The data presented here represent age determinations made by means of calcareous nannofossils on sediment cores recovered in the Atlantic Ocean during Leg 3 of the Deep Sea Drilling Project. All of the determinations were made with a light microscope on smear slides prepared from unprocessed samples.

The accuracy of the age determination differs from one sample to the next, owing largely to the differences in assemblages. Assemblages containing age diagnostic species are readily assignable to a zone. Some samples, however, contain few or no age diagnostic species. In such cases relatively broader age assignments are made which are commonly equivalent to the interval represented by a stage. Stage terms are avoided here as it seems more reasonable to use such terms as upper Miocene or middle Eocene than to refer to one or another stage term used for the respective intervals.

In no case is an exhaustive species list given for a sample. For the most part only those species are recorded which actually aid in the age determination of a sample. It should be stressed that these results are preliminary, and, therefore, subject to minor revisions if more detailed studies are made.

Hole 13

Sample 3-13-1-1, 1 cm:
*Discoaster pentaradiatus; Pseudoemiliania lacunosa; Discoaster brouweri; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri.*
Age: Late Pliocene.

Sample 3-13-1-2, 1 cm:
*Pseudoemiliania lacunosa; Gephyrocapsa sp.; Discoaster pentaradiatus; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri.*
Age: Late Pliocene; probably contaminated.

Sample 3-13-1-3, 2 cm:
*Pseudoemiliania lacunosa; Helicopontosphaera kamptneri; Discoaster pentaradiatus; Gephyrocapsa sp.; Cyclococcolithus leptoporus; Discoaster brouweri.*
Age: Late Pliocene; probably contaminated.

Sample 3-13-1-4, 1 cm:
*Discoaster pentaradiatus; Pseudoemiliania lacunosa; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri; Discoaster brouweri; Ceratolithus rugosus.*
Age: Late Pliocene.

Sample 3-13-1-5, 2-3 cm:
*Pseudoemiliania lacunosa; Discoaster pentaradiatus; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri; Discoaster brouweri.*
Age: Late Pliocene.

Sample 3-13-1-6, 3-4 cm:
Barren of calcareous nannofossils.

Sample 3-13-2-1, 30 cm:
*Discoaster pentaradiatus; Discoaster brouweri; Ceratolithus cf. C. cristatus; Helicopontosphaera kamptneri; Pseudoemiliania lacunosa; Cyclococcolithus leptoporus.*
Age: Late Pliocene.

Sample 3-13-2-2, 1-2 cm:
*Discoaster pentaradiatus; Helicopontosphaera kamptneri; Cyclococcolithus leptoporus; Pseudoemiliania lacunosa.*
Age: Late Pliocene.

Sample 3-13-2-3, 1-2 cm:
*Cyclococcolithus leptoporus; Discoaster pentaradiatus; Discoaster brouweri; Ceratolithus cf. C. cristatus; Discoaster brouweri; Ceratolithus rugosus.*
Age: Pliocene; probably middle.

Sample 3-13-2-4, 5-6 cm:
Barren of calcareous nannofossils.

Sample 3-13-2-5, 4-5 cm:
Barren of calcareous nannofossils.

Sample 3-13-3-1, 67-68 cm:
Barren of calcareous nannofossils.

Sample 3-13-3-2, 5-6 cm:
Barren of calcareous nannofossils.

Sample 3-13-3-3, 3-4 cm:
Barren of calcareous nannofossils.

Sample 3-13-3-4, 4-5 cm:
Barren of calcareous nannofossils.
Sample 3-13-3-5, 5-6 cm:
Barren of calcareous nannofossils.

**Hole 13A**

Sample 3-13A-1-1, 119-120 cm:
*Discoaster barbadiensis; Reticulofenestra umbilica*; aff. *Chiplagnum lithus quadratus.*
Age: Middle Eocene.

Sample 3-13A-2-1, 80-81 cm:
*Cretarhabdus conicus; Cribrosphaera ehrenbergii; Microrhabdus decoratus; Arkhangelskia cymbiformis; Maslovella barnesae; Micula; Prediscosphaera cretacea; Zygodiscus elegans; Lithraphidites carniolensis; Eiffellithus turrisifelf.*
Age: Upper Cretaceous, probably Campanian.

Sample 3-13A-3-1, 101-102 cm:
As above.

Sample 3-13A-3-2, 5-6 cm:
As above.

Sample 3-13A-3-3, 4-5 cm:
As above.

Sample 3-13A-3-4, 5-6 cm:
As above.

Sample 3-13A-4-1, 39-40 cm:
As above, but very poor assemblage.

Sample 3-13A-5-1, 33-34 cm:
As above.

Sample 3-13A-6-4, core catcher:
Barren of calcareous nannofossils.

Sample 3-13A-7-1, 89-90 cm:
*Coccolithus* sp.; unidentifiable placoliths, corroded.
Age: Indeterminable.

**Hole 14**

Sample 3-14-1A-1, 53-54 cm:
*Sphenolithus belennos; Coccolithus neogammation; Discoaster deflandrei; cf. Cyclococcolithus leptoporus.*
Age: Miocene; *Sphenolithus belennos* Zone.

Sample 3-14-1A-2, 7-8 cm:
*Coccolithus neogammation; Sphenolithus belennos; Cyclolithella rotunda.*
Age: As above.

Sample 3-14-1A-3, 1-2 cm:
*Coccolithus neogammation; Discoaster obtusus; Cyclolithella rotunda; cf. Discoaster druggii; Sphenolithus moriformis; Sphenolithus belemnos.*
Age: Early Miocene; probably pre-*Sphenolithus belemnos* Zone.

Sample 3-14-1A-4, 24-25 cm:
*Coccolithus neogammation; Discoaster druggii; Cyclolithella rotunda; Sphenolithus moriformis; Discoaster obtusus.*
Age: As above.

Sample 3-14-1A-5, 4-5 cm:
*Coccolithus neogammation; Sphenolithus moriformis; Discoaster druggii; aff. Sphenolithus belennos; Cyclolithella rotunda; diagnostic fossils lacking.*
Age: Late Oligocene to early Miocene.

Sample 3-14-1A-6:
*Coccolithus neogammation; Sphenolithus moriformis; Cyclolithella rotunda.*
Age: As above.

Sample 3-14-2-1, 1-2 cm:
*Coccolithus neogammation; Sphenolithus moriformis; Cyclolithella rotunda; Reticulofenestra* sp.
Age: Probably late Oligocene.

Sample 3-14-2-2, 1-2 cm:
As above.

Sample 3-14-2-3, 1-2 cm:
As above.

Sample 3-14-2-4, 2-3 cm:
As above.

Sample 3-14-2-5, 1-2 cm:
As above.

Sample 3-14-3-1, 5-6 cm:
*Coccolithus neogammation; Reticulofenestra scissura; Cyclolithella rotunda; Sphenolithus moriformis; Sphenolithus ciperoensis.*
Age: Oligocene; *Sphenolithus ciperoensis* Zone.

Sample 3-14-3-2, 5-6 cm:
*Sphenolithus ciperoensis; Coccolithus neogammation; Reticulofenestra scissura.*
Age: As above.

Sample 3-14-3-3, 6-7 cm:
As above.

Sample 3-14-3-4, 5-6 cm:
As above.

Sample 3-14-3-5, 5-6 cm:
As above.

Sample 3-14-3-6, 5-6 cm:
As above.

