

# 3D models related to the publication: A basal representative of Cetacea from the Eocene of India.

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## Abstract

The present 3D Dataset contains the 3D models of the holotype and only specimen of *Kalakocetus aurorae*, a new cetacean retrieved from the Kalakot area in northwestern India. This specimen consists in a left hemimandible preserving the root of i3, p2, p4, m1 and m3 in situ. Its primitive morphology, with a tricuspid m3 morphologically intermediate between Raoellidae and Pakicetidae, makes it the first offshoot of Cetacea and provides crucial new elements to understand the morphological path that led to the peculiar dental morphology of early cetaceans.

**Keywords:** Cetacea, CT scan, mandibular canal, Middle Eocene

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M3 nr.	Description
M3#1803	left hemi mandible with p2, p4, m1, m3
M3#1804	digitally restored m1
M3#1805	digital restoration of complete mandible
M3#1810	μCT slices (voxel size: 67.42 μm)

**Table 1.** List of models of the specimen *Kalakocetus aurorae* (GU/RJ/07). Collection: paleontological laboratory of the Hemvati Nandan Bahuguna Garhwal University, India

## INTRODUCTION

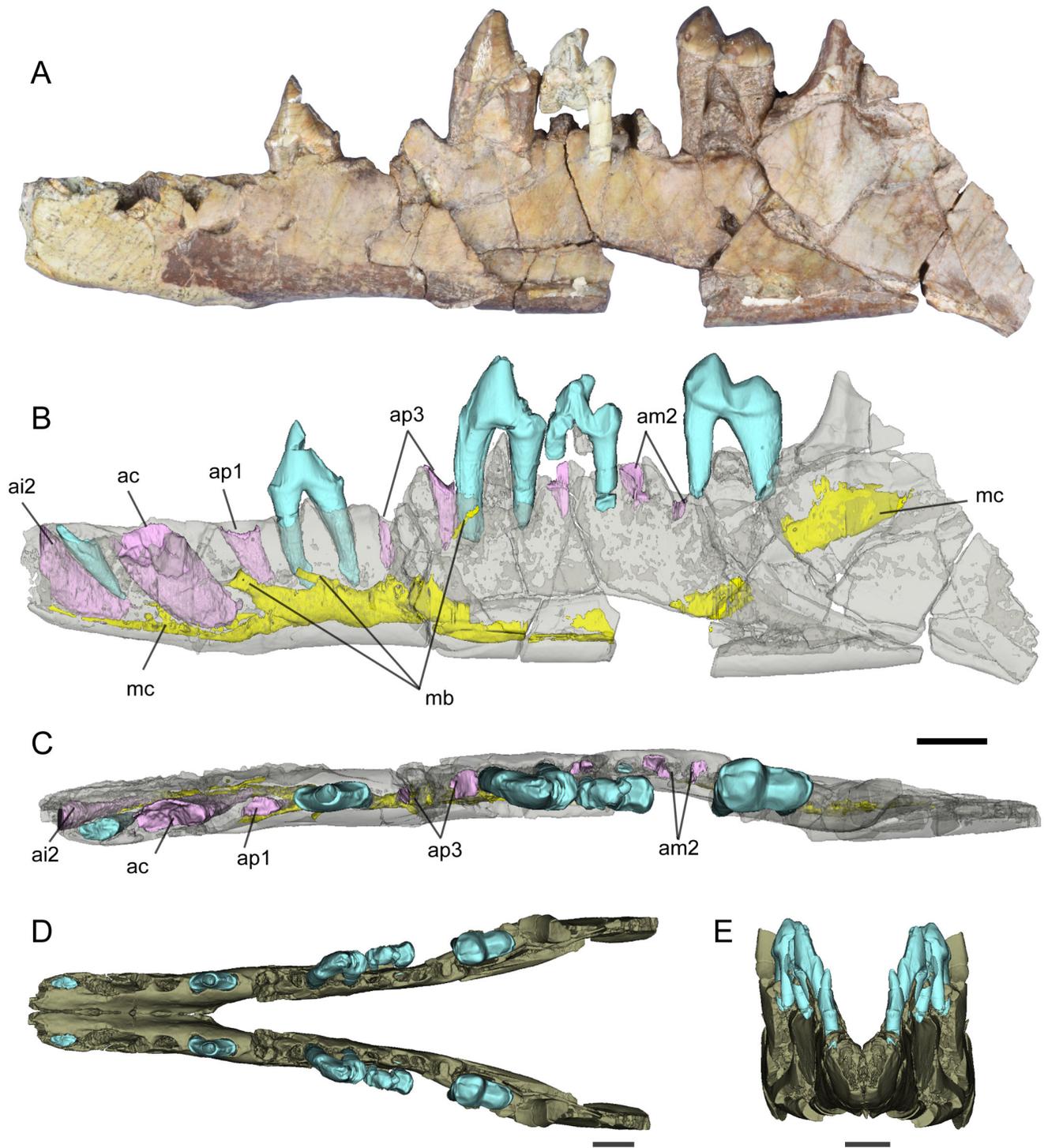
The conquest of the aquatic environment by cetacean artiodactyls was accompanied by a dietary shift from an herbivorous/folivorous diet to a carnivorous diet. This shift appears abruptly in the fossil record with no intermediary stages known. The contribution of Waqas et al. (2026) describes a new cetacean from the middle Eocene deposits of the Kalakot area in India on the basis of a single hemimandible referred to *Kalakocetus aurorae* gen nov sp. nov. This specimen documents an unprecedented intermediate quadricuspid/tricuspid morphology of the lower molars and bridges the gap between the crushing molars with four cupids found in their sister taxon Raoellidae and shearing molars with two cuspids of earliest cetaceans such as pakicetids. Waqas et al. (2026) retrieved *Kalakocetus aurorae* as first offshoot of Cetacea based on phylogenetic analyses and crown topography and wear indicate that it was most probably carnivorous. Microtomography investigation was performed on the specimen to reconstruct the size and shape of the mandibular canal and to access to roots and alveolae morphology and reconstruct dental features (Fig. 1-2).

