

Ossa Morena and beyond: a tribute to Teodoro Palacios

Abstract Book



International Meeting
University of Extremadura
Badajoz, Spain
26th & 27th January 2022



Ossa Morena and beyond: a tribute to Teodoro Palacios

A meeting held as a tribute to Teodoro Palacios on his retirement as
Professor of Palaeontology at the University of Extremadura, Badajoz,
Spain

26th & 27th January, 2022
University of Extremadura, Badajoz

Abstract Book
Edited by Sören Jensen

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Cover photo: Teodoro Palacios in his element, sampling for organic-walled microfossils in the
Cambrian Chapel Island Fm., Newfoundland, Canada

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Biostratigraphy of the Eifelian (Middle Devonian) Pedreira da Engenharia Formation, SW Ossa-Morena Zone

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Introduction and geological setting

Along the southwestern domains of the Ossa-Morena Zone (OMZ) there are scattered Devonian limestone outcrops, some of them geographically associated with the Mississippian Toca da Moura-Cabrela Basin (Machado et al. 2020). The Pedreira (= "quarry") da Engenharia Fm. corresponds to one of these limestone outcrops and is composed of a fine grained calciturbidite sequence of around 30 meters (Jorge et al. 2018), showing a general north quadrant plunging monoclinical structure with normal sedimentary polarity, although local asymmetric folds are found (Theias et al. 2018). Boogaard (1972) did the first biostratigraphic study of this formation, sampling the lower levels of the quarry for conodonts, now inaccessible due to the current water table level. Conodont yields allowed Boogaard to date the formation as Eifelian (Middle Devonian), specifically within the *costatus* conodont biozone. In recent years, the authors conducted a new sampling on the quarry wall, aiming to determine the full age range of this formation. The results of this study are presented herein.

Methods and results

Sampling on the quarry wall was done by abseiling the N and NE exposures of the quarry, with a sampling interval of less than a meter. A total of 26 samples were taken (13 from each exposure), comprising around 20m of the turbidite sequence. The lowermost and uppermost layers of the sequence were not sampled due to their intense secondary dolomitization. The samples were etched in a formic acid solution (~8%) to eliminate carbonated particles and the residue was processed through decantation to remove the lighter particles such as clay and fine silt. The final residue was picked under a microscope.

No macrofossils were identified. The most common microfossils and with a high abundance in all samples (hundreds/kg) belong to dacroconarid tentaculites (Fig. 1a). Conodonts were found in all samples, with an average concentration of 25 elements/kg. Although most of the specimens are fractured and/or belong to S/M/coniform type elements, three index species were identified (*Polygnathus costatus*, *Tortodus australis* and *T. kockelianus*; Fig. 1b and e). Other fossils, such as sponge spicules, bryozoans and ostracods(?) have also been identified, although in a very low concentration. Palynologic studies have been conducted on the same samples, with no positive results.

Discussion

The high abundance of dacroconarid tentaculites indicate a deep depositional environment. The relative rareness of other fossil groups and the presence of only polygnathid and coniform conodonts, which are typical of deep-water sediments, suggests a distal environment, possibly at the base of a slope, which is also in accordance with sedimentary features of this fine-grained calciturbidite sequence (Jorge et al. 2018). In terms of age range, the lowermost sample contained *Polygnathus costatus*, which is the index species of the *costatus* zone (lower

Eifelian), the biozone already identified by Boogaard (1972). In a previous work published by the authors (Silvério et al. 2019), discussing the preliminary results of the current study, a second biozone had been identified by the presence of *Tortodus australis*, the index species of the *australis* zone (upper Eifelian). Recently, a specimen of *Tortodus kockelianus*, the index species of the *kockelianus* zone, was identified in the uppermost sample, meaning that the Pedreira da Engenharia Fm. ranges from the *costatus* to the *kockelianus* zones (lower and upper Eifelian). The lower and uppermost zones of the Eifelian, *partitus* and *ensensis*, respectively, were not identified in the sequence. Nevertheless, an almost complete record of the Eifelian is present, similar to that found further south in the Odivelas Limestone (Machado et al. 2010, 2020). The Middle Devonian age, sedimentary features and the depositional environment of the Pedreira da Engenharia Fm. contrasts with the surrounding rocks of Mississippian age of the Toca da Moura-Cabrela Basin. Consequently, this formation is either a remnant of a carbonated slope which existed in the same place prior to the formation of the basin (Machado et al. 2020), or an olistolith deposited alongside the Mississippian sediments.

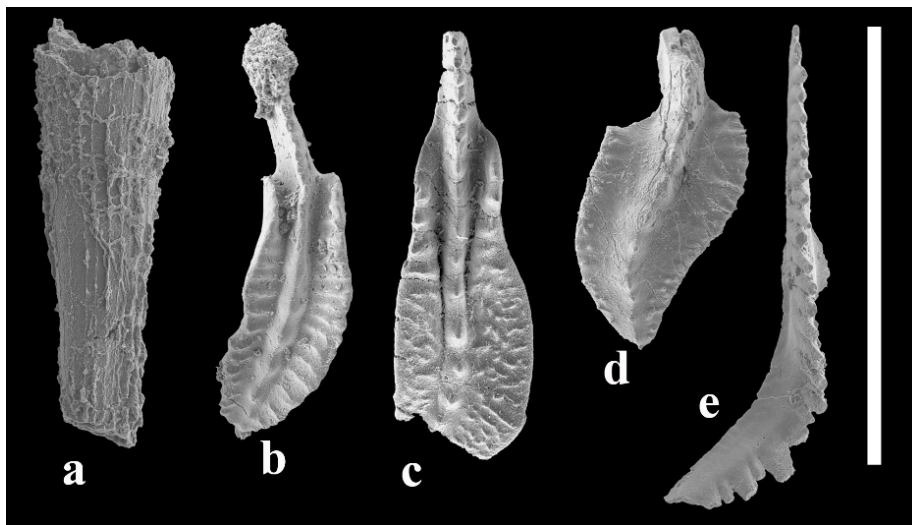


Figure 1. Fossils of the Pedreira da Engenharia Formation. Tentaculite: a – Undetermined dacryoconarid. Conodonts: b – *Polygnathus costatus*, c – *Polygnathus cf. eiflius*, d – *Polygnathus cf. trigonicus*, e – *Tortodus australis*. Scale bar = 1mm.

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