

**INTRODUCTION**

Brazilian Precambrian record embraces almost one-quarter of total surface area, yielding a wide range of fossil groups with significant temporal and evolutionary moments (2,4 Ga – 541 Ma), of great potential for paleobiological studies. It can help answering some open questions regarding Precambrian biosphere evolution and geological changes on early Earth. Some examples are highlighted in this study, namely (i) Microbialites in 2.1-2.4 Ga old carbonates from the Minas Gerais (MG);

(ii) Early Ediacaran microbialites of kilometeric extension in “cap carbonates” after the Marinoan Event, together with other fossil (acritarchs and biomarkers) at the base of the Paraguay Belt in Mato Grosso (MT) and Mato Grosso do Sul (MS); (iii) Ediacaran organic-walled microfossils like Vase-shaped Microfossils (VSMs) from MS and finally (iv) shelly Ediacaran metazoans and other weird vendobiont-like beings, as well as enigmatic colonies of cnidarian-like fossils (not similar to other parts of the world) from Ceará (CE) state.

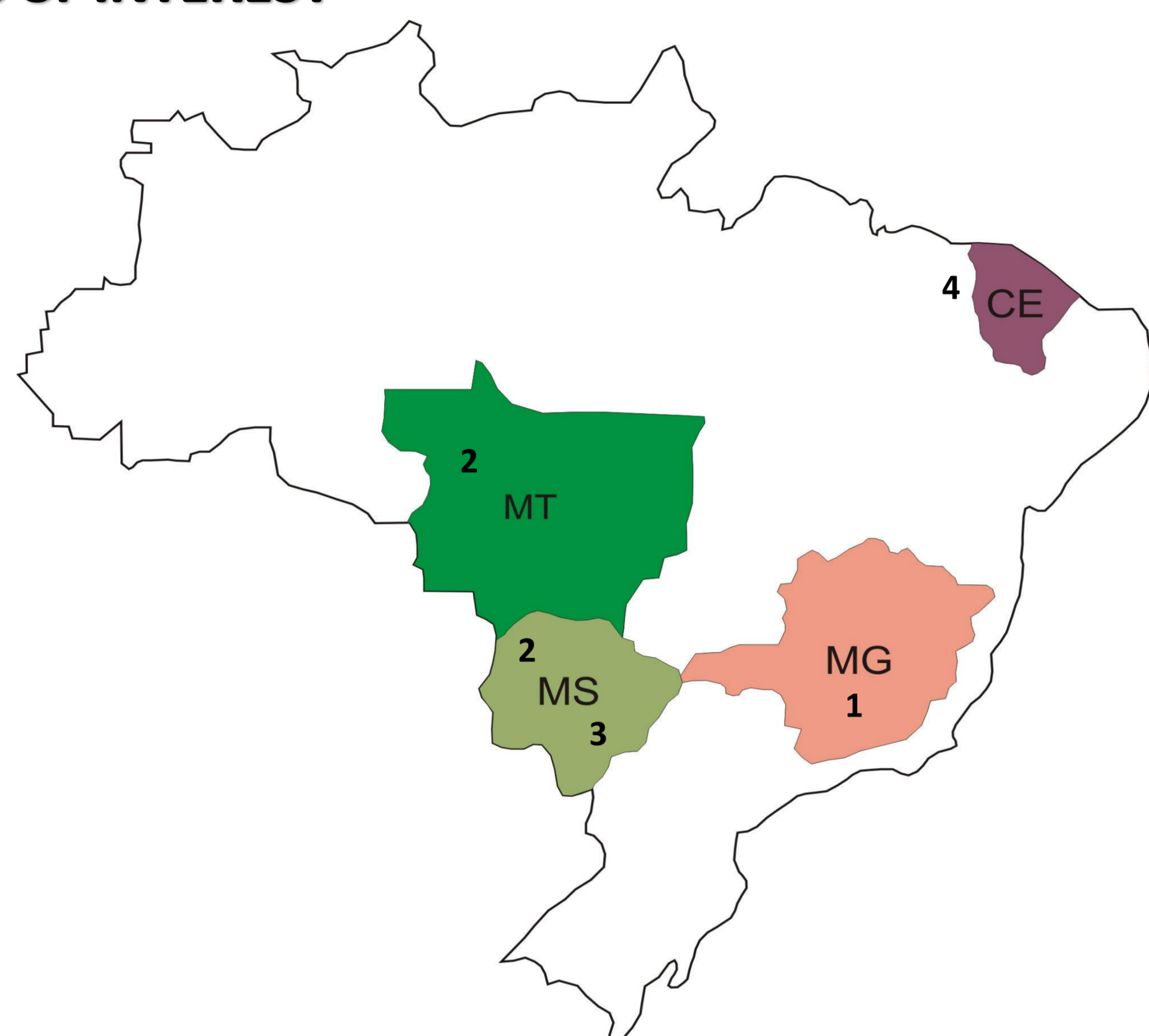
**AREAS OF INTEREST**

Figure 1. Brazilian map with the states where Precambrian fossil record outcrops. Purple: Possible vendobionts from Ceará; Pink: Microbialites older than 2.1 Ga from Minas Gerais; Dark green: Cap carbonates from Mato Grosso; Lith green: Organic-walled and metazoans from Mato Grosso do Sul.