Sample 3-14-1A-3, 1-2 cm:
*Coccolithus neogammation; Discoaster obtusus; Cyclolithella rotunda; cf. Discoaster druggii; Sphenolithus moriformis; Sphenolithus belemnos.*
Age: Early Miocene; probably pre-*Sphenolithus belemnos* Zone.
Sample 3-14-4-1, 10-11 cm:
Coccolithus neogammation; Sphenolithus ciperoensis;
Reticulofenestra scissura; Sphenolithus moriformis;
Sphenolithus distentus.
Age: Oligocene; probably Sphenolithus ciperoensis Zone.

Sample 3-14-4-2, 88-89 cm:
As above.

Sample 3-14-4-3, 10-11 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Sphenolithus distentus.
Age: Middle Oligocene; Sphenolithus distentus Zone.

Sample 3-14-5-1, 5-6 cm:
Coccolithus neogammation; Sphenolithus distentus;
Reticulofenestra scissura.
Age: Oligocene; Sphenolithus distentus Zone.

Sample 3-14-5-2, 5-6 cm:
Coccolithus neogammation; Reticulofenestra scissura;
Sphenolithus moriformis; Sphenolithus distentus.
Age: Oligocene; Sphenolithus distentus Zone.

Sample 3-14-5-3, 8-9 cm:
Reticulofenestra scissura; Coccolithus neogammation;
cf. Helicopontosphaera compacta; Sphenolithus disten-
tus; Sphenolithus moriformis; Cyclolithella rotunda.
Age: Oligocene; Sphenolithus distentus Zone.

Sample 3-14-5-4, 7-8 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Sphenolithus moriformis; Sphenolithus distentus; Sphe-
nolithus pseudoradians; Sphenolithus predistentus.
Age: Oligocene; probably Sphenolithus predistentus Zone.

Sample 3-14-5-5, 5-6 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Sphenolithus moriformis; Sphenolithus predistentus;
Cyclolithella rotunda; Helicopontosphaera compacta.
Age: As above.

Sample 3-14-5-6, 5-6 cm:
Coccolithus neogammation; Reticulofenestra scissura;
Sphenolithus pseudoradians; Cyclolithella rotunda.
Age: As above.

Sample 3-14-6-1, 20-21 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Sphenolithus moriformis; Sphenolithus predistentus;
Cyclolithella rotunda; Helicopontosphaera compacta.
Age: As above.

Sample 3-14-6-2, 5-6 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Sphenolithus moriformis; Sphenolithus predistentus;
Sphenolithus distentus.
Age: As above.

Sample 3-14-6-3, 5-6 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Sphenolithus predistentus; Sphenolithus moriformis;
cf. Discoaster tani; Helicopontosphaera compacta.
Age: As above.

Sample 3-14-6-4, 4-5 cm:
Sphenolithus predistentus; Coccolithus neogammation;
Reticulofenestra scissura; Cyclolithella rotunda.
Age: As above.

Sample 3-14-6-5, 4-5 cm:
Coccolithus neogammation; Reticulofenestra scissura;
Sphenolithus predistentus.
Age: As above.

Sample 3-14-6-6, 5-6 cm:
Coccolithus neogammation; Reticulofenestra scissura;
Helicopontosphaera compacta; Sphenolithus preden-
tus; cf. Discoaster tani.
Age: As above.

Sample 3-14-7-1, 5-6 cm:
Sphenolithus predistentus; Coccolithus neogammation;
Discoaster tani; Reticulofenestra scissura.
Age: As above.

Sample 3-14-7-2, 4-5 cm:
Coccolithus neogammation; Sphenolithus pseudoradi-
dans; Sphenolithus predistentus; Reticulofenestra scis-
sura; Discoaster tani; cf. Sphenolithus distentus.
Age: As above.

Sample 3-14-7-3, 5-6 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Sphenolithus pseudoradians; aff. Zygrhablithus bijugatus.
Age: As above.

Sample 3-14-7-4, 5-6 cm:
Discoaster tani; Reticulofenestra scissura; Coccolithus
neogammation; Sphenolithus predistentus; Helicopont-
osphaera compacta; aff. Zygrhablithus bijugatus.
Age: As above.

Sample 3-14-7-5, 5-6 cm:
Sphenolithus predistentus; Coccolithus neogammation;
Reticulofenestra scissura; Discoaster tani; cf. Zygrhab-
lithus bijugatus.
Age: As above.

Sample 3-14-7-6, 4-5 cm:
Reticulofenestra scissura; Coccolithus neogammation;
Reticulofenestra umbilica; cf. Zygrhablithus bijugatus; Helicopontosphaera compacta; Discoaster tani; Sphenolithus predistentus; Sphenolithus pseudoradians.
Age: As above.

Sample 3-14-8-1, 5-6 cm:
Sphenolithus distentus; Coccolithus neogammation; Sphenolithus predistentus; Reticulofenestra scissura; Sphenolithus pseudoradians; cf. Zygrhablithus bijugatus; Bramletteius serraculoides.
Age: As above.

Sample 3-14-8-2, 5-6 cm:
Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus distentus; cf. Zygrhablithus bijugatus; Sphenolithus pseudoradians; Chiasmolithus oamaruensis; Discoaster tani.
Age: Probably early Oligocene.

Sample 3-14-8-3, 8-9 cm:
Bramletteius serraculoides; Reticulofenestra scissura; Coccolithus neogammation; Discoaster tani; Sphenolithus distentus; cf. Zygrhablithus bijugatus; Sphenolithus pseudoradians; Cyclococcolithus lusitanicus; Sphenolithus pseudoradians.
Age: Early Oligocene; Helicopontosphaera reticulata Zone.

Sample 3-14-8-5, 5-6 cm:
Coccolithus neogammation; Bramletteius serraculoides; Reticulofenestra scissura; Cyclococcolithus lusitanicus; Discoaster tani; Reticulofenestra umbilica; Helicopontosphaera reticulata; Sphenolithus predistentus.
Age: Early Oligocene; Helicopontosphaera reticulata Zone.

Sample 3-14-8-6, 148-150 cm:
Reticulofenestra umbilica; Reticulofenestra scissura; Bramletteius serraculoides; Coccolithus neogammation; Cyclococcolithus lusitanicus; Hayella situiformis; Discoaster tani; Sphenolithus pseudoradians; cf. Zygrhablithus bijugatus.
Age: Early Oligocene or late Eocene.

Sample 3-14-9-2, 12-13 cm:
Reticulofenestra scissura; Cyclococcolithus lusitanicus; Coccolithus neogammation; Bramletteius serraculoides; cf. Zygrhablithus bijugatus; Hayella situiformis; Reticulofenestra umbilica; Sphenolithus pseudoradians.
Age: As above.

Sample 3-14-9-3, 148-150 cm:
Sphenolithus pseudoradians; Reticulofenestra scissura; Cyclococcolithus lusitanicus; Bramletteius serraculoides; Reticulofenestra umbilica; Discoaster tani; Sphenolithus predistentus; Hayella situiformis.
Age: As above.

Sample 3-14-9-4, 30-31 cm:
Zygrhablithus bijugatus; Bramletteius serraculoides; Cyclococcolithus lusitanicus; Discoaster tani; Reticulofenestra scissura; Reticulofenestra umbilica; Coccolithus neogammation; Sphenolithus predistentus; Hayella situiformis; Helicopontosphaera compacta.
Age: As above.

