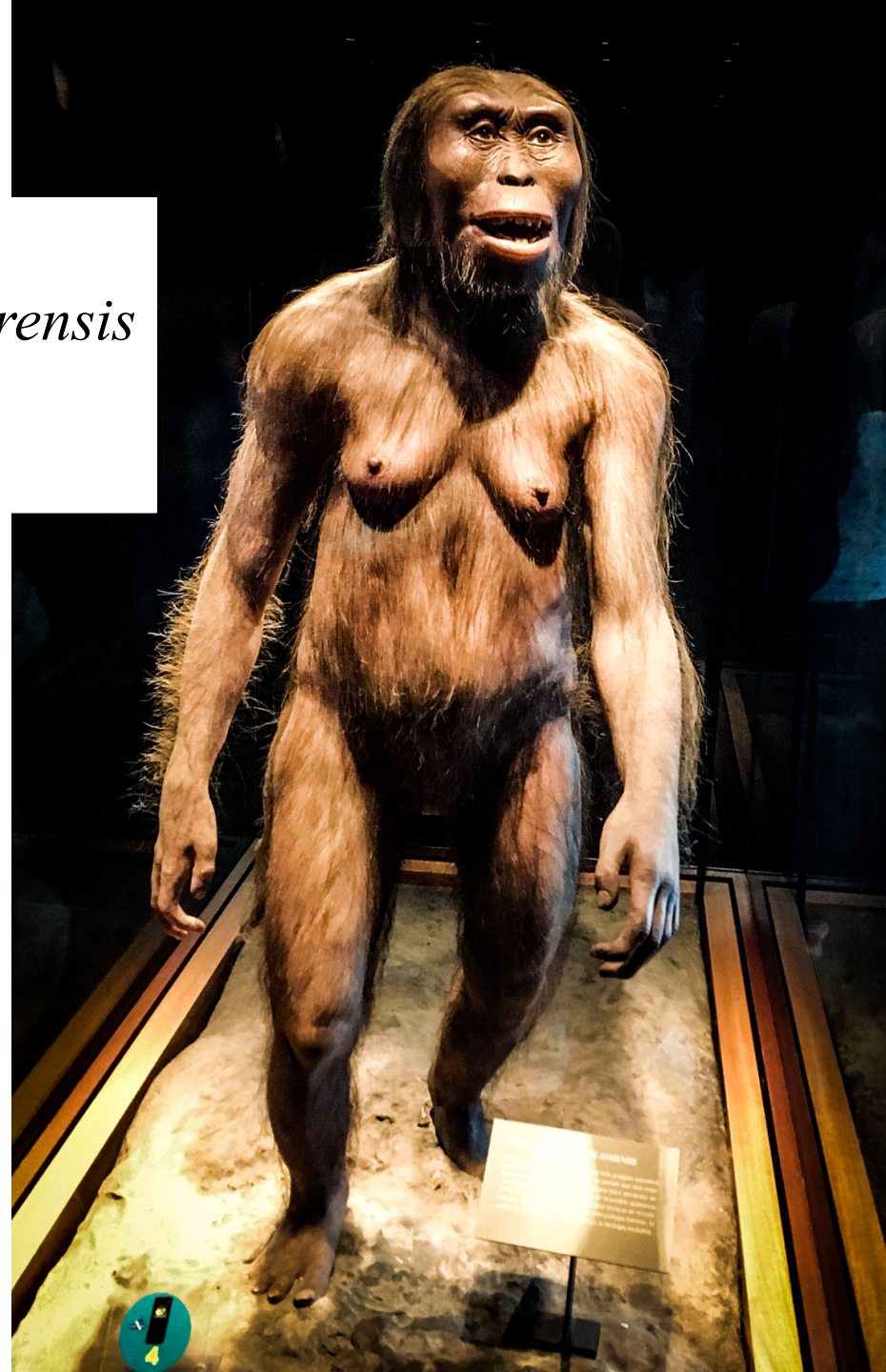

Proconsul
13 million years ago
East Africa

Hominin timeline

This box: view · talk · edit

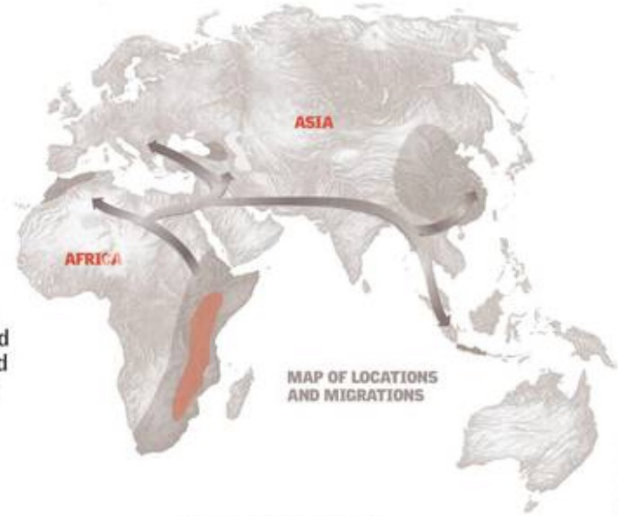


Lucy Dink'inesh
Australopithecus afarensis
3.2 million years ago
Ethiopia



Homo habilis and homo erectus

The emergence of Homo habilis, which had a more humanlike appearance than Australopithecus, in eastern Africa showed important anatomical modifications that allowed advancement, especially in the creation of various stone tools, such as flaked pebbles for cutting and scraping and even hand axes. The bipedal posture for locomotion was established, and the first signs of language appeared. Stone technology became possible thanks to the notable increase in brain size in Homo habilis. In turn, the anatomic development of Homo erectus facilitated its migration toward areas far from its African origins, and it appears to have populated Europe and Asia, where it traveled as far as the Pacific Ocean. Homo erectus was capable of discovering fire, a vital element that improved human nutrition and provided protection from the cold.



