

The Middle Jurassic palynology of the Sagres region, southern Portugal

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The Algarve Basin corresponds to the southernmost geological province of mainland Portugal. It has an E-W strike and is represented onshore from Cap São Vicente to the Guadiana River on the Portuguese-Spanish border. More than 3000 m of essentially marine sediments accumulated during Mesozoic-Cenozoic times in the Algarve Basin.

The Sagres region, is the reference area for the Mesozoic fill of the Western sub-basin, where Middle Jurassic strata outcrop in the cliffs at Mareta and Cilheta beaches.

The Mareta beach represents an important reference section for the Middle Jurassic of the Algarve Basin. The exposed composite section is a 140 m thick succession, which consists of calcarenites at the base that grade upwards into grey marls and marly limestones. This section is assigned to the late Bajocian at the base and to Callovian at the top. The coastal exposure at Cilheta beach comprises a 40 m thick succession of marly limestones, assigned to the Callovian (Rocha, 1976).

The palynological study of the Mareta and Cilheta successions has yielded new biostratigraphical data based on dinoflagellate cysts and miospores. The organic residues are abundant and comprise well-preserved palynomorphs and phytoclasts. Pollen and spores are the dominant palynomorphs however, marine microplankton (i.e. acritarchs, dinoflagellate cysts, foraminiferal test linings) are also present in significant proportions.

The miospores comprise bisaccate pollen, *Classopollis classoides* (PFLUG 1953) POCOCK *et* JANSONIUS 1961, *Callialasporites dampieri* (BALME 1957) SUKH DEV 1961, *Callialasporites turbatus* (BALME 1957) SCHULZ 1967, *Callialasporites* spp., *Cyathidites* spp., *Ischyosporites variegates* (COUPER 1958) SCHULZ 1967, *Leptolepidites* spp., *Perinopollenites elatoides* COUPER 1958, *Sestrosporites pseudoalveolatus* (COUPER 1958) DETTMANN 1963, and *Todisporites* spp.

The dinoflagellate cysts, from the grey marls, present in the lower part of the Mareta succession are indicative of the Bathonian stage, mainly based on the occurrence of *Ctenidodinium* spp., *Ellipsoidictyum/Valensiella* group, *Korystocysta* spp. and *Valensiella ovulum* (DEFLANDRE 1947) EISENACK 1963 (Riding *et al.*, 1985).

The species *Impletosphaeridium varispinosum* (SARJEANT 1959) ISLAM 1993, *Ctenidodinium cornigerum* (VALENSI 1947) JAN DU CHÊNE *et al.* 1985, *Ctenidodinium sellwoodii* (SARJEANT 1975) STOVER *et* EVITT 1978, *Gonyaulacysta jurassica* (DEFLANDRE 1939) NORRIS *et* SARJEANT 1965 subsp. *adecta* SARJEANT 1982, *Korystocysta gochtii* (SARJEANT 1976) WOOLLAM 1983 and *Meiourogonyaux caytonensis* (SARJEANT 1959) SARJEANT 1969, present in the middle part of the succession, assigned to the Macrocephalus Zone, are characteristic of the early Callovian.

The uppermost strata of this succession corresponds to the Cilheta outcrop and yielded *G. jurassica* subsp. *adecta*, *Korystocysta* spp., *M. caytonensis*, *Mendicodinium groenlandicum* (POCOCK *et* SARJEANT 1972) DAVEY 1979, *Tubotuberella dangeardii* (SARJEANT 1968) STOVER *et* EVITT 1978 and *Wanaea acollaris* DODEKOVA 1975 and are assigned to the Callovian stage (Riding, 2005).

The dinoflagellate cysts floras of the Middle/Late Callovian from the North European Jurassic basins are normally characterized by high diversity at the generic level. The Callovian succession present at Mareta beach shows a smaller diversity in genus when

compared to the North European basins (Riding, 2005). This may be due to the relatively enclosed basin conditions and/or to preservation factors, that prevailed during the Callovian in the Algarve Basin.

These results confirm, and refine, the existing macrofaunal age of these successions. The palynostratigraphical research in the Algarve Basin is currently still in progress, with the study of other Middle and Upper Jurassic sections in other regions of the Algarve Basin.

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