Oldest ever Homo sapiens footprint is found, pushing the record back by 30,000 years

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The oldest known footprint of our species, lightly ringed with chalk. It appears long and narrow because the trackmaker dragged their heel. Credit: Charles Helm

Just over two decades ago, as the new millennium began, it seemed that tracks left by our ancient human ancestors dating back more than about 50,000 years were excessively rare.

Only four sites had been reported in the whole of Africa at that time. Two were from East Africa: Laetoli in Tanzania and Koobi Fora in

Kenya; two were from South Africa (Nahoon and Langebaan). In fact the Nahoon site, reported in 1966, was the first hominin tracksite ever to be described.

In 2023 the situation is very different. It appears that people were not looking hard enough or were not looking in the right places. Today the African tally for dated hominin ichnosites (a term that includes both tracks and other traces) older than 50,000 years stands at 14. These can conveniently be divided into an East African cluster (five sites) and a South African cluster from the Cape coast (nine sites). There are a further ten sites elsewhere in the world including the UK and the Arabian Peninsula.

Given that relatively few skeletal hominin remains have been found on the Cape coast, the traces left by our human ancestors as they moved about ancient landscapes are a useful way to complement and enhance our understanding of ancient hominins in Africa.

In a recently published article in *Ichnos*, the international journal of trace fossils, we provided the ages of seven newly dated hominin ichnosites that we have identified in the past five years on South Africa's Cape south coast. These sites now form part of the "South African cluster" of nine sites.

We found that the sites ranged in age; the most recent dates back about 71,000 years. The oldest, which dates back 153,000 years, is one of the more remarkable finds recorded in this study: it is the oldest footprint thus far attributed to our species, Homo sapiens.

The new dates corroborate the archaeological record. Along with other evidence from the area and time period, including the development of sophisticated stone tools, art, jewelry and harvesting of shellfish, it confirms that the Cape south coast was an area in which early

anatomically modern humans survived, evolved and thrived, before spreading out of Africa to other continents.

Very different sites

There are significant differences between the East African and South African tracksite clusters. The East African sites are much older: Laetoli, the oldest, is 3.66 million years old and the youngest is 0.7 million years old. The tracks were not made by Homo sapiens, but by earlier species such as australopithecines, Homo heidelbergensis and Homo erectus. For the most part, the surfaces on which the East African tracks occur have had to be laboriously and meticulously excavated and exposed.

The South African sites on the Cape coast, by contrast, are substantially younger. All have been attributed to Homo sapiens. And the tracks tend to be fully exposed when they're discovered, in rocks known as aeolianites, which are the cemented versions of ancient dunes.

Excavation is therefore not usually considered—and because of the sites' exposure to the elements and the relatively coarse nature of dune sand, they aren't usually as well preserved as the East African sites. They are also vulnerable to erosion, so we often have to work fast to record and analyze them before they are destroyed by the ocean and the wind.

While this limits the potential for detailed interpretation, we can have the deposits dated. That's where optically stimulated luminescence comes in.

An illuminating method

A key challenge when studying the palaeo-record—trackways, fossils, or

any other kind of ancient sediment—is determining how old the materials are.

Without this it is difficult to evaluate the wider significance of a find, or to interpret the climatic changes that create the geological record. In the case of the Cape south coast aeolianites, the dating method of choice is often optically stimulated luminescence.

This method of dating shows how long ago a grain of sand was exposed to sunlight; in other words, how long that section of sediment has been buried. Given how the tracks in this study were formed—impressions made on wet sand, followed by burial with new blowing sand—it is a good method as we can be reasonably confident that the dating "clock" started at about the same time the trackway was created.

The Cape south coast is a great place to apply optically stimulated luminescence. Firstly, the sediments are rich in quartz grains, which produce lots of luminescence. Secondly, the abundant sunshine, wide beaches and ready wind transport of sand to form coastal dunes mean any pre-existing luminescence signals are fully removed prior to the burial event of interest, making for reliable age estimates. This method has underpinned much of the dating of previous finds in the area.

The overall date range of our findings for the hominin ichnosites—about 153,000 to 71,000 years in age—is consistent with ages in previously reported studies from similar geological deposits in the region.

The 153,000 year old track was found in the Garden Route National Park, west of the coastal town of Knysna on the Cape south coast. The two previously dated South African sites, Nahoon and Langebaan, have yielded ages of about 124,000 years and 117,000 years respectively.

Increased understanding

The work of our research team, based in the African Centre for Coastal Palaeoscience at Nelson Mandela University in South Africa, is not done.

We suspect that further hominin ichnosites are waiting to be discovered on the Cape south coast and elsewhere on the coast. The search also needs to be extended to older deposits in the region, ranging in age from 400,000 years to more than 2 million years.

A decade from now, we expect the list of ancient hominin ichnosites to be a lot longer than it is at present—and that scientists will be able to learn a great deal more about our ancient ancestors and the landscapes they occupied.

More information: Charles W. Helm et al, Dating the Pleistocene hominin ichnosites on South Africa's Cape south coast, *Ichnos* (2023). DOI: 10.1080/10420940.2023.2204231

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