

General palaeontology (Biostratigraphy)

Biostratigraphy and geodynamic impact in the uppermost part of the northeastern coastal basin of Togo

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Received 29 August 2008; accepted after revision 18 May 2009

Available online 14 July 2009

Presented by Philippe Taquet

Abstract

Lithological and micropaleontological studies of core-samples from five boreholes drilled in the northeastern part of the coastal basin of Togo allow for a specification of the stratigraphy and the paleogeography of this area during the Maastrichtian and Paleogene. A lithological analysis reveals a marine series consisting of a Lower Maastrichtian unit, a Middle Paleocene to Eocene unit, and an upper unit attributed to the Continental terminal *sensu lato*. The biostratigraphical study, based on planktonic foraminifera, has led to a characterization of the basin in terms of biozones ranging from the *Globotruncana aegyptiaca* to the *Abathomphalus mayaroensis* biozones and biozones P5 to P11, thus specifying a Middle to Upper Maastrichtian, an Upper Paleocene and a Lower to Middle Eocene units. The paleogeographical evolution of the area shows that the series recorded two sedimentary cycles: the first one stops at the end of the Cretaceous and the second one in the Paleogene. **To cite this article: P.Y.D. Da Costa et al., C. R. Palevol 8 (2009).** © 2009 Académie des sciences. Published by Elsevier Masson SAS. All rights reserved.

Résumé

Impact biostratigraphique et géographique dans le secteur nord-est du bassin côtier togolais. L'étude lithologique et micropaléontologique des carottes de cinq sondages exécutés dans le secteur nord-est du bassin côtier togolais a permis de préciser la stratigraphie et la paléogéographie de ce secteur au cours du Maastrichtien et du Paléogène. L'analyse lithologique met en évidence une série marine comportant un ensemble inférieur maastrichtien, un ensemble moyen paléocène à éocène et un ensemble supérieur attribué au Continental terminal *sensu lato*. L'étude biostratigraphique, basée sur des foraminifères planctoniques permet d'y caractériser les biozones allant de la biozone à *Globotruncana aegyptiaca* à la zone *Abathomphalus mayaroensis* et les biozones P5 à P11 définissant ainsi un Maastrichtien moyen à supérieur, un Paléocène supérieur et un Eocène inférieur à moyen. L'évolution paléogéographique montre que cette série comprend deux cycles sédimentaires : le premier se termine à la fin du Crétacé et le second au Paléogène. **Pour citer cet article : P.Y.D. Da Costa et al., C. R. Palevol 8 (2009).** © 2009 Académie des sciences. Publié par Elsevier Masson SAS. Tous droits réservés.

Keywords: Coastal basin of Togo; Stratigraphy; Maastrichtian; Paleogene; Biozone; Foraminifera; Tectonics; Paleogeography

Mots clés : Bassin côtier togolais ; Stratigraphie ; Maastrichtien ; Paléogène ; Biozone ; Foraminifères ; Tectonique ; Paléogéographie

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1. Introduction

The West-African coastal basins (from Morocco to South Africa) owe their origin to the break-up of Gondwana and the opening-up of the South Atlantic Ocean. Therefore, they are rarely older than Cretaceous. For instance, the age of deposits in the coastal basins of the Central Atlantic is Aptian, Albian (Lower Cretaceous) or Cenomanian to Pliocene. Reyment [51,52], Reyre [53] and many other authors have reviewed the stratigraphic sequences of the West-African sedimentary basins.

Numerous micropaleontological and sedimentological studies of Mesozoic and Tertiary formations, realized during the past few years, have brought into evidence some homogeneity in the stratigraphic and paleogeographic results along the West-African coast. Useful data may be found in many papers, notably those by Monciardini [41], Ducasse et al. [20], Kogbe and Me’hes [32], Anglada et al. [5], Bellion [6], Rat et al. [50], Ly and Anglada [40], Petters [44,45,46,47] and Johnson et al., [26].

