

3D models related to the publication: The neuroanatomy of *Zulmasuchus querejazus* (Crocodylomorpha, Sebecidae) and its implications for the paleoecology of sebecosuchians

Yohan Pochat-Cottilloux^{1*}, Jeremy E. Martin¹, Stéphane Jouve², Gwendal Perrichon¹, Jérôme Adrien³, Céline Salaviale¹, Christian de Muizon⁴, Ricardo Céspedes⁵, Romain Amiot¹

¹ Univ Lyon, Univ Lyon 1, ENSL, CNRS, LGL-TPE, F-69622, Villeurbanne, France

² Centre de Recherche en Paléontologie – Paris (CR2P), Sorbonne Université, 4 Place Jussieu, 75005, Paris, France.

³ Laboratoire Matériaux, Ingénierie et Science, Institut National des Sciences Appliquées de Lyon, 20 Avenue Albert Einstein, 69100 Villeurbanne, France.

⁴ Centre de Recherche en Paléontologie – Paris (CR2P), Muséum National d'Histoire Naturelle, CNRS/MNHN/Sorbonne Université, CP38, 57 rue Cuvier, F-75231 Paris cedex 05, France.

⁵ Museo de Historia Natural 'Alcide D'Orbigny', Cochabamba, Bolivia

*Corresponding author: yohan.pochat-cottilloux@univ-lyon1.fr

Abstract

The present 3D Dataset contains the 3D models analyzed in Pochat-Cottilloux Y., Martin J.E., Jouve S., Perrichon G., Adrien J., Salaviale C., Muizon C. de, Céspedes R. & Amiot R. (2021). The neuroanatomy of *Zulmasuchus querejazus* (Crocodylomorpha, Sebecidae) and its implications for the paleoecology of sebecosuchians. The Anatomical Record, <https://doi.org/10.1002/ar.24826>

Keywords: Bolivia, Crocodylomorpha, paleoneuroanatomy, Sebecidae, Zulmasuchus

Submitted:2021-06-14, published online:2021-11-26. <https://doi.org/10.18563/journal.m3.148>

Model nr.	Description
M3#798	Left endosseous labyrinth
M3#799	Endocranial cavities
M3#800	Pneumatic cavities within the braincase

Table 1. Involved 3D models of *Zulmasuchus querejazus* MHNC 6672. MHNC: Museo de Historia Natural “Alcide d’Orbigny” (Cochabamba, Bolivia)

INTRODUCTION

For the first time, a specimen of Sebecidae (*Zulmasuchus querejazus*) was scanned and its internal structures were reconstructed (figs. 1 & 2, see also table 1). This specimen comes from the Tiupampa locality in the Santa Lucia Formation (Vila Vila, Mizque Province, Bolivia) dated from the early Paleocene (Buffetaut & Marshall, 1991; Gayet et al., 1991; Marshall et al., 1997; Muizon et al., 1998; Muizon & Cifelli, 2000; Jouve et al., 2020).

METHODS

A nicely preserved, uncrushed and undeformed braincase of *Zulmasuchus querejazus* (Buffetaut & Marshall, 1991; MHNC 6672) was investigated to reveal its internal anatomy. The Computed Tomography (CT) scan was performed at the Laboratoire Mateis (INSA, Lyon) with a Vtomex laboratory X-ray computed tomograph (GE Phoenix X-Ray GmbH). Scanning parameters were set to 150 kV tube voltage and 80 μ A current, we also used a 0.5 mm copper filter at the source exit. Two acquisitions were made, with a voxel size of 75 μ m and 30 μ m, respectively. The exposure time was one second for each projection and there

was a total of 1200 of them for the global acquisition and 1500 for the zoomed acquisition that served for the reconstruction of the endosseous labyrinth. Volume rendering and processing of scans of the endosseous labyrinth, sinuses and cranial endocasts were obtained using the software Avizo Lite (version 9.5.0), MeshLab (version 2020.02), Blender (version 2.91) and MorphoDig (version 1.5.3; Lebrun, 2018).

ACKNOWLEDGEMENTS

This work was supported by the Agence Nationale de la Recherche (SEBEK project N° ANR-19-CE31-0006-01 to JEM). The authors thank Romain David (Max Planck Institute for Evolutionary Anthropology) for discussions about his previous segmentation of the specimen and the sharing of the data he used in his PhD thesis.