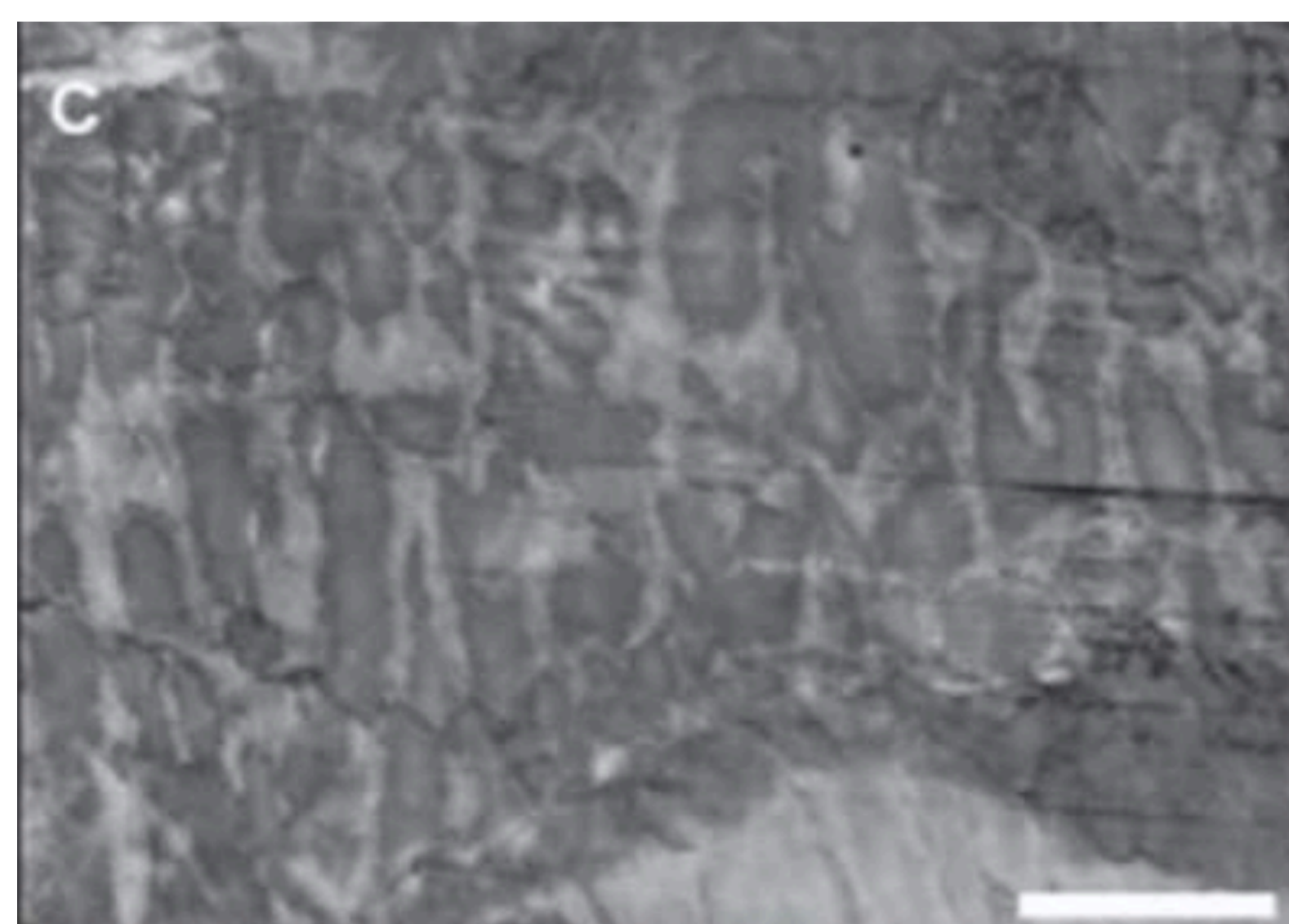
**1. MICROBIALITES**

Figure 2. Image from Fairchild et al. 2012. Longitudinal sections of columnar stromatolites from Minas Supergroup, Minas Gerais (2,4 Ga). Scale: 5cm.

