

25. DIATOM OCCURRENCES, DEEP SEA DRILLING PROJECT SITE 604¹

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Site 604, from the uppermost continental rise 100 mi. southeast of Atlantic City, New Jersey, was investigated for diatoms, utilizing the processing methods of Abbott (1978). Most of this assemblage is poorly preserved and appears to be reworked from Miocene and Eocene deposits. Species found are listed in Table I.

The interval between Cores 604-4 and 604-22 contains both Eocene forms like *Brightwellia hyperborea* and *Triceratium barbadense*, Miocene forms like *Actinocyclus ingens* var. *nodus* (middle Miocene), *Bruniopsis mirabilis*, and *Coscinodiscus lewisiensis* (middle Miocene), and Miocene/Pliocene forms like *Coscinodiscus temporei* (middle Miocene to early Pliocene) and *Nitzschia reinholdii* (late Miocene to Pliocene). The assemblage suggests a late Miocene to Pliocene age, with middle Miocene and Eocene reworking. Nannoplankton studies (Lang and Wise, this volume) place this entire interval in the Pliocene and Quaternary.

Diatom diversity increases in Core 604-23. Although many of these species are again the result of Eocene and Miocene reworking, *Raphoneis fusus* appears for the first time in this interval. This species was described by Andrews (1980) from the Petersburg diatomites of Virginia, which are probably uppermost Miocene or lower Pliocene. On this basis, an early Pliocene to late Miocene age is suggested for the interval. Nannoplankton studies (Lang and Wise, this volume) suggest that Cores 604-23 and 604-24 are within the lower Pliocene and Core 604-25 within the upper Miocene, giving credibility to the assigned diatom age.

Cores 604-26 through 604-30 have a mixture of Miocene and Eocene diatoms similar to the intervals just described. An increase in the concentration of the Miocene forms, combined with the overall character of this assemblage, suggests that this interval is probably no older than middle Miocene. Nannoplankton studies (Lang and Wise, this volume) indicate the presence of both middle and late Miocene species.

TAXONOMIC LIST

Diatoms

- Actinocyclus ehrenbergii* Ralfs in Pritchard, 1861
A. ellipticus Grunow in Heurck, 1881
A. ingens Rattray, 1890
A. ingens var. *nodus* Baldauf and Barron, 1980
Actinoptychus senarius Ehrenberg, 1838
A. splendens Ralfs in Pritchard, 1861
Biddulphia rhombus (Ehrenberg) W. Smith, 1856

- Brightwellia hyperborea* Grunow, 1883
Bruniopsis mirabilis (Brun) Karsten, 1928
Cocconeis placentula Ehrenberg, 1838
Coscinodiscus lewisiensis Greville, 1866
C. marginatus Ehrenberg, 1841
C. nitidus Gregory, 1857
C. nodulifer Schmidt, 1878
C. oculus-iridis Ehrenberg, 1840
C. perforatus Ehrenberg, 1844
C. praenitidus Fenner, 1977
C. rothii (Ehrenberg) Grunow in Schneider, 1878
C. superbus Hardman, 1889
C. temporei Brun in Brun and Tempère, 1889
C. temporei var. *delicata* Barron, 1981
C. vetustissimus Pantocsek, 1886
C. yabei Kanaya, 1959
Craspedodiscus coscinodiscus Ehrenberg, 1844
Cymatogonia amblyoceros (Ehrenberg) Hanna, 1932
Delphineis biseriata (Grunow) Andrews, 1979
D. novaeacaesareae (Kain and Schultze) Andrews, 1977
D. ovata Andrews, 1977
D. penelliptica Andrews, 1977
D. surirella (Ehrenberg) Andrews, 1979
Denticulopsis hustedtii Simonsen and Kanaya, 1961
D. norgwegica Schrader in Schrader and Fenner, 1976
Diploneis crabro Ehrenberg, 1844
D. elliptica Cleve, 1894
Eunotogramma weissi var. *producta* (Grove and Sturt, 1887)
Goniothecium odontella Ehrenberg, 1844
Hemiaulus curvatus Strelnikova, 1971
H. polycystinorum Ehrenberg, 1854
H. polymorphus Grunow, 1884
Hemidiscus ovalis Lohman, 1938
Hyalodiscus scoticus Grunow, 1879
Melosira architecturalis Brun, 1893
M. granulata (Ehrenberg) Ralfs in Pritchard, 1861
M. ornata Grunow, 1884
M. rossica Mills, 1934
M. westii Smith, 1856
Navicula constricta Ehrenberg, 1838
N. directa (Smith) Ralfs in Pritchard, 1861
N. kennedyii Smith, 1856
N. praetexta Ehrenberg, 1840
Nitzschia marina Cleve and Grunow, 1880
N. miocenica Burckle, 1972
N. reinholdii Kanaya and Koizumi, 1970
Paralia sulcata (Ehrenberg) Cleve, 1873
Pseudodimerogramma elegans Schrader and Fenner, 1976
Pseudopodosira bella Gleser and Posnova, 1964
P. wittii Vechina, 1961
Pseudopyxilla americana (Ehrenberg) Forti, 1909
Pyxilla (Pseudopyxilla) dubia (Grunow) Forti, 1909
P. gracilis Forti, 1909
P. prolongata Brun, 1893
Raphidodiscus marylandicus Christian, 1887
Raphoneis diamantella Andrews, 1975
R. fusus Andrews
R. gemmifera Ehrenberg, 1844
R. parilis Hanna, 1932
R. petropolitana (Grunow) Pantocsek, 1886
R. scalaris Ehrenberg, 1845
Rhizosolenia barboi Brun, 1894
R. styliformis Brightwell, 1858

¹ van Hinte, J. E., Wise, S. W., Jr., et al., *Init. Repts. DSDP*, 93: Washington (U.S. Govt. Printing Office).

