

Homo sapiens Corridor

Cradle of our species & emergence of our culture

Tracking our 200,000 year epic journey



Africa Alive Corridors

From Cape to Rio



Homo sapiens Corridor



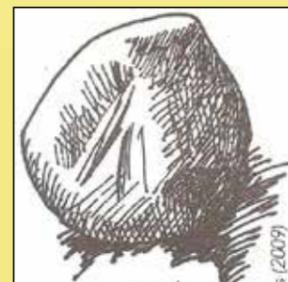
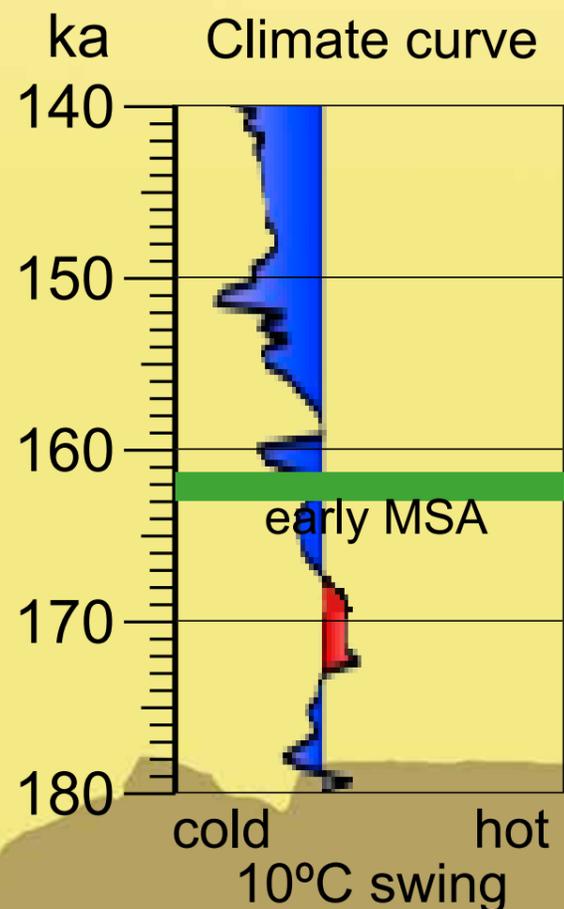
PINNACLE POINT 162,000 years ago

Earliest use of ochre, shellfish, bladelets

Of the growing number of sites along the southern Cape coast, this is perhaps the single most prolific. Discovered only recently, in 1997 by Peter Nilssen, it includes beds going back to 166,000 BP (the oldest known occupation level along the HSC Corridor). These levels yield the earliest evidence of shellfish collecting (diet), heat-treated silcrete blades (technology), & use of ochre pigment (culture).