MAP OF LOCATIONS AND MIGRATIONS

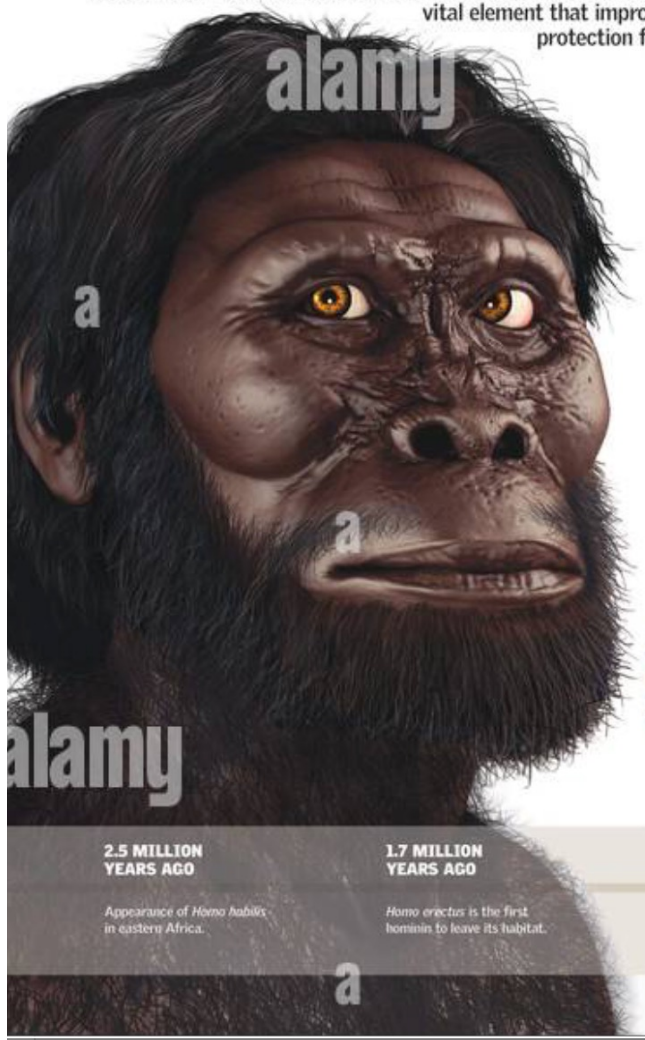
HOMO HABILIS HOMO ERECTUS

Homo erectus

› The "erect man" is native to East Africa, and its age is estimated at 1.8 million years. It was the first hominin to leave Africa. In a short time it populated a great part of Europe. In Asia it reached China to the east and the island of Java to the southeast. Much of what is known about this species was learned from a finding called Turkana Boy near Lake Turkana, Kenya, in 1984. This species was tall and had long limbs. The brain of this specimen was larger than that of *Homo habilis*, and it could have made the fundamental discovery of making fire.

COMPARATIVE SIZES

HOMO HABILIS	HOMO ERECTUS	HOMO SAPIENS
5 FEET (1.3 M)	5.3 FEET (1.6 M)	6 FEET (1.8 M)



Homo habilis

› The appearance of *Homo habilis* in eastern Africa between 2 and 1.5 million years ago marked a significant advancement in the evolution of the human genus. The increased brain size and other anatomical changes together with the development of stone technology were substantive developments in this species, whose name means "handy man." Although it fed on carrion, it was still not capable of hunting on its own.

THE BRAIN

The cranial cavity of *Homo habilis* was larger than that of *Australopithecus*, reaching a cerebral development of between 40 and 50 cubic inches (650-800 cu cm). It is believed that this characteristic was key in developing the capacity of making tools, considering that it had half the brain size of modern humans.

1 **CARVING**
The first step was to select rocks and scrape them until sharp.

2 **REMOVING**
A "stone hammer" was used to sharpen the edges of the tools.

THIS CARVED ROCK IS THE OLDEST KNOWN TOOL.

ARCHAEOLOGICAL FINDINGS

The first being known as *Homo habilis* was found in 1964 in the Olduvai Gorge, located in the Serengeti Plain (Tanzania). The later discovery of the Turkana Boy (Kenya) revealed many of the physical particularities of *Homo erectus*.

SKULL OF *HOMO HABILIS* FOUND IN OLDUVAI (TANZANIA)

SKULL OF *HOMO ERECTUS* FOUND IN KOOBI FORA (KENYA)

FIRE

One of the major discoveries in the evolution of humans. It was used not only for protection from the cold but also to treat wood and cook food. The first evidence of the use of fire is some 1,500,000 years ago.

