

Jurassic palynostratigraphy of the Algarve Basin and the Carrapateira Outlier, Southern Portugal

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The Mesozoic Algarve Basin (AB) corresponds to the southernmost geological province of mainland Portugal. The Carrapateira Outlier (CO) is a small outcrop of Mesozoic rocks located 20 km north of the AB. In this study we investigated the palynostratigraphy of the Jurassic (Upper Bajocian to Lower Kimmeridgian) of the AB and CO.

Samples of marls and limestones were collected from the outcrops at Mareta Beach, Telheiro Quarry and Três Angras Bay. Mareta beach, south of Sagres, represents an important reference section for the Middle Jurassic of the AB. Here the Upper Bajocian, Bathonian and Callovian rocks yielded relatively low to moderate diversity dinoflagellate cyst assemblages. The dinoflagellate cysts from the lower part of the succession are indicative of the Bathonian stage, due principally to the occurrence of *Ctenidodinium* spp., *Ellipsoidictyum/Valensiella* group, *Korystocysta* spp. and *Valensiella ovulum*. The uppermost strata yielded *Gonyaulacysta jurassica* subsp. *adepta*, *Korystocysta* spp., *Meiourogonyaulax caytonensis*, *Mendicodinium groenlandicum* and *Tubotuberella dangeardii*, and are indicative of the Callovian Stage.

The samples collected from the the Lower Callovian marls and limestones at Telheiro Quarry, north of Faro, yielded palynofloras of variable productivity. The productive samples are all from the lowermost part of the succession and are assigned to the ammonite *Bullatimorphites bullatus* Zone. The presence of *Ctenidodinium ornatum*, consistent *Gonyaulacysta jurassica* subsp. *adepta*, *Korystocysta pachyderma*, *Rigaudella* spp. and *Surculosphaeridium? vestitum* indicatives that this succession is no older than Early Callovian by comparison with elsewhere in Europe.

The Três Angras section, located in the CO, yielded relatively low diversity dinoflagellate cyst assemblages. The associations found are indicative of an Early Kimmeridgian age due to the co-occurrence of species such as *Amphorula* sp., *Gonyaulacysta jurassica* subsp. *jurassica*, *Histiophora ornata* and *Tubotuberella dangeardii*. The presence of some Tethyan elements such as *Amphorula* sp. and *Histiophora ornata* are consistent with an enhanced provinciality between northern and southern Europe at this time. Kimmeridgian dinoflagellate cyst assemblages from further north in Europe normally have markedly higher diversities than these.

The relatively low diversity nature of the Late Bajocian to Lower Kimmeridgian dinoflagellate cyst floras of the AB and CO, was probably due either to the relatively deep water or a partially enclosed depositional setting. The partially enclosed nature of the AB and the CO during Jurassic times seems to have prevented the free migration of dinoflagellates between southern Portugal and elsewhere in Europe.