Four new species of deep water agglutinated foraminifera from the Oligocene–Miocene of the Congo Fan (offshore Angola)

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ABSTRACT: Four new species of deep-water agglutinated benthic foraminifera are described from the Oligocene and Miocene of the Congo Fan, offshore Angola. Scherochorella congoensis n.sp., Paratrochamminoides gorayskiformis n.sp., Haplophragmoides nauticus n.sp. and Portatrochammina profunda n.sp. all occur in deep-sea turbiditic shales and sands from the distal section of the Congo Fan.

INTRODUCTION

The Congo Fan is a terrigenous wedge largely built of Oligocene and Miocene prograding turbidite deposits organised into thick sedimentary packages containing paleocanysons, meandering paleochannels, and overbank deposits (Anka and Séranne 2004, Babonneau et al. 2002 and Lavier et al. 2001). Although the Congo Fan has been an oil company target for many years, surprisingly few micropalaeontological studies have been published from the area (e.g. Preece et al. 1999, 2000).

The species described in this study derive from the Oligocene section of an exploration hole drilled in the distal part of the Congo Fan (text-fig. 1). The foraminifera are almost entirely agglutinated indicating deposition beneath a locally raised CCD, and are raised in most samples at medium to low abundances (that suggest a paleobathymetry of mid to lower bathyal). Typical cosmopolitan Paleogene forms can be identified among several species that appear to be new and are here described for the first time. Some of these forms are also present in the Miocene section.

The purpose of this paper is to provide formal descriptions of new agglutinated species from the Oligocene of the distal Congo Fan. A more complete description of the micropaleontology of the Congo Fan is the subject of a Ph.D. thesis at UCL (Kender, in prep.).

MATERIAL AND METHODS

Sample material for this study consists of ditch-cutting samples from an exploration well drilled at water depth of 2,027m in Block 31, offshore Angola. The well penetrated clastic sediments at the base of the Congo Fan. Samples from the well were collected at 10m spacing, and in this well the Oligocene samples (as determined by calcareous nannofossils) occur over an interval from 3,460m to 4,270m (below rotary table). The Oligocene section in the well consists of predominantly black mudstones and siltstones with interbedded sandy horizons. Samples were disaggregated by boiling in a sodium carbonate solution, passed over a 63μm sieve, and foraminifera were mounted onto cardboard reference slides. Selected specimens were imaged using a JEOL JSM-6480LV SEM at University College London, and digital plates were made using Adobe Photoshop.

Type specimens of new species described herein are deposited in the Department of Palaeontology, Natural History Museum, London, and in the authors’ collection at University College London. The species are described below, using the suprageneric classification of Kaminski (2004).

SYSTEMATIC DESCRIPTIONS

Subclass TEXTULARIAI Mikhalevich 1980
Order LITUOLIDA Lankester 1885
Suborder HORMOSININA Mikhalevich 1980
Superfamily HORMOSINACEA Haacke 1894
Family KUNKLERINIDAE Rauser and Reitlinger 1986
Genus Scherochorella Loeblich and Tappan 1984

Scherochorella congoensis Kender, Kaminski and Jones n. sp. Plate 1, figures 1-6

Material: 1213 specimens from 31 samples, Upper Oligocene.

Type locality: Congo Fan, offshore Angola, Block 31.

Type level: Cuttings sample collected at 4,040 meters below rotary table. Oligocene black shales.

Type specimens: Holotype (BMNH PF 67318) and paratypes (BMNH PF 67319) are deposited in the micropalaeontological collections of the Natural History Museum, London.

Derivation of name: After the Congo Fan, the location of its discovery.

Description: Test free (800μm in length, 150μm in width), uniserial, consisting a rectilinear series of 9-10 chambers increasing in size slowly from an initial, small proloculus. Successive
chambers overlap previous ones by approximately 30%. Sutures depressed and straight. Specimens are invariably flattened in various planes. Wall thin, composed of a single layer of coarsely agglutinated sand grains 2-3 grains thick. Aperture a small, round, terminal opening within a slightly raised 'shoulder'. Cement siliceous, presumably organic before fossilization.

Remarks: This species differs from Scherochorella minuta (Tappan) in its more coarsely agglutinated and thinner test wall. This species commonly occurs in great abundance in the studied well, typically making up >50% of the agglutinated specimens present in a sample. It is most commonly present as broken fragments.

Paratrochamminoides gorayskiformis Kender, Kaminski and Jones n. sp.
Plate 1, figures 7-10
Material: 12 specimens from 6 samples, Upper Oligocene to Lower Miocene.

PLATE 1
Scale bar = 200μm (unless indicated)

1-6 Scherochorella congoensis n. sp. 1a-b. Holotype, Sample at 4,040m, 2-6. Paratypes, Sample at 4,040m.

7-10 Paratrochamminoides gorayskiformis n.sp. 7a,b. Holotype, Sample at 3,850m, 8a,b. Paratype, samples at 3,830m, 9a,b. Paratype, sample at 3,830m, 10. Paratype, sample at 3,870m.
Plate 1
Remarks: Holotype (BMNH PF 67320) and paratypes (BMNH PF 67321) are deposited in the micropalaeontological collections of the Natural History Museum, London.