HOMO ERECTUS

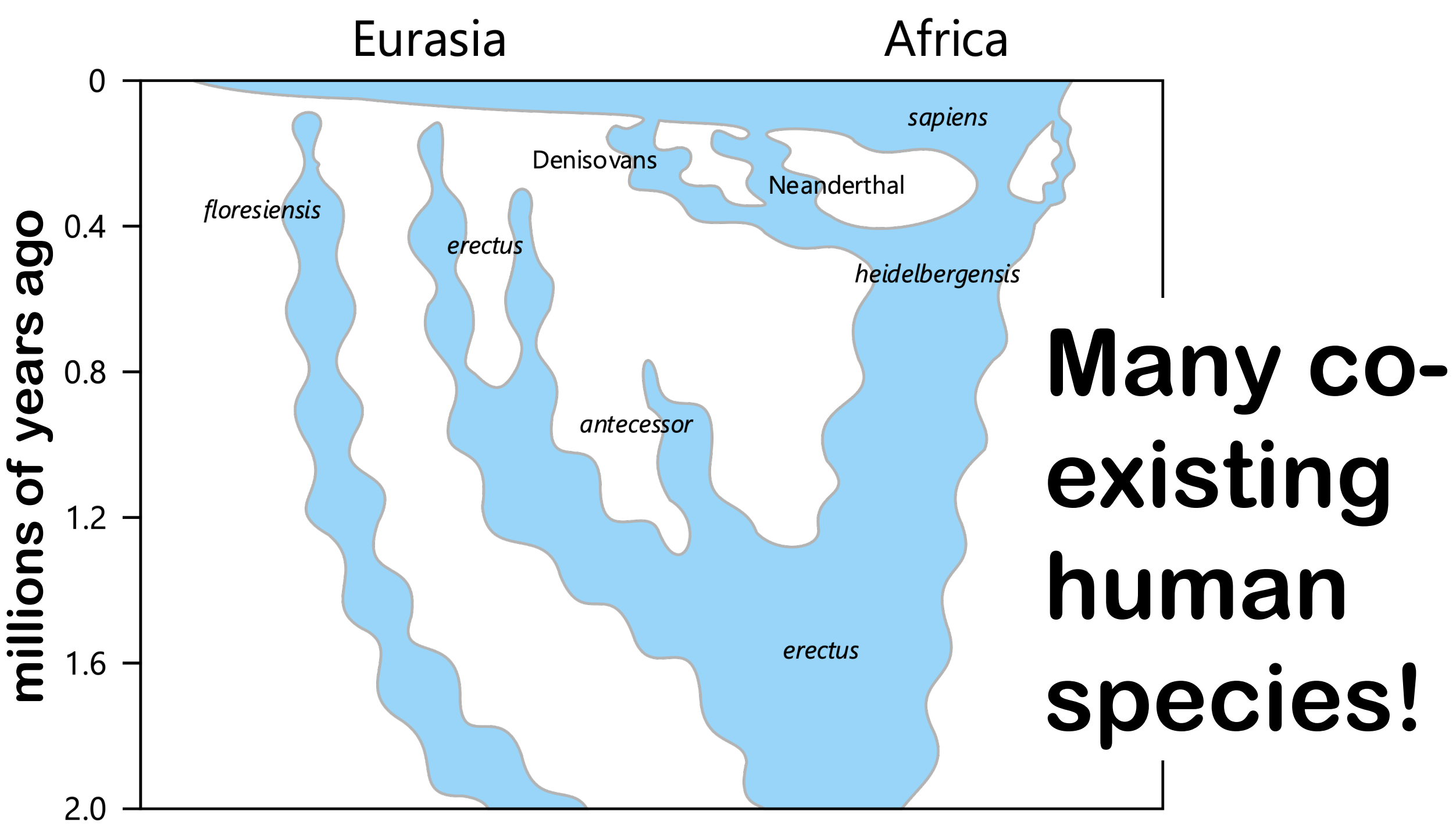
HAND AX IN THE SHAPE OF A DROP

2.5 MILLION YEARS AGO
Appearance of *Homo habilis* in eastern Africa.