Sample 3-14-9-5, 16-17 cm:
Reticulofenestra scissura; Coccolithus neogammation; Cyclococcolithus lusitanicus; Bramletteius serraculoides; Reticulofenestra umbilica; Helicopontosphaera reticulata; Hayella situiformis; Sphenolithus pseudoradians; Zygrhablithus bijugatus; cf. Isthmolithus recurvus; Discoaster tani; Sphenolithus predistentus.
Age: As above.

Sample 3-14-9-6, 10-11 cm:
Reticulofenestra scissura; Coccolithus neogammation; Reticulofenestra umbilica; Cyclococcolithus lusitanicus; Sphenolithus pseudoradians; Discoaster tani.
Age: As above.

Hole 15
Sample 3-15-1-1, 5-6 cm:
Gephyrocapsa sp.; Helicopontosphaera kamptneri; Cyclococcolithus leptoporus; Reticulofenestra pseudoumbilica; Discoaster sp.; Pseudoemiliania lacunosa; Oolithotus antillarum; Sphenolithus abies; Reticulofenestra cf. R. scissura.
Age: Sample badly mixed and includes Pleistocene, Neogene, and Tertiary elements.

Sample 3-15-1-2, 5-6 cm:
Helicopontosphaera kamptneri; Gephyrocapsa sp.; Pseudoemiliania lacunosa; Cyclococcolithus leptoporus.
Age: Quaternary, probably middle Pleistocene.

Sample 3-15-1-3, 8-9 cm:
Pseudoemiliania lacunosa; Gephyrocapsa sp.; Oolithotus antillarum; Helicopontosphaera kamptneri; Umbilicosphaera mirabilis; Cyclococcolithus leptoporus.
Age: Quaternary, probably early to middle Pleistocene.

Sample 3-15-1-4, 4-5 cm:
Pseudoemiliania lacunosa; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri; Umbilicosphaera mirabilis; Gephyrocapsa sp.; Oolithotus antillarum.
Age: As above.

Sample 3-15-1-5, 5-6 cm:
Pseudoemiliania lacunosa; Gephyrocapsa caribbeanica; Cyclococcolithus leptoporus.
Age: As above.

Sample 3-15-1-6, 4-5 cm:
Pseudoemiliania lacunosa; Gephyrocapsa caribbeanica;
Helicopontosphaera kamptneri; Cyclococcolithus leptoporus.
Age: As above.

Sample 3-15-2-1, 5-6 cm:
Pseudoemiliania lacunosa; Helicopontosphaera kamptneri; Cyclococcolithus leptoporus.
Age: Quaternary; early Pleistocene.

Sample 3-15-2-7, 6-7 cm:
Pseudoemiliania lacunosa; Discoaster sp.; Oolithotus antillarum; Discoaster brouweri rutellus; Discoaster brouweri; Umbilicosphaera mirabilis.
Age: Late Pliocene.

Sample 3-15-2-3, 5-6 cm:
Pseudoemiliania lacunosa; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri; Discoaster brouweri.
Age: As above.

Sample 3-15-2-4, 5-6 cm:
Pseudoemiliania lacunosa; Cyclococcolithus leptoporus; Discoaster brouweri; Helicopontosphaera kamptneri.
Age: As above.

Sample 3-15-2-5, 10-11 cm:
Pseudoemiliania lacunosa; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri; Discoaster brouweri.
Age: As above.

Sample 3-15-2-6, 5-6 cm:
Pseudoemiliania lacunosa; Cyclococcolithus leptoporus; Discoaster brouweri; Helicopontosphaera kamptneri; Ceratolithus sp.
Age: Middle Pliocene.

Sample 3-15-3-1, 5-6 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Cyclococcolithus leptoporus; Helicopontosphaera kamptneri; Ceratolithus sp.
Age: Middle Pliocene.

Sample 3-15-3-2, 8-9 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Cyclococcolithus leptoporus; Discoaster pentaradiatus; Helicopontosphaera kamptneri.
Age: As above.

Sample 3-15-3-3, 5-6 cm:
Cyclococcolithus leptoporus; Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; Ceratolithus rugosus; Ceratolithus tricorniculatus.
Age: Early to middle Pliocene.

Sample 3-15-3-4, 5-6 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; Cyclococcolithus leptoporus; Sphenolithus abies.
Age: Early Pliocene.

Sample 3-15-3-5, 6-7 cm:
Reticulofenestra pseudoumbilica; Ceratolithus rugosus; Discoaster pentaradiatus; Discoaster brouweri; Cyclococcolithus leptoporus; Sphenolithus abies.
Age: As above.

Sample 3-15-3-6, 4-5 cm:
Reticulofenestra pseudoumbilica; Cyclococcolithus leptoporus; Discoaster pentaradiatus; Discoaster brouweri; Sphenolithus abies.
Age: As above.

Sample 3-15-4-1, 6-7 cm:
Cyclococcolithus leptoporus; Discoaster pentaradiatus; Discoaster brouweri; Sphenolithus abies; Reticulofenestra pseudoumbilica; Discoaster surculus; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-15-4-2, 10-11 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; cf. Discoaster variabilis; Cyclococcolithus leptoporus; Ceratolithus tricorniculatus; Sphenolithus abies.
Age: As above.

Sample 3-15-4-3, 5-6 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; Cyclococcolithus leptoporus; Sphenolithus abies; cf. Discoaster variabilis; Ceratolithus rugosus.
Age: As above.

Sample 3-15-4-4, 5-6 cm:
Discoaster pentaradiatus; Reticulofenestra pseudoumbilica; Cyclococcolithus leptoporus; Discoaster brouweri; Sphenolithus abies; Ceratolithus rugosus; Discoaster extensus.
Age: As above.

Sample 3-15-4-5, 5-6 cm:
Discoaster pentaradiatus; Discoaster brouweri; Reticulofenestra pseudoumbilica; Cyclococcolithus leptoporus; Sphenolithus abies; Discoaster extensus; Ceratolithus rugosus; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-15-4-6, 4-5 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; Discoaster variabilis; Cyclococcolithus leptoporus; Ceratolithus tricorniculatus; Sphenolithus abies; Discoaster extensus.
Age: Early Pliocene or late Miocene (Messinian).

Sample 3-15-5-1, 5-6 cm:
Discoaster brouweri; Discoaster variabilis; Cyclococcolithus leptoporus; Discoaster pentaradiatus.
Age: As above.
Sample 3-15-5-2, 4-5 cm:
Discoaster variabilis; Discoaster brouweri; Cyclococcolithus leptoporus; Discoaster pentaradiatus.
Age: Probably as above.

Sample 3-15-5-3, 5-6 cm:
Cyclococcolithus leptoporus; Discoaster brouweri; Discoaster variabilis; Discoaster extensus; Discoaster pentaradiatus.
Age: Probably as above.

Sample 3-15-5-4, 5-6 cm:
Discoaster brouweri; Cyclococcolithus leptoporus; Discoaster extensus; cf. Reticulofenestra pseudoumbilica.
Age: Probably as above.

Sample 3-15-5-5, 5-6 cm:
Discoaster brouweri; Discoaster variabilis; Cyclococcolithus leptoporus; Discoaster extensus; Discoaster pentaradiatus.
Age: As above.

Sample 3-15-5-6, 5-6 cm:
Discoaster brouweri; Cyclococcolithus leptoporus; cf. Discoaster variabilis.
Age: As above.

Sample 3-15-6-1, 9-10 cm:
Cyclococcolithus leptoporus; cf. Reticulofenestra pseudoumbilica; cf. Discoaster variabilis; cf. Discoaster extensus.
Age: Probably as above.

