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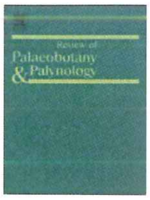

Research papers

New data on the palynology of the Triassic–Jurassic boundary of the Silves Group, Lusitanian Basin, Portugal

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ABSTRACT

New evidence is presented on the Triassic–Jurassic boundary in the northern Lusitanian Basin, Portugal, based on miospore assemblages from a composite Upper Triassic to Lower Jurassic succession of the Silves Group. The latter comprises, from base to top, the Conraria, Penela, Castelo Viegas and the Pereiros formations. Three informal palynological zones have been documented and compared with coeval palynozones from West and South Europe providing new biostratigraphic data to detail the age of the lower and upper formations of the Silves Group and to review previous age attribution.

A Norian, possibly earliest Rhaetian age, is documented for the Conraria Formation on the basis of a palynological assemblage referable to the *Classopollis meyerianus–Granuloperculatipollis rudis* (CG) zone. The Penela and Castelo Viegas formations did not allow a palynostratigraphic revision, due to the not promising lithology for palynological studies. The Pereiros Formation is dated on the basis of microflora assemblages referable, from bottom to top, the *Ischyosporites variegatus–Kraeuselisporites reissingeri* (IK) zone of late Rhaetian–earliest Hettangian age and *Pinuspollenites minimus* (Pm) zone of Hettangian age. The discontinuity between the underlying Castelo Viegas Formation and the overlying Pereiros Formation did not allow to define the lower boundary of the IK palynozone. The Triassic–Jurassic boundary lies in the lower part of Pereiros Formation within the IK zone. The microflora assemblages from the Lusitanian Basin show close affinity to those of eastern N America and western Tethys areas.

1. Introduction

One of the initial objectives of this study was to identify in the Silves Group succession (see Soares et al., 2012) the Triassic–Jurassic boundary (TJB, 201.4 Ma; Gradstein and Ogg, 2020) since it represents one of the most severe biotic crises of the Phanerozoic (Raup and Sepkoski, 1982; Sepkoski, 1996; Tanner et al., 2004). The end-Triassic extinction caused a faunal turnover (Whiteside et al., 2007; Van de Schootbrugge et al., 2009; Lindström et al., 2017a, 2017b), particularly among marine invertebrates(Guex et al., 2004; Van de Schootbrugge et al., 2008), but the impact on terrestrial floras is debatable (Tanner et al., 2004; Cirilli et al., 2009; Cirilli, 2010; Lucas et al., 2011). Recent studies of European plant macro- and microfloral databases suggest that no major extinction occurred across the TJB (Barbacka et al., 2017). Nevertheless, high-resolution studies (Lindström, 2016; Lindström et al., 2017a, 2017b, 2021) indicate a major change in the palynoflora composition, varying from a stable pre-extinction, followed by an extinction phase (with great turnover-rates and taxonomic losses), as well as, a recovery phase, and ending in a stable post-extinction phase (the Hettangian radiation). These phases are interpreted as a reaction to the end-Triassic environmental changes (Lindström, 2016; Lindström et al., 2017a, 2017b). Additionally, the TJB extinction phase is characterized by high relative abundances of spores, an event (or feature) that can be traced worldwide, and it is marked by a major regression (Hallam and Wignall, 1999; Hesselbo et al., 2004; Hillebrandt et al., 2013; Lindström et al., 2017a, 2017b). The pre-extinction and recovery phases are coincident with a prominent transgressions in Western Europe and Tethys regions (Hallam and Wignall, 1999; Lindström et al., 2017a, 2017b).

The increased tectonic activity and sea-level fluctuations at the TJB, particularly in the extinction phase, caused sedimentary hiatuses in many Western European basins (Lindström et al., 2017a, 2017b; Schneebeli-Hermann et al., 2018). However, each basin displays similar basin-fill evolutions, with a continental sand-prone lower unit, followed upwards by a mud-prone unit deposited in lacustrine and marginal marine environments (Frizon de Lamotte et al., 2015).

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