



Taxonomic Notes on Some Species of Genus *Globorotalia* from Kafe Field, Offshore Western Niger Delta, Nigeria

ABSTRACT

The aim of the study is to identify and record the taxonomic notes on species of Genus *Globorotalia* from the study area. The study of study is located in Kafe field of the offshore western Niger Delta area of Nigeria. 550 ditch cuttings samples were retrieved at 10-20 meter intervals from the five wells studied (Kafe-1, Kafe-2, Kafe-4, Kafe-5 and Kafe-6), respectively. The standard micropaleontological preparation technique for foraminiferal samples was employed. The washed ditch cutting samples were initially rinsed to remove drilling mud and then dried. Twenty grams of each dried sample was soaked for four hours in kerosene and the detergent solution water overnight. The aggregated samples were then washed under running faucet water over a 63 µm sieve mesh. The washed residues were then dried over a hot electric plate, and then sieved into three size portions: coarse, medium and fine. They were then put in labelled sample bags. Their foraminiferal contents were then identified under binocular microscope and recorded. Some Globigerina species were identified and their taxonomic notes were documented accordingly.

Keywords: Taxonomic notes, *Globorotalia*, KafeField, western Niger Delta, Nigeria

1 INTRODUCTION

The study of study is located in the Kafefield of the offshore western Niger Delta area of Nigeria (Fig. 1). The Niger Delta is situated in the Gulf of Guinea on the west coast of Central Africa. Niger Delta is between latitudes 4° and 6° N and longitudes 3° and 9° E in the south-south geopolitical region of Nigeria [11]. The Cenozoic Niger Delta is situated at the intersection of the Benue Trough and the South Atlantic Ocean where a triple junction developed during the separation of South America and Africa in the Late Jurassic [18]. The aim of the study is to identify and record the taxonomic notes on Genus *Globorotalia* in the study area.

2 GEOLOGICAL SETTING

Three main formations have been recognized in the subsurface of the Niger Delta [8], [15], [17], [1], [16]. These are the Akata, Agbada, and Benin Formations. The formations were deposited in marine, transitional and continental environments, respectively; together they form a thick, overall progradational passive-margin wedge [8]. The Akata Formation is Paleocene to Pliocene in age and it is the basal unit composed mainly of marine shales believed to be the main source rock within the basin. The Agbada Formation is made up of alternating sandstone, siltstone and shale sequences that constitute the petroleum reservoirs of the basin. Agbada Formation is Eocene to Quaternary in age (Fig. 2 and 3). On the other hand, the Benin Formation is Oligocene to Recent in age and it is mainly made up of non-marine fine to coarse-grained sands with a few mudstone and shaly intercalations [8].