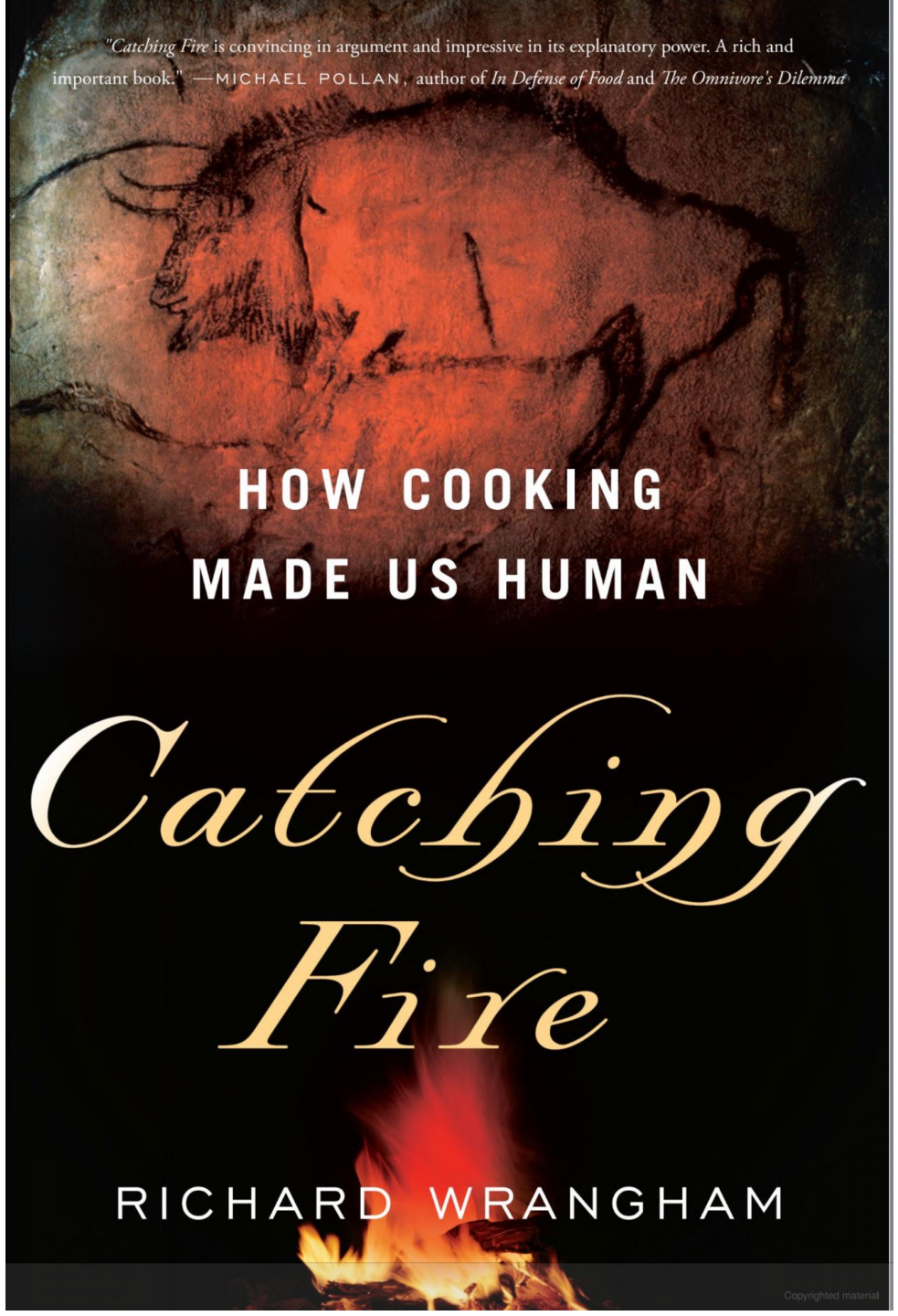
1.7 MILLION YEARS AGO
Homo erectus is the first hominin to leave its habitat.

1.6 MILLION YEARS AGO