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Table 1. Diatom occurrences at Site 604.

| Core-Section (interval in cm) | <i>Actinocyclus ehrenbergii</i> | <i>A. ellipticus</i> | <i>A. ingens</i> | <i>A. ingens</i> var. <i>nodus</i> | <i>Actinopychus senarius</i> | <i>A. splendens</i> | <i>Bidulphia rhombus</i> | <i>Brightwellia hyperborea</i> | <i>Bruniopsis minibialis</i> | <i>Cocconeis placenta</i> | <i>Cosmodiscus lewisiensis</i> | <i>C. marginatus</i> | <i>C. nitidus</i> | <i>C. nodulifer</i> | <i>C. oculus-iridis</i> | <i>C. perforatus</i> | <i>C. praenitidus</i> | <i>C. rothii</i> | <i>C. aff. superbus</i> | <i>C. temporei</i> | <i>C. temporae</i> var. <i>delicata</i> | <i>C. vetustissimus</i> | <i>C. yabei</i> | <i>C. spp.</i> | <i>Craspedodiscus cosciodiscus</i> | <i>Cymatogena amblycerosa</i> | <i>Delphineis biserrata</i> | <i>D. nonoculata</i> | <i>D. ovalia</i> | <i>D. penelliptica</i> | <i>D. sartorii</i> | <i>Denticulopsis hastedii</i> | <i>D. norvegica</i> | <i>Diploneis crabro</i> | <i>D. elliptica</i> | <i>D. spp.</i> | <i>Eunogramma weissi</i> var. <i>producta</i> | <i>Goniothecium odontella</i> | <i>Gyrosigma sp.</i> | <i>Henniaulus curvula</i> | <i>H. polycystinorum</i> | <i>H. polymorphus</i> | <i>Henniaulus sp.</i> | <i>Hemidiscus ovalis</i> | <i>Hyalodiscus scoticus</i> | <i>Melosira architecturalis</i> | <i>M. granulata</i> | <i>M. ornata</i> | <i>M. rotisca</i> |
|----------------------------------|---------------------------------|----------------------|------------------|------------------------------------|------------------------------|---------------------|--------------------------|--------------------------------|------------------------------|---------------------------|--------------------------------|----------------------|-------------------|---------------------|-------------------------|----------------------|-----------------------|------------------|-------------------------|--------------------|---|-------------------------|-----------------|----------------|------------------------------------|-------------------------------|-----------------------------|----------------------|------------------|------------------------|--------------------|-------------------------------|---------------------|-------------------------|---------------------|----------------|---|-------------------------------|----------------------|---------------------------|--------------------------|-----------------------|-----------------------|--------------------------|-----------------------------|---------------------------------|---------------------|------------------|-------------------|
| 4, CC | 5 | | | | 18 | 1 | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-1, 50-54 | 7 | 3 | 4 | 16 | | 1 | 1 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-3, 30-32 | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-1, 50-54 | 1 | 1 | 10 | 2 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-1, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-3, 50-54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-1, 110-12 | 1 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-3, 50-54 | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-1, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15-3, 50-54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17-3, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18-3, 50-54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19-1, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-1, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-2, 50-54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-2, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-4, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22-5, 50-54 | 1 | | 1 | 1 | 1 | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-1, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-2, 30-31 | 1 | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-4, 50-54 | 3 | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24-1, 10-12 | | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-3, 30-31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-4, 50-54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-1, 4-5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-2, 53-54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-3, 30-32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26-4, F | | | 8 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-1, S | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-1, 30-31 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note: Nos. indicate actual no. of specimens in the slide examined.

Rossiella paleacea (Grunow) Schrader, 1974*R. praepaleacea* Schrader, 1974*Sceptroneis grandis* Abbott and Ernisse, 1983*Stephanopyxis grunowii* Grove and Sturt in Schmidt, 1888*S. turris* Ralfs in Pritchard, 1861*Synedra jouseana* Sheshukova-Poretskaya, 1962*Thalassionema nitzschiooides* Grunow in Heurck, 1881*Thalassiosira antiqua* Cleve-Euler, 1951*T. eccentrica* (Ehrenberg) Cleve, 1903*T. lineatus* Ehrenberg, 1838*T. zabelinae* Jousé, 1959*Thalassiothrix longissima* Cleve and Grunow, 1880*Trachyneis aspera* (Ehrenberg) Cleve, 1894*Triceratium barbadense* Greville, 1861*T. brachiatum* Brightwell, 1856*T. schulzii* Jousé, 1949**Silicoflagellates***Corbisema triacantha* (Ehrenberg) Hanna, 1932*Dictyocha ausonia* Deflandre, 1950*Distephanus staurocanthus* Ehrenberg, 1845*Mesocena circulus* (Ehrenberg) Lemmermann, 1901*Naviculopsis constricta* Schulz, 1928**ACKNOWLEDGMENTS**

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