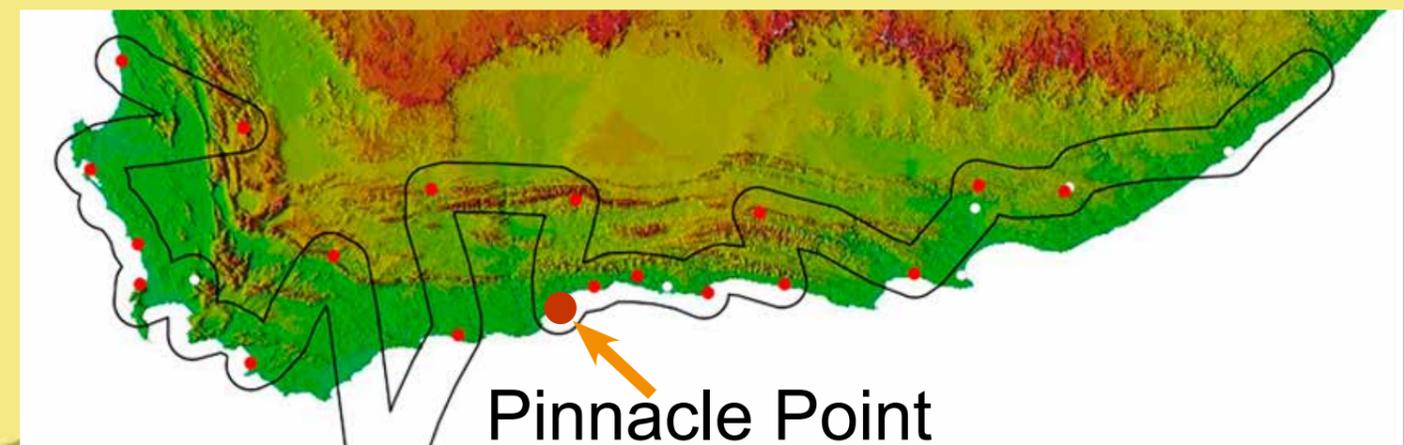
Pinnacle Point



Fire as an engineering tool



Typical seashells collected from Pinnacle Point



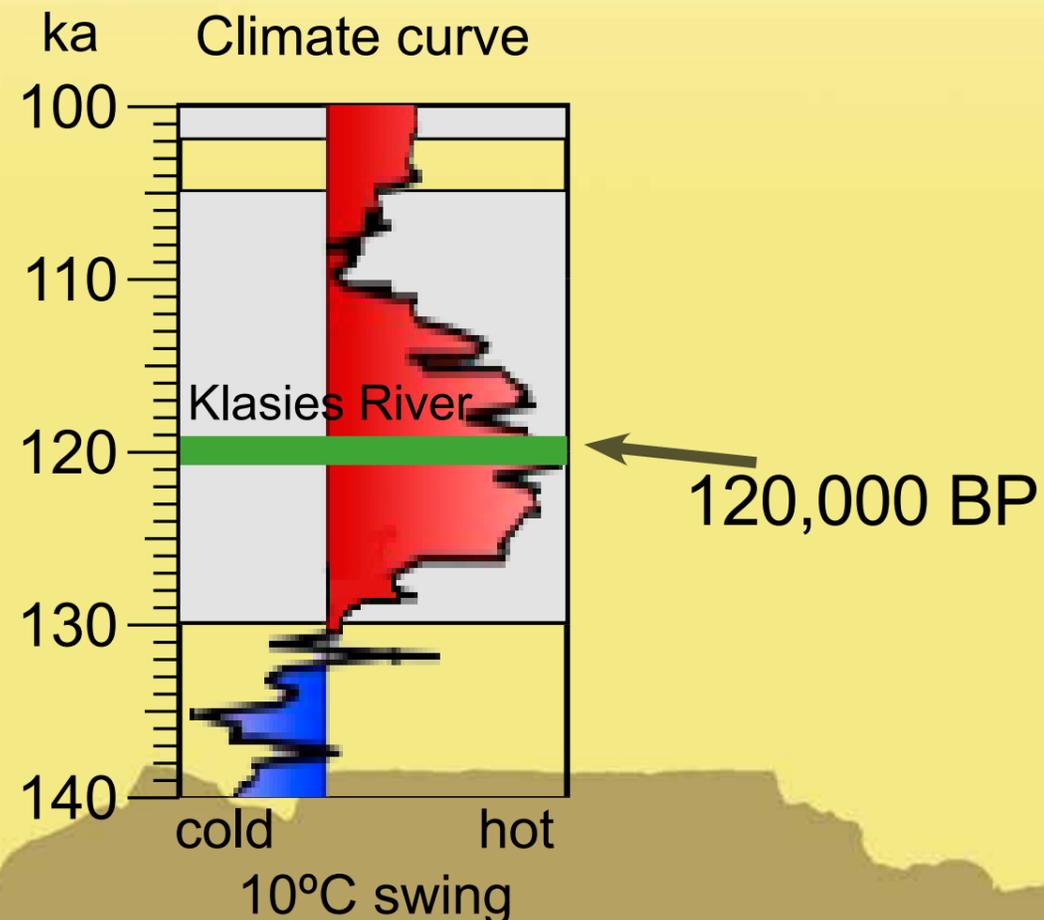
LANGEBAAN 120,000 years ago

Earliest known human footprints

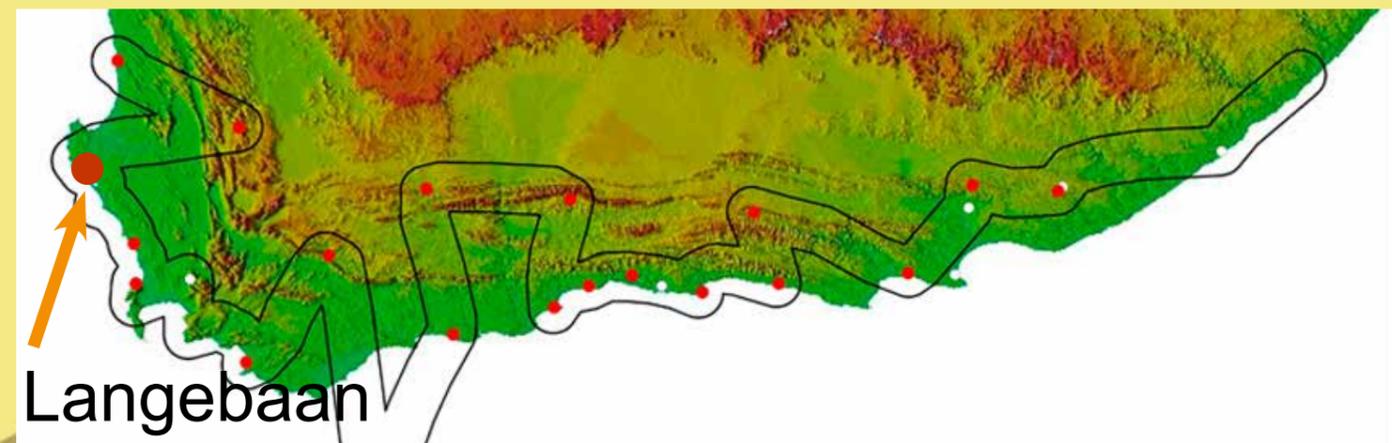
Langebaan, with our earliest known human footprints dating to 120,000 years ago is of the greatest interest. They have been fondly dubbed 'Eve's footprints'. Dave Roberts, who discovered the prints, interprets them as those of a pregnant female (or one with particularly large buttocks) descending with waddling gait diagonally down the side of an ancient sand dune. It is an evocative picture.



Langebaan Lagoon



Eve's footprints



KLASIES RIVER 115,000 years ago

Earliest reliably dated *H sapiens* skeletal remains. It's foremost significance is that it has yielded far more early-human skeletal fragments (>30 specimens, 7 individuals) than any other site. These date to 90,000 & 115,000 BP. Interestingly, this unique sample has been attributed to cannibalism—its earliest known occurrence. The whole sequence shows that the coastal resources, e.g., shell fish & seals, were systematically exploited.



Klasies River



Klasies



2 maxillary fragments

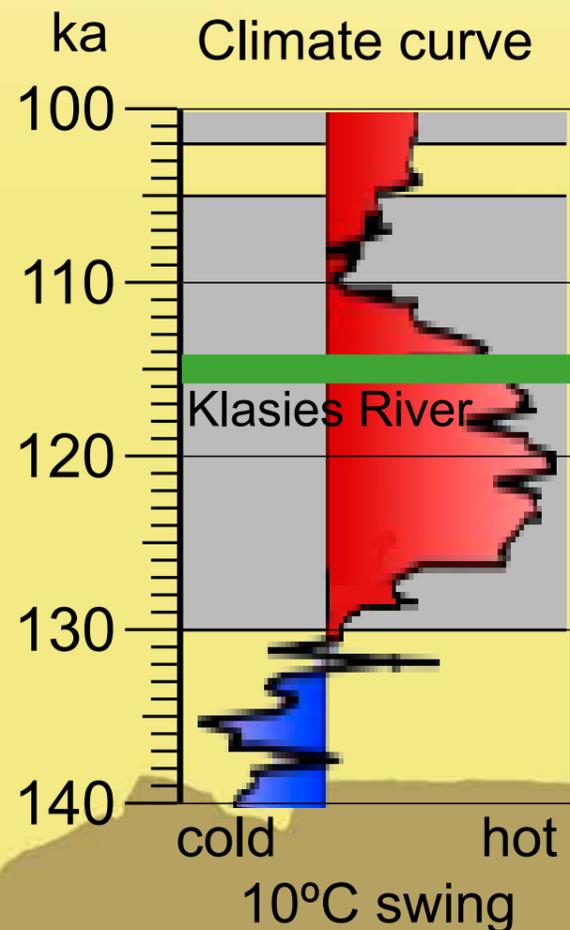
Klasies River

115,000 BP
2 individuals

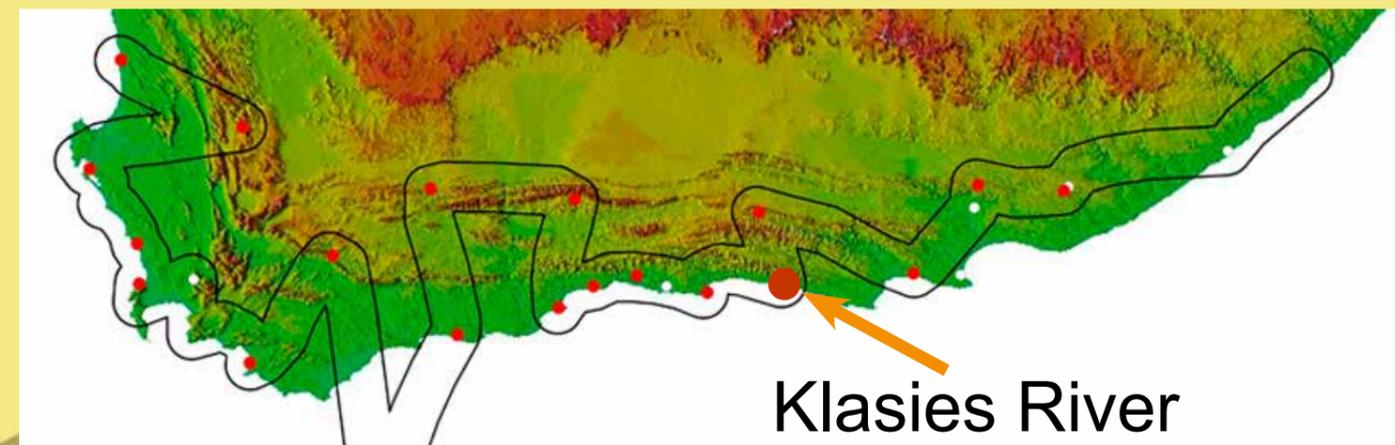


1 parietal fragment
5 mandibles
1 ulna

90,000 BP
5 individuals



115,000 BP



Klasies River

BLOMBOS CAVE 75,000 years ago

Earliest known artwork globally, cross-hatched ochre. Excavations have uncovered a series of finds opening new vistas on our behavioural evolution. From occupation levels dated ca 75 ka have come the earliest evidence of personal ornaments (a supposed shell-bead necklace) & abstract art (geometric designs on ochre & bone). And from those dated 100 ka come abalone shell containers in which were evidently mixed ochre rich pigment.



