No5

PALEONTOLOGICAL STUDY OF THE STATOIL-ESSO 15/12-2 OFFSHORE NORWAY WELL

by

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Micropaleontological studies on this well were carried from 145 to 2924m (T.D.). Palynological slides were prepared from 1015 to 2924m (T.D.). Cores, SWC and cuttings were used in these studies. From this data we propose the following stratigraphic tops:

Micropaleontology	Top	Palynology
Pleistocene	145m	
Pleistocene-Pliocene	305m	
Pliocene	645m	
Late Miocene?	915m	
Late Miocene	995m	
	1015m	in Zone X
Middle Miocene	1085m	
Middle-Early Miocene	1225m	
Late Oligocene	1335m	
	1345m	Zone IX
	1545m	Zone VIII
Middle Oligocene	1595m	
Eocene C? and/or Middle Oligocene?	1615m	
Eocene C	1665m	Zone VII
Eocene B2	1885m	Zone VI
	2035m	Zone V
	2065m	Zone IV
	2081m	Zone III

Micropaleontology	Top	Palynology
Coscinodiscus sp.	2125m	Late to Middle Paleocene: Zone II
	2154m	Zone IB
	2174m	Zone IA2
Early Paleocene	2232m	Zone IA1
Late Cretaceous	2255m?	
Late Cretaceous (Santonian-Coniacian)	2495m	
	2657m	Aptian-Barremian
	2701m	Late Jurassic
	2735m	Early Portlandian-Kimmeridgian
	2823m	Kimmeridgian
	2880m	Permian
T.D.	2924m	T.D.

Stratigraphy

145m-275m. Pleistocene

Predominant species in this interval are the calcareous shallow water foraminifers *Cassidulina crassa, C. laevigata* and *Bulimina marginata.*

305m-625m. Pleistocene-Pliocene

Same species as above, but *Elphidium clavatum, E.* ex gr. *incertum* and *Protelphium orbiculare* become predominant. Same water depth as above.

645m-905m. Pliocene

Characterized by the presence of *Cibicides lobatulus grossa, Elphidium* sp. 16 and *Nonion barleeanum.* At 845m relatively abundant *Globigerina pachyderma.* Environment: shallow shelf.

915m-985m. Late Miocene?

The presence of few specimens of *Ammonia beccarii* in this interval

suggests that we have reached the top of the Miocene at 915m. However, in the absence of any of the other usual markers, we have decided to consider this top as questionable. Environment: shallow shelf.

995m-1075m. Late Miocene

Occurrence of several others Late Miocene foram markers, i.e., *Nonion elongatum, Sphaeroidina bulloides, Bolivina* aff. *punctata* and *Orbulina universa*. First processed palynological sample at 1015m in Zone X. Environment: middle shelf.

1085m-1215m. Middle Miocene

Elphidium inflatum and *Asterigerina staeschei* occur for the first time at 1085m. At 1175m radiolarians become abundant. Environment: middle to deep shelf.

1225m-1325m. Middle-Early Miocene

Increase of planktonic foraminifers, the most relevant being *Globigerinoides* ex. gr.*trilobus* and *Globorotalia* ex gr. *scitula*. At 1265m, occurrence of several *Coscinodiscus* (diatoms) species. Environment: deep shelf.

1335m-1575m. Late Oligocene

The top of the Oligocene is indicated by the presence of common arenaceous foraminifers among which the most significant is *Cyclammina?* aff. *pauciloculata*. *Glomospira charoides* has its first occurrence at 1445m and *Asterigerina guerichi* at 1475m. In this interval were found the tops of our palynological zones IX and VIII (1345 and 1545m, respectively). Environment: deep shelf.

1595m-1605m. Middle Oligocene

Rotaliatina bulimoides, a benthonic calcareous foraminifer, occurs for the first time at 1595m, indicating the top of the Middle Oligocene. Environment: deep shelf.

1615m-1655m. Eocene C? and/or Middle Oligocene?

In this interval the somewhat more consistent occurrence of *Glomospira*

charoides could indicate the Eocene C has been already encountered. However, since the top of our palynological Zone VII is only at 1665m, we could be still in the Middle Oligocene. Environment: deep shelf.

1665m-1875m. Eocene C

Based on the top of our palynological Zone VII at 1665m.

1885m-2115m. Eocene B2

Arenaceous foraminifers are still abundant in this interval. *Ammobaculites* sp. 11 occurs for the first time at 1885m. and *Bolivinopsis spectabilis* at 1965m. Tops of our palynological Zones VI, V, IV and III are at 1885, 2035, 2065 and 2081 meters, respectively. Environment: deep shelf.

2125m-2225m. Late to Middle Paleocene

Based on the top of the palynological Zone II at 2125m, which is now considered as the top Paleocene (see our paleo report EPR-E.WA7.76). Big pyritized *Coscinodiscus* sp. occurred for the first time at the same depth. This is anomalous since, in general, the top of *Coscinodiscus* is close or at the same level as the top of Zone III. Abundant *Bolivinopsis spectabilis* occur at 2135m. At 2154 and 2174 meters, tops of our palynological Zones IB and IA2. Environment: deep shelf.