These coastal basins are very rich in fossils and contain similar fossil fauna. The biostratigraphy of the most of them, mainly based on foraminifera, provides numerous biozones of international value. Their stratigraphic subdivisions are known in very great detail. The old-

est sediments are of non-marine and continental origin. Moreover, some lithostratigraphic landmarks, specifically limestones with *Togocyamus seefriedi* Oppenheim (Middle to Upper Paleocene), overlain by glauconitic horizon (typified of Paleocene/Eocene boundary) and attapugite (palygorskite) level (typical of Lower to Middle Eocene), are recognized in all of these basins. The marine deposits are covered by a continental detrital formation with siderolithic facies known as “Continental terminal”. The age of this formation is Middle Eocene to Quaternary [19,27,32,36,37,57]. The last transgression delayed the deposition of this formation in most of the costal basins (Senegal, Ghana and Ivory Coast).

The paleogeographic evolution in these basins is characterized by three sedimentary cycles. The first transgression took place during the Campanian or Maastrichtian, according to locations. Deposits during this time include sandstones, limestones and claystones. The Cretaceous-Cenozoic transition (K/T boundary) is well documented [9,15,18,22,23,30,43,48,55,56]. According to places, K/T transition is characterized by: (1) mixed microfauna assemblages (foraminifera, ostracods) from both Maastrichtian and Lower Paleocene; (2) a depositional gap of the terminal Maastrichtian or Early Paleocene (*Eugubina* zone); or (3) devoid of planktonic foraminifera in deposits.

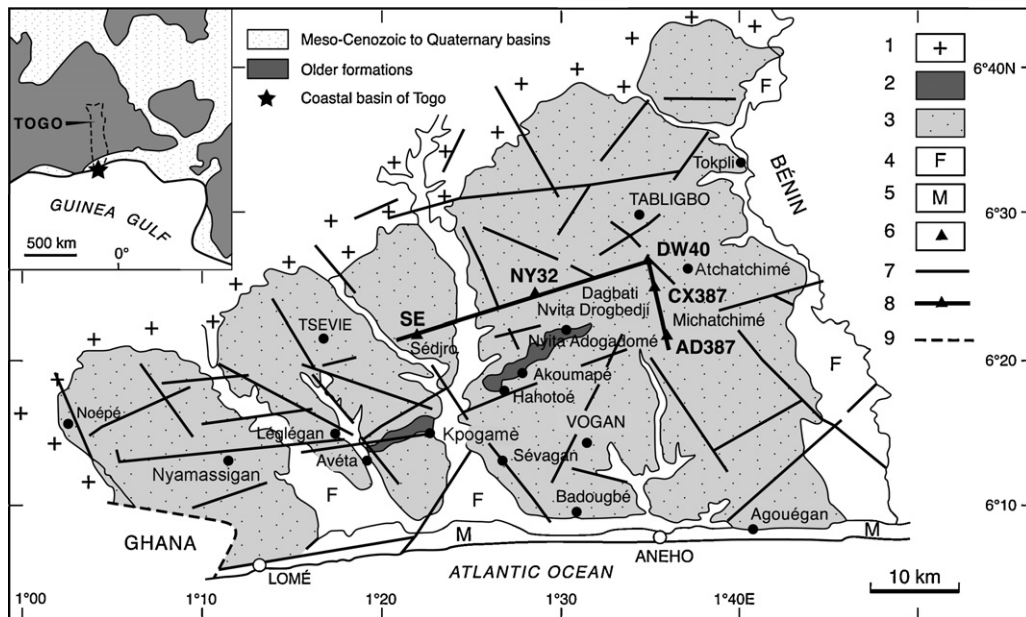


Fig. 1. Structural map of the Togo coastal basin with the locations of the investigated boreholes (after Motorolla [42]). 1: Pan African basement; 2: Hahotoé-Kpogamé phosphatic complex; 3: “Continental terminal” deposits; 4: Fluvio-lacustrine deposits; 5: Lagoonal to marine deposits; 6: Studied borehole; 7: Fault; 8: SW-NE and NW-SE profiles; 9: Uncertain border.

Fig. 1. Carte structurale du bassin côtier du Togo avec la localisation des sondages étudiés (d’après Motorolla [42]). 1: socle panafricain; 2: complexe phosphaté de Hahotoé-Kpogamé; 3: dépôts du « Continental terminal »; 4: dépôts fluvio-lacustres; 5: dépôts marins à lagunaires; 6: sondage étudié; 7: faille; 8: profils SW-NE et NW-SE; 9: frontière incertaine.

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