

INTRODUCTION

The Ediacaran record (~630-551 Ma) comprises evidences of phosphatized embryos of early animals, weird vendobionts, complex algae and protists, and the first biomineralizers. Hence, Ediacaran is of great importance for understanding unprecedented evolutionary moments in the history of Earth. Brazilian ediacaran units account for some of the most impactful open questions regarding origin and evolution of the biological diversity and ecosystems. A yet poorly studied fossil biota from Itajaí Basin (Ediacaran?), Santa Catarina state, has been yielded some intriguing issues that set this geological unit in a global context of knowledge of Ediacaran Biota.

GEOLOGICAL SETTING

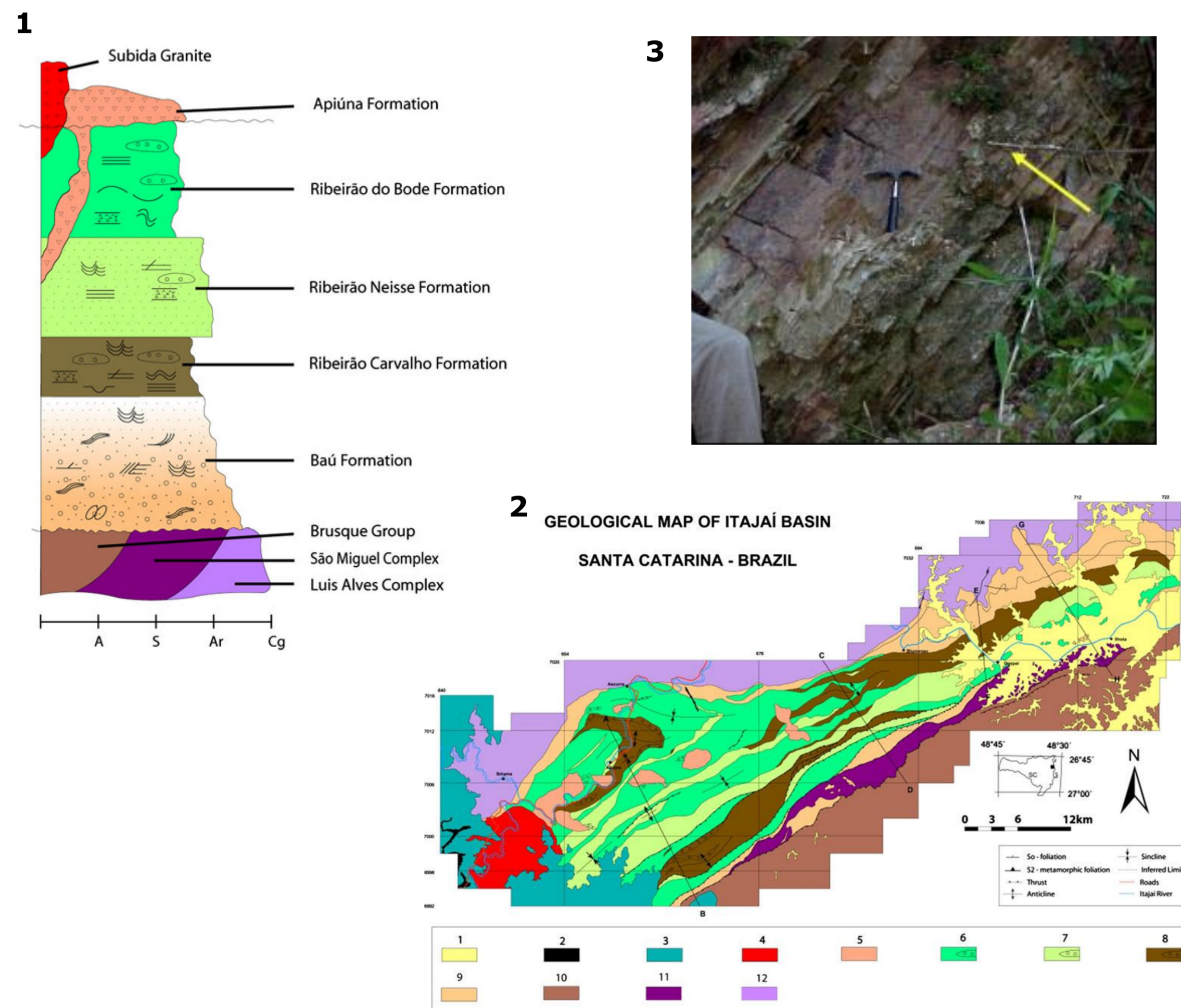


Fig. 1. Stratigraphic column of Itajaí Basin. 2. Geological map of the Itajaí Basin (Modified from Basei *et al.* 2011) Fig. 3. Field work: detail of the outcrop with prodeltaic deposits.

