

# New varanid fossil from China supports Asian origin of Varanidae

February 16 2022, by Li Yuan

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Fig. 1 Reconstruction of *Archaeovaranus lii*. Credit: IVPP

A study based on a new varanid fossil species from China shows that the transition from the ancient Varaniformes to *Varanus* occurred in Asia and supports the Asian origin of Varanidae.

The study was published in *Philosophical Transactions of the Royal Society B* on Feb. 7. It was conducted by researchers from the Institute of Vertebrate Paleontology and Paleoanthropology (IVPP) of the Chinese Academy of Sciences and their collaborators from the UK and Switzerland.

The lizard family Varanidae, whose Chinese name literally means giant lizard, is one of the most successful groups of lizards. Its sole extant genus *Varanus* encompasses more than 80 living species currently distributed across Africa, Asia and Australia, as well as a few close fossil relatives.

It is commonly accepted that Varanidae originated from the Varaniformes of the Late Cretaceous of Eurasia, with well-preserved fossils reported from the Upper Cretaceous of the Gobi Desert of Mongolia and China.

However, the origin of the genus *Varanus* has been of great debate, with Asian, African, and Gondwanan hypotheses proposed. The earliest definitive *Varanus* fossils come from the early Neogene.

Bridging the Late Cretaceous and the Neogene, the Paleogene is then the key period for the transition from Varaniformes to *Varanus*. However, the only well-represented fossils from this key time are the Saniwa skeletons from North America where *Varanus* does not currently exist,

thus further clouding the evolutionary history of Varanidae.

