

Whale like filter-feeding discovered in prehistoric marine reptile

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Reconstruction of Hupehsuchus about to engulf a shoal of shrimps. Credit: Artwork by Shunyi Shu, © Long Cheng, Wuhan Center of China Geological Survey

A remarkable new fossil from China reveals for the first time that a group of reptiles were already using whale-like filter feeding 250 million years ago.

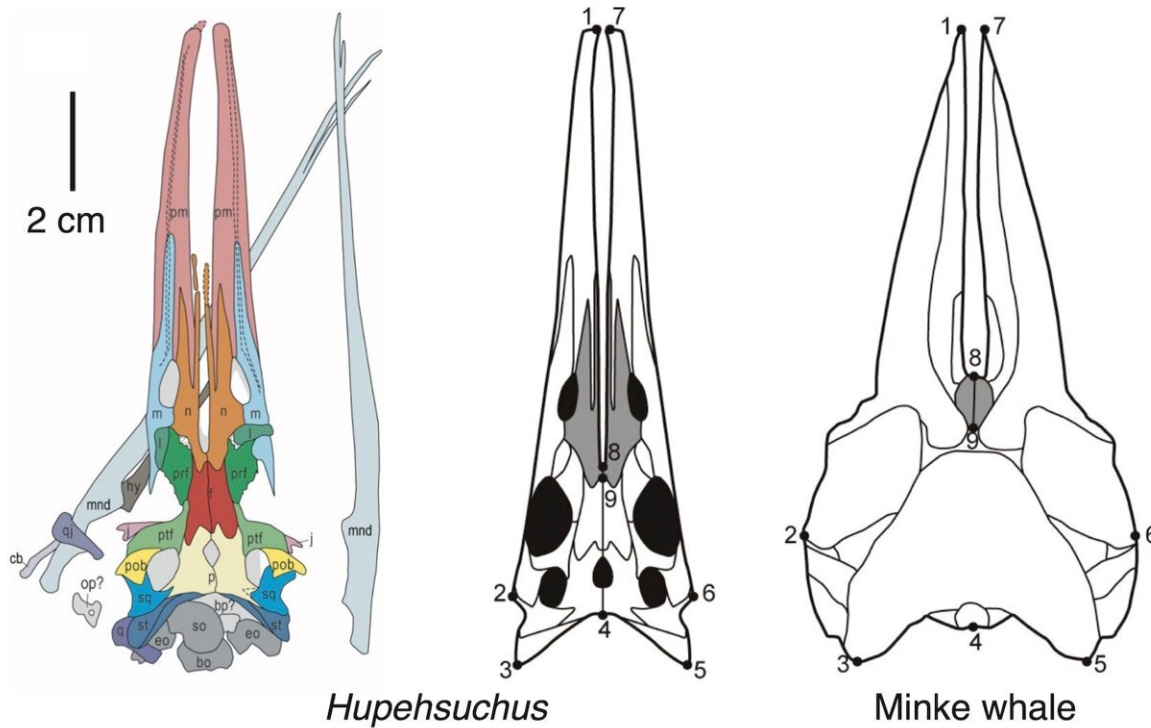
New research by a team from China and the UK has shown details of the

skull of an early marine reptile called *Hupehsuchus* that indicate it had soft structures such as an expanding throat region to allow it to engulf great masses of water containing shrimp-like prey, and [baleen](#) whale-like structures to filter food items as it swam forward.

The team also found that the *Hupehsuchus* skulls show the same grooves and notches along the edges of its jaws similar to baleen whales, which have keratin strips instead of teeth.

"We were amazed to discover these adaptations in such an early marine reptile," said Zichen Fang of the Wuhan Center of China Geological Survey, who led the research. "The hupehsuchians were a unique group in China, close relatives of the ichthyosaurs, and known for 50 years, but their mode of life was not fully understood."

"The hupehsuchians lived in the Early Triassic, about 248 million years ago, in China and they were part of a huge and rapid re-population of the oceans," said Professor Michael Benton, a collaborator at the University of Bristol's School of Earth Sciences. "This was a time of turmoil, only three million years after the huge end-Permian mass extinction which had wiped out most of life. It's been amazing to discover how fast these large marine reptiles came on the scene and entirely changed marine ecosystems of the time."



Skulls of *Hupehsuchus* (left and center) and the minke whale (right) showing similar long snout with narrow, loose bones, indicating attachment of expandable throat pouch. Credit: Zi-Chen Fang et al

"We discovered two new hupehsuchian skulls," said Professor Long Cheng, also of the Wuhan Center of China Geological Survey, who directed the project.

"These were more complete than earlier finds and showed that the long snout was composed of unfused, straplike bones, with a long space between them running the length of the snout. This construction is only seen otherwise in modern baleen whales where the loose structure of the snout and lower jaws allows them to support a huge throat region that

balloons out enormously as they swim forward, engulfing small prey."

Li Tian, a collaborator from the University of Geosciences Wuhan, added, "The other clue came in the teeth... or the absence of teeth,"

"Modern [baleen whales](#) have no teeth, unlike the toothed whales such as dolphins and orcas. Baleen whales have grooves along the jaws to support curtains of baleen, long thin strips of keratin, the protein that makes hair, feathers and fingernails. Hupehsuchus had just the same grooves and notches along the edges of its jaws, and we suggest it had independently evolved into some form of baleen."

The research was published in *Ecology and Evolution*.

More information: Zichen Fang et al, First filter feeding in the Early Triassic: cranial morphological convergence between Hupehsuchus and baleen whales, *Ecology and Evolution* (2023).

Provided by University of Bristol

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