MicroCT

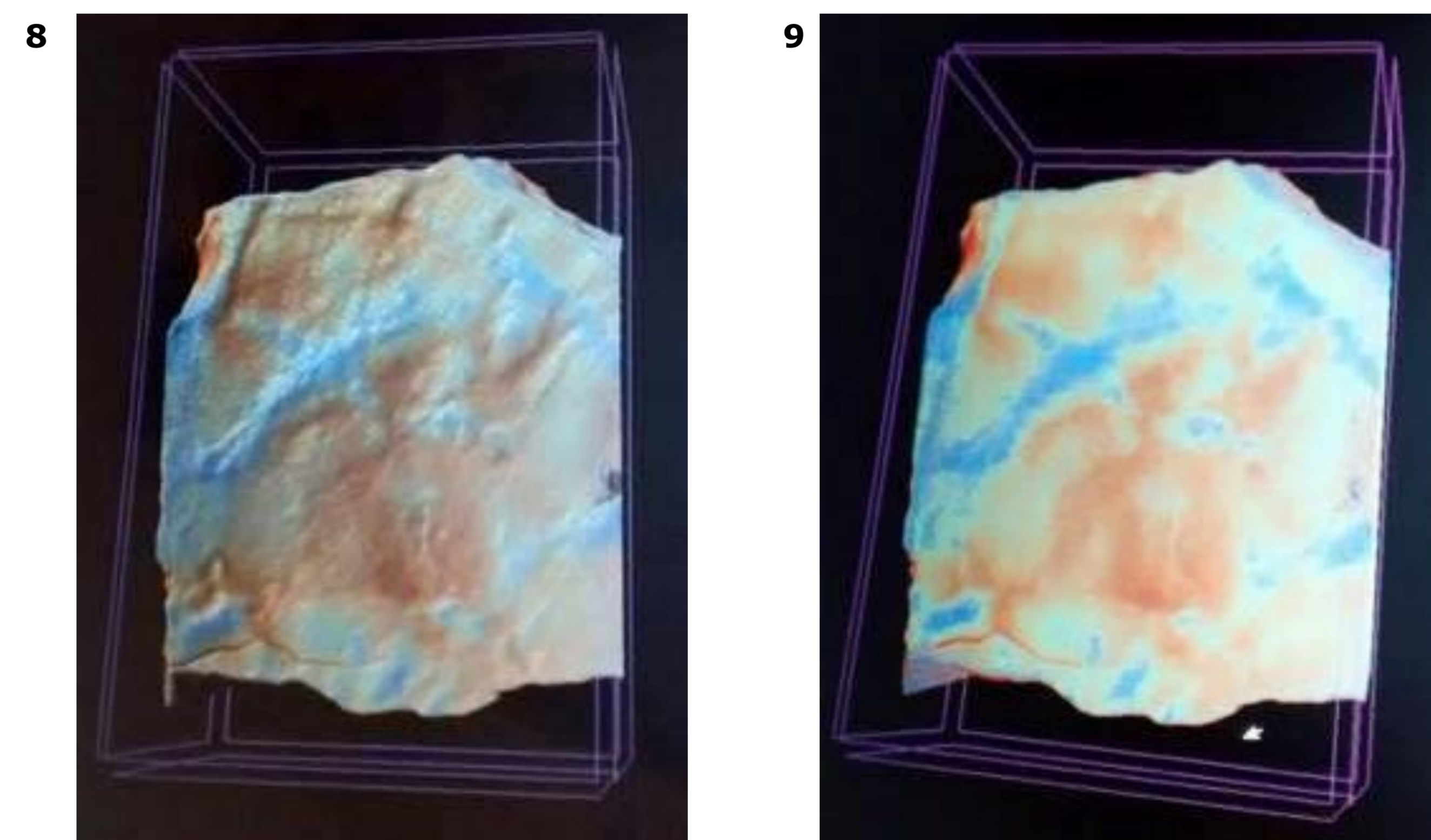


Fig. 8, 9. MicroCT images of possible remains of microbial biofilms (in blue) that are found associated with body fossils in Itajaí Basin.

IMPLICATIONS

Cambrian fossils of *Choia* represents the fossilized bodies of demosponges. The presence of this group in Ediacaran rocks extends its evolutionary history to ca. 50-60 million years back to originally recorded.

More importantly, these fossils can be some of the few evidences of Porifera in the Ediacaran Period. The existence of sponges in the Ediacaran as ecosystem engineers might led to more ventilation of seawater and removal of organic matter from the water column. These ecosystem engineers could be one of the triggers of the drastic environmental changes, such as oxidation of marine waters and oscillations in the global carbon cycle, that occurred at that time, related to the subsequent Cambrian diversification of animal life. Additionally, the presence of *Choia*-like fossils associated with MISS in the Itajaí Basin indicates that these organisms lived in relatively shallow waters. Changes in the patterns of ventilation and removal of organic matter could have initiated in this environmental strata, leading changes in ocean geochemistry and maybe also at the displacement of photic zone.

