

3D model of *Palaeolama* sp. related to the publication: Endocranial casts of *Camelops hesternus* and *Palaeolama* sp., new insights into the recent history of the camelid brain.

Ana Balcarcel^{1*}, Dylan Bastiaans¹, Maëva Orliac²

¹Palaeontological Institute and Museum, University of Zurich, Karl-Schmid-Strasse 4, 8006 Zurich, Switzerland

²Institut des Sciences de l'Évolution de Montpellier (UMR 5554, CNRS, UM, IRD, EPHE), c.c. 064, Université Montpellier, place Eugène Bataillon, F-34095 Montpellier Cedex.

*Corresponding author: maeva.orliac@umontpellier.fr

Abstract

The present 3D Dataset contains the 3D model of the endocranial cast of *Palaeolama* sp. from the mid-Pleistocene (1.2 Mya) of South America, analyzed in Balcarcel et al. 2022.

Keywords: Artiodactyla, Camelidae, natural endocast, neocortex

Submitted:2023-02-17, published online:2023-09-25. <https://doi.org/10.18563/journal.m3.190>

Inv nr.	Taxon	Description
PIMUZA/V4091	<i>Palaeolama</i> sp.	3D model of a natural endocast

Table 1. Related model. Collection : Palaeontological Institute and Museum, Zürich.

INTRODUCTION

Modern camelids, including camels, llamas, and alpacas, display a great level of gyrification of the neocortex. The fossil endocast record of Camelidae covers from approximately 40 Mya (Eocene) to 11 Mya (Miocene), and a gap remained in this record for the last 10 million years. The work of Balcarcel et al. (2022) presents the first descriptions of two more recent camelid endocasts: the endocast of *Palaeolama* sp. from 1.2 Mya, and the endocast of *Camelops hesternus*, a giant camelid from 44-11 Kya. In this direct contribution, we provide the 3D model of the endocast of *Palaeolama* sp (PIMUZ A/V 4091; Fig. 1 and table 1) from 'San Lorenzo 2' locality in Argentina (Schulthess, 1920); that of *Camelops hesternus* is available in the online supplementary material of Balcarcel et al. (2022). The latter work shows that neocortical complexity evolved significantly between the Miocene and Pleistocene Epochs and that by 1.2 Mya the camelid brain already presented a modern morphology. The new fossil evidences indicate that the neocortical invagination into the sagittal sinus occurred during the Pleistocene.

METHODS

The natural endocast PIMUZ A/V 4091 was scanned via X-ray computed tomography at the University of Montpellier using an EasyTom 150 µ-CT scanner at 92 KV with a resulting resolution of 70 µm. The digital reconstruction of the endocast and segmentation to remove remaining cranial bone was executed in Avizo (v. Lite 9.0.1) (Thermo Fisher Scientific-FEI). The 3D surface model is provided in .ply format, and can therefore be opened with a wide range of freeware.

ACKNOWLEDGEMENTS

We thank Gabriel Aguirre for access to collections at the Palaeontology Institute and Museum of UZH (PIMUZ); Renaud Lebrun for the access of scanning facilities (MRI platform member of the national infrastructure France-BioImaging supported by the French National Research Agency [ANR-10-INBS-04, «Investments for the future»], the LabEx CEMEB [ANR-10-LABX-0004] and NUMEV [ANR-10-LABX-0020]). This work was supported by the Swiss National Science Foundation SNF grant no. 31003A-169395 and the Hubert Curien – Germaine de Staël grant no. 46776YE.

BIBLIOGRAPHY

- Balcarcel A. M., Bastiaans D., & Orliac M. J. (2022) Endocranial casts of *Camelops hesternus* and *Palaeolama* sp., new insights into the recent history of the camelid brain. *Brain, Behavior and Evolution*, early view. <https://doi.org/10.1159/000528762>
- Schulthess B. (1920) Beiträge zur Kenntnis der Xenarthra auf Grund der Santiago Roth'schen. Sammlung des Zoologischen Museums der Universität Zürich. Imprimerie Albert Kundig, pp. 58-59.

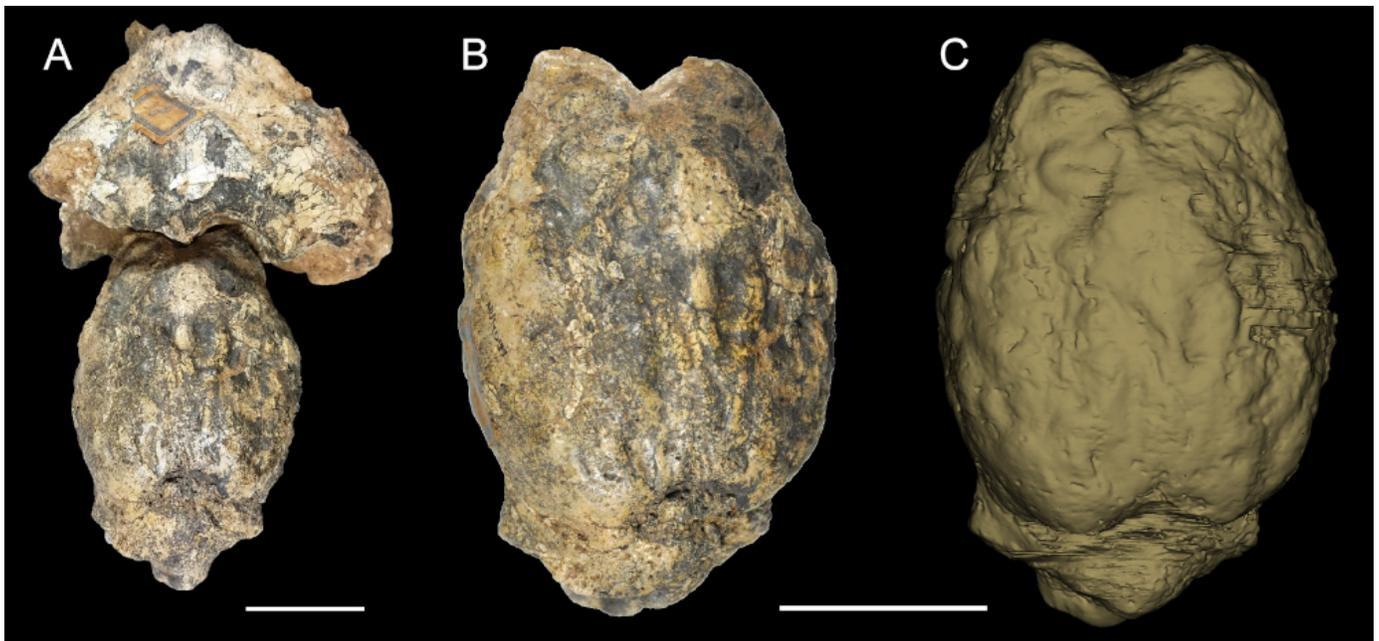


Figure 1. Illustration of the endocast of *Palaeolama* sp. (PIMUZ A/V 4091), A) location of the in situ natural endocast; B) natural endocast; C) 3D model after removal of parietal and occipital bone remains. Scale bars = 5 cm.