Sample 3-15-6-2, 16-17 cm:
Cyclococcolithus leptoporus; cf. Discoaster variabilis; cf. Discoaster brouweri; Reticulofenestra pseudoumbilica; Discoaster pentaradiatus.
Age: As above.

Sample 3-15-6-3, 5-6 cm:
Reticulofenestra pseudoumbilica; Cyclococcolithus leptoporus; cf. Discoaster variabilis; cf. Discoaster extensus.
Age: Probably as above.

Sample 3-15-6-4, 4-5 cm:
Cyclococcolithus leptoporus; cf. Discoaster variabilis; Reticulofenestra pseudoumbilica; cf. Discoaster exilis.
Age: Probably late-middle Miocene.

Sample 3-15-6-5, 5-6 cm:
Coccolithus neogammation; Cyclococcolithus leptoporus; Reticulofenestra pseudoumbilica; Discoaster sp.
Age: Middle Miocene.

Sample 3-15-6-6, 4-5 cm:
Coccolithus neogammation; Reticulofenestra pseudoumbilica; cf. Discoaster exilis; Discoaster deflandrei; cf. Cyclococcolithus leptoporus.
Age: As above.

Sample 3-15-7-1, 4-5 cm:
Coccolithus neogammation; Reticulofenestra pseudoumbilica; cf. Cyclococcolithus leptoporus; Sphenolithus moriformis; Sphenolithus heteromorphus.
Age: Middle Miocene, Sphenolithus heteromorphus Zone.

Sample 3-15-7-2, 6-7 cm:
Coccolithus neogammation; Reticulofenestra pseudoumbilica; Discoaster aulakos; Sphenolithus heteromorphus; cf. Cyclococcolithus leptoporus.
Age: As above.

Sample 3-15-7-3, 5-6 cm:
Sphenolithus heteromorphus; Coccolithus neogammation; Discoaster aulakos; aff. Cyclococcolithus leptoporus.
Age: As above.

Sample 3-15-7-4, 8-9 cm:
Coccolithus neogammation; aff. Cyclococcolithus leptoporus; Discoaster aulakos; Sphenolithus heteromorphus.
Age: As above.

Sample 3-15-7-5, 5-6 cm:
Coccolithus neogammation; cf. Cyclococcolithus leptoporus; Discoaster aulakos; cf. Sphenolithus heteromorphus.
Age: As above.

Sample 3-15-7-6, 5-6 cm:
Coccolithus neogammation; Sphenolithus heteromorphus; aff. Cyclococcolithus leptoporus; Cyclolithella rotunda; Discoaster aulakos; cf. Discoaster exilis.
Age: As above.

Sample 3-15-8-1, 148-150 cm:
Coccolithus neogammation; Cyclolithella rotunda.
Age: Probably as above.

Sample 3-15-8-2, 5-6 cm:
Helicopontosphaera intermedia; Coccolithus neogammation; Sphenolithus heteromorphus; Discoaster sp.
Age: As above.

Sample 3-15-8-3, 5-6 cm:
Coccolithus neogammation; Sphenolithus heteromorphus; Cyclolithella rotunda; aff. Cyclococcolithus leptoporus.
Age: Probably as above.

Sample 3-15-8-4, 5-6 cm:
Coccolithus neogammation; Sphenolithus moriformis; Cyclolithella rotunda.
Age: As above.

Sample 3-15-8-5, 5-6 cm:
Coccolithus neogammation; Sphenolithus moriformis;
cf. Sphenolithus heteromorphus; Cyclolithella rotunda.  
Age: As above.

Sample 3-15-8-6, 6-7 cm:  
*Coccolithus neogammation*; *Sphenolithus moriformis*;  
*Cyclolithella rotunda*; *Discoaster* sp.  
Age: Probably as above.

Sample 3-15-9-1, 46-47 cm:  
*Coccolithus neogammation*; *Sphenolithus heteromorphus*; cf. *Cyclococcolithus leptopus*.  
(This sample appears to be younger than last sample above; probably from contamination due to caving.)  
Age: Early-middle Miocene, *Sphenolithus heteromorphus* Zone.

Sample 3-15-9-2, 9-10 cm:  
*Coccolithus neogammation*; *Sphenolithus heteromorphus*; *Discoaster aulakos*; *Cyclolithella rotunda*; aff. *Cyclococcolithus leptopus*.  
Age: As above.

Sample 3-15-9-3, 4-5 cm:  
*Sphenolithus heteromorphus*; *Coccolithus neogammation*; *Discoaster aulakos*; *Cyclolithella rotunda*; *Heliocopitosphaera intermedia*; aff. *Cyclococcolithus leptopus*.  
Age: As above.

Sample 3-15-9-4, 4-5 cm:  
*Coccolithus neogammation*; *Discoaster aulakos*; *Discoaster deflandrei*; *Sphenolithus heteromorphus*, aff. *Cyclococcolithus leptopus*.  
Age: As above.

Sample 3-15-9-5, 5-6 cm:  
*Coccolithus neogammation*; *Sphenolithus moriformis*; *Cyclolithella rotunda*; cf. *Sphenolithus heteromorphus*.  
Age: Probably as above.

Sample 3-15-9-6, 4-5 cm:  
*Coccolithus neogammation*; *Sphenolithus moriformis*; *Discoaster obtusus*; cf. *Discoaster druggi*; *Cyclolithella rotunda*.  
Age: Early Miocene.

**Hole 16**

Sample 3-16-1-1, 6-7 cm:  
*Gephyrocapsa oceanica*; *Emiliania huxleyi*.  
Age: Late Pleistocene.

Sample 3-16-1-2, 4-5 cm:  
*Gephyrocapsa oceanica*; *Emiliania huxleyi*.  
Age: As above.

Sample 3-16-1-4, 0-3 cm:  
*Gephyrocapsa oceanica*; *Emiliania huxleyi*.  
Age: As above.

Sample 3-16-2-1, 150 cm:  
*Pseudoemiliania lacunosa*; no *Gephyrocapsa*; no *Discoaster*.  
Age: Early Pleistocene.

Sample 3-16-2-2, 150 cm:  
*Pseudoemiliania lacunosa*; no *Gephyrocapsa*; no *Discoaster*.  
Age: As above.

Sample 3-16-2-3, 150 cm:  
*Pseudoemiliania lacunosa*; *Gephyrocapsa oceanica*; *Gephyrocapsa aperta*.  
Age: Middle Pleistocene.

Sample 3-16-2-4, 150 cm:  
*Pseudoemiliania lacunosa*; *Discoaster brouweri*.  
Age: Late Pliocene.

Sample 3-16-2-5, 150 cm:  
*Pseudoemiliania lacunosa*; *Discoaster brouweri*.  
Age: As above.

Sample 3-16-2-6, 5-6 cm:  
*Pseudoemiliania lacunosa*; *Discoaster brouweri*.  
Age: As above.

Sample 3-16-3-1, 150 cm:  
*Discoaster pentaradiatus*; *Pseudoemiliania lacunosa*; *Discoaster brouweri*; *Discoaster surculus*.  
Age: Late Pliocene.

Sample 3-16-3-2, 150 cm:  
*Discoaster pentaradiatus*; *Pseudoemiliania lacunosa*.  
Age: As above.

Sample 3-16-3-3, 150 cm:  
*Discoaster pentaradiatus*; *Pseudoemiliania lacunosa*; *Discoaster surculus*; *Discoaster brouweri*.  
Age: As above.

Sample 3-16-3-4, 150 cm:  
*Discoaster pentaradiatus*; *Pseudoemiliania lacunosa*.  
Age: As above.

