



## Research paper

# Dinoflagellate cyst assemblages of the Cunga - Quifangondo cenozoic formations in the Cabo São Brás section, Kwanza Basin (Angola): towards a first stratigraphic and paleoenvironmental interpretation



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## ABSTRACT

This work introduces one of the first palynostratigraphic study conducted on formations from the Eocene and overlying lowermost Miocene successions (Cunga and Quifangondo formations) exposed in the Onshore Kwanza Basin, Angola.

To improve the Cunga and Quifangondo formations age, new biostratigraphic correlations and palaeoenvironmental interpretations based on qualitative and quantitative analyses of organic walled dinoflagellate cysts from sedimentary rocks sampled in the Cabo de São Brás section were obtained.

Those works have revealed that the Cunga Formation could be assigned to a middle Eocene - early Oligocene age, with a palynomorph signature typical of outer neritic to oceanic environments (dominance of dinocysts with microforaminiferal linings and radiolarian pyritized fragments).

The lower Quifangondo Formation could be assigned to late Oligocene (latest Chattian) - early Miocene (Aquitania) ages. This assumption is based on the first occurrence of *Ectosphaeropsis burdigalensis*, and the last occurrence of *Deflandrea* spp. and *Chiropteridium galea*. Additionally, the *Chiropteridium*, *Distatodinium*, *Homotryblum*, *Hystrichokolpoma* and *Lingulodinium* acme endorses a latest Chattian-early Aquitania age to these samples. The palynomorph signature of this unit reflects an outer neritic environment.

The latest Oligocene/early Miocene Quifangondo Formation overlaps unconformably on strata of the middle Eocene to early Oligocene Cunga Formation, pointing out a hiatus between the two units.

## 1. Introduction

The Kwanza Basin (Figure 1, units according to the Geological Map of Total and Sonangol, 1987) is located in the central part of the Angolan South Atlantic Coast of West Africa. The latitudinal extension of the basin is over 300 km (North-South) and presents a maximum longitudinal width of 170 km (East-West). It is one of the several basins within the West African Aptian Salt Basin. The Kwanza Basin is regarded as a passive margin type, developed as a result of the rifting of the Gondwanaland from the late Jurassic (?) to the early Cretaceous. This rift-to-drift margin basin was formed as a product of the separation between South America and Africa continents and the consequent opening of the South Atlantic Ocean (Brognon and Verrier, 1966; Lundin, 1992; Burwood,

1999; Marton et al., 2000; Karner et al., 2003; Hudec and Jackson, 2004; Brownfield and Charpentier, 2006; Jian-Ping et al., 2008).

The Kwanza Basin is divided into two main sub-basins, the Onshore (Inner) and Offshore (Outer) Kwanza Basins.

Three main tectonic-sedimentary evolution stages characterise both sub-basins, namely: pre-rift, syn-rift and post-rift stages (Brognon and Verrier, 1966; Brownfield and Charpentier, 2006; Hudec and Jackson, 2004). A distinct Aptian salt horizon marks the initial post-rift phase. The independent evolution of both onshore and offshore basins resulted in different depositional environments but time-equivalent units. Pre-rift late Jurassic continental clastic rocks, deposited unconformably over the Pre-Cambrian basement, were later faulted during rifting. The Syn-rift depositional phase, which is characterized by lacustrine black organic shales and deltaic/fluviatile deposits, ended with the establishment of the continental break-up. The accumulation of a thick Aptian horizon marks the beginning of the post-rift phase (Brognon and Verrier, 1966; Karner et al., 2003; Brownfield and Charpentier, 2006). The Cretaceous post-rift sedimentation (Infra-Binga, Binga, Tuenza,

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