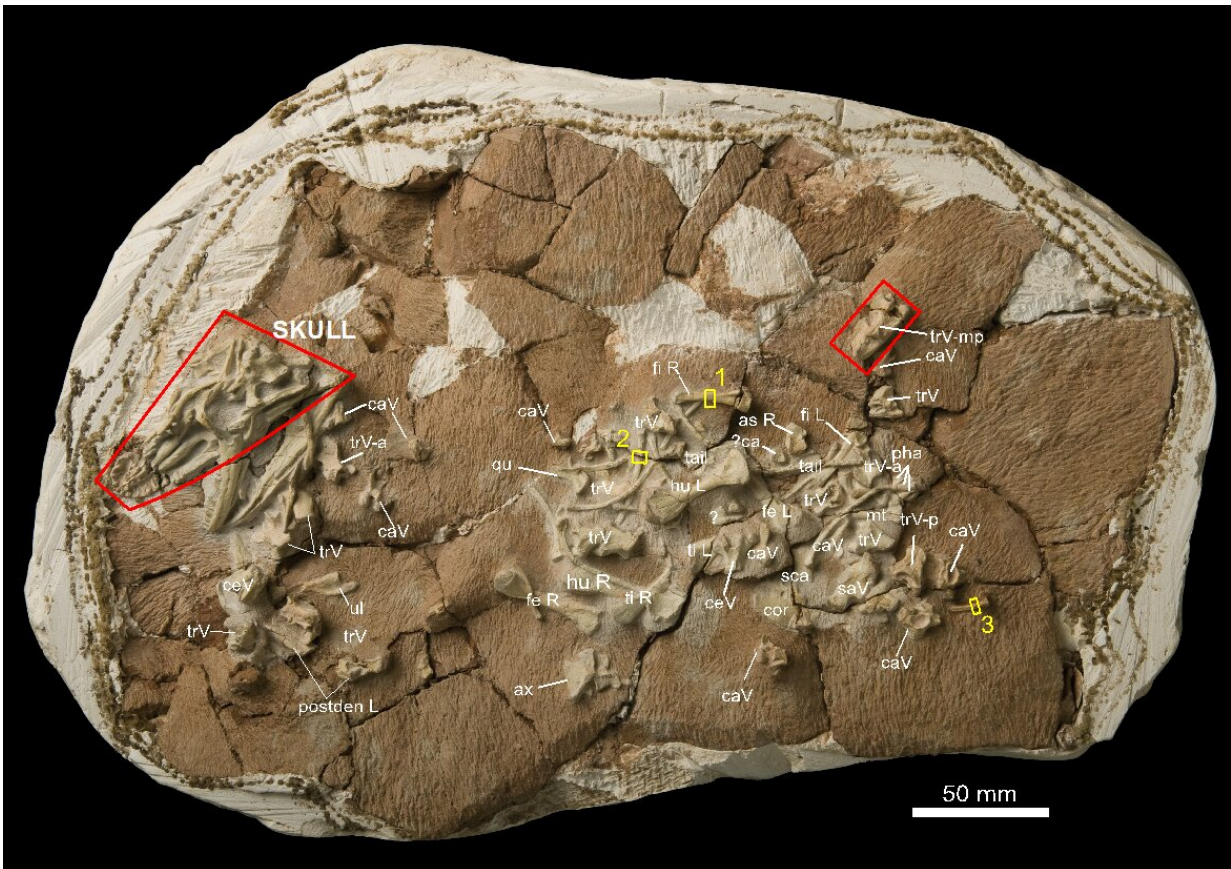


Fig. 2 Holotype of *Archaeovaranus lii* from the Eocene of Liguangqiao Basin.  
Credit: IVPP

The new varanid fossil from China, *Archaeovaranus lii*, was excavated by a research group led by Prof. Wang Yuanqing of IVPP from the Lower Eocene of the Liguangqiao Basin in Hubei Province in 2008.

*Archaeovaranus* was about one meter long. It shares many features with *Varanus*, such as its elongated snout, intramandibular joint, and precondylar constriction, but it also differs from *Varanus* in its open

subolfactory canal and orbit, palatal teeth, and lesser degree of coracoid fenestration.

What is most characteristic in *Archaeovaranus* is the similar length of the forelimb and hindlimb (not including the manus and pes). In contrast, *Varanus*'s hindlimb is obviously longer than its forelimb.