Fossil Biota

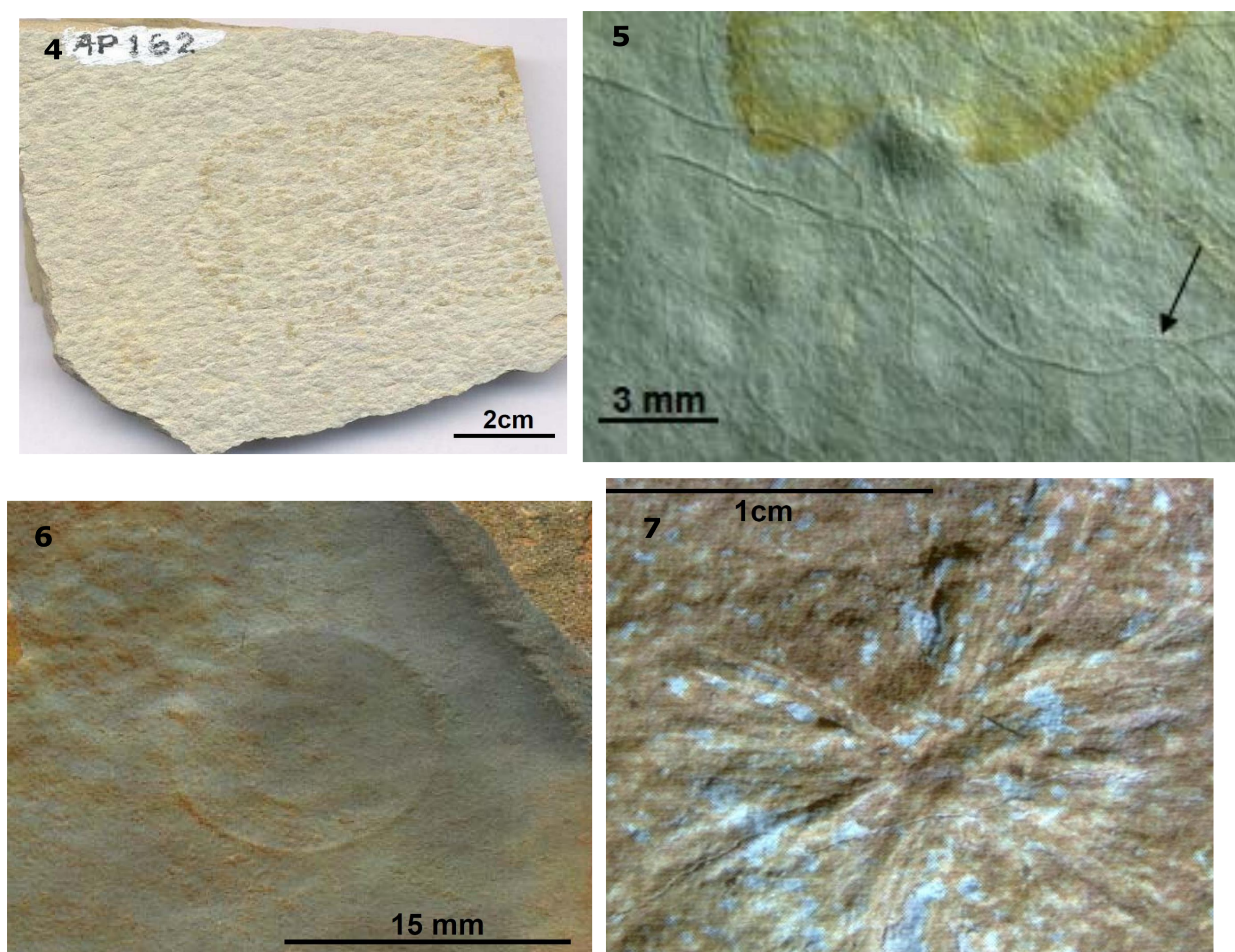


Fig. 4. Microbial induced sedimentary structures (MISS). Fig. 5. Ichnofossils of *Helminthoidichnites*. Fig. 6 Typical discoidal impressions of Ediacara Biota. Fig. 7. The intriguing evidence of *Choia*-like impressions from the Cambrian Period in the Ediacaran Itajaí Basin comprises a new ecological implication for Ediacaran ecosystems.



Fig. 10. Sponges were probably great ecosystem engineers that generated more ventilation and removal of organic matter in the oceans of Ediacaran Period.