

## Fossil snake said to break length record

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Courtesy Indiana University and [World Science](#) staff



Scientists have recovered fossils from a 60-million-year-old South American snake whose length and weight might make today's anacondas and reticulated pythons seem a bit cuter and more cuddly.

Named *Titanoboa cerrejonensis* by its discoverers, the size of the snake's vertebrae suggest it weighed 1,140 kilograms (2,500 pounds) and measured 13 meters (42.7 feet) nose to tail tip—and that's a conservative estimate, researchers say.

A report on the find appears in this week's issue of the research journal *Nature*.

"At its greatest width, the snake would have come up to about your hips," said Indiana University Bloomington geologist David Polly, who identified the position of the fossil vertebrae, which made a size estimate possible.

"The size is pretty amazing. But our team went a step further and asked, how warm would the Earth have to be to support a body of this size?"

Crews led by Smithsonian Tropical Research Institute geologist Carlos Jaramillo and University of Florida, Florida Museum of Natural History vertebrate paleontologist Jonathan Bloch discovered the fossils in the Cerrejon Coal Mine in northern Colombia and investigated what the snake's environment might have been like. Paleontologist Jason Head of the University of Toronto-Mississauga, the *Nature* report's lead author, used information gleaned by his collaborators to make an estimate of Earth's temperature 58 to 60 million years ago in an area encompassed by modern-day Colombia.

Paleontologists have long known of a rough correlation between a period or epoch's temperature and the size of its poikilotherms (cold-blooded creatures). As the Earth's temperature increases, so does the upper size limit on poikilotherms.

"There are many ways the anatomy of a species is correlated with its environment on broad scales," Polly said. "If we understand these correlations better, we will know more about how climate and climate change affect species, as well as how we can infer things about past climates from the morphology of the species that lived back then."

Assuming the Earth today is not particularly unusual, Head estimated a snake of Titanoboa's size would have required an average annual temperature of 30 to 34 C (86 to

93 F) to survive. By comparison, the average yearly temperature of today's Cartagena, a Colombian coastal city, is about 83 F.

"Tropical ecosystems of South America were surprisingly different 60 million years ago," said Bloch. "It was a rainforest, like today, but it was even hotter and the cold-blooded reptiles were all substantially larger. The result was, among other things, the largest snakes the world has ever seen... and hopefully ever will."

The tropical rainforest at Cerrejon appears to have thrived at a temperature of 32 degrees Celsius (90 Fahrenheit), five degrees warmer than the upper temperature limit for tropical rainforests in modern times.

"These data challenge the view that tropical vegetation lives near its climatic optimum, and it has profound implications in understanding the effect of current global warming on tropical plants," said Carols Jaramillo, a palaeobotanist at the Smithsonian Tropical Research Institute.

Evolution has produced a wide variety of gigantic animals over the last several hundred million years—dinosaurs, ancient dragonflies and today's blue whale, to name a few. Why some species' lineages produce monsters remains a matter of debate among evolutionary biologists and ecologists.

The scientists classify Titanoboa as a boine snake, a type of non-venomous constrictor that includes anacondas and boas.

Polly extrapolated the placement of Titanoboa fossil vertebrae by comparing the fossils' structure to the vertebrae of today's boine snakes. Snake vertebrae get bigger near a snake's midsection, but they are also structured differently than vertebrae closer to a snake's head or tail. Using a computer model he wrote, Polly estimated the fossil vertebrae originate near Titanoboa's middle. That means that if Polly's model is incorrect about the bone's placement, the snake could have been even bigger.

*Image: Reconstruction illustration of the giant snake (courtesy Jason Bourque)*