BIBLIOGRAPHY

- Buffetaut E. & Marshall L. G. (1991). A new crocodylian, *Sebecus querejazus*, nov. sp. (Mesosuchia, Sebecidae) from the Santa Lucia formation (Early Paleocene) at Vila Vila, southcentral Bolivia. *Fósiles y Facies de Bolivia*, 1: 545-557.
- Gayet M., Marshall L. G. & Sempéré T. (1991). The Mesozoic and Paleocene vertebrates of Bolivia and their stratigraphic context: a review. *Revista Técnica de Yacimientos Petrolíferos Fiscales Bolivianos*, 12(3-4): 393-433.
- Jouve S., Muizon C. de, Céspedes-Paz R., Sossa-Soruco V. & Knoll S. (2020). The longirostrine crocodyliforms from Bolivia and their evolution through the Cretaceous–Palaeogene

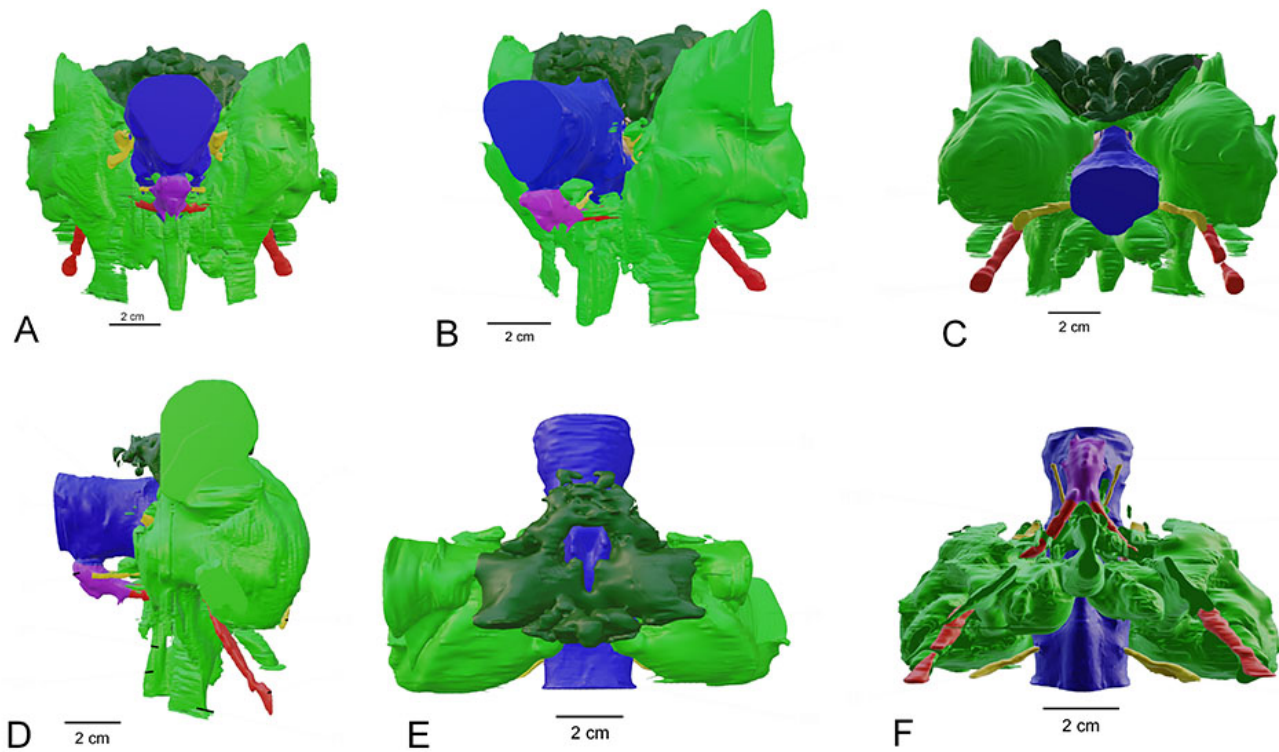


Figure 1. Three-dimensional reconstruction of the pneumatic and endocranial cavities within the braincase of *Z. querejazus* (MHNC 6672) in anterior (A), anterior 3/4 (B), posterior (C), lateral (D) dorsal (E) and ventral (F) views. Blue: endocranium, light green: pharyngotympanic sinus and eustachian system, dark green: intertympanic diverticula, red: internal carotid artery, yellow: cranial nerve, purple: pituitary fossa.

boundary. *Zoological Journal of the Linnean Society*, 20: 1-35.
doi.org/10.1093/zoolinnea/zlaa081

Lebrun R. MorphoDig, an open-source 3D freeware dedicated to biology. IPC5, Paris, France; 07/2018.

Marshall L. G., Sempere T. & Butler R. F. (1997). Chronostratigraphy of the mammal-bearing Paleocene of South America. *Journal of South American Earth Sciences*, 10(1): 49-70.
[doi.org/10.1016/S0895-9811\(97\)00005-9](https://doi.org/10.1016/S0895-9811(97)00005-9)

Muizon C. de., Cifelli R. L. & Bergqvist L. P. (1998). Eutherian tarsals from the early Paleocene of Bolivia. *Journal of Vertebrate Paleontology*, 18(3): 655-663. doi.org/10.1080/02724634.1998.10011092

Muizon C. de & Cifelli R. L. (2000). The “condylarths” (archaic Ungulata, Mammalia) from the early Palaeocene of Tiupampa (Bolivia): implications on the origin of the South American ungulates. *Geodiversitas*, 22(1): 47-150.

