

How seals made *Nautilus* a ‘Living Fossil’

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Abstract

The Cenozoic distribution patterns of pinnipeds and nautilids from the Oligocene onward show the local extinction of nautiloids in the areas where pinnipeds appeared, eventually resulting in the present-day restriction of *Nautilus* and *Allonautilus* to the central Indo-West Pacific Ocean. In addition, the development of oxygen minimum zones due to enhanced ocean circulation in the Oligocene prevented nautiloids to escape predation by retreating to deeper waters, resulting in their disappearance especially from the west coast of the Americas. The demise of the nautiloid *Aturia* due to predation pressure was less immediate, probably because it avoided predation by fast swimming rather than retreating to greater depths. Ultimately, however, this might have resulted in *Aturia*'s end-Miocene extinction, because its adaptations to fast swimming prevented it from retreating to depths that allowed *Nautilus* to escape the ever-increasing predation pressure. An immediate role of echolocating whales in the demise of shelled cephalopods is not apparent; their long, delicate snouts with numerous teeth likely were ill-suited for handling large shelled nautilids. A possible exception are short-snouted Simocetidae and Agorophiidae in the Oligocene of the North American Atlantic and Pacific coasts, which appeared in this area at the same time as the nautilids disappeared (Kiel et al. 2022).

References

Kiel, S., Goedert, J.L., and Tsai, C.-H., 2022: Seals, whales and the Cenozoic decline of nautiloid cephalopods. *Journal of Biogeography* 49: 1903–1910.