2232m-2251m. Early Paleocene

In this interval small planktonic foraminifers are common. The presence of *Globorotalia compressa* together with *Globigerina daubjergensis* suggests that we are at the top of the Danian already at 2232m. The top of our palynological Zone IA1 is also at 2232m. Environment: deep shelf.

2255m?-2465m. Late Cretaceous

Very few specimens of *Rugoglobigerina* sp. are found from 2251m downwards and do not allow to place the Cretaceous-Tertiary boundary with certainty. The presence of *Globotruncana* ex gr. *fornicata* at 2318m confirms the presence of Late Cretaceous sediments at this level.

Environment: deep shelf.

2495m-2654m. Late Cretaceous (Santonian-Coniacian)

Santonian to Coniacian sediments are first encountered at 2495m where *Globotruncana* ex gr. *linneiana* is found for the first time. Environment: deep shelf.

2657m-2687m. Aptian-Barremian

The presence of the calcareous benthonic foraminifers *Gavelinella intermedia* and *G. barremiana*, together with common specimens of *Hedbergella* spp. suggests an Aptian-Barremian age for this interval.

JF:mc1
Aug. 2, 1976

PROPRIETARY
EXPLORESSO

STATOIL - ESSO 15/12-2

LOG II

SCALE: 1/2000

No 5

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EXPLANATION

Sidewall core M: processed for foraminifers
" " P: " " palynology
" " C: " " coccoliths

DEPTH IN meters	DEPTH IN feet
50	100', 200'
100	300', 400'
150	500'
200	
300	1000'
400	
500	1500'
600	2000'
700	
800	2500'
900	3000'
1000	
1100	3500'
1200	4000'
1300	
1400	4500'
1500	5000'
1600	
1700	5500'
1800	6000'
1900	
2000	6500'
2100	7000'
2200	
2300	7500'
2400	8000'
2500	
2600	8500'
2700	9000'
2800	
2900	9500'
3000	10 000'

SAMPLES

Cores: C.1 2823,0m – 2835.5m

swc: 1885m MP, 1932m MP, 1972m MP, 2010m MP, 2052m MP, 2061m MP, 2081m MP, 2125m MP, 2154m MP, 2174m MP, 2194m MP, 2207m MP, 2232m MP, 2236m M, 2275m M, 2335m M, 2343m M, 2360m M, 2390m M, 2420m M, 2430m P, 2495m M, 2526m P, 2530m MP, 2541m M, 2555m M, 2585m P, 2615m M, 2645m MP, 2651m MP, 2663m MP, 2671m P, 2695m P, 2701m P, 2705m MP, 2735m MP, 2755m MP, 2766m MP, 2789m MP, 2813m P, 2822m M, 2844m P, 2854m P, 2869m P, 2876m MP, 2880m MP, 2884m M, 2890m P, 2902m P, 2913m MP

AGE and **PALEONTOLOGICAL SUBDIVISION – FORAMINIFERA OSTRACODS**

Depth	AGE	FORAMINIFERA OSTRACODS
	NO SAMPLES	
145m	PLEISTOCENE	Cassidulina crassa C. laevigata Bulimina marginata
305m	PLEISTOCENE — PLIOCENE	Elphidium clavatum E. ex gr. incertum Protelphidium orbiculare
645m	PLIOCENE	Cibicides lobatulus grossa
825m		Elphidium sp. 16 Globigerina spp.
915m	LATE MIOCENE ?	Ammonia beccarii
995m	LATE MIOCENE	Nonion elongatum
1085m	MIDDLE MIOCENE	Elphidium inflatum Asterigerina staeschei
1175m		Abundant radiolarians
1225m	MIDDLE - EARLY MIOCENE	Globigerinoides ex gr. trilobus Globorotalia scitula
1335m	LATE OLIGOCENE	Arenaceous forams Cyclammina sp.
1595m	MIDDLE OLIGOCENE	Rotaliatina bulimoides
1615m	EOCENE C? and/or MIDDLE OLIGOCENE ?	Glomospira charoides
1665m	EOCENE C	
1885m	EOCENE B2	Ammobaculites sp. 11
1965m		Bolivinopsis spectabilis
2125m	LATE TO MIDDLE PALEOCENE	Coscinodiscus sp.
2135m		Bolivinopsis spectabilis (very abundant)
2232m	EARLY PALEOCENE	Small globigerinids
2255m ? ? ? ?	LATE CRETACEOUS	Rugoglobigerina spp.
2495m	LATE CRETACEOUS (SANTONIAN - CONIACIAN)	Globotruncana ex gr. linneiana
2657m	APTIAN - BARREMIAN	
2666m		Gavelinella intermedia G. barremiana
2701m	LATE JURASSIC	
2735m	EARLY PORTLANDIAN — KIMMERIDGIAN	Barren
2823m	KIMMERIDGIAN	
2880m	PERMIAN	
2924m T.D.		

SPORES-POLLEN DINOFLAGELLATES

Depth	Zone
1015m	X
1345m	IX
1545m	VIII
1665m	VII
1885m	VI
2035m	V
2065m	IV
2081m	III
2125m	II
2154m	IB
2174m	IA2
2232m	IA1

RELATIVE WATER DEPTH

REMARKS

1015m. First palynological sample in Zone X. Top of Zone X indeterminate.