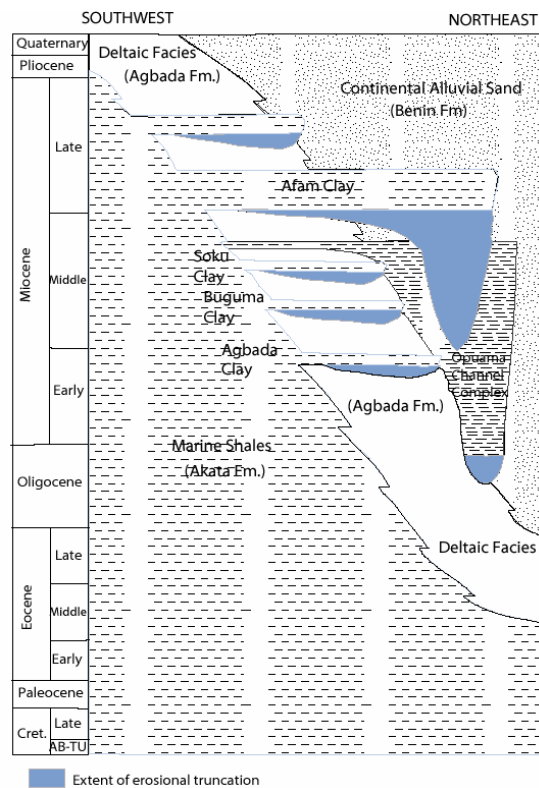
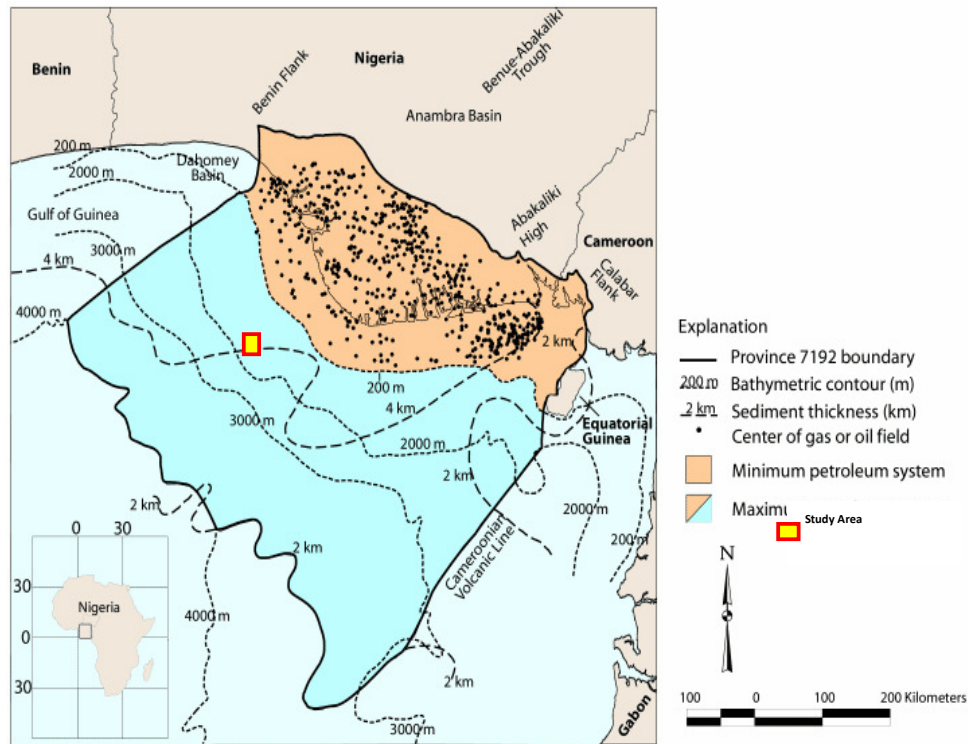


Fig. 2. Stratigraphic column showing the three formations of the Niger Delta (after Tuttle et al.[16]; modified from Doust and Omatsola [9])