Blombos Cave



sharpened bone tool



punctured beads



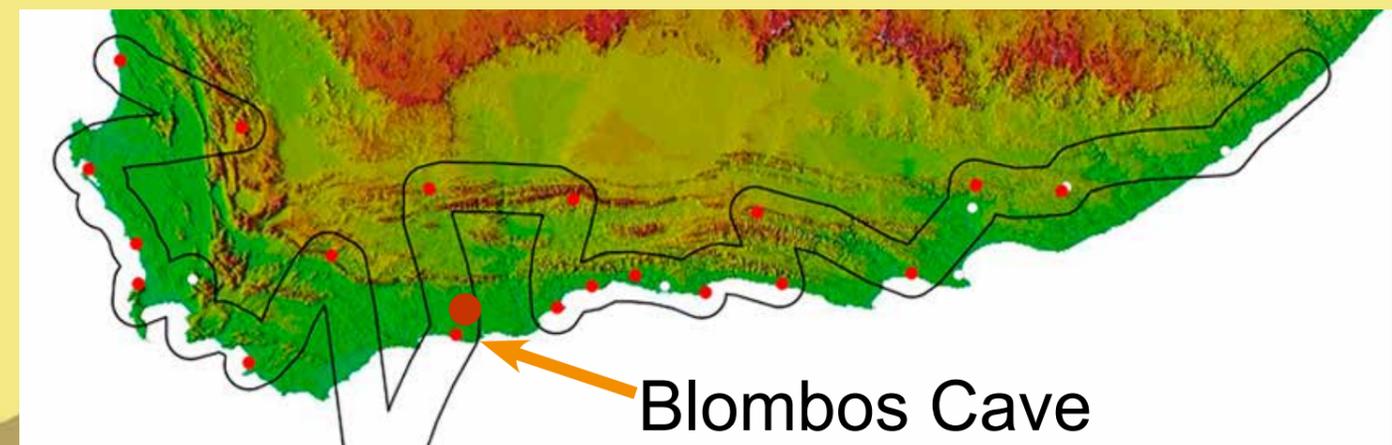
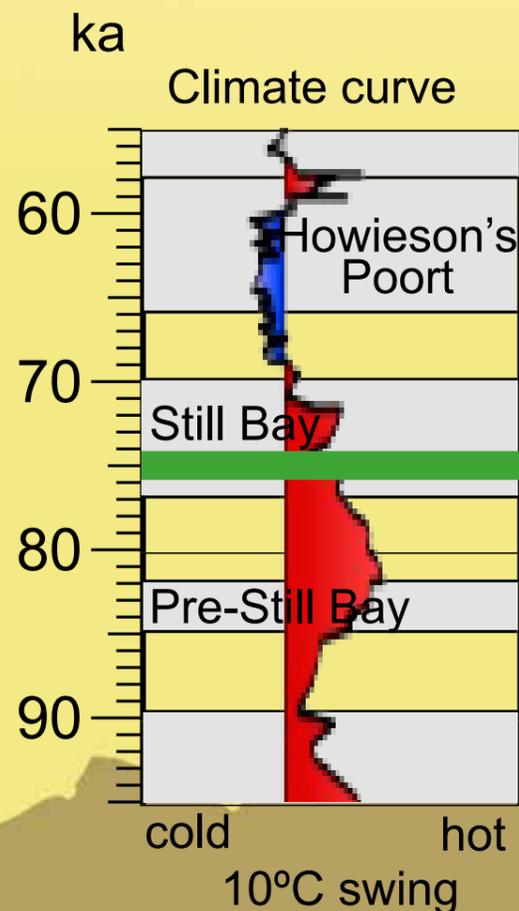
Nassarius beads



engraved ochre



75,000 BP



PINNACLE POINT 71,000 years ago

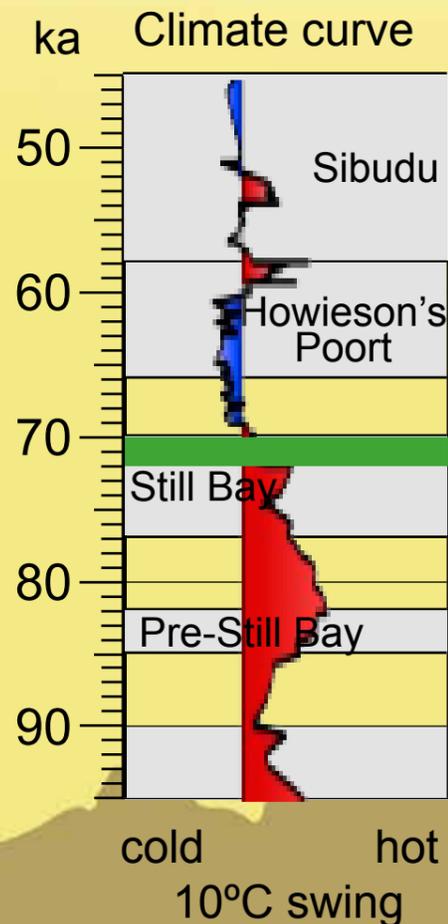
Earliest evidence of the **bow & arrow**.

Of the growing number of sites along the southern Cape coast, this is perhaps the single most prolific. Discovered only recently, in 1997 by Peter Nilssen.

The younger 71,000 BP occupation levels have yielded the evidence for the bow & arrow.



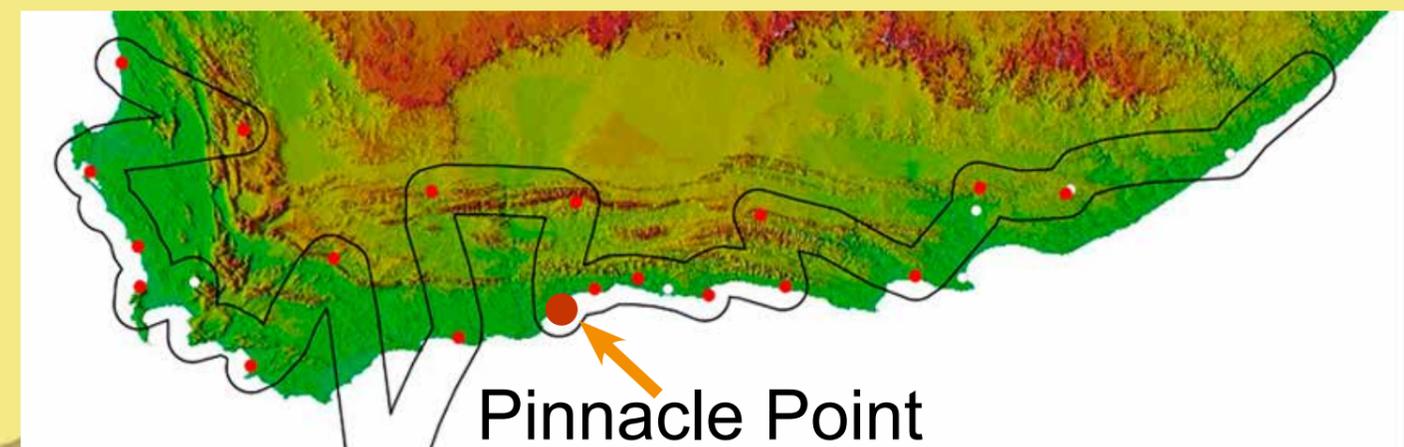
Pinnacle Point



microlithic blades made from silcrete



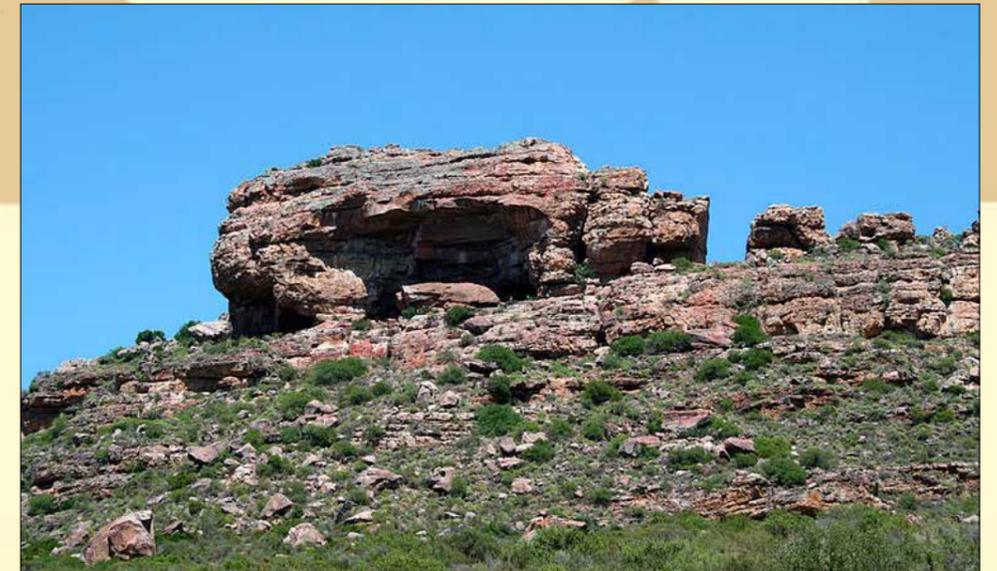
silcrete blades experimentally attached to shaft