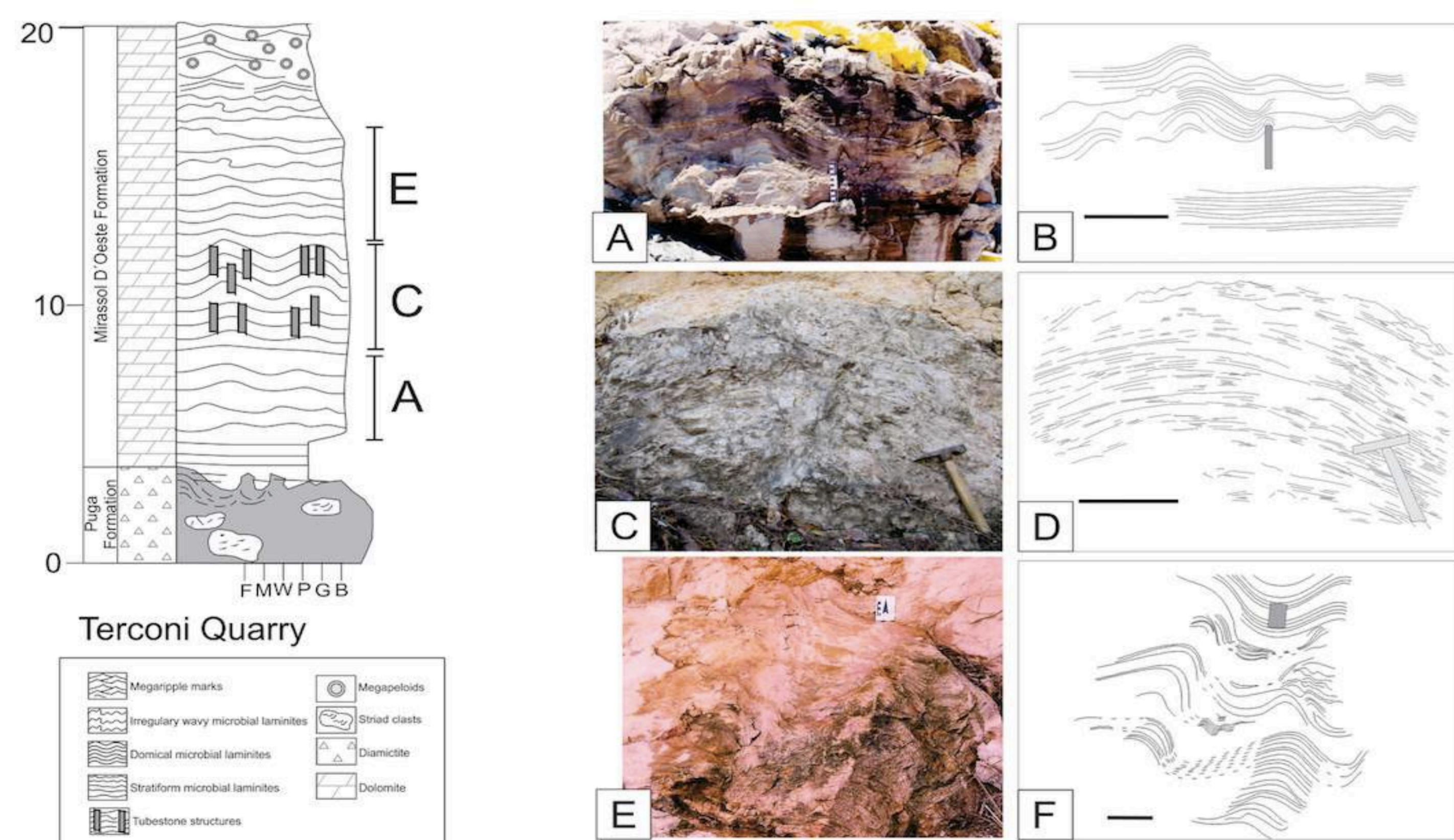
**2. CAP CARBONATES**

Figure 3. Lithostratigraphic column of the Terconi Quarry Mirassol D'Oeste Formation (635 Ma) Paraguay Belt (west-central Brazil). A-F) Laterally continuous and morphologically simple stromatolites, continuing upwards as stratiform and domical microbial laminites for up to 9 m (A-D). Wavy irregular stratiform laminites form a 1-m-thick succession commonly asymmetrical, laterally continuous stromatolites having decimetric dimensions (E-F).

