STAGES
PLANKTONIC FORAMINIFERA ZONATIONS
BLOW & coworkers
BOLLI & coworkers
Calabrian
N22 & N23
Globorotalia truncatulinoides truncatulinoides
Astian
Piacenzian
N21
Globorotalia truncatulinoides tosaensis
Tabianian
N19 & N20
Globorotalia exilis
Globorotalia miocenica
N18
Globorotalia margaritae
Globorotalia dutertrei
Messinian
N17
Globigerinoides obliquus extremus
Tortonian
N12 — N16
Globorotalia acostaensis
G. menardii
G. mayeri
G. fohsi robusta
Serravallian
N10 & N11
Globorotalia fohsi lobata
Globorotalia fohsi fohsi
Globorotalia fohsi barisanensis
Langhian
N18 & N9
Globigerinatella insueta
Burdigalian
N7
Aquitanian
N5 & N6
Globorotaloides stainforthi
Globigerinata dissimilis
N4
Globorotalia kugleri
Chattian
N3
Globigerina ciperoensis ciperoensis
N2
Globorotalia opima opima
N1
Globigerina ampliapertura
Rupelian
Lattorfian
P18 & P19
Cassigernella chipolensis
Hastigerina micra
Priabonian
P18
Globorotalia cerroazulensis
LEG 9 SITES
77
78
79
80
81
82
83
84
M.Y.
1.85
3.0
3.9
4.4
5.0
9.5
14.5
22.5
32.0
36.0
TIME
PLEISTOCENE
PLIOCENE
LATE
EARLY
MIOCENE
LATE
MIDDLE
EARLY
OLIGOCENE
LATE
EARLY
EOCENE
LATE
ZONATION
PLANKTONIC FORAMINIFERA
Pulleniatina obliquilocutata
Globigerinoides fistulosus
Sphaeroidinella dehiscens
Globorotalia tumida
Globorotalia plesiotumida
Globoquadrina altispira
Globorotalia fohsi lobata
Globorotalia fohsi fohsi
Globorotalia peripheroacuta
Globorotalia peripheronda
Praeorbulina glomerosa curva
Globigerinoides bisphericus
Globoquadrina venezuelana
Globigerinita dissimilis
Globorotalia kugleri
Globigerina angulisuturalis
Globorotalia opima
Chiloguembelina cubensis
Globigerina ampliapertura
Pseudohastigerina barbadoensis
Globorotalia insolita
Globigerina bulloides
Globorotalia humerosa
Globorotalia tumida flexuosa
Globorotalia tumida tumida
Globorotalia margaritae
Globigerina apertura
Sphaeroidinella dehiscens
Globorotalia multicamerata
Pulleniatina obliquiloculata
Globigerina rubescens
Globorotalia crassaformis crassaformis
Globigerinoides fistulosus
Globorotalia crassula
Globorotalia dutertrei
Globigerina digitata
Globigerina quinqueloba
Globorotalia continuosa
Globigerina juvenilis
Globoquadrina dehiscens
Globigerinita glutinata
Globigerinoides trilobus
Globigerinoides ruber
Globoquadrina altispira
Globigerinoides obliquus
Globigerinoides sacculifer
Globorotaloides hexagona
Sphaeroidinella seminulina
Globorotalia scitula
Orbulina universa
Globigerina falconensis
Globigerinoides bolli
Globigerinella aequilateralis
Globigerina nepenthes
Globorotalia menardii
Sphaeroidinella subdehiscens
Globorotalia merotumida
Globigerina decoraperta
Globorotalia acostaensis
Globigerina calida
Globorotalia plesiotumida
Globorotalia exilis
Globorotalia pseudomiocenica
Globorotalia hirsuta
Candeina nitida
Pulleniatina primalis
Globigerinoides conglobatus
Globorotalia peripheroronda
Globigerina foliata
Globorotalia praescitula
Globigerinoides bisphericus
Hastigerinella bermudezi
Globigerinatella insueta
Globorotalia archaeomenardii
Praeorbulina glomerosa curva
Globorotalia praemenardii
Globorotalia peripheroacuta
Globorotalia fohsi fohsi
Globigerina bradyi
Globorotalia kugleri
Globorotalia cf. pseudokugleri
Globorotalia siakensis
Globigerina ciperoensis
Globorotalia opima
Globoquadrina tripartita
Globigerina angulisuturalis
Globigerina euapertura
Globigerina cf. angiporoides
Globigerina rohri
Globigerina prasaepis
Globigerina selli
Globigerina gortanii
Globigerina tapuriensis
Pseudohastigerina barbadoensis
Cassigerinella chipolensis
Globigerina angustiumbilicata
Globorotalia ins
Globigerina linaperta
Globorotalia gemma
Chiloguembelina cubensis
Globorotalia nana
Globigerina ampliapertura
Globigerinita dissimilis
ZONATION
RADIOLARIA
No Zonal Name
Pterocanium prismatium
Spongaster pentas
Stichocorys peragrina
Ommatartus penultimus
Ommatartus antepenultimus
Cannartus (?) petterssoni
Cannartus laticonus
Brachiospyris alata
Calocycletta costata
Calocycletta virginis
Lychnocanium bipes
Hexaspyris papilio
Theocyrtis annosa
Theocyrtis tuberosa
Thyrsocyrtis bromia
Tholospyris cortinisca
Lithopera baueri
Lithopera thornburgi
Lithopera neotera
Tholospyris scaphipes
Cyrtocapsella japonica
Liriospyris elevata
Cannartus (?) petterssoni
Tholospyris infericosta
Liriospyris ovalis
Ommatartus hughesi
Ommatartus antepenultimus
Lithopera bacca
Tricolospyris leibnitziana
Giraffospyris angulata
Ommatartus penultimus