Homo habilis disappears because of unknown causes.

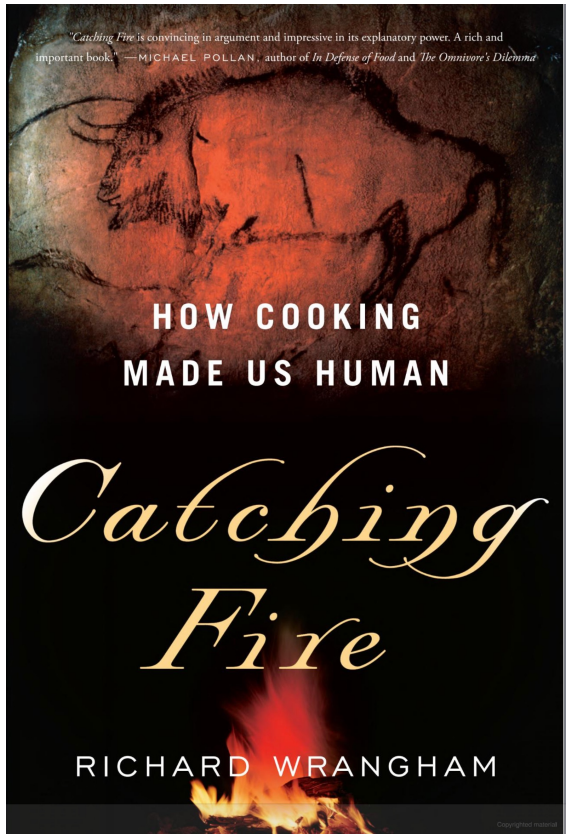
ABOUT 1.5 MILLION YEARS AGO
First use of fire by *Homo erectus*, in southern Africa



