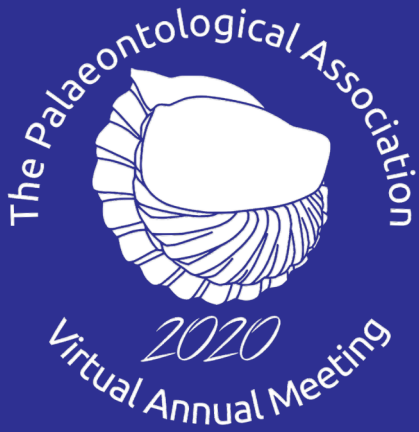
64th Palaeontological Association Annual Meeting

16–18 December 2020

Oxford University Museum of Natural History



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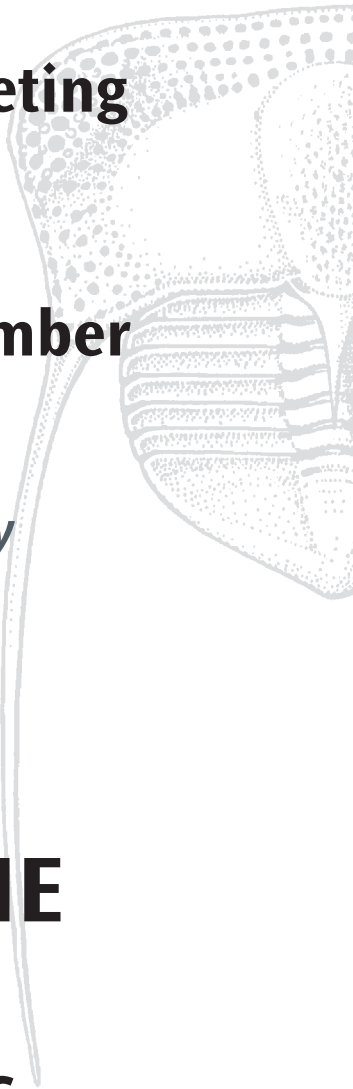

The locomotory eco-morphology and evolution of body plan in Mesozoic marine reptiles

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The aftermath of the end-Permian mass extinction provided ecological opportunity for many groups of reptiles, setting the beginning of the reptile dominance of the Mesozoic oceans. Clades like ichthyosaurs, thalattosuchians, sauropterygians, mosasaurs and turtles explored a remarkable diversity of ecological niches, becoming important components of aquatic ecosystems. Locomotion is one key aspect of the ecology, crucial for many biological functions such as foraging or migration. However, the evolution of locomotory adaptations in the ensemble of Mesozoic marine reptiles remains unexplored at a large scale. Here we present multivariate and disparity analyses based upon body proportions, body size and post-cranial features with inferred functional value in 126 species of Mesozoic marine reptiles. This analysis captures the main anatomical transformations across time and within clades, highlighting key transitions between drag and lift-based swimming modes in both the axial and appendicular spectrum. Our results show that locomotory disparity increased gradually during the whole Mesozoic and was highest in the Cretaceous, providing important insight into the dynamics of the Mesozoic ocean ecosystems.

Filling the palaeobiogeographic gap in mysticetes evolution: new records of baleen whales from the Neogene of the Atacama region, southeastern Pacific, Chile

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Mysticetes are an iconic group of marine mammals that include the most gigantic microphagous vertebrates that have ever lived on Earth. The fossil record of baleen whales dates back to the early Oligocene, reaching a diversification and widespread distribution during the Miocene, being present along most of the oceans (Atlantic, North and southwestern Pacific, and the Mediterranean). However, along the southeastern Pacific, especially at the Chilean coast, the fossil record of baleen whales remains a mystery. In recent years we increased fieldwork efforts in the Neogene Bahía Inglesa and Coquimbo formations, and performed a critical review of fossil specimens from national collections. At least three groups of mysticetes were recognized from diagnostic materials (skulls; tympano-periotic): Cethotheriidae (c.f. *Herpetocetus* sp.), Balaenidae (*Balaena* sp.) and Balaenopteroidea (*Balaenoptera* sp.). Both the cethotheriids and balaenids records are the first for the southeastern Pacific coast, greatly expanding their geographical distribution during the late Miocene. In the case of balaenids, presently unrepresented in the area, the new record implies a contraction of the distribution of right whales after the Neogene. Contrasting with their scarce representation in coeval formations along the southwestern Atlantic coast of Argentina, balaenopteroids are the most abundant mysticete remains in Chilean Miocene deposits.