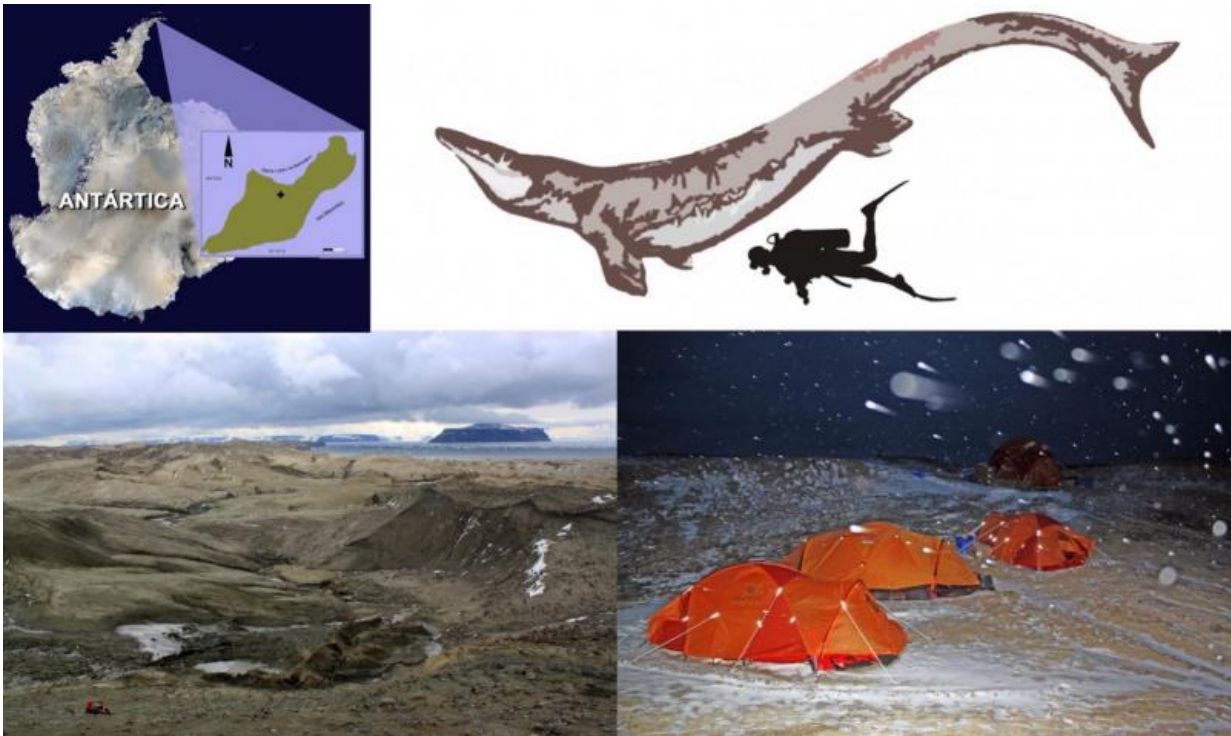


A giant predatory lizard swam in Antarctic seas near the Maastrichtian period

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Upper left: Kaikaifilu was found in late cretaceous rocks from Seymour island, Antarctica. Upper right: An estimated size comparison of Kaikaifilu with a human. The size of the skull remains suggest it could have been as long as 12-14 mt. Bottom left: The terrain where the remains of Kaikaifilu were found turns mostly into mud under bad weather conditions like those encountered by the Chilean expedition (bottom right). Credit: Universidad de Chile

Kaikaifilu is a new species of giant sea lizard (mosasaur) discovered in 66 million-year-old rocks of Antarctica. At about 10 m long, it is the largest known top marine predator from this continent. It lived near the end of the dinosaur age, when Antarctica was a much warmer ecosystem, and fed on filter-feeding marine reptiles.

Because of its harsh conditions, Antarctica is probably one of the toughest places to work for palaeontologists. However, precisely because of this, information is scarce, and new discoveries can be highly rewarding. In 2010, an expedition of Chilean scientists to Seymour Island encountered particularly bad weather. During their last days in the field, after hikes through knee-deep mud, they made a truly exciting discovery in 66 million-year-old rocks: The fossil remains of a particularly large skull of a mosasaur, a giant sea lizard.