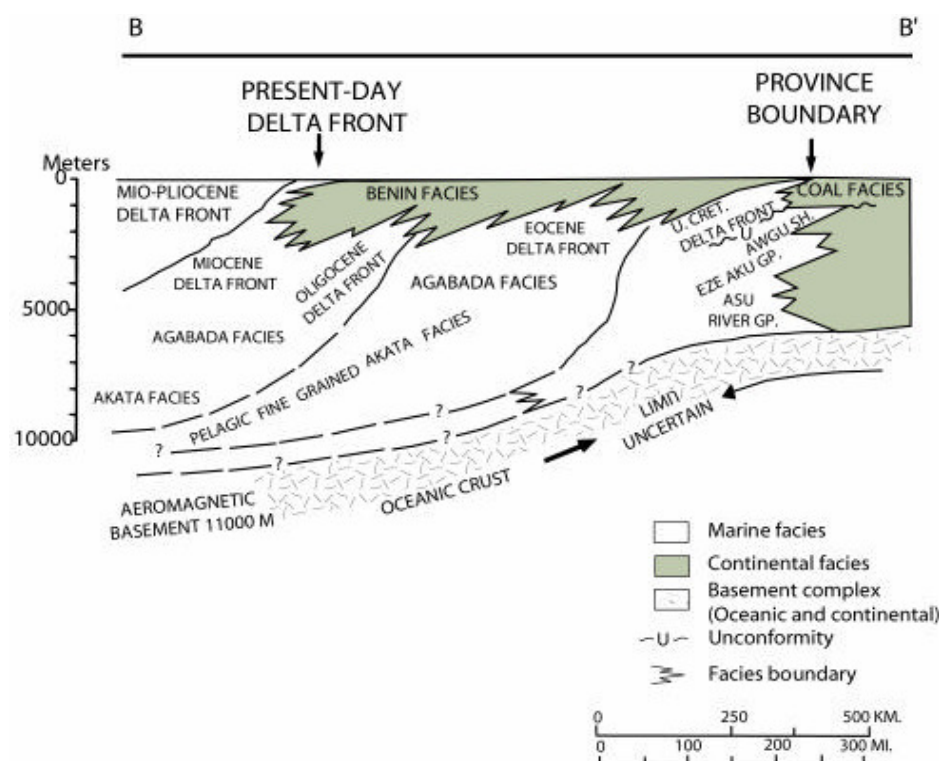


Fig. 3. Southwest-Northeast (B-B') cross-section through the Niger Delta (modified from Whiteman [18])

3 METHODS OF STUDY

Total of 550 ditch cuttings samples were retrieved at 18.29 meter intervals from the five wells studied labelled Kafe-1, Kafe-2, Kafe-4, Kafe-5 and Kafe-6. The standard micropaleontological preparation technique for foraminiferal samples was employed. The washed ditch cutting samples were initially rinsed to remove drilling mud and then dried. Twenty grams of each dried sample was soaked for four hours in kerosene and the detergent solution water overnight. The aggregated samples were then washed under running faucet water over a 63 µm sieve mesh. The washed residues were then dried over a hot electric plate then sieved into three size portions: coarse, medium and fine. They were then put in labelled sample bags. Their foraminiferal contents were then identified under binocular microscope recorded.

4 RESULTS AND DISCUSSION

The nomenclature and taxonomic notes used in this study are based on the published methods [6], [7], [10], [4], [14], [13], [12]. The listing of synonyms and detailed descriptions of species were omitted

because the encountered species are well described in published literature some of which have been mentioned in this paper. *Globorotalia mayeri* CUSHMAN & ELLISOR, *Globorotalia continuosa* BLOW, *Globorotalia obesa* BOLLI, *Globorotalia menardii* 'A' BOLLI, *Globorotalia foshi lobata* BERMUDEZ are the species of the Genus *Globorotalia* that were identified and their taxonomic notes are given below, while their photomicrographs are shown in Plate 1. The family and sub-family names are in bold font, while the genus and species names are given in italic font in line with international standards.

4.1 TAXONOMIC NOTES

Family Globorotaliidae CUSHMAN

Subfamily Globorotaliinae CUSHMAN

Genus *Globorotalia* CUSHMAN

Globorotalia mayeri CUSHMAN & ELLISOR
(Plate 1.1)

Remarks

This form is different from *Globorotalia opima* BOLLI in having an aperture with a distinctly arched slit. It is also different from *Globorotalia siakensis* LEROY and *Globorotalia foshi peripheroronda* BLOW & BANNER in having curved, spiral intercameral sutures and less lobate equatorial periphery. According to Bolli and Saunders [6], this species was used as zone marker by Brönnimann [5] and emended by Bolli [2], [3].

Age: Lower Oligocene to Middle Miocene [4].

Globorotalia continuosa BLOW (Plate 1.2)

Remarks:

This form is small and has four chambers and it is regarded by its author as closely related to the ancestral *Grt. nana* BOLLI and to be itself the ancestor of *Grt. acostaensis* BLOW, which appeared at the base of the Late Miocene. However, Bolli and Saunders [4], basing their argument on very strong reasons founded on more recent research findings, disagreed with earlier publication that *Grt. continuosa* BLOW is the ancestor of *Grt. acostaensis* BLOW. This species is distinguished from *G. mayeri* by its smaller size and by having only four instead of 5-6 chambers in the last whorl. However, it is identical to *Grt. mayeri* CUSHMAN & ELLISOR in its overall morphology, the range and the coiling pattern. It is distinguished from *Grt. acostaensis* BLOW in having aperture that is high, comma-shaped arch while that of *Grt. acostaensis* BLOW is a low slit.

