## Biozonation and Correlation of BDX-1 and BDX-2 Wells of Deep Offshore Niger Delta Using Calcareous Nannofossils\*

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## **Abstract**

The need for absolute age determination and refined zonation of the deep offshore Niger Delta area has made calcareous nannofossil very useful over other fossils, though they still compliment each other. This study is aimed at subdividing the sequence within the depth intervals of the two wells into zones (Figure 1 and Figure 2). 124 and 220 ditch cutting samples for BDX-1 and BDX-2 wells respectively were analyzed for nannopalaeontology. The calcareous nannofossils species identified were used to make biostratigraphic deductions, using the standard zonation schemes (Figure 3 and Figure 4).

The zones encounter in this study are *Cyclicargolithus floridanus* zone (NN6), *Discoaster bollii* zone (NN7-NN8), *Discoaster hamatus* zone (NN9), *Minylitha convalis* zone (NN10), *Discoaster berggrenii* zone (NN11a), *Discoaster quinqueramus* zone (NN11b), *Ceratolithus spp.* zone (NN12), *Gephyrocasa spp.* zone (NN13) and it ranges from Middle Miocene to Early Pliocene. This zones were derived based on the First and Last occurrences of marker species as well as their relative abundance. Stratigraphic positioning was used to mark the top and the base of NN7and NN8 interval, since the boundary between the two can not be determined. The presence of *Ceratolithus spp.* at the upper part of BDX-2 marks the boundary of Miocene-Pliocene.

The two wells correlate with each other based on the related zones derived (Figure 5). The resulting biozonation has further helped to subdivide the Deep Offshore Niger Delta Neogene sequence into easily recognizable biostratigraphic units which will enhance oil exploration in the area.

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## **List of Figures**

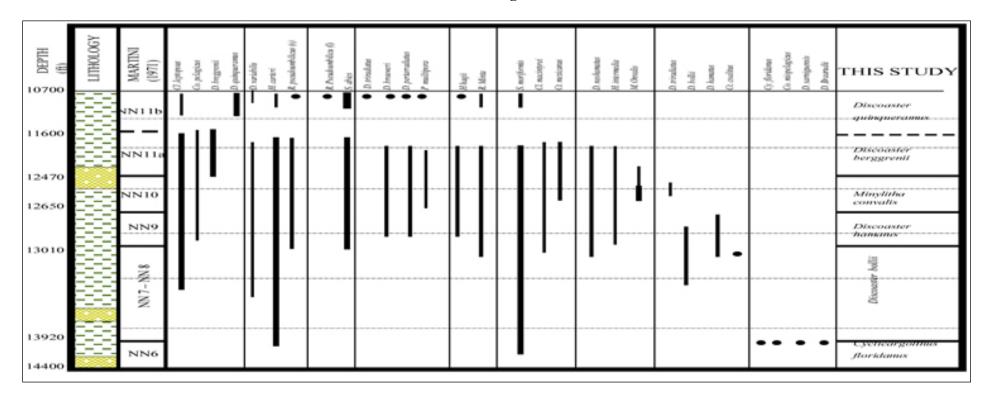


Figure 1. Nannofossil distribution of BDX-1 well.

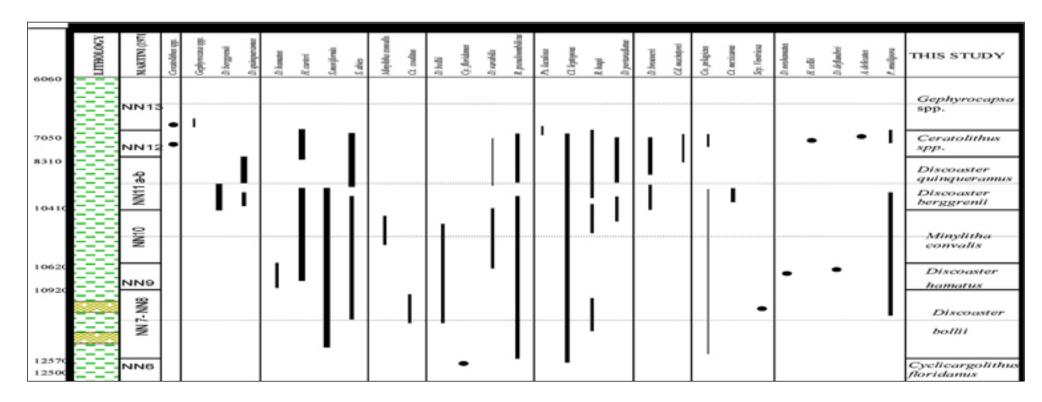


Figure 2. Nannofossil distribution of BDX-2 well.