Many co-existing human species!

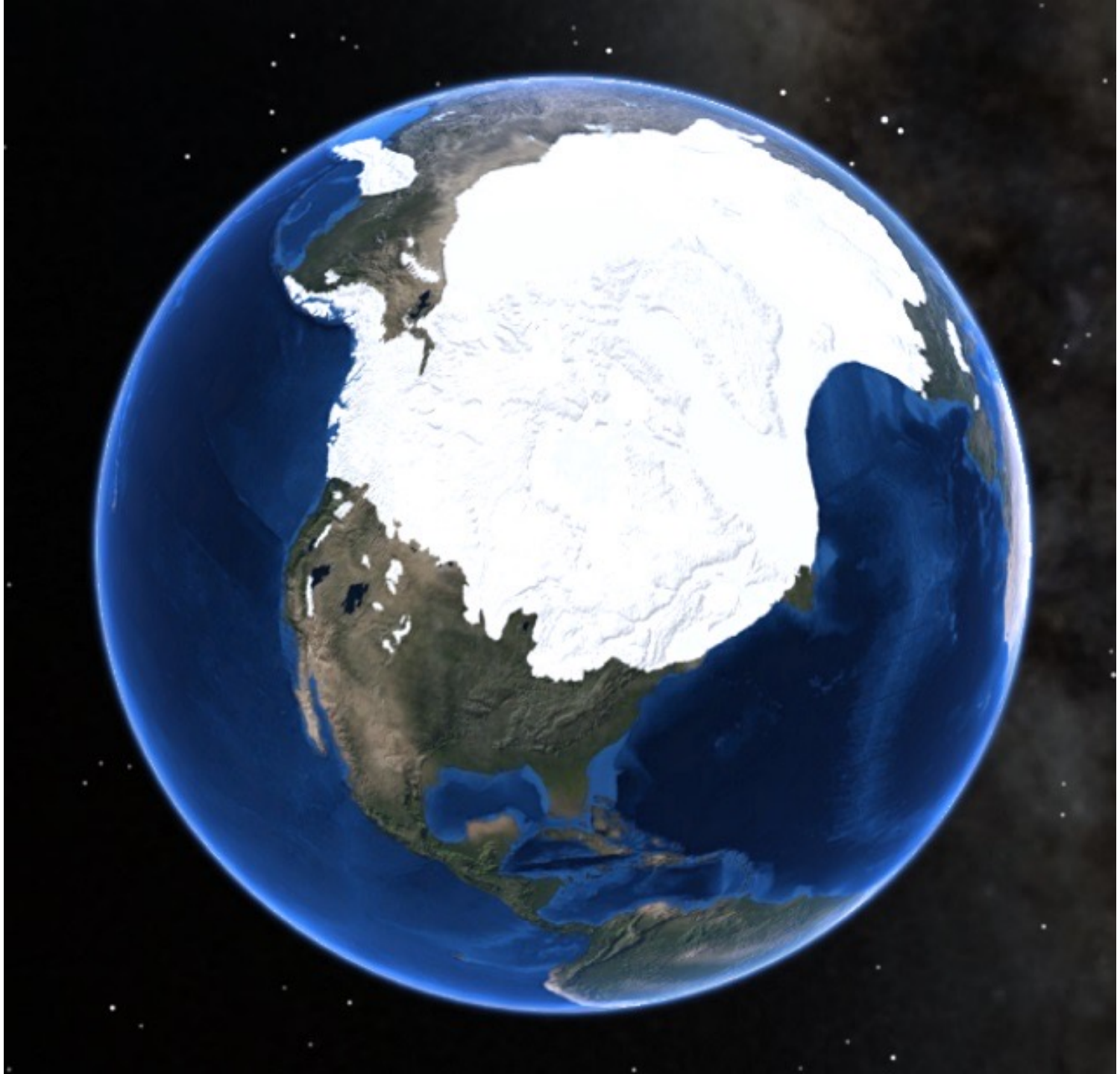


Published in 2009



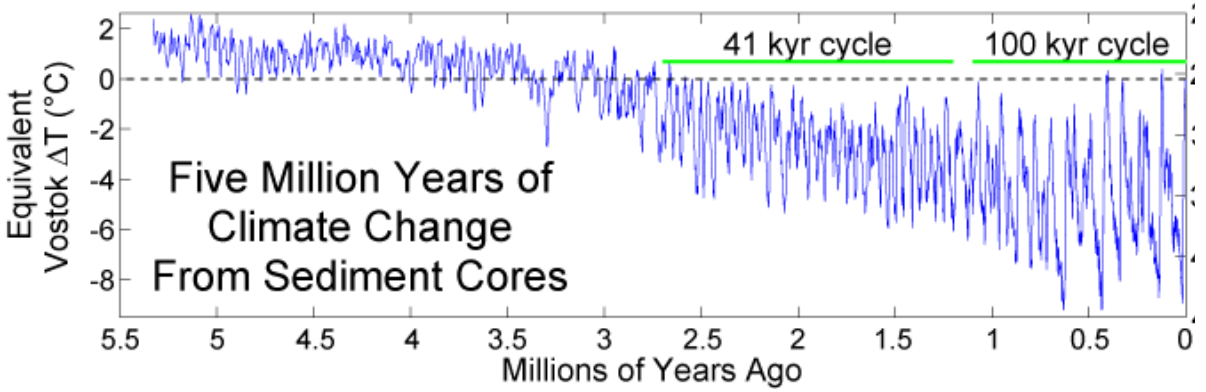
- Digestion of enough raw tubers and forest fruits for maintenance requires chewing 8 hours a day!
- Meat is more calorie dense but hunting is too risky – spend all day hunting and come back hungry, and it's too late to chew enough plants to make up the caloric deficit
- Leaving tubers by the fire softened them & made them quickly digestible
- Outsourcing digestion allowed H. habilis to lose half its gut and quickly become H erectus
- Losing half the gut saved more than 10% of daily calories for gut maintenance, freed up energy to grow the brain

- Cooking plants facilitated division of labor, cooperation, social organization
- Foragers gathered plants & cooked them; hunters sought meat but had cooked plants as a fallback when the hunt failed
- Cooked food was shared by an extended family around a settled hearth/home
- Increased meat & steady caloric intake converted gut maintenance to brain growth
- Ultimately led to production of tools, social networks, and agriculture



6. Brrrr!

Past 2 million years



- Not “the” Ice Age – 20 of them!
- Ice grows for 90k years …
- Then melts for 10k years …
- Then grows again!

- First time in NH?

Next Up: Geology & Paleontology

- Paleozoic: “Old Life”
  - Oceans to land
  - Ended (badly!) 252 million years ago
- Mesozoic: “Middle Life”
  - Age of the Dinosaurs
  - Nearly all the rocks at Ghost Ranch
  - Ended (badly!) 66 million years ago
- Cenozoic: “New Life”
  - Age of the Mammals
  - Progressive cooling & drying