Age: top of Middle Miocene – base of Late Miocene [4].

Globorotalia obesa BOLLI (Plate 1.3)

Remarks

In this form, the last whorl is formed by four globular chambers, which are separated by deeply incised sutures in a more lobate equatorial periphery. This species is distinguished from *Grt. continuosa* BLOW in having more ovate and less inflated chambers.

Age: Early Miocene to upper Middle Miocene [4].

Globorotalia menardii 'A' BOLLI (Plate 1.4)

Remarks: According to Bolli & Saunders [4], the Middle Miocene *Grt. menardii* also called *Globorotalia menardii* 'A' was introduced by Bolli [3]. It differs from *Grt. praemenardii* CUSHMAN & STAINFORTH in having a more strongly developed peripheral keel, less inflated chambers and limbate intercameral sutures on the spiral side, six chambers in the last whorl and less lobate chambers in equatorial view. According to Bolli & Saunders [4], the Pleistocene – Holocene *Grt. menardii* has been designated *Grt. menardii* PARKER, while the older Middle Miocene taxa have been designated *Grt. menardii* 'A' BOLLI.

Age: Middle Miocene to Early Pliocene [4].

Globorotalia fohsi lobata BERMUDEZ (Plate 1.5)

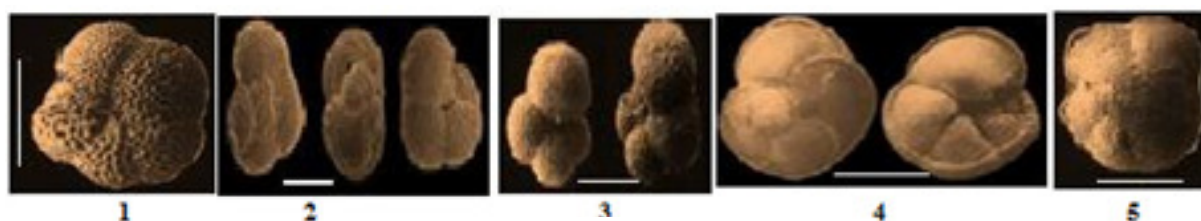
Remarks

This species is different from *Grt. mayeri* CUSHMAN & ELLISOR and *Grt. obesa* BOLLI in having its last two to three chambers very elongated and forming strongly lobate and cockcomb-like equatorial periphery.

Age: Middle Miocene [4].

5 CONCLUSION

Five species of the Genus *Globorotalia*, namely: *Globorotalia mayeri* CUSHMAN & ELLISOR, *Globorotalia continuosa* BLOW, *Globorotalia obesa* BOLLI, *Globorotalia menardii* 'A' BOLLI, *Globorotalia fohsi lobata* BERMUDEZ were identified in Kafe-1, Kafe-2, Kafe-4, Kafe-5 and Kafe-6 wells, respectively and their taxonomic notes recorded accordingly. The value of the taxonomic notes is to contribute to the study of the species of the Genus *Globorotalia* that will in turn help other researchers in the study area to easily and quickly identify these planktonic foraminifera. The taxonomic notes will help in eradication of uncertainty and arbitrary identification of species.



White Scale bars: 100 µm

Plate 1. Photomicrographs of Some Members of Genus *Globorotalias* from Study Area

1. *Globorotalia mayeri* CUSHMAN & ELLISOR

2. *Globorotalia continuosa* BLOW
3. *Globorotalia obsea* BOLLI
4. *Globorotalia menardii* 'A' BOLLI
5. *Globorotalia foshi lobata* BERMUDEZ

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