Dataset

3D models related to the publication: European mammal turnover driven by a global rapid warming event preceding the Paleocene-Eocene Thermal Maximum

Rodolphe Tabuce[1]*, Killian Gernelle[1]

[1] *Institut des Sciences de l'Évolution de Montpellier (ISE-M, UMR 5554, CNRS/UM/IRD/EPHE), c.c. 064, Université de Montpellier, place Eugène Bataillon, 34095 Montpellier Cedex 05, France*

***Corresponding author**: rodolphe.tabuce@umontpellier.fr

Abstract

This contribution contains the 3D models described and figured in the following publication: Tabuce R., Marandat B., Adnet S., Gernelle K., Girard F., Marivaux L., Solé F., Schnyder J., Steurbaut E., Storme J.-Y., Vianey-Liaud M., Yans J. (2025). European mammal turnover driven by a global rapid warming event preceding the Paleocene-Eocene Thermal Maximum. *PNAS*

Keywords: France, Late Paleocene, Mammalia, Pre-Onset Event

Submitted: 19/05/2025, published online: 27/06/2025. https://doi.org/10.18563/journal.m3.275

INTRODUCTION

We report from France a new mammalian fauna, named Albas, which is interpreted to postdate the Pre-Onset Excursion (POE) and predate the Paleocene-Eocene Thermal Maximum (PETM, 56 Ma). Albas yielded the European first definitive Paleocene record of metatherians, paromomyid primates, "creodonts," and rodents, challenging the assumption that these groups migrated into Europe during the PETM. Because the majority of them originated from North American pre-POE species, we tentatively suggest that these "precursor" dispersers entered Europe during the POE. Our findings highlight how a brief warming event in the Arctic during the latest Paleocene, such as the POE (which could result in a release of carbon into the atmosphere similar to cumulative ongoing anthropogenic emissions), significantly influenced the evolutionary dynamics of European mammals. We present here the 3D digital models of the key specimens of Albas belonging to nyctitheriid and adapisoriculid "insectivores", paromomyid primates, herpetotheriid metatherians, ischyromyid rodents, hyaenodontid "creodonts", and louisinid "condylarths" (Fig. 1 and Table 1). The specimens are permanently housed in the collections of the Université de Montpellier (UM).

METHODS

The specimens were scanned using a µCT-scanning station Easy-Tom 150/Rx Solutions (Montpellier Ressources Imagerie [MRI], ISEM, Montpellier, France), with a resolution of 5 µm. The 3D surfaces were extracted semi-automatically using the segmentation threshold selection tool of Avizo® 9.3. The 3D surface models, visualized with Avizo® 9.3, are provided in .ply format and can therefore be opened with a wide range of freeware (e.g., MorphoDig).

ACKNOWLEDGEMENTS

We would like to thank the authorities of the Albas village for granting permission for paleontological excavations in the Albas "Windmill" section. We are also grateful to Anne-Lise Charruault (Université de Montpellier) for her invaluable technical assistance and expertise. We acknowledge the imaging facility MRI, member of the national infrastructure France-BioImaging (https://ror.org/01y7vt929) supported by the French National Research Agency (ANR-24-INBS-0005 FBI BIOGEN). This research was supported by grant ANR-20-CE02-0007.

BIBLIOGRAPHY

Tabuce, R., Marandat, B., Adnet, S., Gernelle, K., Girard, F., Marivaux, L., Solé, F., Schnyder, J., Steurbaut, E., Storme, J.-Y., Vianey-Liaud, M., and Yans, J. (2025). European mammal turnover driven by a global rapid warming event preceding the Paleocene-Eocene Thermal Maximum. *Proceedings of the National Academy of Sciences*. https://doi.org/10.1073/pnas.2505795122.