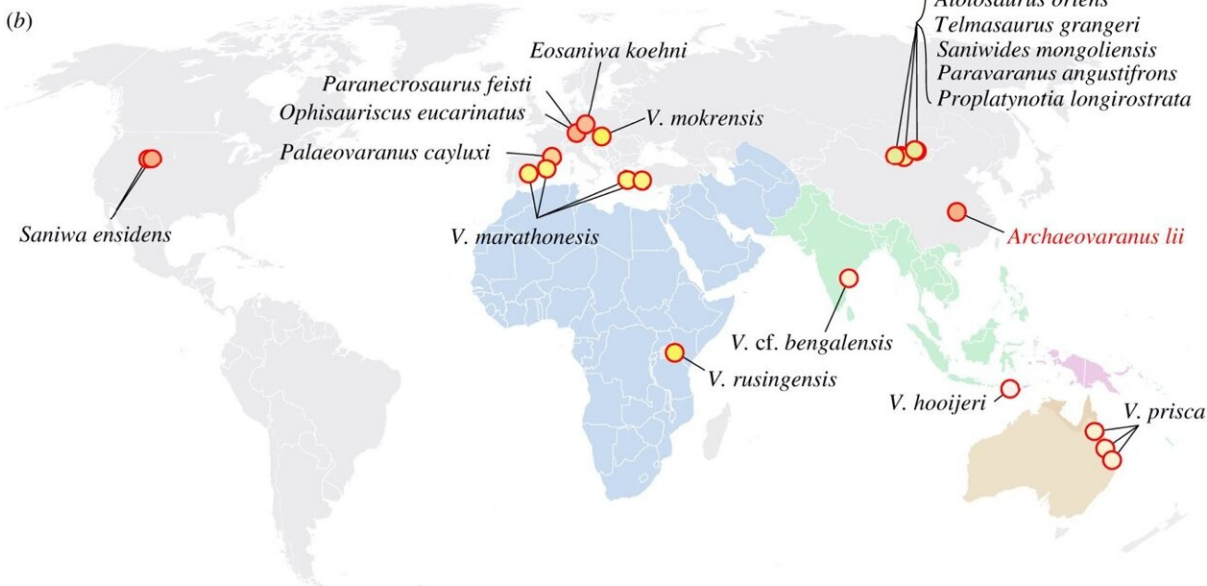
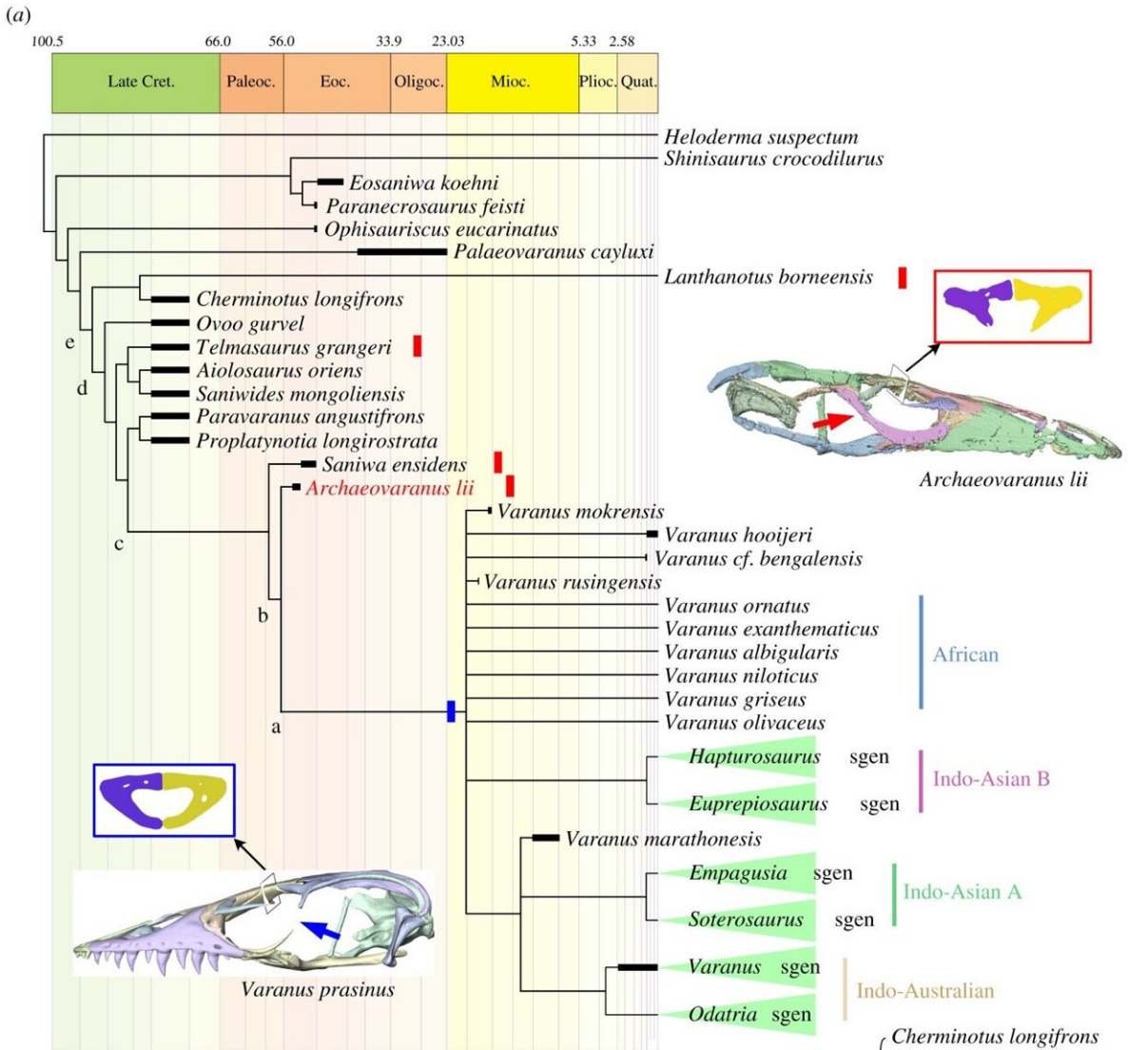


Fig. 3 Phylogeny of Varaniformes (a) and geographic location of the varaniforme fossils (b): *Archaeovaranus lii* is the closest relative of the genus *Varanus*. Credit: IVPP

Such a body proportion suggests that *Archaeovaranus* employed a specialized locomotion at least different from the contemporaneous *Saniwa* of North America. The *Archaeovaranus* individual represented by the [fossil](#) had matured sexually at the age of five and died at 16.

*Archaeovaranus* also highlights the evolution of some feeding-related characters within the family Varanidae. From the stem varanids to *Varanus*, the opening of the orbit increased the efficiency of feeding, while the closing of the subolfactory canal helped neutralize the growing stress created by the opening of the orbit. Meanwhile, the retention of palatal teeth in *Archaeovaranus* suggests a complicated history of tongue function from the prey transition in other lizards to chemosensation in *Varanus*.

**More information:** Liping Dong et al, A new stem-varanid lizard (Reptilia, Squamata) from the early Eocene of China, *Philosophical Transactions of the Royal Society B: Biological Sciences* (2022). [DOI: 10.1098/rstb.2021.0041](https://doi.org/10.1098/rstb.2021.0041)

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