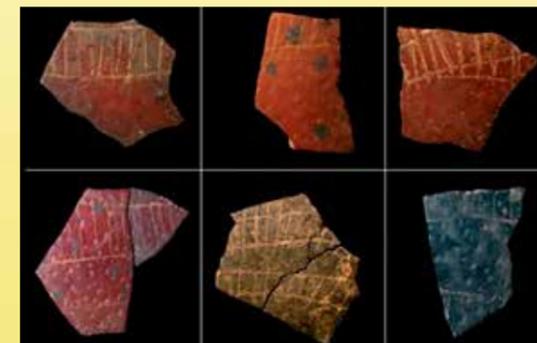
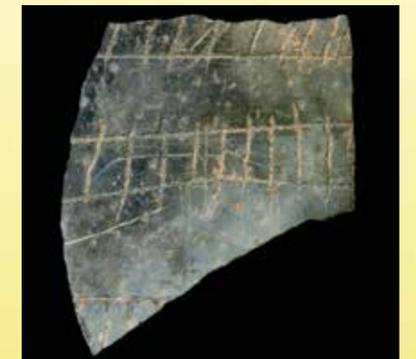
Pinnacle Point

DIEPKLOOF 60,000 years ago

Engraved ostrich eggshell water containers are at the heart of this rock shelter's significance. A unique tally of 270 fragments of these EOES represent a minimum number of 25 containers. They 'appear in 18 sequential stratigraphic levels', thus representing a tradition that very likely persisted for 'several thousand years'. These are some of the earliest known symbols thought to identify individuals within a group.



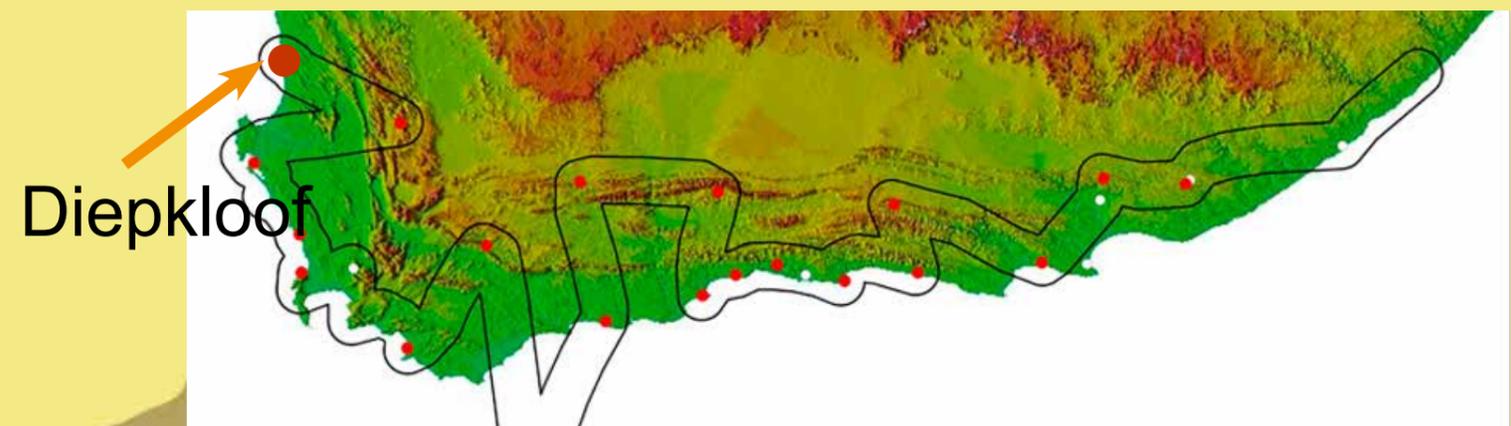
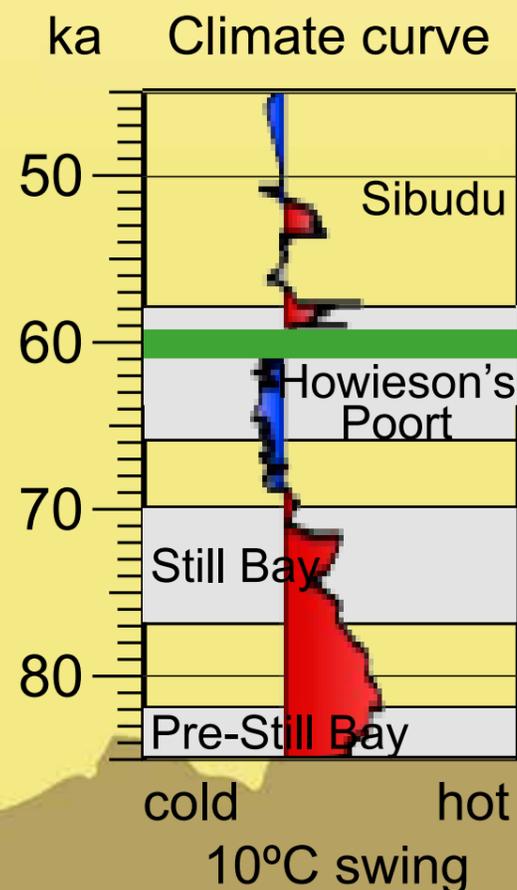
Diepkloof shelter



engraved ostrich eggshells



60,000 BP

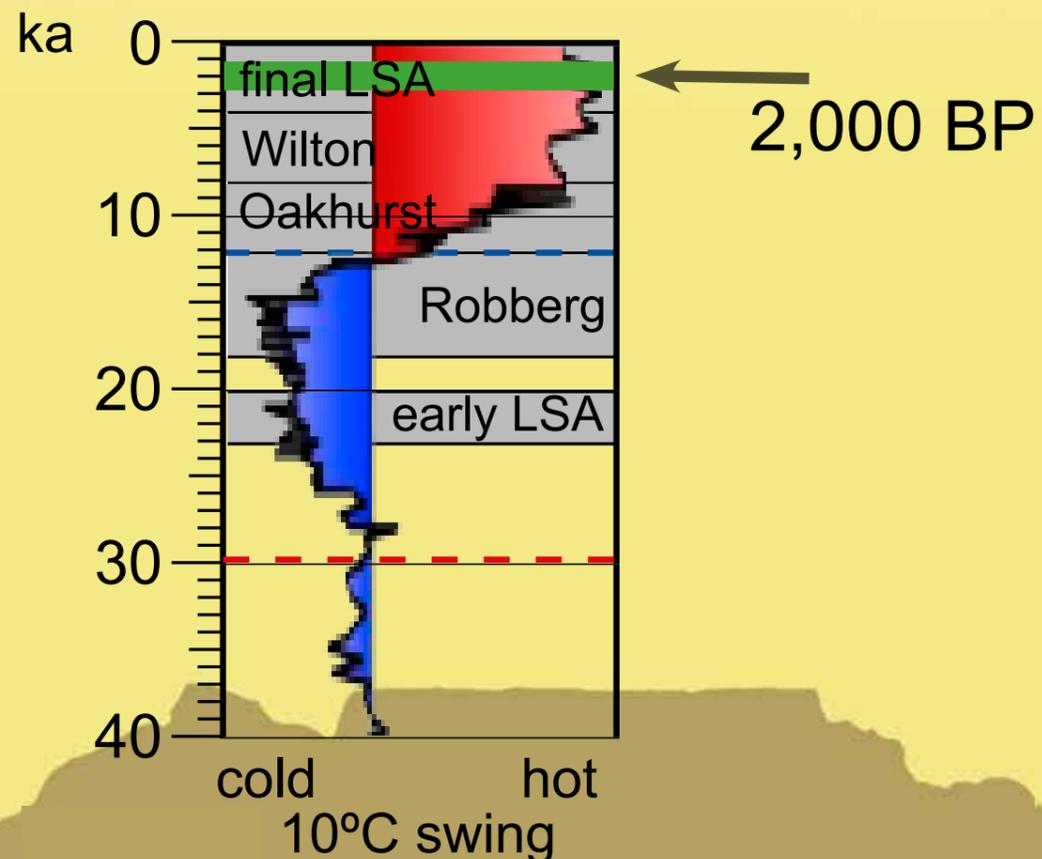


KLEIN SWARTBERG 2,000 years ago

Numerous rock-art sites depicting therianthropes. The Klein Swartberg and adjacent ranges are rich with San rock art sites. The paintings echo a world of social relationships, mythology, rituals & beliefs—offering a special glimpse of our human past. The common depiction of therianthropes—half human half animal, fish or bird—suggests the spiritual leaning of the people. Ostrich men and watermeide portray transformation during trance, altered states of consciousness.



