

First occurrence of *Cloudina carinata* Cortijo et al., 2010 in South America, Tamengo Formation, Corumbá Group, upper Ediacaran of Midwestern

Primera cita de Cloudina carinata Cortijo et al., 2010 en Sudamérica, Formación de Tamengo, Grupo de Corumbá, Brasil Brazil

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ABSTRACT

It is herein presented the unprecedented occurrence of *Cloudina carinata* Cortijo et al., 2010 in the American continent. This new occurrence expanded the geographic distribution of this species, until now reported from sections in Spain and Siberia. The assembled biomineralizing metazoans *Cloudina carinata*, *Cloudina luciano* (Beurlen & Sommer, 1957) and *Corumbella werner* Hahn et al., 1982 are presented for the first time from the Tamengo Formation, Corumbá Group, Porto Figueiras section, Corumbá Municipality, Mato Grosso do Sul State, Brazil. This new occurrence could be employed as an additional biostratigraphic tool for international correlation of the terminal Ediacaran, as well as for palaeobiogeographic and palaeoecologic reconstructions.

Keywords: *Cloudina carinata*; terminal Ediacaran; Tamengo Formation; Brazil.

RESUMEN

Se documenta en este resumen la primera aparición de *Cloudina carinata* Cortijo et al., 2010 en el continente americano. Esta nueva aparición extiende la distribución geográfica de esta especie, hasta ahora restringida a España y Siberia. Se presenta por primera vez en la Formación de Tamengo (Corumbá, Estado de Mato Grosso do Sul, Brasil) la asociación de metazoos mineralizados compuesta por *Cloudina carinata*, *Cloudina luciano*

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(Beurlen & Sommer, 1957) y *Corumbella weneri* Hahn *et al.*, 1982. Esta asociación podría ser útil como marcador bioestratigráfico en las correlaciones internacionales del Ediacárico terminal, así como para futuras reconstrucciones paleobiogeográficas y paleoecológicas.

Palabras clave: *Cloudina carinata*; Ediacárico terminal; Formación de Tamengo; Brasil.

Introduction

This work deals with the unprecedented occurrence of *Cloudina carinata* Cortijo *et al.*, 2010 in the American continent. *C. carinata* had documented occurrences in Spain (Cortijo *et al.*, 2010, 2015) and Siberia, Russia (Kontorovich *et al.*, 2008), and now a new occurrence from the Tamengo Formation at Porto Figueiras section, Corumbá Municipality, Mato Grosso do Sul State, Brazil is presented.

Cloudina species have wide geographic distribution reported from Namibia (Grant, 1990), Oman (Conway Morris *et al.*, 1990), South China (Hua *et al.*, 2005; Cai *et al.*, 2013; Cortijo *et al.*, 2015), Spain (Cortijo *et al.*, 2010, 2015), Siberia (Terleev *et al.*, 2011; Kontorovich *et al.*, 2008); Mexico (Sour-Tovar *et al.*, 2007), Brazil (Adorno *et al.*, 2017), Argentina and Uruguay (Gaucher *et al.*, 2006), Canada (Hofmann & Mountjoy, 2001), Paraguay (Warren *et al.*, 2011, 2013, 2014, 2017, 2019) and the USA (Grant, 1990; Zhuravlev *et al.*, 2012).

Cloudina carinata occurs in the uppermost Ediacaran section of Spain, in association with *C. lucianoi* (Beurlen & Sommer, 1957) in the Membrillar olistostrome (Cortijo *et al.*, 2010) and

the Navalpino Anticline, central Spain (Cortijo *et al.*, 2015). Occurrences of *Cloudina carinata* and *C. lucianoi* have also been reported from Siberia, Russia (Terleev *et al.*, 2011), and now it is herein presented the first occurrence of this species in South America from the yellowish siltstones of the Tamengo Formation.

Results

A new occurrence of *Cloudina carinata* is presented herein, in the Porto Figueiras section, outcropping along the Paraguay river bank in a locality nowadays called Marina do Gelson, at the geographic coordinates: -18.998748° S and -57.629023° W, approximately 750 m to the west of the Sobramil Port section. At this locality, *C. carinata* occurs in association with *C. lucianoi* and *Corumbella weneri*. The implication of this new occurrence of *C. carinata* in the Tamengo Formation is discussed herein under the light of its contribution to the palaeobiogeographic distribution of *Cloudina* species, the palaeogeography of Western Gondwana, the palaeoecology and the chronobiostratigraphy of the uppermost Ediacaran sections.

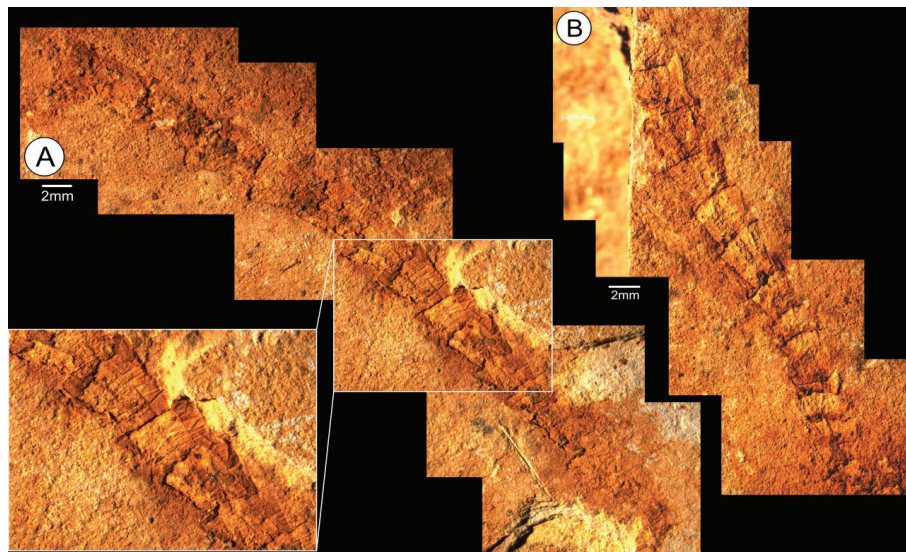


Figure 1.—Two specimens of *Cloudina carinata* Cortijo *et al.*, 2010 from the Tamengo Formation Specimen MAF-522 (original number MP-717).

The study material consists of silty impression moulds of the exterior wall of *Cloudina carinata* (Fig. 1). The taxonomic assignment of *C. carinata* from the Tamengo Formation is the result of morphometric and morphologic analysis. Regarding the mode of occurrence, *C. carinata* and *Corumbella weneri* occur in pelitic layers of the Tamengo Formation, while *C. luciano* occurs in carbonate rocks. This could reflect, to a certain extent, that *C. luciano* preferred palaeoecological conditions with clear waters and without major siliciclastic input, where carbonate could precipitate, whereas *C. carinata* and *Corumbella weneri* dwelled in probably deeper and calmer conditions, with more detrital influx. The occurrence of *Cloudina carinata* in the Tamengo Formation increases the potential for the inclusion of the Tamengo Formation in the international biostratigraphic correlation.

Conclusions

It is herein reported the first occurrence of *Cloudina carinata* in the American continent, from the Tamengo Formation in the Porto Figueiras section (Corumbá Municipality, Mato Grosso do Sul State, Brazil). The importance of this new occurrence is the expansion of the geographic distribution of *Cloudina carinata*, indispensable for global correlations. Additionally, this new occurrence could collaborate to the inclusion of the South America sections in international biostratigraphic correlation and palaeobiogeographic and palaeoecological reconstructions.

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