Mosasaur were not dinosaurs, but close relatives of modern-day lizards, which thrived in the seas during the Cretaceous period of the dinosaur age. Unlike modern lizards, however, mosasaur evolved paddle-like limbs, and a long, deep tail for swimming. Some of them were top predators that reached truly gigantic size, like the fearsome *Tylosaurus* (regularly featured in books of prehistoric animals). Prior to this find, the largest known mosasaur from the Antarctic continent was represented by *Taniwhasaurus antarcticus*, a predator with a skull about 70 cm long.

Interestingly, the new species is found to be five million years younger, a close relative of *Taniwhasaurus*. It is also a close relative of the the North American *Tylosaurus*. However, the new Antarctic mosasaur lived ca. 20 million years later, in the opposite hemisphere. Its skull is estimated to be a about 1.2 m long, being the largest southern mosasaur to date, suggesting a body length close to 10 mts. And while it is similar to North American giants like *Tylosaurus*, it shows other completely unique traits that justify a new scientific name.

The scientists called it *Kaikaifilu hervei* after the cosmology of the Mapuche, the native people from southern Chile and Argentina. Kai-Kai filú is the almighty giant reptile owner of the seas, rival of Treng-Treng filú, the land reptile, both creators of the lands through their continuous fighting, which causes the earthquakes, volcanoes, tsunamis and all the events that shaped the Earth. The species is named after Dr. Francisco Hervé, a world-renowned Chilean geologist and pioneer earth-science Antarctic explorer.

According to Rodrigo Otero, one of the authors of the study, "The increasing diversity of endemic Cretaceous marine reptiles in the southern hemisphere are slowly changing an historical paradigm. Since the 19th century, many southern fossil reptiles had been assigned to species from the [northern hemisphere](#). In this sense, *Kaikaifilu* adds to this paradigm shift. The southern record has scarce mosasaur skulls, most of them found in New Zealand. However, in southern South America and Antarctica, mosasaur remains are especially scarce. Hence, the relevance of the new specimen, which shows a distant kinship with respect to the northern hemisphere mosasaurs."

Prior to the discovery of *Kaikaifilu*, isolated teeth were frequently found in Late Cretaceous rocks of Antarctica. Anatomical features led scientists to attribute them to several mosasaur species previously known in the Northern Hemisphere. Remarkably, the jaws of *Kaikaifilu* now reveal that many of these teeth co-existed as different tooth types in the mouth of this species, a condition known as heterodonty. Therefore, in all probability, the diversity of Antarctic mosasaurs has been overestimated. The case nicely illustrates the difficulties that palaeontologists may encounter when discovering unique but isolated body parts.

During the [dinosaur age](#), antarctic climate was much warmer and the continent harboured a diverse ecosystem, that included several unusual

reptiles. *Kaikaifilu* probably fed on an abundant buffet of contemporaries, especially the unique aristonectine plesiosaurs, robust, long-necked species that did not feed on fish but rather were filter-feeders of much smaller prey, using fine, narrow teeth and whale-like adaptations in their skulls.

"Prior to this research, the known mosasaur remains from Antarctica provided no evidence for the presence of very large predators like *Kaikaifilu*, in an environment where plesiosaurs were especially abundant. The new find complements one expected ecological element of the Antarctic ecosystem during the latest Cretaceous," says Otero.

These ecosystems existed shortly before the ultimate demise of the dinosaurs, a time in which temperatures and sea levels experienced significant changes. Scientists continue to discuss how these changes may have affected extinction and evolution in these southernmost marine ecosystems.

More information: Rodrigo A. Otero et al. *Kaikaifilu hervei* gen. et sp. nov., a new large mosasaur (Squamata, Mosasauridae) from the upper Maastrichtian of Antarctica, *Cretaceous Research* (2016). [DOI: 10.1016/j.cretres.2016.11.002](https://doi.org/10.1016/j.cretres.2016.11.002)

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