



Original article

Biostratigraphic and structural research in the Guedelhinha–Lançadoiras–Algaré sector in the context of the geology of the Neves–Corvo mine region, Iberian Pyrite Belt [☆]

Zélia Pereira ^{a,*}, João Xavier Matos ^b, Márcia Mendes ^a, Rita Solá ^c, Luís Albardeiro ^b, Igor Morais ^b, Vitor Araújo ^d, Nelson Pacheco ^d, José Tomás Oliveira ^c

^a Laboratório Nacional de Energia e Geologia, LNEG, Rua da Amieira, Ap. 1089, 4466-901 S. Mamede de Infesta, Portugal

^b Laboratório Nacional de Energia e Geologia, LNEG, Bairro da Val d'Oca. Ap. 14, 7601-909 Aljustrel, Portugal

^c Laboratório Nacional de Energia e Geologia, LNEG, Estrada da Portela, Zambujal. Ap. 7586, 2611-901 Amadora, Portugal

^d Sociedade Mineira de Neves–Corvo, SA (Somincor), St^o Bárbara de Padrões, 7780-409 Castro Verde, Portugal

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ABSTRACT

Based on drill hole sampling and sedimentary rock dating by palynology, the present research focuses on the palynostratigraphic events established in the key geological section of Guedelhinha–Lançadoiras–Algaré located in the Portuguese Neves–Corvo mine region, Iberian Pyrite Belt. The age data allow detailing the lithostratigraphic sequence and further understanding the complex structural setting, representing an important contribution to the geological knowledge of this sector located to the immediate WNW of the Neves–Corvo VMS deposit. The combination of the studied events allows the reconstruction of the Devonian–Carboniferous sedimentation and paleoenvironments along the Iberian Pyrite Belt. Several stratigraphic hiatuses identified in the Neves–Corvo region by the palynological record are confirmed, mainly occurring from the mid Frasnian to mid Famennian, from the early and mid Strunian, and from the early to late Tournaisian, which were mainly coincident with the worldwide extinction events, in particular during Frasnian–Famennian and Late Devonian times. Extensional tectonics and related gravitational faults, local uplift mechanisms and intense volcanic activity could also explain the lack of palynological data and sedimentary hiatus. In this research, the importance of the late Strunian times in the Iberian Pyrite Belt (Miospore Biozone LN of the Neves Formation) is highlighted, confirming the contemporaneity of felsic volcanism, hydrothermalism, sulphide mineralization precipitation and black shale anoxic sedimentation.

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1. Introduction

The Devonian and Carboniferous were critical periods on Earth's history marked by important mass extinctions, particularly in the Frasnian–Famennian (Kellwasser event; Late Devonian) and in the Devonian–Carboniferous boundary (Hangenberg event) that impacted both land plants and marine phytoplankton (Kaiser, 2005; Kaiser et al., 2015; Van De Schootbrugge and Gollner, 2013). Focusing on these events and how they affected the biota and sediment deposition during these periods, the study of the Iberian Pyrite Belt (IPB; located in the south of Portugal and Spain) becomes essential, since it corresponds to a well-developed Late

Devonian to mid Carboniferous marine basin (Tornos, 2006; Inverno et al., 2015) coincident with a period where the marine realm is affected by an anoxic event marked by the deposition of black shales, felsic volcanics, as well as massive sulphide mineralization (Barriga et al., 1997; Leistel et al., 1998; Carvalho et al., 1999; Tornos, 2006; Oliveira et al., 2013a, 2013b). Here, the Devonian and Carboniferous main extinction events are discussed in the light of the palynological and geochronological record, in close relationship with the stratigraphic hiatus known in the stratigraphic record, particularly in the geology of the Neves–Corvo mine region situated at the southeastern sector of the Rosário anti-form, in the IPB (Oliveira et al., 2005, 2013b, 2019; Fig. 1).

The Neves–Corvo mine lithostratigraphic sequence is the most studied in the IPB, based mainly on major exploration programs developed by Somincor/Lundin Mining, complemented by research on palynostratigraphy, geochronology and geophysical

[☆] Corresponding editor: Catherine Girard.

* Corresponding author.

E-mail address: zelia.pereira@lneg.pt (Z. Pereira).