

Bioevent ages - Gulf of Mexico Basin, USA

Mid-latitude global, regional and sub-regional nannofossil and foraminifera-based bioevents typically identified in the Gulf Basin, USA

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 Ver. 20210618

AGE (Ma) GTS 2020	EPOCH	SUB-EPOCH	STAGE	BENTHIC FORAM BIOEVENT	PLANKTONIC FORAM BIOEVENT	NANNOFOSSIL BIOEVENT	AGE (Ma) GTS 2020	STANDARD NANNOFOSSIL ZONES (Martini, 1971)	STANDARD FORAMINIFERA ZONES (Bollii, 1969,1979)		
0.07	PLEISTOCENE	LATE/ MIDDLE	Unnamed/ Chibanian		GLOBOROTALIA FLEXUOSA		0.07	NN21	N22		
0.43							PSEUDOEMILIANIA LACUNOSA A	0.43		NN20	
0.62							GLOBOROTALIA TRUNCATULINOIDES COIL R/L			0.62	
0.65								PSEUDOEMILIANIA LACUNOSA B		0.65	
0.73					.77 Ma	.77 Ma	TRIMOSINA A			0.73	
0.79								GLOBOROTALIA TRUNCATULINOIDES COIL L/R		0.79	
0.79								PSEUDOEMILIANIA OVATA		0.79	
0.81								PSEUDOEMILIANIA PACIFICA		0.81	
0.84								PSEUDOEMILIANIA LACUNOSA C		0.84	
0.84								SPHAERODINELLA DEHISCENS ACME A		0.84	
0.84					SECONDARY MARKER (ANGULOGERINA MAGNA)		0.84				
0.89						GEPHYROCAPSA LARGE	0.89				
0.95						SECONDARY MARKER (GLOBOROTALIA INCISA)	0.95	NN19			
1.09				CALABRIAN	HYALINEA BALTHICA		1.09				
1.19					SECONDARY MARKER (GLOMOSPIRA CHAROIDES)		1.19				
1.24						HELICOSPHAERA SELLII	1.24				
1.30						SECONDARY MARKER (GLOBIGERINOIDES OBLIQUUS)	1.30				
1.53			EARLY		ANGULOGERINA B		1.53				
1.57						SECONDARY MARKER (GLOBOROTALIA TOSAENSIS)	1.57				
1.60						SPHAERODINELLA DEHISCENS ACME B	1.60				
1.60			1.80 Ma			1.60					
1.91					GLOBOROTALIA PRAEHIRSUTA	1.91					
1.93					DISCOASTER BROUWERI	1.93					
1.93					SECONDARY MARKER (DISCOASTER TRIRADIATUS)	1.93	NN18				
1.96				CRISTELLARIA S		1.96					
2.21					SECONDARY MARKER (DISCOASTER BROUWERI A)	2.21					
2.39						2.39					
2.39			GELASIAN	LENTICULINA 1		2.39					
2.39					GLOBOROTALIA MENARDII COIL L/R	2.39					
2.39					GLOBOROTALIA MIOCENICA	2.39					
2.39					DISCOASTER PENTARADIATUS	2.39	NN17				
2.39				SECONDARY MARKER (BOLIVINA IMPORCATA)		2.39					
2.53		2.59 Ma	2.59 Ma			2.53					
2.60				CERATOBULIMINA PACIFICA		2.60					
2.64						2.64					
2.64					SECONDARY MARKER (CYCLOPERFOLITHUS CARLAE)	2.64					
2.76					DISCOASTER TAMALIS	2.76					
2.98					GLOBOROTALIA MULTICAMERATA	2.98					
3.00					SECONDARY MARKER (GLOBIGERINA VENEZUELANA)	3.00					
3.02		LATE	PIACENZIAN	SECONDARY MARKER (SARACENARIA NUTTALI)		3.02	NN16				
3.13					GLOBOQUADRINA ALTISPIRA	3.13					
3.16					SPHAERODINELLOPSIS SEMINULINA	3.16					
3.18				SECONDARY MARKER (ROTALIA B)		3.18					
3.29					SECONDARY MARKER (GLOBOROTALIA PRAEMIOCENICA)	3.29					

