ACTA PALAEONTOLOGICA POLONICA

Evidence for different shark species feeding on a diminutive right whale and a relative of the beluga in the Early Pliocene of the southern North Sea

Olivier Lambert, John R. Stewart, Stephen Louwye, Luc De Coninck, Mark Bosselaers, Lucile Crété, Stijn Goolaerts, Christophe Mallet, and Frederik H. Mollen
Acta Palaeontologica Polonica 71 (1), 2026: 69-84 doi:10.4202/app.01297.2025

Documenting past trophic relationships is crucial to understand deep time changes in the ecology and geographic distribution of large marine predators. Though bite marks on cetacean bones are a useful source of information to assess shark-whale predator-prey relationships, in many cases the identity of the prey and/or predator cannot be precisely determined. In this work, we investigate two cetacean specimens from the Kattendijk Formation (Lower Pliocene, north of Belgium): (i) the partial cranium of a small balaenid (right whale) that we describe and refer to *Balaenella brachyrhynus* and (ii) the previously described partial skeleton of a monodontid (family of beluga and narwhal), attributed here to the genus *Casatia*. Shark bite marks observed on the bones of the two specimens are described and the tip of a shark tooth found embedded in each cranium is visualized through micro-CT imaging. A comparison with shark species recorded in the Kattendijk Formation allows for the identification of the author of at least one bite for each cetacean: the bluntnose sixgill shark *Hexanchus griseus* for *B. brachyrhynus* and the large lamnid shark *Carcharodon plicatilis* for *Casatia* sp. Based on the position and topology of the marks, the *H. griseus* bite on *B. brachyrhynus* may have occurred on an upside down, floating carcass, a hypothesis that could indicate a scavenging event. Bite marks on the monodontid cranium suggest an attempt by *C. plicatilis* to sever the head from the rest of the body and point to the forehead region as a main targeted area. These new Early Pliocene records of shark-cetacean trophic relationships constitute a first step towards the exploration of the possible link between changes through time in the availability of prey in the southern North Sea and the local loss of large predatory sharks, which occurred in the Late Pliocene to Pleistocene time interval.

Key words: Mammalia, Balaenidae, Monodontidae, *Carcharodon, Hexanchus* , trophic interaction, active predation, scavenging, Belgium.

Olivier Lambert [olambert@naturalsciences.be; ORCID: https://orcid.org/0000-0003-0740-5791] and Stijn Goolaerts [sgoolaerts@naturalsciences.be; ORCID: https://orcid.org/0000-0002-7082-9012], O.D. Earth & History of Life, Royal Belgian Institute of Natural Sciences, Vautierstreet 29, 1000 Brussels, Belgium. John R. Stewart [jstewart@bournemouth.ac.uk

; ORCID: http://orcid.org/0000-0002-3506-5264], Faculty of Health, Environment and Medical Sciences, Bournemouth University, Fern Barrow, Poole, BH12 5BB Dorset, UK. Stephen Louwye [stephen.louwye@ugent.be ; ORCID: https://orcid.org/0000-0003-4814-4313], Department of Geology, Ghent University, Krijgslaan 297/S8, 9000 Ghent, Belgium. Luc De Coninck [deconinckluc11@outlook.be], Belgische Vereniging voor Paleontologie, Belgische Vereniging voor Paleontologie, Lage Kerkwegel 3, 9170 Sint-Gillis-Waas, Belgium. Mark Bosselaers [mark.bosselaers@telenet.be ; ORCID: https://orcid.org/0000-0003-3016-1246], O.D. Earth & History of Life, Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Koninklijk Zeeuwsch Genooschap der Wetenschappen, Kousteensedijk 7, 4331 Middelburg, The Netherlands. Lucile Crété [l.crete@nhm.ac.uk; ORCID: https://orcid.org/0000-0001-8460-7747], Centre for Human Evolution Research, Natural History Museum, Cromwell Road, SW7 5BD London, UK. Christophe Mallet [cmallet@naturalsciences.be ; ORCID: https://orcid.org/0000-0002-1982-3803], O.D. Earth & History of Life, Royal Belgian Institute of Natural Sciences, Brussels, Belgium; Faculty of Engineering, Department of Geology and Applied Geology, University of Mons, rue de Houdain 9, 7000 Mons, Belgium. Frederik H. Mollen [frederik.mollen@gmail.com; ORCID: https://orcid.org/0000-0002-9934-1029], Elasmobranch Research, Rehaegenstraat 4, 2820 Bonheiden, Belgium.