Type locality: Congo Fan, offshore Angola, Block 31.

Type level: Cuttings sample collected at 3,850 meters below rotary table. Oligocene black shales.

Derivation of name: Taken from its similar appearance to Paratrochamminoides gorayskii (Grzybowski).

Description: Test ovate in outline (approximately 0.6mm in length). Coiling trilocular, coiled in three planes, with the long axis defined as in line with the intersection of the coiling planes. The tabular test is divided into chambers of varying length, from elongate to distinctly bead-like, approximately five in the last whorl. Wall is finely agglutinated with a fine to medium-coarse finish. Wall thin. Aperture at the open end of the tube. Cement siliceous, presumably organic before fossilisation.

Remarks: This species is similar to Paratrochamminoides gorayskii (Grzybowski) in its coiling mode and shape, but can be distinguished by its shorter chamber length and thinner wall.

Superfamily LITUOLACEA de Blainville 1827
Family HAPLOPHRAGMOIDIDAe Maync 1952
Genus Haplophragmoides Cushman 1910

Haplophragmoides nauticus Kender, Kaminski and Jones n. sp.

Plate 2, figures 1-2

Haplophragmoides sp.1 Kender, Kaminski and Cieszkowski 2005, p. 267, fig. 13b.

Material: 45 specimens from 17 samples, Upper Oligocene to Lower Miocene.

Type specimens: Holotype (BMNH PF 67322) and paratypes (BMNH PF 67323) are deposited in the micropalaeontological collections of the Natural History Museum, London.

Type locality: Congo Fan, offshore Angola, Block 31.

Type level: Cuttings sample from 3,840 meters below rotary table. Oligocene black shales.

Derivation of name: After the Latin for 'nautical', after its association with the ocean.

Description: Test planispiral (up to 1mm diameter), circular in outline, with an acute periphery. Coiling is evolve with 9 chambers in the final whorl. Chambers are truncated triangular (trapezoidal) in shape, increasing rapidly in size. Sutures are straight to sigmoidal, and slightly depressed. Wall simple, thin, finely agglutinated and finely finished. Aperture is slit-like, located at the base of the final chamber. Cement siliceous, presumably organic before fossilisation.

Remarks: This species differs from its most closely related form Haplophragmoides walteri (Grzybowski) by having a distinctly evolve coiling mode and the trapezoidal chambers. H. nauticus has been found from many localities within the Polish Carpathians, and was recently illustrated as Haplophragmoides sp. 1 (Kender et al., 2005) from the Lower Eocene of the Magura Unit, Outer Carpathians.

Suborder TROCHAMMININA Saidova 1981
Superfamily TROCHAMMINACEA Schwager 1877
Family TROCHAMMININAE Schwager 1877
Subfamily TROCHAMMININAE Schwager 1877
Genus Paratrochammina Echols 1971

Portatrochammina profunda Kender, Kaminski and Jones n. sp.

Plate 2, figures 3-8

Material: 206 species from 26 samples, Upper Oligocene.

Type specimens: Holotype (BMNH PF 67324) and paratypes (BMNH PF 67325) are deposited in the micropalaeontological collections of the Natural History Museum, London.

Type locality: Congo Fan, offshore Angola, Block 31.

Type level: Cuttings sample 3,840 meters below rotary table. Oligocene black shales.

Derivation of name: After the Latin for 'deep', relating to its place of discovery in the distal part of the Congo Fan.

Description: Test free (up to 1mm diameter). Coiling low trochospiral (both dextral and sinistral) with 3-4 whorls and 4-4.5 chambers in each whorl. Chambers are inflated and increase in size rapidly so that the final whorl makes up most of the test. Sutures depressed. Wall thin, with a rough surface made up of predominantly medium grains containing occasional coarse inclusions. Specimens are invariably flattened. Aperture a low umbilical-facing opening covered by an umbili-

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PLATE 2

Scale bar = 200µm (unless indicated)

1-2 Haplophragmoides nauticus n. sp. 1a,b. Holotype, Sample at 3,840m. 2. Paratype, sample at 3,800m.

3-8 Portatrochammina profunda n. sp. 3a,b. Paratype, Sample at 3,860m. 4. Paratype, Sample at 3,830m. 5. Paratype, Sample at 3,860m. 6a,b. Holotype, Sample at 3,840m. 7a,b. Paratype, Sample at 3,800m. 8. Paratype, Sample at 3,860m.
cal flap. Cement siliceous, presumably organic before fossilization.

Remarks: This species is similar to *Trochammina trincherasensis* Bermúdez, described from the Upper Oligocene of the Dominican Republic Trincher Formation. *Trochammina trincherasensis* differs by having a typical trochamminid-like elongate apertural slit between the umbilicus and the periphery. It is described as having calcareous cement, although we believe it more probable that this is not the case. *Portatrochammina profunda* n.sp. can occur in high abundance in the studied well.

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**REFERENCES**


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