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3.61	PLIOCEN	EARLY	ZANCLEAN			SPHENOLITHUS ABIES	3.61	NN15	N20			
3.82				3.60 Ma	3.60 Ma					RETICULOFENESTRA PSEUDOUMBILICA	3.82	
3.77							SECONDARY MARKER (GLOBOROTALIA PLESIOTUMIDA)				3.77	
3.85							GLOBOROTALIA MARGARITAE				3.85	
3.86										PSEUDOSPHENOLITHUS ABIES B ASSEMBLAGE	3.86	
3.88							SECONDARY MARKER (GLOBIGERINA BOLLII)				3.88	
3.90							GLOBIGERINA NEPENTHES				3.90	
3.90										SPHENOLITHUS ABIES B ASSEMBLAGE	3.90	
3.90							SECONDARY MARKER (UVIGERINA RUSTICA)				3.90	
3.93										SECONDARY MARKER (AMAUROLITHUS DELICATUS)	3.93	
3.93										AMAUROLITHUS TRICORNICULATUS	3.93	
3.93							BULIMINELLA 1				3.93	
3.99					TEXTULARIA JUGOSA		3.99					
4.43					SECONDARY MARKER (SIGMOILINA P)		4.43					
4.57						DICTYOCOCCITES ANTARCTICUS (HPO)	4.57					
5.04						CERATOLITHUS ACUTUS	5.04					
5.25		5.33 Ma	5.33 Ma	5.33 Ma		GLOBIGERINOIDES MITRA		5.25	NN12	N19		
5.33							TEXTULARIA X				5.33	
5.47								GLOBOROTALIA MENARDII COIL R/L				5.47
5.53											DISCOASTER A (QUINQUERAMUS)	5.53
5.66											SECONDARY MARKER (DISCOASTER A ACME)	5.66
5.75											DISCOASTER B	5.75
5.75								SECONDARY MARKER (GLOBOROTALIA JUANAII)				5.75
5.79								SECONDARY MARKER (TEXTULARIA TATUMI)				5.79
5.84						MESSINIAN		RETICULOFENESTRA ROTARIA			5.84	
5.91							GLOBOQUADRINA DEHISCENS				5.91	
5.96							ROBULUS E				5.96	
6.03							SECONDARY MARKER (SPHAERIDINELLOPSIS SUBDEHISCENS)				6.03	
7.06				SECONDARY MARKER (GLOBOROTALIA ACOSTAENSIS R/L)		7.06						
7.16			7.25 Ma		DISCOASTER C	7.16						
7.38				SECONDARY MARKER (SPHAERIDINELLOPSIS DISJUNCTA)		7.38						
7.40				BIGENERINA A		7.40						
7.40				TEXTULARIA 16		7.40						
7.51					DISCOASTER CALCARIS	7.51						
7.51					DISCOASTER NEOHAMATUS	7.51						
7.54					DISCOASTER LOEBLICHII	7.54						
7.59				CRISTELLARIA K		7.59						
7.64				SECONDARY MARKER (TRITAXALINA ATLANTICA)		7.64						
7.86				LOCAL MARKER (PLANULINA RENZI)		7.86						
7.86				LOCAL MARKER (AMPHISTEGINA E)		7.86						
7.97				LOCAL MARKER (CIBICIDES H)		7.97						
8.07		LATE			CATINASTER MEXICANUS	8.07						

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14.53	EARLY	EARLY	LANGHIAN		PRAEORBULINA SICANA		14.53	NN4	N9		
14.75					PRAEORBULINA GLOMEROSA		14.75				
14.82					GLOBOQUADRINA DEHISCENS ACME		14.82				
14.83							SECONDARY MARKER (HELICOSPHAERA SCISSURA)		14.83		
14.86							HELICOSPHAERA AMPLIAPERTA		14.86		
15.02							GLOBIGERINATELLA INSUETA		15.02		
15.20									HELICOSPHAERA AMPLIAPERTA PERSISTENT	15.20	
15.39							SECONDARY MARKER (GLOBIGERINOIDES DIMINUTUS)		15.39		
15.51									SECONDARY MARKER (FAD DISCOASTER PETALIFORMIS)	15.51	
15.58							AMPHISTEGINA B			15.58	N8
15.80				15.99 Ma	15.99 Ma				DISCOASTER DEFLANDREI ACME	15.80	
16.13							ROBULUS L			16.13	
16.13						SECONDARY MARKER (DISCORBIS I)		16.13			
16.13						SECONDARY MARKER (ANOMALINA C)		16.13			
16.45						LOCAL MARKER (CRISTELLARIA 2)		16.45			
16.68						SECONDARY MARKER (CIBICIDES 38)		16.68			
16.95						CAMERINA 1		16.95			
16.95						SECONDARY MARKER (EPONIDES ORNATUS)		16.95	N7		
16.96						ROBULUS MAYERI		16.96			
17.32							SECONDARY MARKER (SPHENOLITHUS DISSIMILIS)	17.32			
17.68							SPHENOLITHUS DISBELEMNOS	17.68			
17.73							SECONDARY MARKER (GLOBOROTALIA BIRNAGEAE)	17.73			
17.75						GYROIDINA 9		17.75			
17.79							SECONDARY MARKER (CATAPSYDRAX STAINFORTHII)	17.79			
17.94					BURDIGALIAN			SPHENOLITHUS BELEMNOS	17.94	NN3	
17.95							CATAPSYDRAX DISSIMILIS		17.95		
18.11								DISCOASTER CALCULOSUS > 14	18.11		
18.27								TRIQUETRORHABDULUS CARINATUS	18.27		
18.58							CRISTELLARIA A		18.58		
18.58							SECONDARY MARKER (DISCORBIS BOLIVARENSIS)		18.58		N5
19.09								GLOBIGERINA BINAIENSIS	19.09		
19.41							MARGINULINA ASCENSIONENSIS		19.41		
19.41				SECONDARY MARKER (BOLIVINA TENUISTRATA)			19.41				
20.27				SIPHONINA DAVISI			20.27				
20.35					SECONDARY MARKER (FAD SPHENOLITHUS BELEMNOS)	20.35					
20.43			20.45 Ma		SECONDARY MARKER (GLOBIGERINOIDES PRIMORDIUS)	20.43	NN2				
20.58				PLANULINA PALMERAE		20.58					
20.96					CYCLICARGOLITHUS ABISECTUS >11	20.96					
21.01					TRIQUETRORHABDULUS CARINATUS ACME	21.01					
21.01				LENTICULINA HANSENI		21.01					
21.12					PARAGLOBOROTALIA KUGLERI	21.12					
21.98				CRISTELLARIA R		21.98					
22.26			AQUITANIAN	DISCORBIS RESTRICTED		22.26					