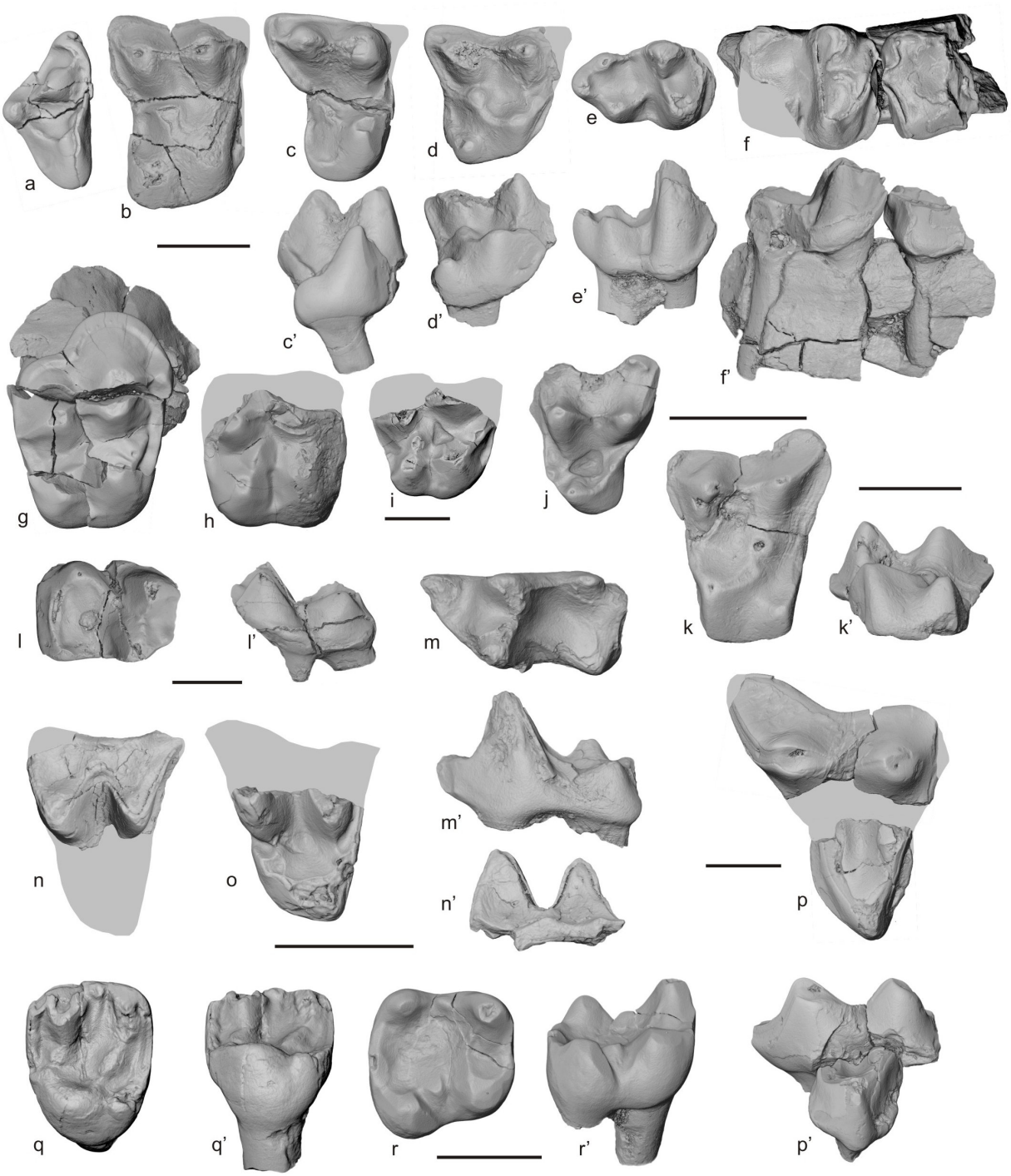

Figure 1. Mammals from Albas (X-ray µCT surface reconstructions). **a-f**, Paschatherium marianae, **a**, right M3 UM-ALB-10 in occlusal view; **b**, right M2 UM-ALB-33 in occlusal view; **c-c'**, right P4 UM-ALB-4 in occlusal (c) and lingual (c') views; **d-d'**, left DP4 UM-ALB-5 in occlusal (d) and lingual (d') views (reversed); **e-e'**, right m3 UM-ALB-22 in occlusal (e) and labial (e') views; **f-f'**, right m1-2 UM-ALB-8 in occlusal (f) and labial (f') views. **g-i**, Teilhardimys cf. reisi, **g**, right M2 UM-ALB-36a in occlusal view; **h**, right M1 UM-ALB-36b in occlusal view; **i**, right DP4 UM-ALB-28 in occlusal view. **j**, Bustylus sp., left M1 UM-ALB-37 in occlusal view. **k-k'**, ?Pseudorhyncocyonidae nov. gen. nov. sp. UM-ALB-27, M1or2 (left) in occlusal (k) and lingual (k') views. **l-l'**, Arcius cf. rougieri, left m2 UM-ALB-3 in occlusal (l) and labial (l') views. **m-o**, Peratherium sp., **m-m'**, left m2 in occlusal (m) and labial (m') views; **n-n'**, left labial part of ?M3 UM-ALB-25 in occlusal (n) and labial (n') views (reversed); **o**, right lingual part of ?M2 UM-ALB-23 in occlusal view. **p-p'**, Arfia nov. sp., right M1or2 UM-ALB-2 in occlusal (p) and lingual (p') views. **q-r**, Acritoparamys aff. atavus, **q-q'**, left P4 UM-ALB-41 in occlusal (q) and lingual (q') views; **r-r'**, right m1 UM-ALB-42 in occlusal (r) and labial (r') views. Incomplete teeth seen in occlusal view have their outlines tentatively completed. Scale bars: 1 mm.

