

05/2013

The rise and fall of South American Miocene crocodiles



9 million years ago in South America lived up to 14 species of crocodiles, at least 7 of which shared the same geographical area, an abundance of closely related crocodiles that remains unparalleled to this day. The finding has been published today in the journal *Nature Communications* by paleontologists from the University of Zurich with the participation of the researcher of the ICP in the UAB, Massimo Delfino. The study also describes the extinction of these species 5 million years ago, probably as a result of changes in the watercourses due to the Andean uplift. The article also describes two new species of crocodile.

Nowadays, the most diverse species of crocodile are found in northern South America and Southeast Asia. As many as six species of alligator and four of true crocodile exist, although no more than two or three ever live alongside one another at the same time. The study published

today in the journal *Nature Communications* describes a completely different situation between 9 and 5 million years ago, when fourteen species of crocodile populated the coastal areas of the Urumaco River in Venezuela and at least seven of them lived in the same geographic area.



Figure 1: Illustration by Jorge A. Gonzalez.

This study, led by Marcelo Sanchez and Torsten Scheyer of the University of Zurich has involved Massimo Delfino, a researcher at the Institut Català de Paleontologia Miquel Crusafont. Paleontologists have also discovered two new species for science: *Globidentosuchus brachyrostris*, which belonged to the caiman family and had spherical teeth, and *Crocodylus falconensis*, a crocodile that the researchers assume could grow up to well over four meters long. Although colloquially we refer to all these animals as "crocodiles", is actually a group of several families: Crocodylidae (the so-called true crocodiles), the Alligatoridae (which includes true alligators and caimans) and Gavialidae (which are characterized by their extremely long, thin snouts and are only found in Southeast Asia nowadays).

On account of the species' extremely different jaw shapes, the researchers are convinced that the different crocodylians were highly specialized feeders: With their pointed, slender snouts, the fossil gharials must have preyed on fish. Researchers think that gharials occupied the niche in the habitat that was filled by dolphins after they became extinct. With its spherical teeth, however, *Globidentosuchus brachyrostris* most likely specialized in shellfish, snails or crabs. And giant crocodiles, which grew up to 12 meters long, fed on turtles, giant rodents and smaller crocodiles. This high specialization in feeding allowed all these species to occupy the same areas without competing for resources.

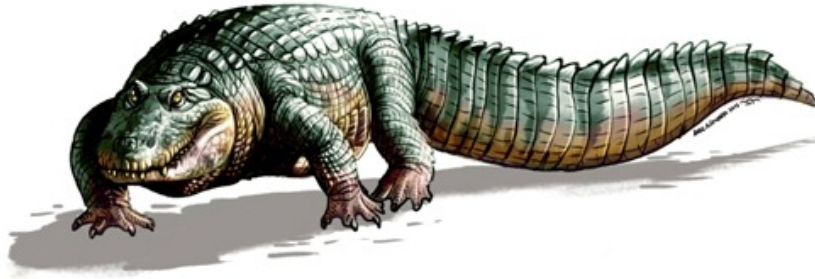


Figure 1: *Crocodylus falconensis* (illustration by Jorge A. Gonzalez).

All this diversity of species of crocodiles in the Amazon and Urumaco (a river which does not exist and that flowed into the Gulf of Venezuela) disappeared 5 million years ago with the extinction of all species of crocodiles in the area. The Andean uplift changed the courses of rivers and, as a result, the Amazon River no longer drained into the Caribbean, but the considerably cooler Atlantic Ocean. With the destruction of the habitat, an entirely new fauna emerged that we know from the Orinoco and Amazon regions today.

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References

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