Pochat-Cottilloux Y., Martin J.E., Jouve S., Perrichon G., Adrien J., Salaviale C., Muizon C. de, Cespedes R. & Amiot R. (2021). The neuroanatomy of *Zulmasuchus querejazus* (Crocodylomorpha, Sebecidae) and its implications for the paleoecology of sebecosuchians”. *The Anatomical Record*, <https://doi.org/10.1002/ar.24826>

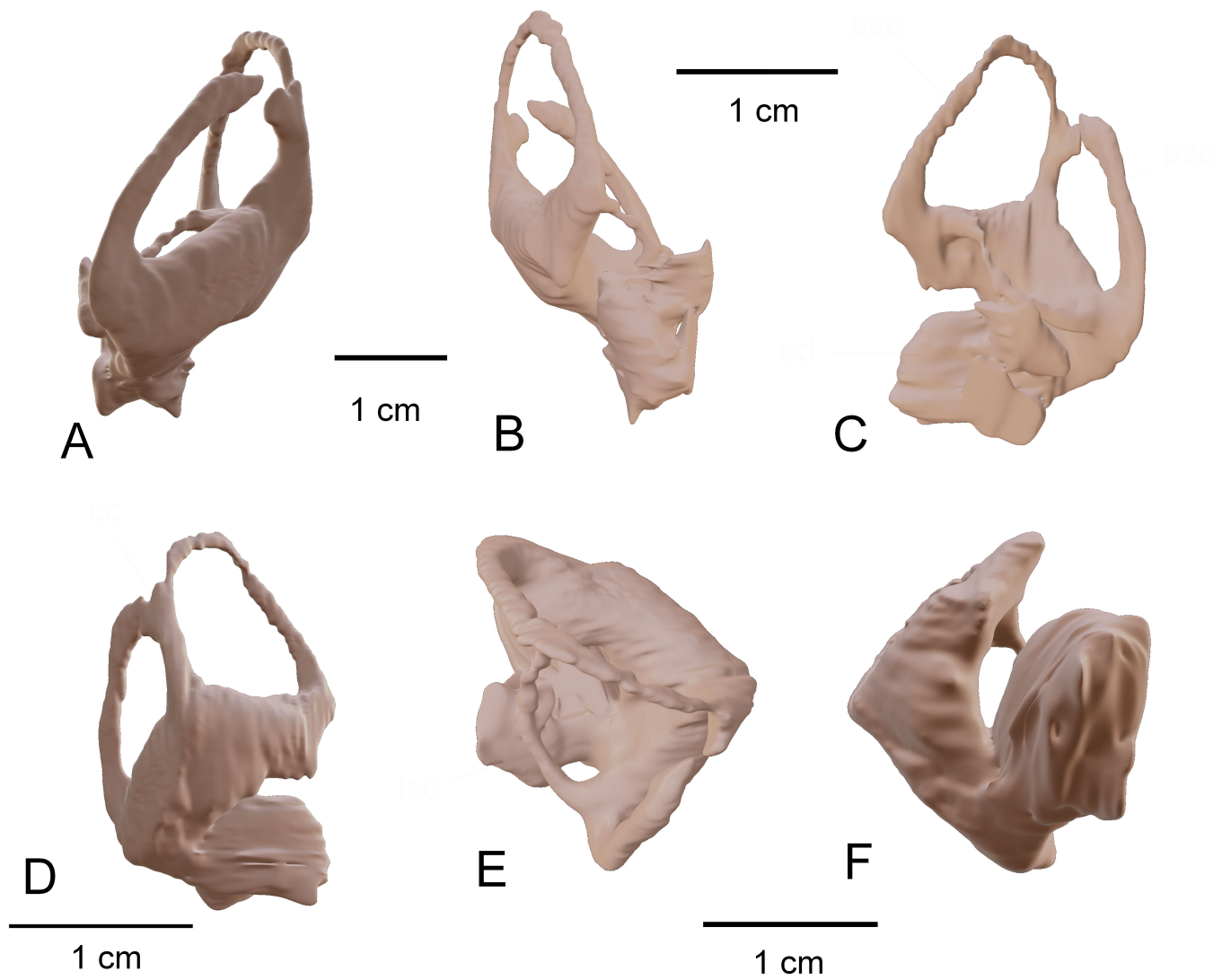


Figure 2. Three-dimensional reconstruction of the left endosseous labyrinth of *Z. querejazus* (MHNC 6672) in posterior (A), anterior (B), lateral (C and D), dorsal (E) and ventral (F) views.