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Press Release

The First Giant Salamander Was a Hot Hunter

Modern giant salamanders live only in water – but their ancestors ventured out on land, say geoscientists at the University of Tübingen.

Tübingen, 20.09.2012

Giant salamanders (*cryptobranchidae*) are amazing animals. These amphibians can live to be 100, can grow up to two meters in length, and they have been around for more than 56 million years. The fossils of giant salamanders are found relatively often in Eurasia; they show little variation from their modern descendants. Early giant salamanders had a similar lifestyle and were just as big as today's, which live in East Asia and North America. But while the latter stick to oxygen-rich, fast-flowing mountain streams in China, Japan and the US, their ancestors also lived in rivers and lakes in the lowlands.

Now, geoscientists at the University of Tübingen have discovered another difference. The oldest known giant salamander, *aviturus exsecratus*, was able to live on land as well as in water, according to Professor Dr. Madelaine Böhme of the Senckenberg Center for Human Evolution and Paleoecology at the University of Tübingen and Dr. Davit Vasilyan of the Terrestrial Palaeoclimatology working group. In the light of recent information, the researchers reexamined fossils of *aviturus exsecratus,* which lived some 56 million years ago in what is now southern Mongolia. They were able to demonstrate that the animal hunted for food both in the water and on land. That makes it different from all the later giant salamanders, which live or lived only in water. These results are presented in the actual issue of the magazine PLOS ONE.

The development of a species from a purely aquatic lifestyle to an amphibious-terrestrial lifestyle is linked with gigantism and sustained growth and is called peramorphosis. It is completely unknown in modern salamanders. Individual development like that was only seen in palaeozoological amphibians such as *eryops,* which lived 300 million years ago.
The scientists suspect that *aviturus exsecratus* lived on fish and invertebrates in the water – as suggested by the shape of its lower jaw. At the same time, *aviturus* probably hunted insects. Terrestrial adaptation is indicated by the animal's heavy bones, long hind legs, a well-developed sense of smell, and palatal dentition typical of a terrestrial salamander. Also, fossil remains of this huge, up to 2m long animal were found in rock typically formed from water's-edge sediments.

The researchers think this drastic individual development in *aviturus exsecratus* was probably due to a short period of global warming 55.8 mil-

lion years ago: the Paleocene-Eocene Thermal Maximum. This most sudden climate change since the death of the dinosaurs saw global temperatures rise 6 degrees Celsius within around 20,000 years.

The publication: http://dx.plos.org/10.1371/journal.pone.0040665

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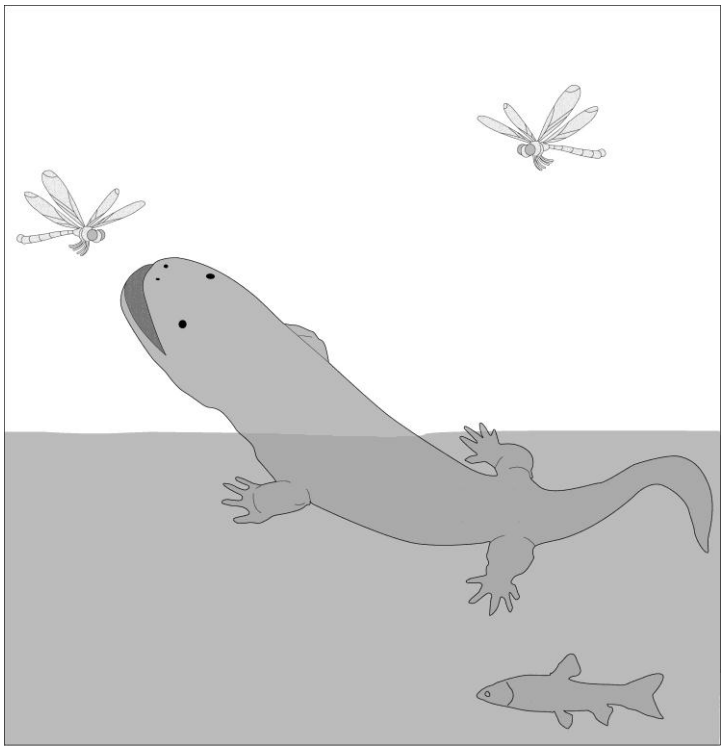
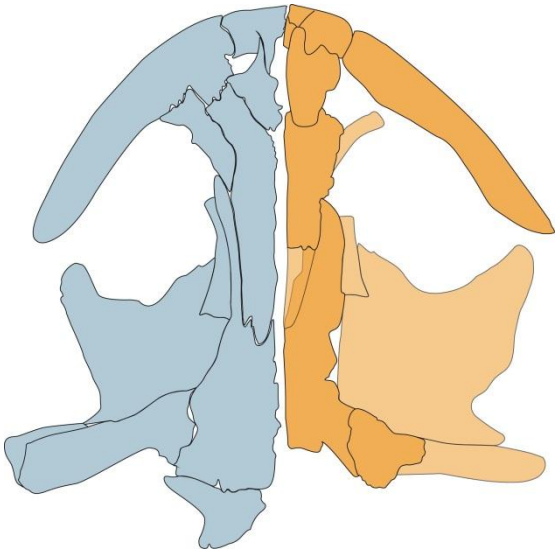


Aviturus exsecratus (reconstruction)

Parietal bone of the Mongolian salamander from below (left) and above (right).



Sketch of the skull of the extant Chinese salamander (blue) and a reconstruction of the fossil Mongolian salamander (yellow). All images: Vasilyan