## METHODS

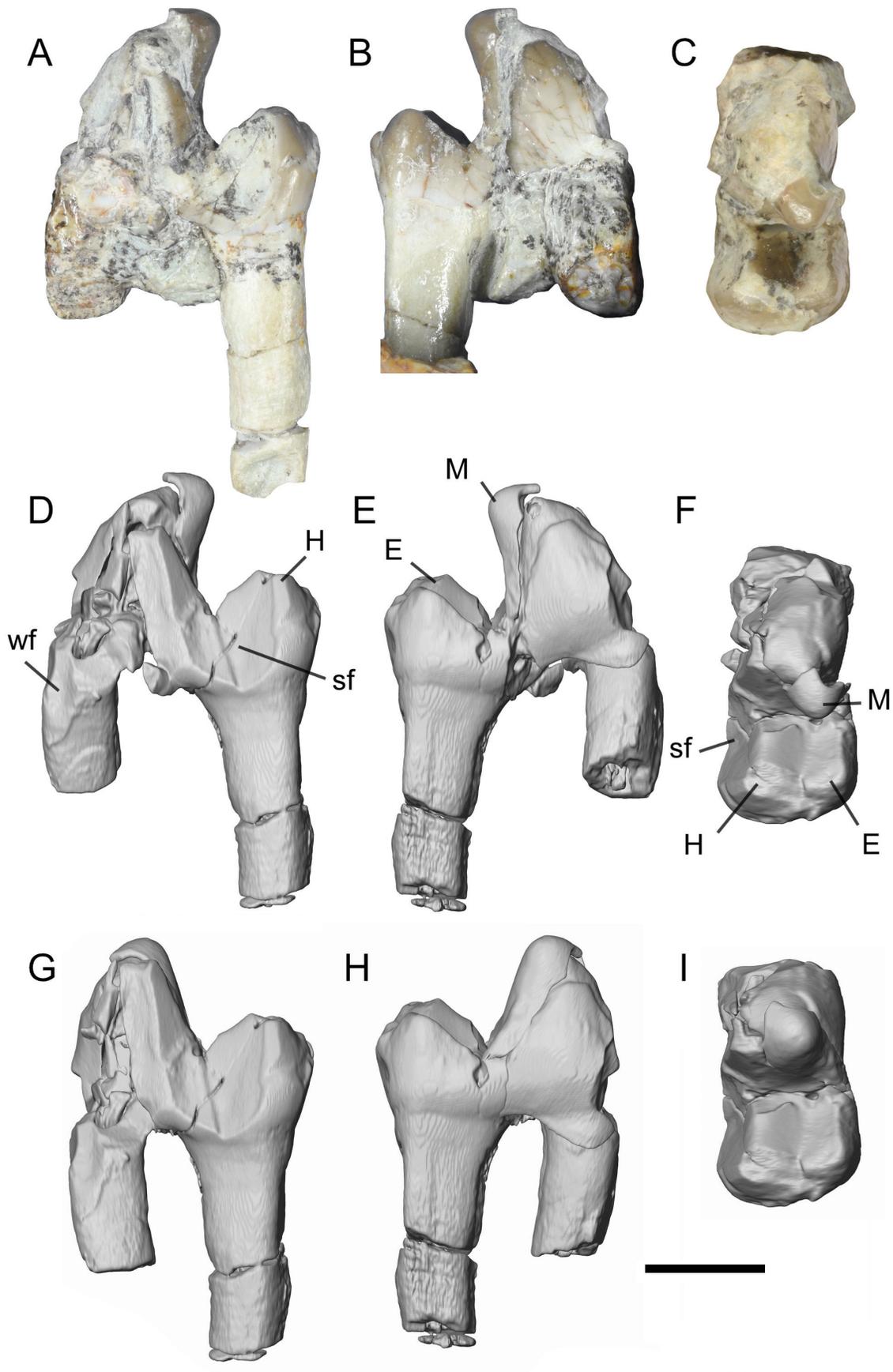
The holotype and only specimen of *Kalakocetus aurorae* (GU/RJ/07) is stored in the paleontological laboratory of the Hemvati Nandan Bahuguna Garhwal University, India. Specimen preparation and photography were carried out at the *Institut des sciences de l'Evolution de Montpellier* (ISEM). The specimen was scanned at the μCT scanner facility of the Montpellier Ressources Imagery platform using a RX-Solution Easy Tom 150a CT scanner, with a voxel size of 0.0674 mm. Segmentation and measurements were performed using Avizo® 9.3 (Thermo Fisher Scientific-FEI). Segmentation was performed manually slice by slice using the pencil segmentation tool. The teeth, alveolae, and mandibular canal were segmented separately on different label fields. The first molar of GU/RJ/07 is badly damaged in its anterior part, preventing accessing the morphology of the crown. It was digitally restored by putting back together four main parts segmented separately with AVIZO using the software MorphoDig (<https://morphomuseum.com/morphodig>; Fig. 2) and following the protocol illustrated by Waqas et al. (2026, Fig. S8 supplementary material).

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**Figure 1.** Mandible of *Kalakocetus aurorae* (GU/RJ/07). (A-E), GU/RJ/07 holotype specimen with p2, p4-m1 and m3, with (B-C) digital reconstruction of teeth (light blue), alveolae (in pink) and mandibular canal (in yellow) visible through a translucent rendering of the mandible, and (D-E) digital reconstruction of the complete mandible using a mirrored mesh of the specimen. Specimen figured in lateral/Buccal (A-B), occlusal (C, D), and anterior (E) views. Abbreviations: a, alveolus; mc, mandibular canal; mb, mental branch of inferior alveolar nerves. Scale bars = 1 cm.



**Figure 2.** Photograph and digital models of the m1 of *Kalakocetus aurorae* (GU/RJ/07). (A-C) Photograph in labial (A), lingual (B), occlusal (C) views; (D-F) digital model before restoration in labial (A), lingual (B), occlusal (C) views; (G-I) digital model after digital restoration. Abbreviations: E, Entoconid; H, Hypoconid; M, metaconid; sf, shearing facet; wf, wear facette. Scale bar = 5 mm.

(ISEM, projet au Sud).

## BIBLIOGRAPHY

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