Giraffospyris laterispina
Cyclampterium (?) neatum
Acrobotrys tritubus
Panartus tetrathalmus
Tristylospyris palmipes
Stichocorys peregrina
Tholospyris procera
Pterocanium prismatium
Archicircus rhombus
Nephrospyris renilla
Clathrocircus stapedius
Ceratospyris hyperborea
Tholospyris devexa
Androspyris anthropiscus
Lamprospyris huxleyi
Dendrospyris damaecornis
Dorcadospyris pentagona
Liriospyris reticulata
Dendrospyris binapertonis
Cyclampterium (?) brachythorax
Tympanidium binoctonum
Liriospyris mutuaria
Dipodospyris forcipata
Cyrtocapsella tetrapera
Cyrtocapsella cornuta
Tholospyris mammilaris
Calocycletta virginis
Gorgospyris schizopodia
Cyrtocapsella elongata
Cyclampterium (?) leptetrum
Giraffospyris annulispina
Stichocorys diploconus
Stichocorys delmontense
Cannartus violina
Dorcadospyris dentata
Liriospyris stauropora
Liriospyris globosa
Cannartus mammiferus
Calocycletta costata
Acrocubus octopylus
Giraffospyris toxaria
Lithopera renzae
Cyclampterium (?) tanythorax
Cannartus laticonus
Brachiospyris alata
Dendrospyris pododendros
Cannartus prismaticus
Liriospyris longicornuta
Hexaspyris papilio
Clathrobursa clathrobursa
Dendrospyris pannosa
Lychnocanium bipes
Cannartus tubarius
Brachiospyris simplex
Theocyrtis tuberosa
Dendrospyris anthocyrtoides
Artophormis gracilis
Dorcadospyris costatescens
Lithocyclia angustum
Gamospyris circulus
Cantharospyris ateuthus
Cyclampterium (?) pegetrum
Theocyrtis annosa
Tholospyris anthopora
ZONATION
NANNOFOSSILS
Gephyrocapsa spp.
Ceratolithus cristatus
C. leptopora macintyrei
Discoaster brouweri
Coccolithus carteri
Cyclococcolithina leptopora
Reticulofenestra pseudoumbilica
Ceratolithus rugosus
Ceratolithus tricorniculatus
Discoaster variabilis
Discoaster neohamatus
Discoaster hamutus
Discoaster exilis
Coccolithus eopelagicus
Discoaster kugleri
C. neogammation
S. heteromorphus
T. rugosus
Helicopontosphaera selli
Sphenolithus heteromorphus
Triquetrorhabdulus carinatus
Sphenolithus belemnos
Discoaster druggii
Coccolithus abisectus
T. carinatus
Coccolithus bisectus
Sphenolithus distentus
Helicopontosphaera compacta
C. formosa
S. predistentus
Isthmolithus recurvus
Discoaster barbadiensis
Nitzschia marina
Dictyocha fibula rhombica
Discoaster variabilis
Discoaster hamatus
Discoaster pentaradiatus
Nitzschia pliocena
Dictyocha fibula longispina
Discoaster surculus
Discoaster quinqueramus
Dictyocha fibula perlaevis
Ceratolithus tricorniculatus
Discoaster assymmetricus
Thalassiora convexa
Dictyocha mutabilis
Ceratolithus rugosus
Rhizosolenia bergoni
Sphenaster metula
Ceratolithus cristatus
Asteromphalus elegans
Dictyocha rhombus
Rhizosolenia praebergoni
Pseudoeunotia doliolus
Coccolithus carteri
Coscinodiscus lineatus var. ellipticus
Gephyrocapsa sp.
Dictyocha mesocenoidea
Dictyocha trifenestra
Denticula hustedtii
Dictyocha crux longispina
Dictyocha crux stauracanthus
Coscinodiscus plicatus & C. yabei
Reticulofenestra pseudoumbilica
Discoaster stellulus
Cyclococcolithina leptopora
Discoaster challengeri
Triquetrorhabdulus rugosus
Cyclococcolithina leptopora macintyrei
Discoaster exilis
Denticula nicobarica
Discoaster subsurculus
Discoaster aulakos
Dictyocha ausonia
Craspedodiscus coscinodiscus
Actinocyclus ellipticus var. moronensis
Dictyocha triommata
Actinocyclus ingens
Actinocyclus tsugaruensis
Mesocena circulus
Coscinodiscus lewisianus
Helicopontosphaera heteromorphus
Sphenolithus belemnos
(?) Orthorhabdus serratus
Coccolithus abisectus
Discoaster divaricatus
Discoaster woodringi trinidadensis
Discoaster saundersii
Discoaster woodringi lidzi
Triquetrorhabdulus carinatus
Discoaster woodringi
Reticulofenestra gartneri
Sphenolithus ciperoensis
Sphenolithus distentus
Discoaster woodringi nephados
Sphenolithus predistentus
Sphenolithus pseudoradians
Coscinodiscus excavatus var. quadricellatus
Discoaster adamanteus
Discoaster adamanteus obtusus
Zyghrablithus bijugatus
Pontosphaera vadosa
Bramletteius serraculoides
Discoaster tani ornatus
Chiasmolithus oamaruensi
Isthmolithus recurvus
Helicopontosphaera compacta
Discoaster barbadiensis
Reticulofenestra umbilica
Discoaster slapanensis
Cyclococcolithina formosa
Discoaster tani tani
Discoaster tani nodifer
Coccolithus cf. C. scissurus
Coccolithus bisectus
Cyclococcolithina neogammation
Coccolithus eopelagicus
SERIES
PLEISTOCENE
PLIOCENE
UPPER
LOWER
MIOCENE
UPPER
MIDDLE
LOWER
OLIGOCENE
UPPER
LOWER
EOCENE
UPPER