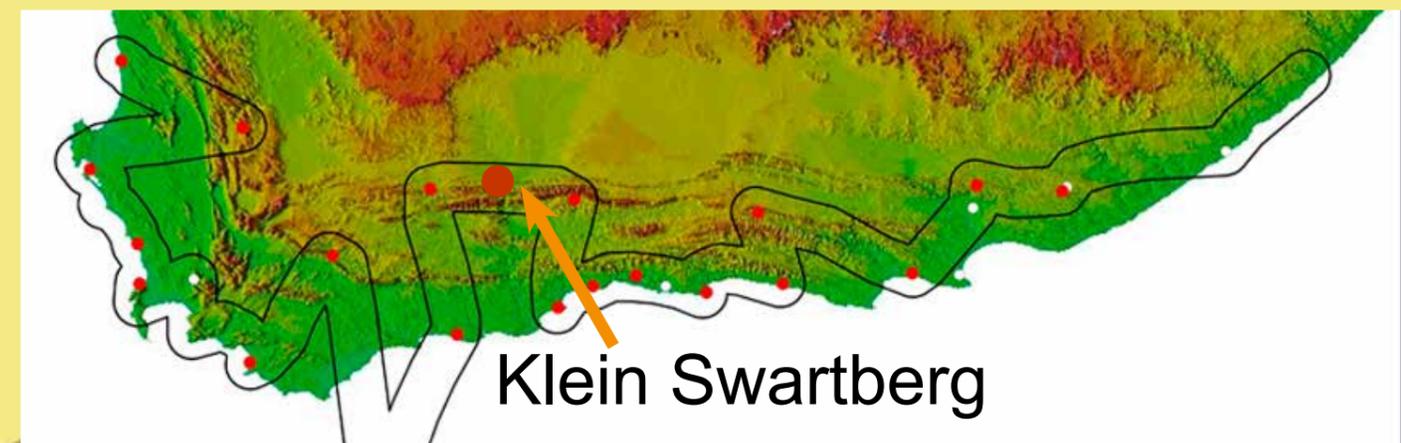
Klein Swartberg



Frieze of 24 ostrich-men



Watermeide

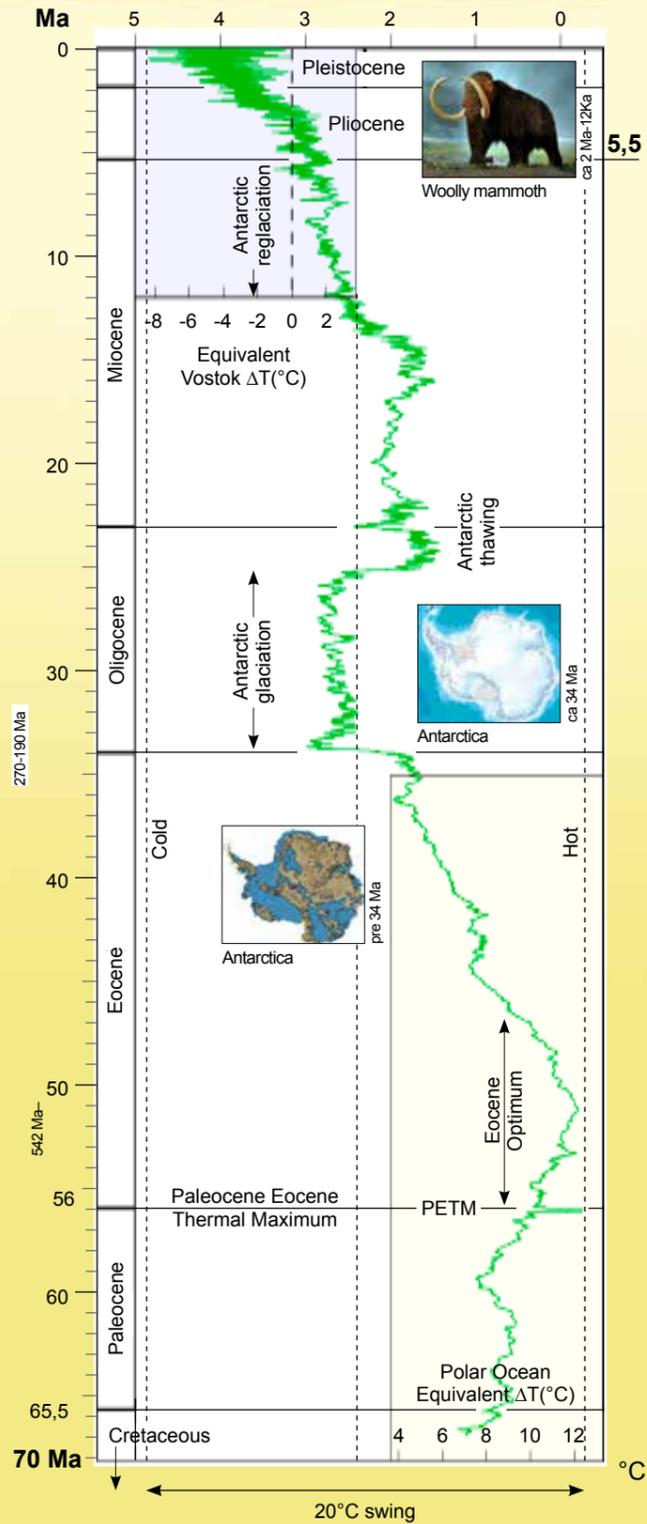


Klein Swartberg

CHANGING CLIMATE

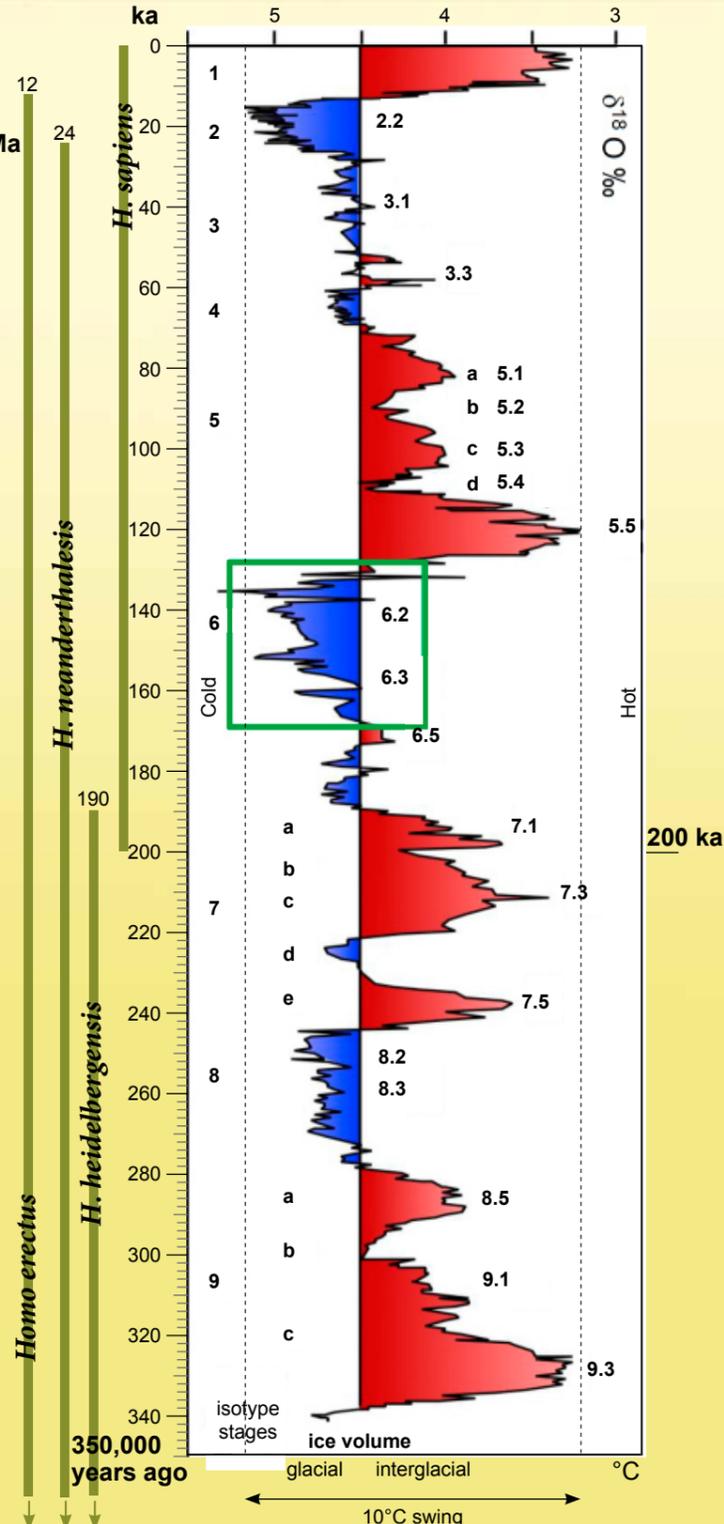
SHIFTING COASTLINES

2. The last 65 million years From dinosaurs to mammals



The dinosaurs were cold-blooded creatures & thrived in hot temperatures (a hothouse world); mammals are warm-blooded animals & thrive in cold temperatures (an icehouse world). **The mammals** became the dominant land animals after the extinction of the dinosaurs at the end of the Cretaceous (65 myr). They **have evolved to great diversity in a cooling world**—through a drop of 20°C. If things return to the hothouse world of the dinosaurs, the mammals, including ourselves, will not survive.

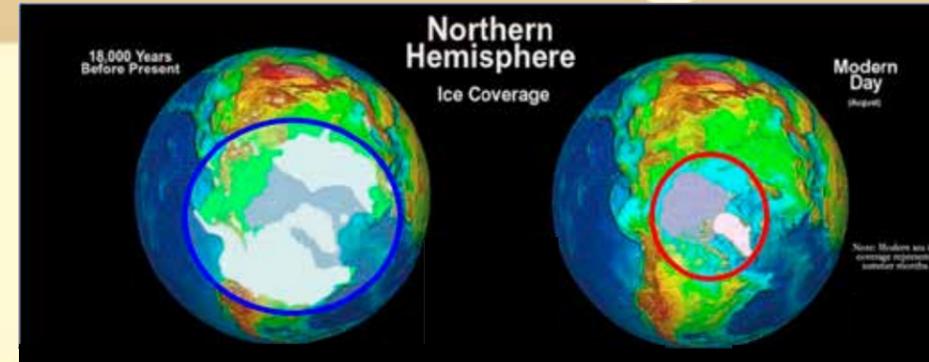
6. The last 350,000 years Across the divide to *Homo sapiens*



On this graph, we home in on **the last three major interglacial-glacial cycles**. Each spanning ca 100,000 years and reflecting a swing of ca 10°C. *Homo sapiens* (anatomically modern humans) first appeared somewhere, at around 200 ka, on the cooling curve from the interglacial MIS 7 to the glacial MIS 6. The compelling thing from this time on is how closely our major cultural breakthroughs—our genius moments—parallel the climate curve. We will consider this further in the following graph.

