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Comment on

Comment on "Stratigraphy of the Northern Pulo do Lobo Domain, SW Iberia Variscides: A palynological contribution" by Zélia Pereira et al. (2018) – *Geobios* 51, 491–506☆

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1. Introduction

The paper by Zélia Pereira et al. (2018) is a valuable input to better constrain the Devonian palynological record of a number of siliciclastic formations of the Pulo do Lobo Unit (also known as Pulo do Lobo Domain or Pulo do Lobo Zone) in SW Iberia. They have recognized for the first time in the Pulo do Lobo Fm. and in the imbricated phyllites of the Peramora Mélange palynomorph assemblages assigned to the middle Frasnian, as well as new Devonian palynomorphs in the Ribeira de Limas, Santa Iria and Horta da Torre formations, and the Alájar Mélange. Furthermore, Zélia Pereira et al. (2018) intend to promote a "*detailed discussion of the palynological versus geochronological ages*" by comparing their biostratigraphic ages with the maximum depositional ages inferred for the same formations according to detrital zircon geochronology (Pérez-Cáceres et al., 2017; Pereira et al., 2017). The purpose of their discussion is to question the validity of zircon geochronological data, which allegedly would be contradictory with the palynomorph content, and thus not compatible with the established stratigraphic sequence. In our view, this discussion is inconsistent due to:

- the impossibility that primary igneous ages in zircon grains would have been rejuvenated during Early Carboniferous low-grade regional metamorphism;
- a wrong interpretation of the meaning and implications of maximal depositional ages derived from the youngest detrital zircon population.

In the following paragraphs, we refer separately to these two issues.

2. Alleged Early Carboniferous rejuvenation of primary igneous zircon ages

Zélia Pereira et al. (2018) notice the conflict between some of the youngest detrital zircon population ages and the attributed palynological ages (for instance, in the Santa Iria Fm.), i.e., detrital zircon ages cannot be younger than biostratigraphic ages. They solve the problem by simply arguing a disturbance ("*temporary leakage*" in their own words) in the U-Th isotopic system of zircon caused by metamorphism and deformation, but this is untenable in the case of the Pulo do Lobo Unit. Despite the variable deformation experienced by some of the stratigraphic units, the metamorphic conditions did not exceed low-grade (Eden, 1991; Pérez-Cáceres, 2017). It is well-known from the literature that low-temperature ($< 450\,^{\circ}C$) alteration of zircon would occur as a combination of accumulation of radiation damage through time, fluid circulation, temperature and mineral composition (Hay and Dempster, 2009). Actually, the fracturing due to deformation is critical in allowing fluids to access the interior parts of zircon grains. Alteration makes original detrital zircon porous and weakly luminescent, with xenotime overgrowths and inclusions. Thus, great care is needed to select ablation points, avoiding any visible inclusions, micro-fractures, and pores. To do so, advanced techniques of

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