ISSN: 2274-0422

Inv nr.	Taxon	Description
UM-ALB-41	*Acritoparamys* aff. *atavus*	3D digital model
UM-ALB-42	*Acritoparamys* aff. *atavus*	m1 (right)
UM-ALB-43	*Acritoparamys* aff. *atavus*	M3 (right)
UM-ALB-7	?Adapisoriculidae	M1or2 (left)
UM-ALB-3	*Arcius* cf. *rougieri*	m2 (left)
UM-ALB-2	*Arfia* sp.	M1 or M2 (right)
UM-ALB-37	*Bustylus* sp.	M1 (left)
UM-ALB-44	?*Corbarimys*	M1 or M2 (left)
UM-ALB-26	Mammalia indet.	upper molar (right)
UM-ALB-39	Mammalia indet.	m1 or m2 (left)
UM-ALB-4	*Paschatherium marianae*	P4 (right)
UM-ALB-5	*Paschatherium marianae*	DP4 (right)
UM-ALB-8	*Paschatherium marianae*	mandible with m2 and talonid of m1 (left)
UM-ALB-10	*Paschatherium marianae*	M3 (righ
UM-ALB-22	*Paschatherium marianae*	m3 (right)
UM-ALB-33	*Paschatherium marianae*	M2 (right)
UM-ALB-12	*Peratherium* sp.	?m2 (left)
UM-ALB-23	*Peratherium* sp.	?M2 (right)
UM-ALB-25	*Peratherium* sp.	?M3 (left)
UM-ALB-16	*Plagioctenodon* cf. *dormaalensis*	M1 or M2 (right)
UM-ALB-18	*Plagioctenodon* cf. *dormaalensis*	P4 (right)
UM-ALB-27	?Pseudorhyncocyonidae indet	M1 or M2 (left)
UM-ALB-36a	*Teilhardimys* cf. *reisi*	M2 (right)
UM-ALB-36b	*Teilhardimys* cf. *reisi*	M1 (right)
UM-ALB-19	*Wyonycteris* sp.	M1 or M2 (right)

Table 1. List of 3D models. Collection: Institut des Sciences de Montpellier, Université de Montpellier, Montpellier, France.

ISSN: 2274-0422