Sample 3-16-3-5, 150 cm:  
*Discoaster pentaradiatus*; *Pseudoemiliania lacunosa*; *Discoaster brouweri*.  
Age: Late Pliocene.

Sample 3-16-3-6, 150 cm:  
*Discoaster pentaradiatus*; *Pseudoemiliania lacunosa*.  
Age: As above.

Sample 3-16-4-1, 5-6 cm:  
*Discoaster brouweri*; *Reticulofenestra pseudoumbilica*; *Pseudoemiliania lacunosa*; *Discoaster pentaradiatus*.  
Age: Middle Pliocene.
Sample 3-16-4-2, 5-6 cm:
Discoaster pentaradiatus; Reticulofenestra pseudoumbilica; Discoaster brouweri.
Age: Middle Pliocene.

Sample 3-16-4-3, 4-5 cm:
Discoaster pentaradiatus; Reticulofenestra pseudoumbilica; Discoaster brouweri; Ceratolithus rugosus; Discoaster extensus.
Age: Middle Pliocene.

Sample 3-16-4-4, 4-5 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; Ceratolithus rugosus.
Age: Middle Pliocene.

Sample 3-16-4-5, 4-5 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Discoaster extensus; Discoaster brouweri; Sphenolithus abies.
Age: Early Pliocene.

Sample 3-16-4-6, 150 cm:
Sphenolithus abies; Reticulofenestra pseudoumbilica; Ceratolithus tricorniculatus; Discoaster pentaradiatus; Discoaster brouweri; Discoaster extensus.
Age: Early Pliocene.

Sample 3-16-5-1, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; Discoaster pentaradiatus; Sphenolithus abies; Ceratolithus tricorniculatus.
Age: Early Pliocene or late Miocene (Messinian).

Sample 3-16-5-2, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Discoaster variabilis; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-16-5-3, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; Sphenolithus abies; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-16-5-4, 150 cm:
Reticulofenestra pseudoumbilica; Sphenolithus abies; Discoaster pentaradiatus; Discoaster challenger; Discoaster brouweri; Discoaster variabilis; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-16-5-5, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus; Sphenolithus abies; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-16-6-1, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Ceratolithus tricorniculatus; Discoaster brouweri.
Age: As above.

Sample 3-16-6-2, 150 cm:
Ceratolithus tricorniculatus; Reticulofenestra pseudoumbilica; Discoaster variabilis.
Age: As above.

Sample 3-16-6-3, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Discoaster brouweri; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-16-6-4, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; Discoaster brouweri; Discoaster pentaradiatus.
Age: As above.

Sample 3-16-6-5, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; cf. Ceratolithus tricorniculatus.
Age: Probably Messinian.

Sample 3-16-6-6, 150 cm:
Sphenolithus abies; Discoaster pentaradiatus; Reticulofenestra pseudoumbilica; Ceratolithus tricorniculatus; Discoaster variabilis.
Age: Probably Messinian.

Sample 3-16-7-1, 150 cm:
Discoaster pentaradiatus; Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster variabilis.
Age: Late Miocene.

Sample 3-16-7-2, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis.
Age: As above.

Sample 3-16-7-3, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri.
Age: As above.

Sample 3-16-7-4, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis.
Age: As above.

Sample 3-16-7-5, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster variabilis; Discoaster pentaradiatus.
Age: Late Miocene.

Sample 3-16-7-6, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster variabilis; Discoaster pentaradiatus.
Age: As above.
Sample 3-16-8-1, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Discoaster variabilis; Sphenolithus abies.
Age: As above.

Sample 3-16-8-2, 150 cm:
Ceratolithus tricorniculatus; Discoaster variabilis; Reticulofenestra pseudoumbilica; Discoaster pentaradiatus.
Age: Late Miocene (Messinian).

Sample 3-16-8-3, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; Sphenolithus abies; Discoaster pentaradiatus; Discoaster brouweri.
Age: Late Miocene.

Sample 3-16-8-4, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; Discoaster pentaradiatus; Reticulofenestra pseudoumbilica; Discoaster challenger.
Age: Late Miocene (Messinian).

Sample 3-16-8-5, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; Discoaster pentaradiatus; Ceratolithus tricorniculatus; Sphenolithus abies.
Age: Late Miocene (Messinian).

Sample 3-16-8-6, 150 cm:
Reticulofenestra pseudoumbilica; Sphenolithus abies; Discoaster variabilis; Discoaster pentaradiatus; Ceratolithus tricorniculatus.
Age: As above.

Sample 3-16-9-1, 150 cm:
Discoaster brouweri; Discoaster variabilis; Discoaster pentaradiatus; Reticulofenestra pseudoumbilica.
Age: Late Miocene.

Sample 3-16-9-2, 150 cm:
Discoaster variabilis; Discoaster brouweri.
Age: Late Miocene (Tortonian).

Sample 3-16-9-3, 150 cm:
Discoaster variabilis; Discoaster pentaradiatus; Discoaster brouweri; cf. Discoaster hamatus.
Age: As above.

Sample 3-16-9-4, 150 cm:
Discoaster variabilis; Discoaster brouweri; cf. Discoaster hamatus; Discoaster pentaradiatus.
Age: As above.

Sample 3-16-9-5, 150 cm:
Discoaster variabilis; Discoaster brouweri.
Age: As above.

Sample 3-16-9-6, 150 cm:
Discoaster variabilis; Discoaster brouweri; Discoaster pentaradiatus; cf. Discoaster hamatus.
Age: As above.

Sample 3-16-10-1, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Discoaster brouweri; Discoaster variabilis; aff. Discoaster hamatus.
Age: As above.

Sample 3-16-10-2, 150 cm:
Discoaster brouweri; Discoaster aulakos; cf. Discoaster hamatus; Discoaster variabilis; Discoaster brouweri; Discoaster pentaradiatus.
Age: As above.

Sample 3-16-10-3, 150 cm:
Discoaster brouweri; Discoaster aulakos; Discoaster pentaradiatus; cf. Discoaster hamatus; Discoaster variabilis.
Age: As above.

Sample 3-16-10-4, 150 cm:
Discoaster brouweri; Discoaster variabilis; Discoaster pentaradiatus; cf. Discoaster hamatus.
Age: As above.

Sample 3-16-10-5, 150 cm:
Discoaster brouweri; Discoaster variabilis; Discoaster pentaradiatus; cf. Discoaster hamatus.
Age: As above.

Sample 3-16-10-6, 150 cm:
Discoaster brouweri; Discoaster variabilis; aff. Discoaster hamatus; Discoaster pentaradiatus.
Age: As above.

Sample 3-16-11-1, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; Discoaster pentaradiatus; Discoaster brouweri; cf. Discoaster hamatus.
Age: As above.

Sample 3-16-11-2, 150 cm:
Discoaster brouweri; Reticulofenestra pseudoumbilica; Discoaster variabilis; Discoaster pentaradiatus; cf. Discoaster hamatus.
Age: As above.

Sample 3-16-11-3, 150 cm:
Discoaster brouweri; Reticulofenestra pseudoumbilica; Discoaster variabilis; aff. Discoaster hamatus.
Age: As above.

Sample 3-16-11-4, 150 cm:
Discoaster brouweri; Discoaster variabilis; aff. Discoaster hamatus; Discoaster pentaradiatus.
Age: As above.

Sample 3-16-11-5, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster brouweri; Discoaster pentaradiatus.
Age: As above.

