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The geodynamic importance of the Late Cambrian to Late Devonian reworked palynomorphs from the borehole SDJ1, Santa Susana region, Ossa Morena Zone (OMZ), Portugal

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## Abstract

The detail study of the borehole SDJ1 from the Santa Susana coal basin western border of the OMZ, Portugal, proved that most of the volcano sedimentary lithologic sequence yielded palynomorphs of mid late Viséan (NM Biozone) i.e., they belong to the Toca da Moura Volcano Sedimentary Complex (TMC). The deepest few meters of the drill core have shales of mid Moscovian (Biozona SL) (see Pereira et al., in this volume). Together with the miospore assemblages that provide the age of the SDJ1 strata, mid late Visean and Moscovian age, associations of exceptional well preserved Lower Palaeozoic acritarchs and spores were identified, interpreted as reworked into the Carboniferous rocks. Four ages of reworked associations were identified: 1 - Late Cambrian acritarchs: *Acanthodiacrodium ?petrovii*, *Cristallinium randomense*, *Eliasum* sp., *Timofeevia phosphoritica*; 2 - Ordovician acritarchs: *Navifusa punctata*, *Stelliferidium striatulum*, *Striatotheca rarirrugulata*; 3 - Mid Late Silurian to Lower Devonian, spore taxa: *Ambitisporites* sp., *Archaeozonotriletes chulus*, *Brochotriletes* sp., *Dictyotriletes subgranifer*; *Emphanisporites* sp. and *Synorisporites labeonis*, cryptospores taxa *Laevolancis* sp., *Tetraedraletes medinensis* and *Quadritisporites variabilis*, acritarch taxa such as *Duvernaysphaera aranoides*, *Micrhystridium stellatum*, *Multiplicisphaeridium ramusculosum*; 4 - Late Devonian miospore taxa: *Retispora lepidophyta* and *Rugospora flexuosa* and acritarch taxa *Craterosphaeridium ?sprucegrovense*, *Gorgonisphaeridium ohioense*, *Stellinium comptum*, *S. micropolygonale*, *Villosacapsula colemanii*, *Pterospmella* sp.. Detail examination of the reworked assemblages, still in progress, indicates that these are clearly dominated by Late Cambrian, Early Ordovician and Late Devonian acritarchs. In minor amount are Mid Silurian to Lower Devonian palynomorphs and the typical Middle Devonian species are very scarce. The TMC sediments are interpreted as had been deposited in an intra-arc basin in close association with the igneous rocks of the Beja Massif, a magmatic arc installed at the south border of the OMZ (Oliveira et al. 2006). The ages of the reworked palynomorphs suggest that considerable erosion of exposed Lower Palaeozoic OMZ basement occurred during Carboniferous times. The exposure of these rocks may have occurred by the first pulses phases of the Variscan Orogeny in the OMZ. Within the OMZ the rock formations that may constitute the sources for the reworked palynomorphs are: the Early Ordovician *Phyllodocites Shales* (Piçarra et al., 2011); the *Raiados* and *Nódulos Shales* Fm. and the *Terena* Fm. of Mid Late Silurian to Lower Devonian, age (Pereira et al., 1999; Lopes et al., 2009). The Late Devonian association could have come from the South Portuguese Zone, where late Famennian palynomorphs are very well documented. Lastly, there are no proved units of Late Cambrian age in the OMZ. The occurrence of reworked Late Cambrian palynomorphs in the Santa Susana region indicate that elsewhere in the OMZ, sedimentation of this age must have existed.

## Keywords

Ossa Morena Zone; Reworked; Palynomorphs