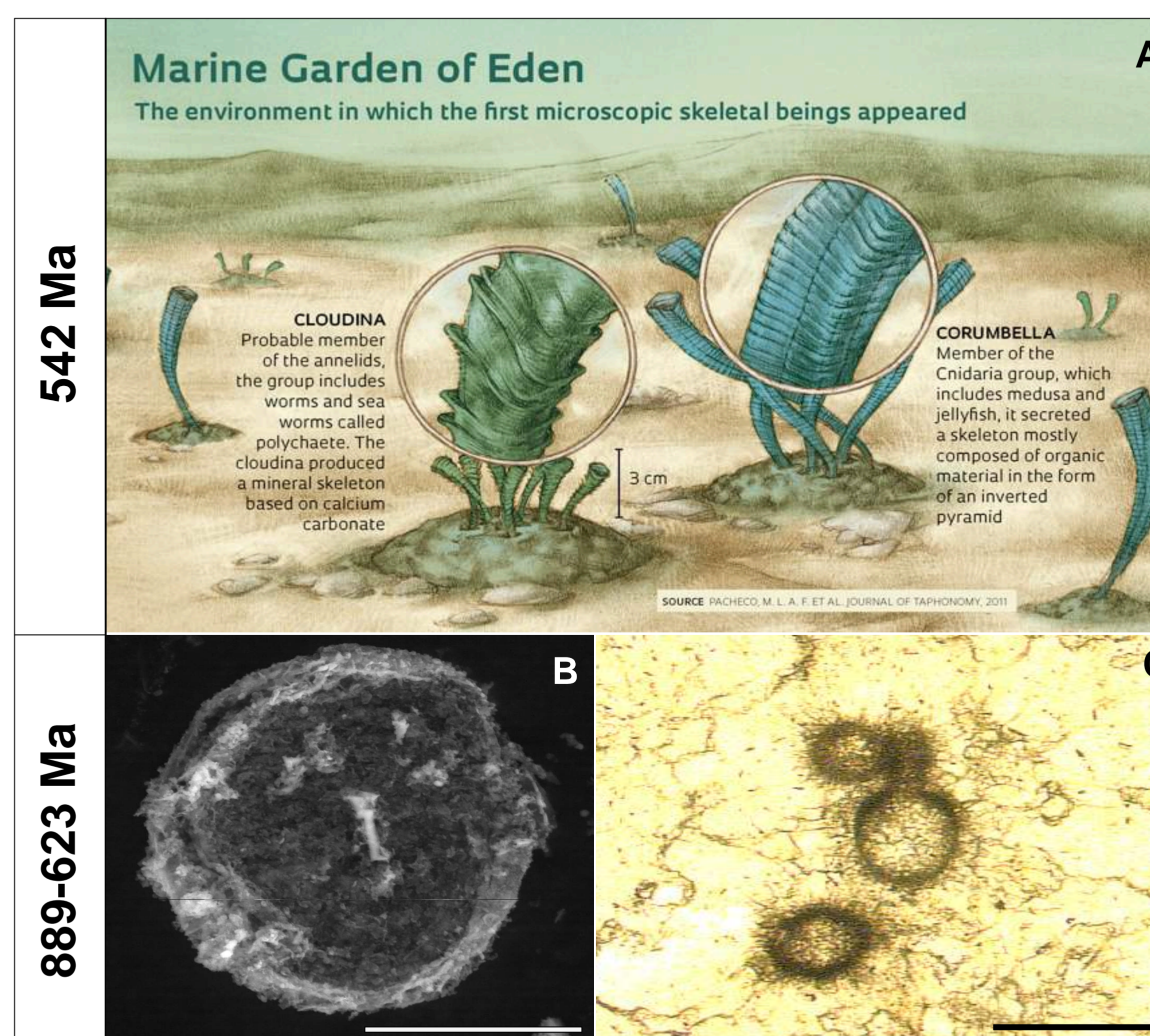
**3. ORGANIC-WALLED MICROFOSSILS AND METAZOANS**

Figure 4 . Changes in biota recorded in Neoproterozoic deposits of Mato Grosso do Sul - Brazil. A: First records of metazoans found in Tamengo Formation, Corumbá Group (ca. 542 Ma). Source: <http://revistapesquisa.fapesp.br/en/2012/09/11/life-protected-by-armor/>. B: Possible acritarchs found in older deposits of Urucum Formation, Jacadigo Group (889-623 Ma), which also recorded VSMs demonstrated in C. (Scale B: 40µm; C: 100µm).