OEPTH (ft)	LITHOLOGY	CHRONO	MARTINI (1971)	OKADA & BUKRY (1980)	THIS STUDY	ZONAL CHARATERISTICS / BIOEVENTS
10700		Міосепе	NNII	CN9	Discoaster quinqueramus  Discoaster	Top Catinaster mexicanus (7.8 Ma)  Top Catinaster mexicanus (7.8 Ma)
12470		Late Mio	NN 10	CN 8	berggrenii Minylitha	Base Discoaster berggrenii (8.6 Ma)  Top Discoaster bollii (9.1 Ma)
13010			NN 9	CN 7	Discoaster hamatus	Top Discoaster hamatus (9.4 Ma)
13920		Middle Miocene – Late Miocene	NN 7-NN 8	CN 5b – CN 6	Discoaster bollii	Base Discoaster hamatus (10.7 Ma)
14400		Middle Miocene	NN6	CN5a	Cyclicargoithus floridanus	Top Cyclicargolithus floridamus

Figure 3. Biozonation of BDX-1 well.

DELLH		CHRONO	MARTINI	OKADA &		
(ft)	LITHOLOGY	Epoch / Age	(1971)	BUKRY (1980)	THIS STUDY	ZONAL CHARACTERISTICS / BIOEVENT
6060					Gephyrocapsa	
		Early Pliocene	NN13	CN10c	spp	← Base Gephyrocapsa spp. (small)
7050		Late Miocene – Early Pliocene	NN12	CN10a-CN10b	Ceratolithus spp	← Presence of Ceratolithus spp.
8310					Discoaster quinqueramus	Top Discoaster quinqueramus (5.6 Ma)
9720		Miocene	NNII	CN9a – CN9b	Discoaster berggrenii	→ Dominance of Discoaster berggrenii over Discoaster quinqueramus  → Top Catinaster mexicanus (7.8 Ma)
10410		Late	NN10	CN8a – CN8b	convens	→ Base Discoaster berggrenii (8.6 Ma)  → Top Discoaster bollii (9.1 Ma)  → Top Discoaster hamatus (9.4 Ma)
11620			NN9	CN7a – CN7t	Discoaster hamatus	→ Base Discoaster hamatus (10.7 Ma)
11920		Middle Miocene- Late Miocene	NN7-NN8	CN5b -CN6	Discoaster bollii	Base Catinaster coalithus (11.3Ma) / Base Discoaster bollii
12570		Middle Miocene	NN 6	CN 5a	Cy. floridanus	← Top Cyclicargolithus floridamus
12630				7-17-17-17-7	. 12	

Figure 4. Biozonation of BDX -2 well.

Depth (ft)	Lithology	Martini (1971)	This Study	Correlation lines	This Study	Martini (1971)	Lithology	Depth (ft)
0700	====		D. quinqueramus		Gephyrocapsa spp.	NN13		6060 7050
1600		NNII	2x quaqueronus	D. quinqueramus zone  D. berggrenii	Ceratolithus spp.	NN12		7000
1600			D. berggrenii	queramus -				8310
2470				D. berggrenii zone	D. Quinquerames			
2650		NN10	M. Convalts	ggrenii z	•	NN11	<u> </u>	9720
		NN9	D. Hamatus	M. convais zone	D. Berggrenii			
3010	[=====			. namatus	M. Convalis	NN10	[	10410
		NN7-NN8	D. Bollii	D. hamatus zone  D. bollii zone	D. Hamatus	NN9		10620
3920				zone				10920
4400		NN6	Cy. Floridanus	Cv. floridanus zone	D. Bollii	NN7-NN8		
Base litho	logy			Joridanus 30				
ihale	크			zone	Cy. floridamis	NN6		12570
andstone	. 88							12630

Figure 5. Correlation table for BDX-1 and BDX-2 wells.

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