18,000 years ago

Today



Courtesy Richard Cowling

Glacials-interglacials

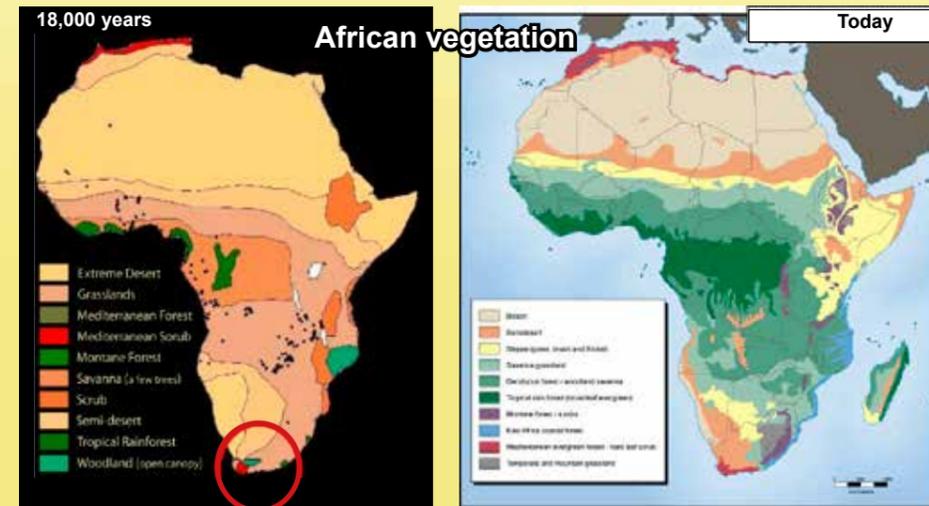
Our world is a hugely different place during glacial & interglacial epochs. At 18,000 years ago & at 135,000 years ago, the ice-caps were far more extensive than now; with the Arctic ice covering the greater part of North America and Western Europe.



Courtesy Curtis Marean

Sea-level fluctuation

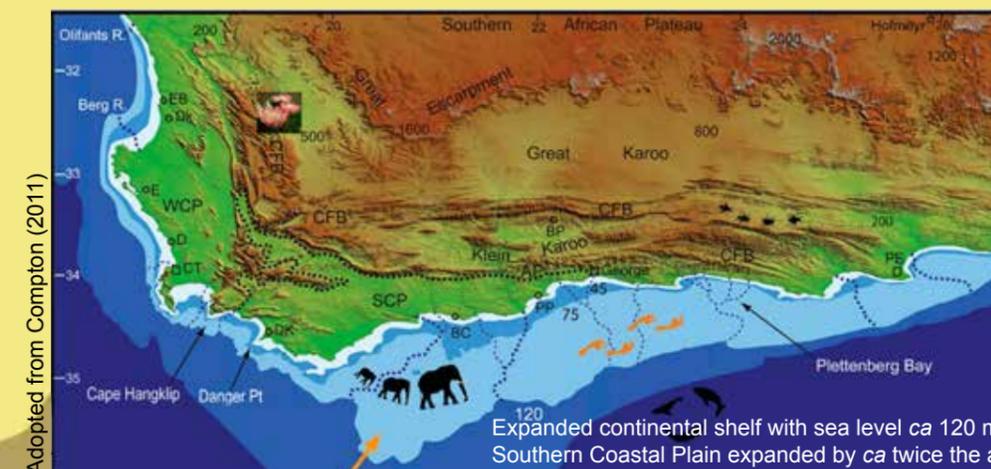
Hunter-gatherers occupying Pinnacle Point on the Cape coast during these same glacial & interglacial epochs, would have seen all-together different scenes—from landscape with a diversity of antelope to seascape with whales & seals.



Vegetation biomes

During intervals of maximum glaciation, Africa was a parched and far grimmer place for humans to eke out an existence. The Cape coastal region would have been one of the few places where the climate and food resources (terrestrial & marine) would have been manageable.

At 18 000 & again at around 138 000 years ago, the world was very different from how we know it today. The ice caps were far more extensive, the continental shelves largely exposed, the deserts way more expansive & the tropical forests much reduced.



