

A 3.8-million-year-old skull reveals the face of Lucy's possible ancestors

The fossilized hominid skull illuminates the earliest-known Australopithecus species

[Bruce Bower](#) August 28, 2019 at 1:00 pm



A 3.8-million-year-old fossil of a hominid skull (right) offers hints about what the individual looked like (artist's reconstruction, left).

L-R: Matt Crow/Cleveland Museum of Natural History, John Gurche (facial reconstruction); Dale Omori/Cleveland Museum of Natural History

In a remarkable evolutionary windfall, fossil hunters have discovered neatly fitting halves of a nearly complete, 3.8-million-year-old hominid skull. This unexpected specimen shines some light on poorly understood, early members of the human evolutionary family.

The East African skull, which turned up at Ethiopia's Woranso-Mille site, has been classified as *Australopithecus anamensis*. It is the oldest known species in a hominid genus that includes *Australopithecus afarensis*, known best for [Lucy's 3.2-million-year-old partial skeleton](#) (SN: 10/28/14).

The research team, led by paleoanthropologist Yohannes Haile-Selassie of the Cleveland Museum of Natural History, describes its analysis of the skull in two papers published online August 28 in *Nature*.

"This specimen provides the first glimpse of the face of *Australopithecus anamensis*," Haile-Selassie said during an Aug. 27 news conference. The skull, which is slightly larger than a modern adult human's fist, also includes the [first good example of an *A. anamensis* braincase](#).



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For early-hominid investigators, "this is the specimen we have been waiting for," says paleoanthropologist Carol Ward of the University of Missouri in Columbia. Ward was not part of the Woranso-Mille team.

Until now, [A. anamensis fossils](#) consisted only of partial upper and lower jaws, isolated teeth, a braincase fragment and some lower-body bones (SN: 2/18/15). Those specimens, previously unearthed in Kenya and Ethiopia, date to between 4.2 million and 3.9 million years ago.

Then, on February 10, 2016, a member of the Woranso-Mille team noticed the lower part of a hominid skull protruding from eroding sediment. Later that day, Haile-Selassie found the braincase lying on the ground about three meters from the initial find. Soil sieving produced additional skull fragments.



Paleoanthropologist Yohannes Haile-Selassie holds a nearly complete *Australopithecus anamensis* skull shortly after its discovery at an Ethiopian site. Cleveland Museum of Natural History

Geoscientist Beverly Saylor of Case Western Reserve University in Cleveland led an effort to [date the fossil](#) by estimating the ages of nearby volcanic rock layers. Known reversals of Earth's magnetic field in Woranso-Mille sediment also aided dating.

Geologic evidence indicated that the fossil *A. anamensis* individual had been covered in sandy deposits where a river entered a lake. The surrounding region was largely dry, but included some forested areas. Volcanic eruptions occasionally blanketed the lake and its surroundings.

A digital reconstruction of the Woranso-Mille skull helped to establish its species. The braincase displays features, such as a long, narrow shape and a roughly chimpanzee-sized brain, similar to those of [even older proposed hominids](#) such as *Sahelanthropus tchadensis* and *Ardipithecus ramidus* (SN: 2/16/11). In contrast, forward-projecting cheek bones recall those of later hominids, such as 2.5-million-year-old *Paranthropus aethiopicus*. That species belonged to an African line of big-jawed, small-brained creatures that died out around 1 million years ago. It's hard to know whether these shared traits evolved independently, or if the traits signal an evolutionary relationship.

Further comparisons connected the Woranso-Mille skull to earlier *A. anamensis* finds. Many of the skull's features differ from those of Lucy's kind, Haile-Selassie says. For instance, *A. anamensis* possessed a sloping face, unlike the flat faces of *A. afarensis*.

Crucially, the Woranso-Mille skull differs enough from an approximately 3.9 million-year-old hominid forehead bone discovered in East Africa in 1981 to assign that older find, known as the Belohdelie frontal, to *A. afarensis*, Haile-Selassie contends. If so, *A. anamensis* — now placed at between 4.2 million and 3.8 years ago — and Lucy's kind — dating to between 3.9 million and 3 million years ago — overlapped for at least 100,000 years. That scenario contradicts [an earlier hypothesis](#) that *A. anamensis* evolved directly into Lucy's kind, with the earlier species disappearing as it morphed into its descendant species (SN: 4/12/06).

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A discovery at an Ethiopian desert site of a nearly complete, 3.8-million-year-old *Australopithecus anamensis* skull is letting researchers reconstruct what the ancient individual looked like and its relationship to Lucy's species.

A large *A. anamensis* group might have become isolated from its species-mates and then evolved into an early version of *A. afarensis*, Haile-Selassie speculates. In that case, other *A. anamensis* groups would have coexisted for a while with Lucy's species.

While the newly discovered skull "fills a critical gap in *Australopithecus* evolution," the evolutionary status of the Belohdelie frontal remains unknown, says paleoanthropologist William Kimbel of Arizona State University's Institute of Human Origins in Tempe. More *A. anamensis* skulls are needed to assess whether the Belohdelie frontal displays traits more typical of that species or of Lucy's kind, Kimbel says.

Paleoanthropologist Berhane Asfaw of Rift Valley Research Service in Addis Ababa, Ethiopia, agrees. Asfaw [described the Belohdelie frontal](#) in

a 1987 paper. Frontal bone shapes vary considerably in Lucy's species, which includes four partial skulls, he says. "And we don't know what kind of face the Belohdelie frontal had."

In all its largely intact glory, the Woranso-Mille skull highlights how little is known about the relationship between *A. anamensis* and Lucy's kind, Ward says.