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Sample 3-16A-11-6, 150 cm:
Reticulofenestra pseudoumbilica; Discoaster variabilis; Discoaster brouweri; Discoaster aulakos.
Age: Late Miocene.

Hole 17
Sample 3-17-1-1, 15-16 cm:
Pseudoemiliania lacunosa; Cyclococcolithus leptopus; Discoaster sp.; Gephyrocapsa caribbeana; cf. Reticulofenestra pseudoumbilica.
Age: Early Pleistocene-Pliocene.

Sample 3-17-1-2, 5-6 cm:
Pseudoemiliania lacunosa; Cyclococcolithus leptopus; Gephyrocapsa oceanica; Ceratolithus rugosus.
Age: Probably Pleistocene; contaminated.

Sample 3-17-1-3, 5-6 cm:
As above.

Sample 3-17-1-4, 7-8 cm:
Discoaster pentaradiatus; Discoaster brouweri; Pseudoemiliania lacunosa; Gephyrocapsa oceanica.
Age: Probably late Pliocene, contaminated with Pleistocene.

Sample 3-17-1-5, 3-4 cm:
As above.

Sample 3-17-2-6, 4-5 cm:
Reticulofenestra pseudoumbilica; Discoaster pentaradiatus; Discoaster brouweri; Ceratolithus rugosus.
Age: Middle Pliocene.

Hole 17A
Sample 3-17A-1-1, 5-6 cm:
Sphenolithus heteromorphus; Coccolithus neogammation; cf. Discoaster pentaradiatus.
Age: Middle Miocene, Sphenolithus heteromorphus Zone.

Sample 3-17A-1-6, 6-7 cm:
Coccolithus neogammation; Cyclococcolithus leptopus; Sphenolithus heteromorphus.
Age: As above.

Sample 3-17A-2-1, 3-4 cm:
Coccolithus neogammation; Sphenolithus moriformis. Assemblage not age diagnostic.

Sample 3-17A-2-6, 4-5 cm:
As above.

Sample 3-17A-3-1, 4-5 cm:
Cf. Sphenolithus ciperoensis; Coccolithus neogammation; Reticulofenestra scissura.
Age: Oligocene, Sphenolithus ciperoensis Zone.

Sample 3-17A-3-6, 148-150 cm:
Chiasmolithus oamaruensis; Reticulofenestra scissura; Coccolithus neogammation; cf. Sphenolithus distentus; Discoaster tani.
Age: Middle Oligocene.

Sample 3-17A-4-2, 2-3 cm:
Reticulofenestra scissura; Coccolithus neogammation; Helicopontosphaera compacta; Sphenolithus distentus.
Age: As above.

Sample 3-17A-4-5, 0-2 cm:
Discoaster tani; Coccolithus neogammation; Sphenolithus predistentus; Reticulofenestra scissura; Sphenolithus distentus; Helicopontosphaera compacta; Chiasmolithus oamaruensis.
Age: Middle Oligocene.

Sample 3-17A-4-6, 3-4 cm:
Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus predistentus; Chiasmolithus oamaruensis; Helicopontosphaera compacta.
Age: Middle Oligocene.

Hole 17B
Sample 3-17B-1-1, 4-5 cm:
Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus ciperoensis Zone.
Age: Oligocene, probably Sphenolithus ciperoensis Zone.

Sample 3-17B-1-6, 42-43 cm:
Coccolithus neogammation; Reticulofenestra scissura; cf. Sphenolithus ciperoensis.
Age: As above.

Sample 3-17B-2-1, 2-3 cm:
Chiasmolithus oamaruensis; Coccolithus neogammation; Reticulofenestra scissura; Discoaster tani; Sphenolithus ciperoensis.
Age: Middle Oligocene.

Sample 3-17B-2-6, 3-4 cm:
Coccolithus neogammation; Helicopontosphaera intermedia; Reticulofenestra scissura; Sphenolithus cf. ciperoensis.
Age: As above.

Sample 3-17B-3-1, 3-4 cm:
Coccolithus neogammation; Helicopontosphaera intermedia; Reticulofenestra scissura; Sphenolithus ciperoensis.
Age: As above.

Sample 3-17B-3-6, 24-25 cm:
Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus distentus.
Age: Middle Oligocene.
Sample 3-17B-4-1, 25-26 cm:
Sphenolithus distentus; Reticulofenestra scissura; Coccolithus neogammation.
Age: As above.

Sample 3-17B-4-6, 2-3 cm:
Chiasmolithus oamaruensis; Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus predistentus; Discoaster tani; Helicopontosphaera compacta; Sphenolithus pseudoradians.
Age: Oligocene, Sphenolithus predistentus Zone.

Sample 3-18-1-5, 9-10 cm:
Gephyrocapsa oceanica.
Age: Middle Pleistocene.

Sample 3-18-2-1, 0-2 cm:
Coccolithus neogammation; Sphenolithus belemnos; Sphenolithus heteromorphus; cf. Cyclococcolithus leptorpus.
Age: Early Miocene, Helicopontosphaera ampliaperta Zone.

Sample 3-18-2-6:
Coccolithus neogammation.
Assemblage not age diagnostic.

Sample 3-18-3-1, 150 cm:
Coccolithus neogammation.
Assemblage not age diagnostic.

Sample 3-18-3-6, 148-150 cm:
Coccolithus neogammation; aff. Sphenolithus belemnos.
Age: Probably early Miocene.

Sample 3-18-4-2, 0-2 cm:
As above.

Sample 3-18-4-5, 148-150 cm:
Coccolithus neogammation.
Assemblage not age diagnostic.

Sample 3-18-5-1, 148-150 cm:
Coccolithus neogammation; Discoaster tani.
Assemblage not age diagnostic.

Sample 3-18-5-6, 0-2 cm:
Coccolithus neogammation; Helicopontosphaera intermedia.
Assemblage not age diagnostic.

Sample 3-18-6-1, 2-3 cm:
Coccolithus neogammation; cf. Sphenolithus belemnos; Helicopontosphaera parallela.
Age: Early Miocene.

Sample 3-18-6-6, 2-3 cm:
Coccolithus neogammation.
Assemblage not age diagnostic.

Hole 19
Sample 3-19-1-1, 35-36 cm:
Discoaster brouragei; Pseudoemiliania lacunosa.
Age: Late Pliocene.

Sample 3-19-3-1, 40-41 cm:
Reticulofenestra umbilica; Reticulofenestra scissura; Coccolithus neogammation.
Age: Probably middle Oligocene.

Sample 3-19-3-6, 4-5 cm:
Reticulofenestra scissura; Coccolithus neogammation; Discoaster deflandrei; Bramletteius serraculoides.
Age: Early Oligocene.

Sample 3-19-4-1, 148-150 cm:
Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus predistentus; Discoaster tani; Sphenolithus pseudoradians.
Age: Oligocene, Sphenolithus predistentus Zone.

Sample 3-19-4-6, 148-150 cm:
Bramletteius serraculoides; Reticulofenestra umbilica; Sphenolithus predistentus; Isthmolithus recurvus; Bramletteius serraculoides.
Age: As above.

Sample 3-19-5-1, 148-150 cm:
Reticulofenestra scissura; Reticulofenestra umbilica; Cyclococcolithus lusitanicus; Coccolithus neogammation; Sphenolithus predistentus; Isthmolithus recurvus; Bramletteius serraculoides.
Age: As above.

Sample 3-19-5-6, 2-3 cm:
Reticulofenestra scissura; Reticulofenestra umbilica; Cyclococcolithus lusitanicus; Discoaster barbadiensis; Discoaster saipanensis.
Age: Late Oligocene, Isthmolithus recurvus Zone.