Adopted from Compton (2011)

Expanded continental shelf with sea level ca 120 m lower than today; Southern Coastal Plain expanded by ca twice the area of the Kruger National Park

THE ANTHROPOCENE (6th EXTINCTION)

TSWAING

Asteroid impact



220,000 years ago

Pretoria, South Africa
Genetic mutation
Mitochondrial Eve
(Our mutual great-great
great granny)

TOBA

Volcanic explosion



75,000 years ago

Sumatra, Indonesia
Population bottleneck
(50 - 100,000 humans)
Bow & Arrow
Global colonisation
(1st Wave, Out of Africa)

GOBEKLI TEPE

Human megaliths



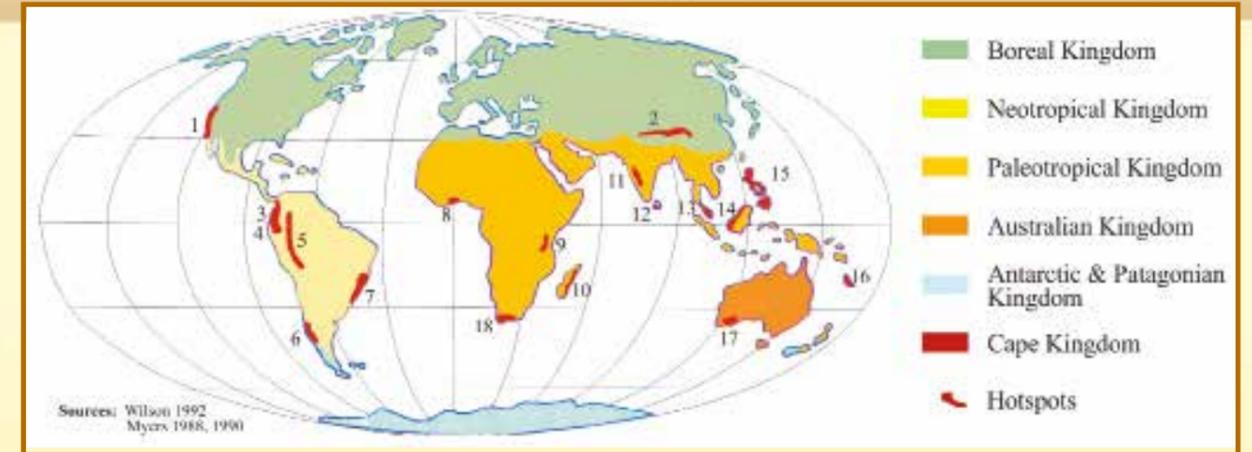
9,600 years ago

Turkey, Middle-East
Organised Religion
Towns
Farming, Domestication
Global colonisation
(2nd Wave, Out of Mid.-East)

CAPE FOLD BELT



FYNBOS



6 Plant Kingdoms Worldwide
Cape Floral Kingdom, 9,000 species
(British Isles, 3,5x larger, 1,500 species)



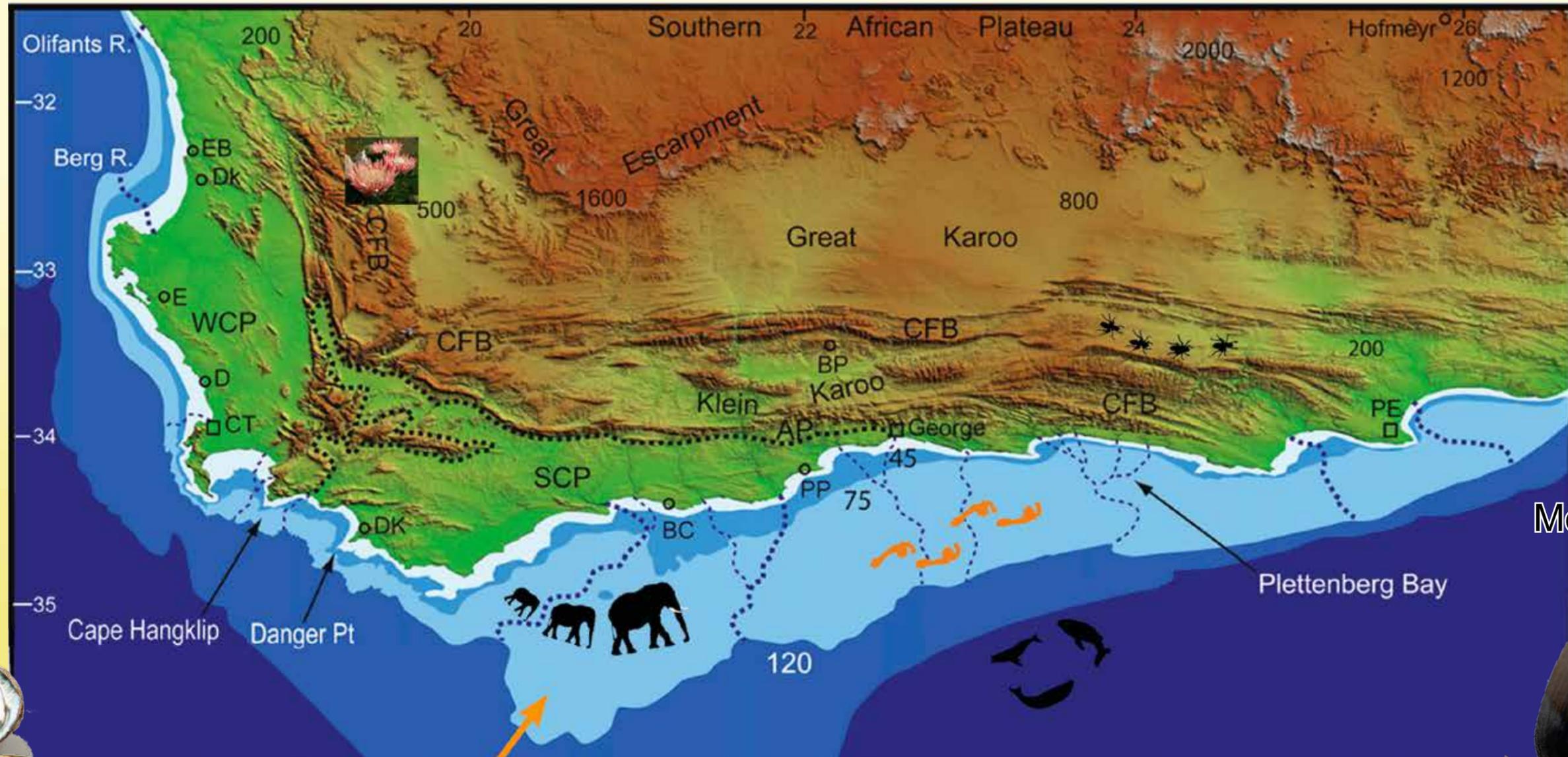
Ericaceae (*Erica*)
627 species



Proteaceae (*Protea*)
330 species

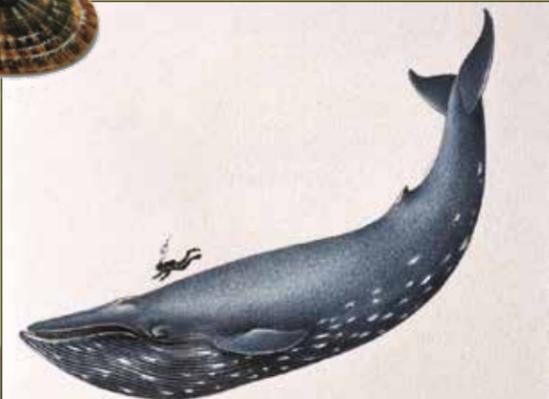
MARINE DIVERSITY

From mollucs to whales



Cold Benguella current

Warm Mosambique current



Bryde's Whale.

77
species globally



Humpback Whale

37
species SA



Southern Right Whale

Biodiversity & Extinction

Compiled by Dr John Anderson
Layout by Waldo Swart

This is an introduction to a 12-part series. We explore the stunning richness of life on Earth, and the head-on collision between one species - us - and the rest of nature.

From the printing press to biodiversity Six giant steps from the Middle Ages to the Information Age

1454: Printing press

Johannes Gutenberg

It was my press that propelled us along two opposite tracks. The first was to knowledge (like evolution and biodiversity). The second was to our exploding population (and the extinction of biodiversity). Ironic!



1543: Scientific revolution

Nicolaus Copernicus

Within 100 years of the printing press, came the Scientific Revolution. An entirely new way of seeing the world and the universe emerged. It began when I discovered that the Earth is not the centre of the universe.



1735: Names and classifications

Carolus Linnaeus

I came around and gave binomial names (genus and species) to plants and animals, including us: *Homo sapiens*. I also classified plants and animals into families, orders and so on.



