Dataset

3D models related to the publication: Sacral co-ossification in dinosaurs: the oldest record of fused sacral vertebrae in Dinosauria and the diversity of sacral co-ossification patterns in the group

Débora Moro[1, 2*], Leonardo Kerber[1, 2, 3], Rodrigo Temp Müller[2], Flávio Augusto Pretto[1,2*]

[1] *Programa de Pós-Graduação em Biodiversidade Animal, Universidade Federal de Santa Maria, Santa Maria, Brazil, CEP 97105-900*
[2] *Centro de Apoio à Pesquisa Paleontológica da Quarta Colônia, Universidade Federal de Santa Maria, São João do Polêsine, Brazil, CEP 97230-000*
[3] *Museu Paraense Emílio Goeldi, Coordenação de Ciências da Terra e Ecologia, Belém, Brazil, CEP 66040-170*
***Corresponding authors**: deboramorod@gmail.com; flavio.pretto@ufsm.br

Abstract
The present 3D Dataset contains the 3D models of the sacral vertebrae analyzed in “Sacral co-ossification in dinosaurs: The oldest record of fused sacral vertebrae in Dinosauria and the diversity of sacral co-ossification patterns in the group”.

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Inv nr.	Taxon	Description
CAPPA/UFSM 0035	*Buriolestes schultzi*	Sacral vertebrae
CAPPA/UFSM 0228	cf. *Buriolestes*	Sacral vertebrae

Table 1. Specimen list. Collection: CAPPA/UFSM, paleontological collection Centro de Apoio à Pesquisa Paleontológica da Quarta Colônia/Universidade Federal de Santa Maria.

INTRODUCTION

The fusion of the sacrum occurs in the major dinosaur lineages, i.e. ornithischians, theropods, and sauropodomorphs, but it is unclear if this trait is a common ancestral condition, or if it evolved independently in each lineage, or even how or if it is related to ontogeny. In addition, the order in which the different structures of the sacrum are co-ossified, as well as the causes that lead to this co-ossification, are poorly understood. Moro et al. (in review) described the oldest record of co-ossified sacral vertebrae within dinosaurs, based on two fused primordial sacral vertebrae from the Late Triassic of Candelária Sequence, southern Brazil. Their results suggest that primordial sacral vertebrae can co-ossify early in the lineage. Especially in Sauropodomorpha, intervertebral fusion is observed to encompass progressively more vertebral units as the lineage evolves, reaching up to five or more fully fused sacrals in Neosauropoda. Furthermore, the new specimen described here indicates that the fusion of sacral elements occurred early in the evolution of dinosaurs. This contribution contains the 3D models of the sacra of *Buriolestes schultzi* (CAPPA/UFSM 0035) and one indeterminate dinosaur, possibly referrable to *Buriolestes* (CAPPA/UFSM 0228), both discussed in the aforementioned contribution (see Table 1 and Fig. 1).

METHODS

The specimens CAPPA/UFSM 0228 and CAPPA/UFSM 0035 (a partial skeleton referred to *Buriolestes schultzi*) were scanned using tomography and microtomography. Specimen CAPPA/UFSM 0228 was scanned with a µCT scan Skyscan 1173 at Laboratório de Sedimentologia e Petrologia of the Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), Porto Alegre, Brazil, using 115 kV and 61 µA. The scan resulted in 2,631 tomographic slices, with a pixel size of 29.98 µm. Specimen CAPPA/UFSM 0035 was scanned using a Philips Brilliance 64-Slice CT Scanner (located at Santa Maria city), using 120 kV and 150.52 mAs. The analysis generated 332 slices with a 0.67mm thickness, increment of 0.33 mm, and pixel size of 0.553 mm. The reconstructed images were imported in 3D Slicer 3.10 to generate three-dimensional models of the specimens. 3D surface models are provided in .ply format, and can therefore be opened with a wide range of freeware.

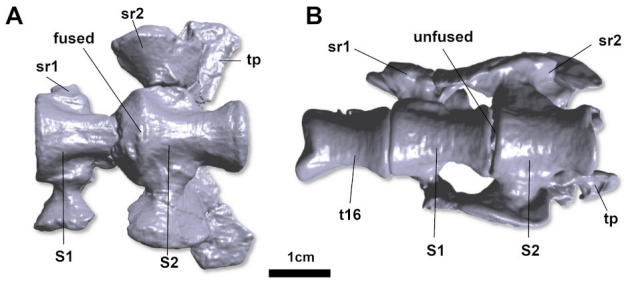

Figure 1. 3D models of the CAPPA/UFSM 0228 and CAPPA/UFSM 0035. Abbreviations: S1, first primordial sacral vertebrae; S2, second primordial sacral vertebrae; sr1, sacral rib of S1; sr2, sacral rib of S2; tp, tranverse process; t16, 16th trunk vertebra.

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