Sample 3-19-6-1, 148-150 cm:
Discoaster barbadiensis; Reticulofenestra scissura; Cyclococcolithus lusitanicus; Discoaster saipanensis; Bramletteius serraculoides; Discoaster tani; Isthmolithus recurvus.
Age: As above.

Sample 3-19-6-6, 148-150 cm:
Reticulofenestra scissura; Reticulofenestra umbilica; Cyclococcolithus lusitanicus; Discoaster tani; Discoaster saipanensis; cf. Sphenolithus radians; Bramletteius
serraculoïdes; Discoaster barbadiensis; aff. Chiasmolithus grandis.
Age: Mixed middle/late Eocene.

Sample 3-19-7-1, 4-5 cm:
Reticulofenestra umbilica; Cyclococcolithus lusitanicus; Discoaster saipanensis; Cyclococcolithus reticulatus; cf. Discoaster barbadiensis; Reticulofenestra scissura; Bramletteius serraculoïdes; Chiasmolithus grandis.
Age: Late middle Eocene.

Sample 3-19-7-6, 2-3 cm:
Chiasmolithus grandis; Reticulofenestra umbilica; Sphenolithus radians; Cyclococcolithus lusitanicus; Sphenolithus furcatolithoides; Bramletteius serraculoïdes.
Age: Middle Eocene; probably mixed.

Sample 3-19-8-1, 148-150 cm:
Bramletteius serraculoïdes; Reticulofenestra scissura; cf. Discoaster tani; Reticulofenestra umbilica; Cyclococcolithus lusitanicus; Sphenolithus radians; Discoaster barbadiensis; Chiasmolithus grandis.
Age: Middle Eocene.

Sample 3-19-8-6, 148-150 cm:
Reticulofenestra umbilica; Chiasmolithus grandis; Sphenolithus radians; Cyclococcolithus lusitanicus; Sphenolithus furcatolithoides; Bramletteius serraculoïdes; cf. Discoaster barbadiensis.
Age: Middle Eocene.

Sample 3-19-9-1, 148-150 cm:
As above.

Sample 3-19-9-6, 2-3 cm:
Reticulofenestra umbilica; cf. Sphenolithus radians; Discoaster tani; Discoaster barbadiensis; Chiasmolithus grandis.
Age: Middle Eocene.

Sample 3-19-10-1, 148-150 cm:
Cyclococcolithus lusitanicus; Discoaster barbadiensis; cf. Reticulofenestra umbilica; Chiasmolithus grandis; Sphenolithus radians.
Age: As above.

Sample 3-19-10-6, 148-150 cm:
Chiasmolithus grandis; Cyclococcolithus lusitanicus; Sphenolithus radians; cf. Reticulofenestra umbilica; Bramletteius serraculoïdes.
Age: Middle Eocene.

Sample 3-19-11-4, 148-150 cm:
As above.

Hole 20A
Sample 3-20A-2-1, 49-50 cm:
Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus predistentus.
Age: Middle Oligocene.

Sample 3-20A-2-6, 148-150 cm:
Reticulofenestra scissura; Coccolithus neogammation; Reticulofenestra umbilica; Bramletteius serraculoïdes; Sphenolithus pseudoradians.
Age: Early Oligocene.

Hole 20B
Sample 3-20B-1-1, 1-2 cm:
Coccolithus neogammation; Reticulofenestra scissura; Sphenolithus distentus.
Age: Middle Oligocene.

Sample 3-20B-1-6, 3-4 cm:
Reticulofenestra scissura; Coccolithus neogammation; Sphenolithus distentus.
Age: As above.

Hole 20C
Sample 3-20C-1-1, 47-48 cm:
Discoaster pentaradiatus; Discoaster surculus; Discoaster brouweri.
Age: Pliocene, probably middle Pliocene.

Sample 3-20C-1-2, 3-4 cm:
Barren of nannofossils.
Sample 3-20C-1-6, 79-80 cm:
Discoaster brouweri; Discoaster pentaradiatus.
Age: Probably Pliocene.

Sample 3-20C-1-3, 3-4 cm:
Coccolithus neogammation; cf. Reticulofenestra scissura.
Age: Probably Oligocene.

Sample 3-20C-1-6, 3-4 cm:
Reticulofenestra scissura; Coccolithus neogammation.
Age: As above.

Sample 3-20C-2-1, 148-150 cm:
Reticulofenestra umbilica; Cyclococcolithus lusitanicus; Reticulofenestra scissura; Bramletteius serraculoïdes; cf. Helicopontosphaera compacta; Sphenolithus predistentus; Chiasmolithus oamaruensis; Discoaster tani; Sphenolithus pseudoradians.
Age: Early Oligocene or late Eocene.

Sample 3-20C-2-5, 148-150 cm:
Reticulofenestra scissura; Reticulofenestra umbilica; Hayella situiformis; Bramletteius serraculoïdes; Discoaster tani; Cyclococcolithus lusitanicus; Sphenolithus pseudoradians; cf. Helicopontosphaera compacta.
Age: As above.

Sample 3-20C-2-6, 148-150 cm:
Reticulofenestra scissura; Discoaster tani; Cyclococcolithus lusitanicus; Reticulofenestra umbilica; Bramletteius serraculoïdes; Helicopontosphaera compacta; Hayella situiformis; Sphenolithus predistentus.
Age: As above.
Sample 3-20C-3-1, 3-4 cm:
Reticulofenestra umbilica; Bramletteius serraculoides; Discoaster barbadiensis; Cyclococcolithus lusitanicus; Discoaster tani; Discoaster saipanensis; Reticulofenestra scissura.
Age: Uppermost middle Eocene or late Eocene.

Sample 3-20C-2-6, 4-5 cm:
Discoaster barbadiensis; Reticulofenestra umbilica; Discoaster saipanensis; Bramletteius serraculoides; Discoaster tani; Discoaster saipanensis; Reticulofenestra scissura.
Age: As above.

Sample 3-20C-4-1, 20-21 cm:
Reticulofenestra umbilica; Discoaster barbadiensis; Reticulofenestra scissura.
Age: Probably as above.

Sample 3-20C-4-4, 148-150 cm:
Discoaster barbadiensis; Cyclococcolithus lusitanicus; Reticulofenestra cf. umbilica; Chiasmolithus grandis.
Age: Middle Eocene.

Sample 3-20C-5-1, 148-150 cm:
Sphenolithus radians; Discoaster barbadiensis; Sphenolithus cf. furcatolithoides; Chiasmolithus gigas; Chiasmolithus grandis; Chiasmolithus quadratus; cf. Chiasmolithus solitus.
Age: Lowermost middle Eocene.

Sample 3-20C-5-6, 3-4 cm:
Chiasmolithus grandis; Sphenolithus radians; Chiasmolithus cf. californicus; Marthasterites triradiatus.
Age: Early Eocene, probably Marthasterites triradiatus Zone.

Sample 3-20C-6-1, 148-150 cm:
Chiasmolithus californicus; cf. Discoaster multiradiatus; cf. Chiasmolithus bidens; Fasciculithus tynpaniformis; Ellipsolithus distichus; Towelus eminens; aff. Chiasmolithus grandis.
Age: Early Eocene or late Paleocene.

Sample 3-20C-6-4, 1-2 cm:
Discoaster multiradiatus; Ellipsolithus distichus; Towelus eminens; Fasciculithus tynpaniformis; Towelus craticulus; Chiasmolithus bidens; Chiasmolithus californicus.
Age: Late Paleocene, Discoaster multiradiatus Zone.