1769: Industrial Revolution

James Watt

My steam engine powered the Industrial Revolution. With it came extensive coal mining and oil drilling. Unfortunately, this led to atmospheric pollution and climate change.



1859: Evolution

Charles Darwin

In my *Origin of Species*, we learnt about evolution and how species adapt. Like the Earth, we find that humans are not the centre of the universe. We are related to the world around us.



1992: Biodiversity

Edward Wilson

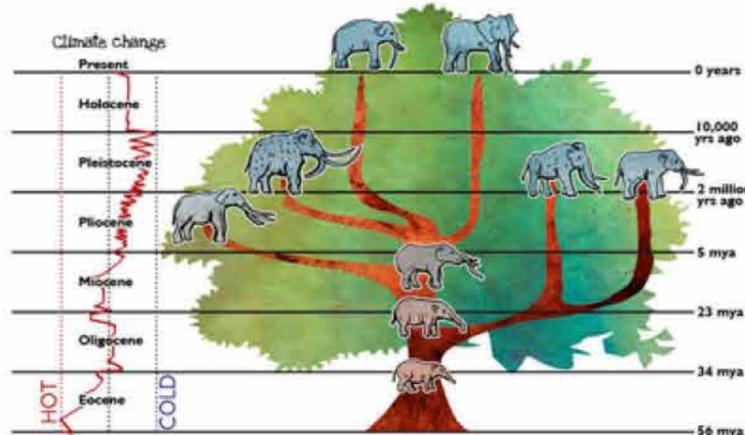
I popularised the word 'biodiversity'. We can now imagine the immense richness of life around us. We've become aware of how much effect we have on the environment.



Biodiversity

Biodiversity tells of the enormous variety of life on Earth. Have a look at the simplified elephant timetree to see how they evolved over time due to environmental change, particularly climate change. There are many more genera and species in the elephant order than are shown. So diverse!

In recent years, we have had widespread effects on the environment in general, not just the elephants. Let us preserve the rich biodiversity that is left on our planet.



The Sixth Extinction

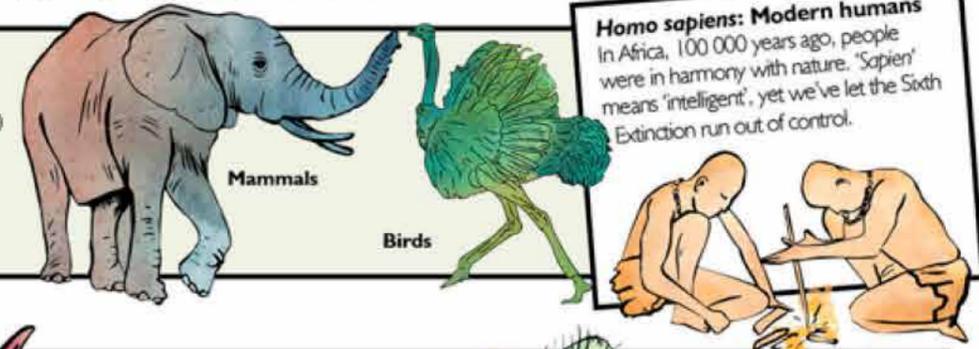
The Earth has seen five earlier mass extinctions caused by natural disasters. The Sixth Extinction began about 70 000 years ago, when our ancestors started spreading across the world from Africa. Through time we've over-hunted, destroyed habitats, introduced alien species, and polluted the atmosphere and oceans. Now climate change! Scientists predict that if we don't stop this third wave of destruction, a high percentage of the 10 million or more plant and animal species will become extinct before 2100!



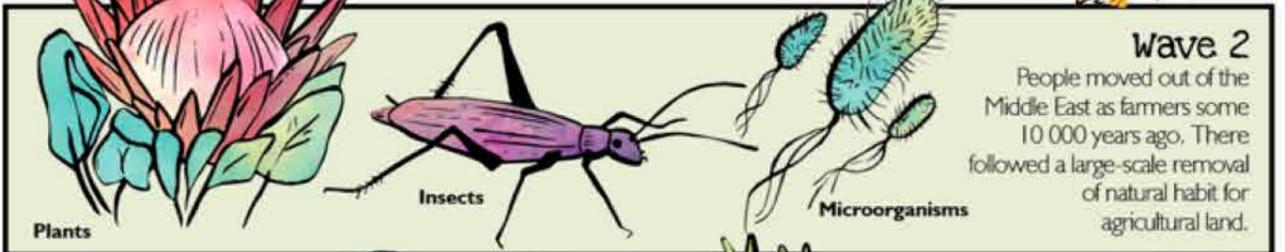
Sixth Extinction in three waves

Wave 1

People moved out of Africa as hunter-gatherers around 70 000 years ago. 80-90% of all large mammals and large flightless bird species were hunted to extinction, except in Africa.

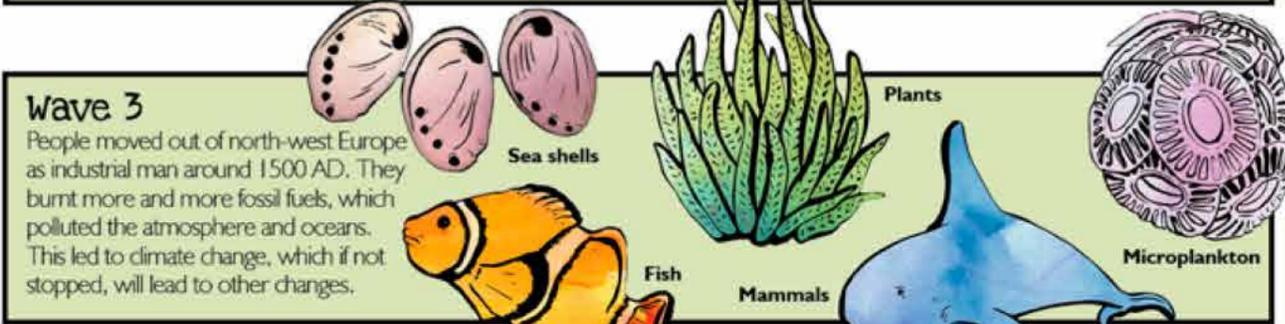


Homo sapiens: Modern humans
In Africa, 100 000 years ago, people were in harmony with nature. 'Sapien' means 'intelligent', yet we've let the Sixth Extinction run out of control.



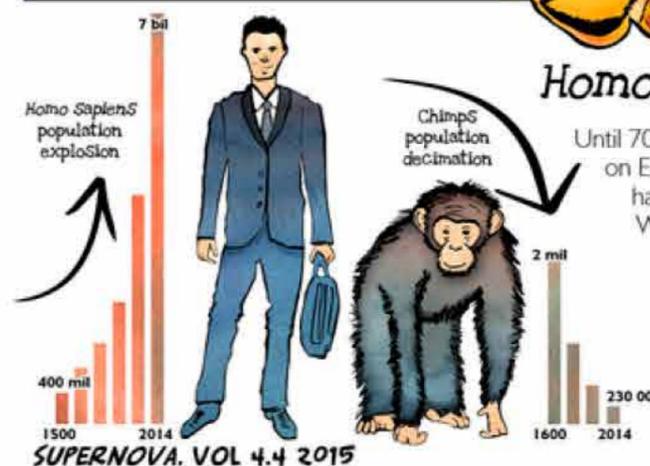
Wave 2

People moved out of the Middle East as farmers some 10 000 years ago. There followed a large-scale removal of natural habitat for agricultural land.



Wave 3

People moved out of north-west Europe as industrial man around 1500 AD. They burnt more and more fossil fuels, which polluted the atmosphere and oceans. This led to climate change, which if not stopped, will lead to other changes.



Homo Sapiens population explosion

Until 70 000 years ago, there were perhaps the same number of people on Earth as chimpanzees. From then until the present, our population has exploded while the chimp population has declined dramatically. We have obviously left a very heavy footprint on the environment.

We - 7 billion of us - are causing the disappearance of the richness of life. The Sixth Extinction continues. We need to do something about this. In the next issue, we will focus on the biodiversity and extinction of flowering plants.