

# The homeland of modern humans

October 28 2019

---



Vanessa Hayes discussing the significance of the region with Headman Ikun Ikunta from an extended Ju/'hoansi family. Living within the homeland region of the greater Kalahari of Namibia, Vanessa has been visiting Ikun and his extended family for over a decade. Ikun was proudly one of the many participants who donated his mitogenome to this study. Credit: Chris Bennett, Evolving Picture, Sydney, Australia

A study has concluded that the earliest ancestors of anatomically modern humans (*Homo sapiens sapiens*) emerged in a southern African 'homeland' and thrived there for 70 thousand years.

The breakthrough findings are published in the prestigious journal *Nature* today.

The authors propose that changes in Africa's climate triggered the first human explorations, which initiated the development of humans' genetic, ethnic and cultural diversity.

This study provides a window into the first 100 thousand years of modern humans' history. DNA as a time capsule.

"It has been clear for some time that anatomically modern humans appeared in Africa roughly 200 thousand years ago. What has been long debated is the exact location of this emergence and subsequent dispersal of our earliest ancestors," says study lead Professor Vanessa Hayes from the Garvan Institute of Medical Research and University of Sydney, and Extraordinary Professor at the University of Pretoria.

"Mitochondrial DNA acts like a [time capsule](#) of our ancestral mothers, accumulating changes slowly over generations. Comparing the complete DNA code, or mitogenome, from different individuals provides information on how closely they are related."

In their study, Professor Hayes and her colleagues collected blood samples to establish a comprehensive catalogue of modern human's earliest mitogenomes from the so-called 'L0' lineage. "Our work would not have been possible without the generous contributions of local communities and study participants in Namibia and South Africa, which allowed us to uncover rare and new L0 sub-branches," says study author and public health Professor Riana Bornman from the University of

Pretoria.

"We merged 198 new, rare mitogenomes to the current database of modern human's earliest known population, the L0 lineage. This allowed us to refine the evolutionary tree of our earliest ancestral branches better than ever before," says first author Dr. Eva Chan from the Garvan Institute of Medical Research, who led the phylogenetic analyses.

By combining the L0 lineage timeline with the linguistic, cultural and geographic distributions of different sub-lineages, the study authors revealed that 200 thousand years ago, the first *Homo sapiens sapiens* maternal lineage emerged in a 'homeland' south of the Greater Zambezi River Basin region, which includes the entire expanse of northern Botswana into Namibia to the west and Zimbabwe to the east.





Vanessa learning how to make fire with Jul'hoansi hunters in the now dried homeland of the greater Kalahari of Namibia. From left to right: N#amce Sao, Ikun N#amce, Vanessa Hayes and Ikun Ikunta. Credit: Chris Bennett, Evolving Picture, Sydney, Australia

## **A homeland perfect for life to thrive**

Investigating existing geological, archeological and [fossil evidence](#), geologist Dr. Andy Moore, from Rhodes University, revealed that the homeland region once held Africa's largest ever lake system, Lake Makgadikgadi.

"Prior to modern human emergence, the lake had begun to drain due to shifts in underlying tectonic plates. This would have created, a vast wetland, which is known to be one of the most productive ecosystems for sustaining life," says Dr. Moore.

## **Modern humans' first migrations**

The authors' new evolutionary timelines suggest that the ancient wetland ecosystem provided a stable ecological environment for modern humans' first ancestors to thrive for 70 thousand years.

"We observed significant genetic divergence in the [modern humans'](#) earliest maternal sub-lineages, that indicates our ancestors migrated out of the homeland between 130 and 110 thousand years ago," explains Professor Hayes. "The first migrants ventured northeast, followed by a second wave of migrants who travelled southwest. A third population remained in the homeland until today."

"In contrast to the northeasterly migrants, the southwesterly explorers appear to flourish, experiencing steady population growth," says Professor Hayes. The authors speculate that the success of this migration was most likely a result of adaptation to marine foraging, which is further supported by extensive archaeological evidence along the southern tip of Africa.

## Climate effects

To investigate what may have driven these early human migrations, co-corresponding author Professor Axel Timmermann, Director of the IBS Center for Climate Physics at Pusan National University, analysed climate computer model simulations and geological data, which capture Southern Africa's climate history of the past 250 thousand years.

"Our simulations suggest that the slow wobble of Earth's axis changes summer solar radiation in the Southern Hemisphere, leading to periodic shifts in rainfall across southern Africa," says Professor Timmermann. "These shifts in climate would have opened green, vegetated corridors, first 130 thousand years ago to the northeast, and then around 110 thousand years ago to the southwest, allowing our [earliest ancestors](#) to migrate away from the homeland for the first time."

"These first migrants left behind a homeland population," remarks Professor Hayes. "Eventually adapting to the drying lands, maternal descendants of the homeland population can be found in the greater Kalahari region today."

This study uniquely combined the disciplines of genetics, geology and climatic physics to rewrite our earliest human history.

**More information:** Human origins in a southern African palaeowetland and first migrations, *Nature* (2019). [DOI](#):

[10.1038/s41586-019-1714-1](https://doi.org/10.1038/s41586-019-1714-1) , [nature.com/articles/s41586-019-1714-1](https://www.nature.com/articles/s41586-019-1714-1)

Provided by Garvan Institute of Medical Research

Citation: The homeland of modern humans (2019, October 28) retrieved 25 April 2024 from <https://phys.org/news/2019-10-homeland-modern-humans.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.