Sample 3-20C-6-5, 74-75 cm:
Micula; Tetralithus murus; Lithraphidites quadratus.
Age: Upper Cretaceous, Maestrichtian.

Sample 3-21-1-6, 148-150 cm:
Discoaster pentaradiatus; Discoaster brouweri; Pseudemmillania lacunosa.
Age: As above.

Sample 3-21-2-1, 148-150 cm:
Towieus eminens; Chiasmolithus consuetus; Towelus craticulus; Discoaster gemmeus; Discoaster multiradiatus; Ellipsolithus distichus; Chiasmolithus bidens; Fasciculithus tynpaniformis; Chiasmolithus californicus; Cyclcooccolithus robustus; Ellipsolithus macellus.
Age: Late Paleocene, Discoaster multiradiatus Zone.

Sample 3-21-3-1, 148-150 cm:
Cylindricalithus gallicus; Micula; Tetralithus murus; Lithraphidites quadratus.
Age: Upper Cretaceous, Maestrichtian.

Sample 3-21-3-6, 148-150 cm:
Micula; Cylindricalithus gallicus; Lithraphidites quadratus.
Age: As above.

Sample 3-21-4-1, 148-150 cm:
Ellipsolithus distichus; Chiasmolithus californicus; Effelolithus turrisseiffeli; Collvilia barnesae; Cretarhabdus; Arkhangelskia parca; Tetralithus pyramidus; Micula; Cylindricalithus serratus; Tetralithus aculeus; Rhabdolithina splendens; Rhabdolithina regularis.
Age: Upper Cretaceous, probably Campanian.

Sample 3-21-4-6, 148-150 cm:
Prediscosphaera cretacea; Micula; Tetralithus pyramidus; Cribrasphaerae ehrenbergii; Cylindricalithus serratus; Rhabdolithina regularis; Arkhangelskia parca.
Age: As above.

Sample 3-21-5-1, 2-3 cm:
Arkhangelskia parca; Prediscosphaera cretacea; Collvilia barnesae; Micula; Cylindricalithus serratus; Tetralithus pyramidus; Rhabdolithina regularis.
Age: As above.

Sample 3-21-5-6, 148-150 cm:
Cylindricalithus serratus; Micula; Tetralithus pyramidus; Tetralithus aculeus; Rhabdolithina regularis; Arkhangelskia parca.
Age: As above.

Sample 3-21-6-3, 5-6 cm:
Arkhangelskia parca; Rhabdolithina regularis; Micula;
Tetralithus aculeus; Tetralithus pyramidus.
Age: As above.
Sample 3-21-6-6, 2-3 cm:
Tetralithus pyramidus; Micula; Prediscophaera cretacea;
Tetralithus aculeus; Rhabdolithina regularis; Arkhangelskiella parca;
Chiasmolithus grandis (contaminant); Cylindricalithus serratus.
Age: As above.
Sample 3-21-7-1, 148-150 cm:
Tetralithus aculeus; Micula; Rhabdolithina regularis.
Age: As above.
Sample 3-21-7-6, 148-150 cm:
Arkhangelskiella parca; Micula; Cylindricalithus serratus;
Rhabdolithina regularis; Tetralithus aculeus.
Age: As above.
Sample 3-21-8-1, 0-2 cm:
Micula; Prediscophaera cretacea; Tetralithus pyramidus;
Arkhangelskiella parca; cf. Kampferius magnificus; Cylindricalithus serratus;
Rhabdolithina regularis; Tetralithus aculeus.
Age: As above.
Sample 3-21-8-6, 12-13 cm:
As above.
Hole 21A
Sample 3-21A-1-1, 148-150 cm:
Discaster barbadensis; Sphenolithus radians; Cyclococcolithus lusitanicus;
Chiasmolithus grandis; Chiasmolithus consuetus.
Age: Probably early middle Eocene.
Sample 3-21A-1-6, 148-150 cm:
Chiasmolithus grandis; Chiasmolithus gigas; Bramletteius serraculoides;
Sphenolithus furcatolithoides; Discaster perplexus; Sphenolithus radians.
Age: As above.
Sample 3-21A-2-1, 148-150 cm:
Discasteroides kupperi; Chiasmolithus bidens; Sphenolithus radians;
Cyclococcolithus g ammonium; Discaster lodoensis; Coccolithus crassus sattr.
Age: Early Eocene, probably Discaster lodoensis Zone.
Sample 3-21A-2-6, 148-150 cm:
Chiasmolithus bidens; Cyclococcolithus lusitanicus; Discaster lodoensis; Discasteroides kupperi; Helicopontospheara seminulum lophota;
Chiasmolithus grandis; Cyclococcolithus g ammonium; Sphenolithus radians; Coccolithus crassus sattr.
Age: Early Eocene, probably Discaster lodoensis Zone.
Sample 3-21A-3-1, 148-150 cm:
Chiasmolithus grandis; Discaster cf. barbadensis; Chiasmolithus consuetus; Chiasmolithus bidens; Cyclococcolithus g ammonium; Discaster lodoensis; Discaster multiradiatus; Sphenolithus radians; Ellipsolithus distichus; Coccolithus crassus.
Age: Early Eocene, probably Chiasmolithus consuetus Zone, with some vertical mixing.
Sample 3-21A-3-6, 2-3 cm:
Chiasmolithus bidens; Cyclolcoccolithus robustus; Fasciculithus tympaniciformis; Towitus eminus; Chiasmolithus grandis; Discaster lodoensis; Discaster cf. gemmeus; Discaster multiradiatus; Sphenolithus radians; Ellipsolithus distichus; Chiasmolithus californicus.
Age: Probably as above.
Sample 3-22-1-1, 148-150 cm:
Pseudoemiliania lacunosa; Cyclolcoccolithus leptoporus.
Age: Early Pleistocene.
Sample 3-22-1-6, 23-24 cm:
Pseudoemiliania lacunosa; Cyclolcoccolithus leptoporus; Discaster brouweri.
Age: Late Pleistocene.
Sample 3-22-2-1, 2-3 cm:
Coccolithus neogammation; Discoaster druggi; cf. Helicopontospheara intermedia; Discaster obtusus; assemblage not diagnostic.
Age: Probably late Oligocene or early Miocene.
Sample 3-22-2-6, 2-3 cm:
As above.
Sample 3-22-3-1, 148-150 cm:
Coccolithus neogammation; aff. Zygrhablithus bijugatus; Discoaster deflandrei; Coronocyclus serratus.
Age: Probably Oligocene.
Sample 3-22-3-5, 148-150 cm:
Coccolithus neogammation; Zygrhablithus bijugatus; Reticulofenestra scissura; aff. Reticulofenestra umbilica.
Age: Early to middle Oligocene.
Sample 3-22-3-6, 2-3 cm:
As above.
Sample 3-22-4-1, 72-73 cm:
Coccolithus neogammation; Reticulofenestra scissura; mostly detrital carbonates.
Age: Probably Oligocene.
Sample 3-22-4-6, 7-8 cm:
As above.
Sample 3-22-5-1, 12-13 cm:
As above.

Sample 3-22-5-2, 140-142 cm:
Reticulofenestra umbilica; Discoaster barbadiensis;
Reticulofenestra scissura; cf. Discoaster saipanensis;
Chiasmolithus oamaruensis; Cyclococcolithus lusitanicus.
Age: Late Eocene.