CALCAREOUS NANNOFOSSIL BIOZONATION SCHEME OF

THE DEEP OFFSHORE NIGER DELTA

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A THESIS SUBMITTED IN PARTIAL

FULFILMENT OF THE REQUIREMENTS FOR

THE AWARD OF THE DEGREE OF DOCTOR OF

PHILOSOPHY (Ph. D) APPLIED GEOLOGY

OF THE

DEPARTMENT OF GEOLOGY,

FACULTY OF SCIENCE,

OBAFEMI AWOLOWO UNIVERSITY,

ILE-IFE, NIGERIA.

2008

ABSTRACT

A high resolution calcareous nannofossil biostratigraphic study was carried out on eight wells from the deep offshore Niger Delta with the aim of subdividing the sequences penetrated into zones and local subzones. The study is also aimed at identifying new nannofossils species, dating observed condensed sections as well as identifying nannofossil species with acme events.

Ditch cuttings from the eight wells (DPW1 – DPW8) obtained from the Niger Delta were logged and composited at 10 metres interval and processed for nannofossil analysis using the modified standard smear technique. The prepared slides were examined with the Olympus Photomicroscope at 1000X and 1500X magnifications under cross polarized and transmitted light. Detailed species identification of all encountered nannofossils was made in eight horizontal sweeps (traverses) in each slide by using relevant bibliographic references. Nannofossils distribution plots were made on the scale of 1:5000 with sample depths on the Y-axis and all nannofossil taxa observed on the X-axis using the Stratabug biostratigraphic software. Zonal subdivision was based on First and Last occurrences of marker species as well as their relative abundance. The abundance and diversity patterns were calibrated with chronostratigraphically important bioevents to date all observed major condensed sections for the sequence stratigraphic interpretation of the studied wells.

The results revealed high to moderately diverse and abundant calcareous nannofossils in the eight wells in the area. The zones encountered in this study ranged from the Early Miocene NN1 (CNIa) to Early Pliocene NN13 (CN10c) zones. Four wells – DPW2, DPW4, DPW5 and DPW6 penetrated sediments of Miocene to Early PIiocene age while wells DPW1, DPW3, DPW7 and DPW8 were restricted within the Miocene age. Five major zones NN1, NN2, NN4, NN5 and NN11 were subdivided into subzones.

The acme events of *Discoaster pentaradiatus, D. quinqueramus, D. berggrenii, D. bollii* and *D. deflandrei* were found to be associated with the 5.0 Ma, 5.8 Ma, 7.0 Ma, 9.2 Ma and 16.0 Ma Maximum Flooding Surfaces respectively following the Haq *et al.'s* Global Sequence Cycle Chart. The Miocene/Pliocene boundary was easily inferred from the consistent occurrence of *Ceratolithus acutus* and C. *armatus* (5.2 Ma) in the Niger Delta deepwater. Two new nannofossils species – *Calcidiscus sp. 1* and *Calcidiscus sp.* 2 of the Late Miocene age were identified in the studied wells. A dearth of nannofossils spanning a period of approximately 5 Million years between 10.9 Ma – 15.6 Ma was observed within the Middle Miocene Serravalian age of the deep offshore Niger Delta.

It was concluded that the zonation scheme used in the study had further helped to subdivide the deep offshore Niger Delta Miocene ‐ Pliocene sequence into easily recognizable biostratigraphic units.