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New palynological data from the Ruivo-1 and Corvina wells, offshore Algarve Basin, Portugal – implications for future hydrocarbon exploration

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Abstract

The Algarve Basin is an important Mesozoic sedimentary basin located in southern Portugal. Its onshore part consists largely of marine carbonate sediments with more than 2000 m in thickness. The basin extends offshore where its geology is recognized seismically and a few hydrocarbon exploration wells were drilled in the mid 70's and early 80's. The palynostratigraphical study of two of these wells, Ruivo-1 and Corvina, has yielded new biostratigraphical data based on dinoflagellate cysts.

The Ruivo-1 well has a total depth of 2100 m and drilled a thick Callovian succession between 1800 and 2030 m. The samples from this interval yielded abundant organic residues that comprise well-preserved palynomorphs together with plant fragments. The dinoflagellate cysts assemblage include *Batiacasphaera* spp., *Ctenidodinium* sp., *Ctenidodinium sellwoodii* group, *Ellipsoidictyum gochtii*, *Ellipsoidictyum/Valensiella* group, *Gonyaulacysta jurassica* subsp. *adecta*, *Impletosphaeridium* spp., *Korystocysta gochtii*, *Meiourgonyaulax caytonensis* group, *Pareodinia ceratophora*, *Sentusidinium* spp., *Systematophora areolata*, *Systematophora penicillata*, *Systematophora* spp. and *Tubotuberella dangeardii*. This association is indicative of the Middle-Late Callovian. However, the presence in this interval of *Nannoceratopsis deflandrei* subsp. *deflandrei*, a Toarcian-Aalenian marker, suggesting reworking.

The Corvina well cored a 2700 m thick succession of Miocene to Upper Jurassic sediments. Samples collected between 1595 and 2680 m yielded relatively abundant organic residues dominated by dinoflagellate cysts. The pollen associations are of low diversity and include bisaccate pollen, *Callialasporites dampieri*, *Callialasporites turbatus*, *Callialasporites* spp., *Classopollis classoides* and *Perinopollenites elatoides*. The dinoflagellate cyst floras from these samples are indicative of the ?Early-Middle Oxfordian due principally to the occurrence of *Ctenidodinium ornatum*, *Compositosphaeridium polonicum*, *Hystrichosphaerina orbifera*, *Endoscrinium luridum*, *Gonyaulacysta jurassica* subsp. *jurassica*, *Rigaudella aemula*, *Surculosphaeridium vestitum*, *Stephanelytron redcliffense*, *Systematophora* spp. and *Wanaea acollaris*.

The dinoflagellate cyst assemblages from the two wells are less diverse than typical Callovian-Oxfordian associations from further north in Europe. The results are also consistent with the onshore Algarve Basin and could be explained by the partially enclosed nature of the Algarve Basin during Jurassic times. This new biostratigraphical data will help to refine the time calibration of the available seismic lines and help in future hydrocarbon exploration work.

Keywords

Biostratigraphy, palynology, Ruivo-1 well, Corvina well, offshore Algarve Basin, Portugal