



Preliminary late Miocene palynomorph assemblages from the Quifangondo and Luanda formations, Onshore Kwanza Basin, Angola

C.F. Rodrigues^{a,b,c}, Z. Pereira^{d,*}, M. Mendes^e, P.C. Nsungani^{a,c}, P. Fernandes^f, G. Lopes^f, L. V. Duarte^g, W. Aboelkomsan^a, E. Taylor^h, M. Tyrrell^h, M.F. Fernandoⁱ, V. Machadoⁱ

^a SonaStream Ltd, Unit no. 117, Orion Mall, Palm Street, Victoria, Mahe, Seychelles

^b FP-ENAS, Universidade Fernando Pessoa, Praça de 9 de Abril, 349, 4249-004, Porto, Portugal

^c Departamento de Geologia, Faculdade de Ciências, Universidade Agostinho Neto, Avenida 4 de Fevereiro, 71, Luanda, Angola

^d LNEG, Rua da Amieira, 4465-965, S. Mamede de Infesta, Portugal

^e LNEG, Bairro da Vale d'Oca Apartado 14, 7601-909, Aljustrel, Portugal

^f Centro de Investigação Marinha e Ambiental (CIMA), Universidade do Algarve, Campus de Gambelas, 8005-130, Faro, Portugal

^g Universidade de Coimbra, MARE, Departamento de Ciências da Terra, Faculdade de Ciências e Tecnologia, Rua Sílvio Lima, 3030-790, Coimbra, Portugal

^h PGS, 4 The Heights Brooklands Weybridge Surrey, KT13 0NY, United Kingdom

ⁱ Sonangol E.P., Rua Rainha Gíngua no 29/31, C. Postal 1316, Luanda, Angola

ARTICLE INFO

Keywords:

Quifangondo formation
Luanda formation
Palynostratigraphy
Miocene
Onshore Kwanza basin
Angola

ABSTRACT

A Miocene succession exposed at the Cabo Ledo and Miradouro da Lua sections in the Onshore Kwanza Basin, Angola, was examined for palynology. Palynomorphs of preliminary late Miocene age identified are presented herein. The upper part of the Quifangondo Formation is dated as middle Tortonian in age based on the co-occurrence of the pollen grain *Fenestrites spinosus* and the dinoflagellate species *Selenopemphix armageddonensis*. The palynomorph signature indicates a middle neritic marine environment dominated by dinoflagellate cyst taxa.

A late Miocene (late Tortonian to Messinian) age is also documented for the first time at the base of the Luanda Formation based on the co-occurrence of the pollen taxa *Echitricolporites spinosus*, *Fenestrites spinosus*, *Fenestrites longispinosus*, *Monoporopollenites annulatus*, and *Retistephanocolpites gracilis*. The palynomorph signature of this unit reflects an inner neritic marine (coastal/lagoon transitional) environment dominated by terrestrial palynomorphs and very rare dinoflagellate cyst taxa.

The present research contributes data for improving the stratigraphical framework of the Quifangondo and Luanda formations, both of which are recognized as the main potential source rocks and reservoirs of the Post-Salt Paleogene/Neogene Petroleum System of the Kwanza Basin. This significant contribution provides important biostratigraphic and palaeoenvironmental data for defining the vital temporal horizons of these settings in a basin where petroleum exploration is of interest.

1. Introduction

The Angolan passive margin is known as a world-class petroleum province comprising a group of sedimentary basins, including the Lower Congo, Kwanza, Benguela and Namibe basins (Brownfield and Charpentier, 2006; Guiraud et al., 2010; Serié et al., 2017). The Kwanza Basin is located in the central part of the Angolan South Atlantic Coast in West Africa. This basin is ca. 300 km long (North-South) and 170 km wide (East-West) and is one of the several basins within the West African Aptian Salt Basin. The Kwanza Basin is regarded as a passive margin

basin, developed as a result of the rifting of Gondwanaland from the Late Jurassic (?) to the Early Cretaceous. This rift-to-drift margin basin formed as a product of the separation between the South America and Africa continents and the consequent establishment of the South Atlantic Ocean (Brognon and Verrier, 1966; Lundin, 1992; Burwood, 1999; Marton et al., 2000; Karner et al., 2003; Hudec and Jackson, 2002; Brownfield and Charpentier, 2006; Jian-Ping et al., 2008). The Kwanza Basin is divided into two main sub-basins, the Onshore (Inner) Kwanza and Offshore (Outer) Kwanza Basin, both showing an independent evolution but time-equivalent units.

* Corresponding author.

E-mail address: zelia.pereira@lneg.pt (Z. Pereira).

<https://doi.org/10.1016/j.jafrearsci.2021.104141>

Received 18 February 2020; Received in revised form 15 January 2021; Accepted 4 February 2021

Available online 17 February 2021

1464-343X/© 2021 Elsevier Ltd. All rights reserved.