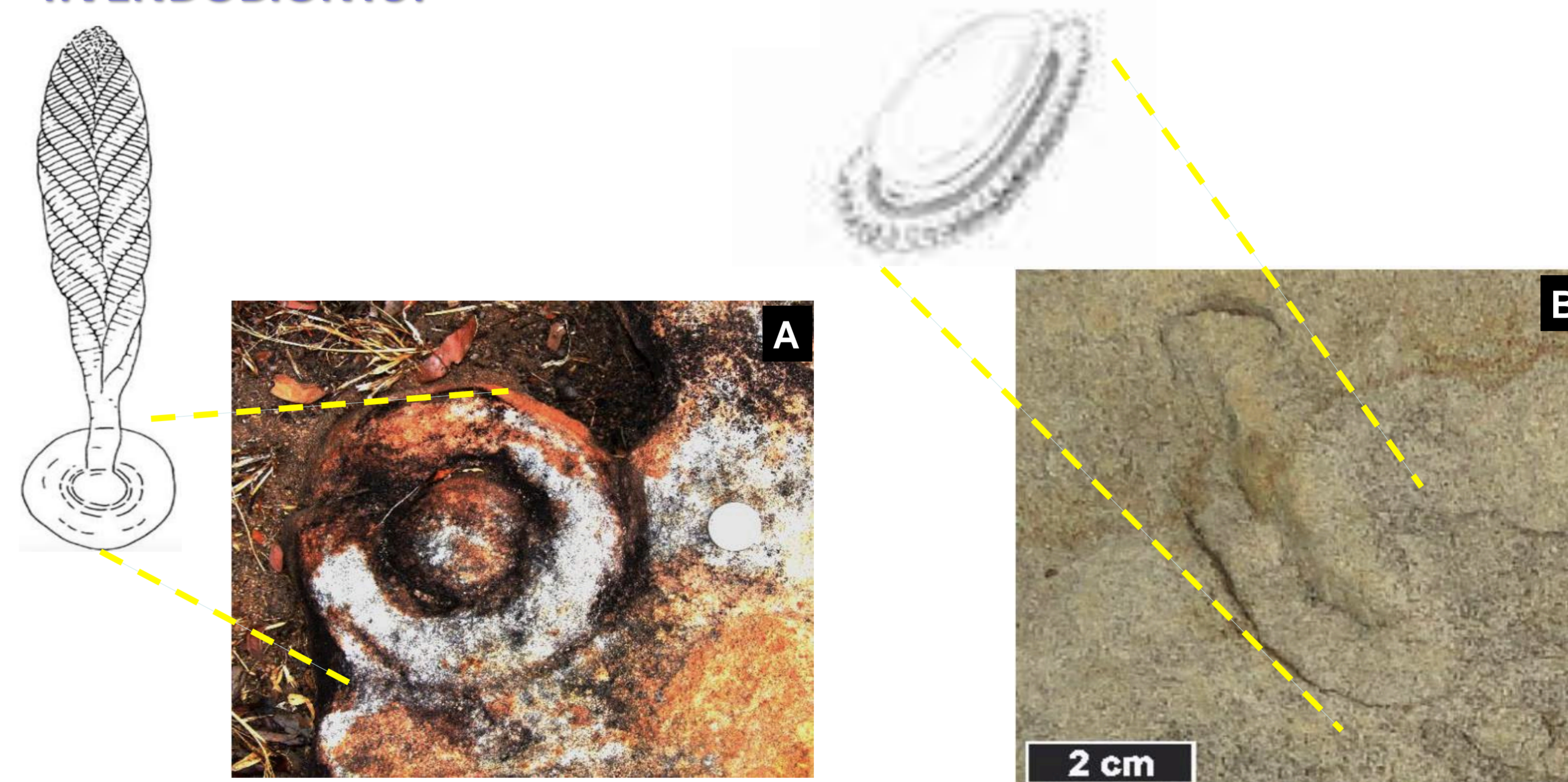
**4. VENDOBIONTS?**

Figure 5 . Image from Barroso et al., 2014: A. Disc-like structure (Scale 1,5cm; and B, *Kimberella quadrata* Glaessner & Wade, 1966

**FUTURE PERSPECTIVES**

Traditional descriptions and applications of advanced techniques to the study of fossils are raising the research in paleobiology to a new level of sophistication, also in Brazil. As well as world famous Precambrian records, we also have amazing taphonomic windows and plenty of paleoenvironments to be explored. Brazilian Precambrian fossils are becoming, in fact, scientific challenges for the development of the twenty-first century paleobiological issues (e.g. modeling paleoenvironments in contexts of climate and geochemical changes on early Earth). This new paleontology requires not only the basic description of data, but the elaboration of modern concepts and methodological assumptions in the effort of “bring back to life ancient and extinct beings”. Brazilian Precambrian research is still growing and opening new perspectives to deepen our knowledge about origin and evolution of life on Earth, and for performing models that helps to understand and search for life in other parts of the cosmos from the point of view of astrobiology.

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