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22.26	CENOZOIC	LATE	AQUITANIAN	ROBULUS A			22.26	NN1	N4		
22.56					SECONDARY MARKER (GLOBIGERINA TRIPARTITA)	22.56					
22.71					LOCAL MARKER (LIEBUSELLA BYRAMENSIS)	22.71					
23.00						CLAUSICOCCUS FENESTRATUS	23.00				
23.11						SPHENOLITHUS CAPRICORNUTUS	23.11				
23.11				23.04 Ma	23.04 Ma	23.04 Ma				SECONDARY MARKER (CATAPSYDRAX DISSIMILIS ACME)	23.11
23.11						DISCORBIS GRAVELLI					23.11
23.11										SPHENOLITHUS DELPHIX	23.11
23.13										DICTYOCOCCITES BISECTUS	23.13
23.13										DICTYOCOCCITES STAVENSIS	23.13
23.22					GLOBIGERINA CIPEROENSIS	23.22					
23.25					GLOBIGERINA SELLII	23.25					
23.38				HETEROSTEGINA ISRAELSKYI			23.38				
23.74				CIBICIDES JEFFERSONENSIS			23.74				
23.99				BOLIVINA PERCA			23.99				
24.36						SPHENOLITHUS CIPEROENSIS	24.36				
24.62				MARGINULINA IDIOMORPHA			24.62				
24.78			CHATTIAN		SECONDARY MARKER (GLOBIGERINA ANGULISUTURALIS)		24.78	NP25			
24.81		MARGINULINA VAGINATA				24.81					
25.04				SECONDARY MARKER (GLOBIGERINA GORTANII SS)		25.04					
25.44		MARGINULINA HOWEI				25.44					
25.93		TEXTULARIA 14				25.93					
26.02		CAMERINA A				26.02					
26.29		UVIGERINA CANARIENSIS				26.29					
26.44		SECONDARY MARKER (PARAROTALIA CHOCTAWENSIS)				26.44					
26.47		MIOGYPSINOIDES A				26.47					
26.81					PARAGLOBOROTALIA OPIMA OPIMA	SPHENOLITHUS DISTENTUS	26.81				
26.93					SPHENOLITHUS PREDISTENTUS	26.93					
26.93		27.29 Ma	27.29 Ma			26.93					
27.30				TEXTULARIA C			27.30				
27.51				CIBICIDES HAZZARDI			27.51				
27.82				CYCLAMMINA A			27.82				
27.84				CRISTELLARIA H			27.84				
28.27						DISCOASTER TANII	28.27				
28.27						DISCOASTER TANII NODIFER	28.27				
28.27						HELICOSPHAERA COMPACTA	28.27				
28.27				MARGINULINA TEXANA			28.27				
28.27					SECONDARY MARKER (GLOBIGERINA GORTANII SL)		28.27				
28.73						SECONDARY MARKER (SPHENOLITHUS PSEUDORADIANS)	28.73				
29.33				BOLIVINA MEXICANA			29.33				
29.37				UVIGERINA H			29.37				
29.42				CIBICIDES MEXICANA			29.42				
29.47				NONION STRUMA			29.47				
29.71				NODOSARIA BLANPIEDI			29.71				

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29.96	Oligocene	EARLY	RUPELIAN	DISCORBIS D			29.96	NP23	P19		
30.00						FAD SPHENOLITHUS DISTENTUS	30.00				
30.03				UVIGERINA C			30.03				
30.04				UVIGERINA C-3			30.04				
30.21				ANOMALINA F			30.21				
30.28					SECONDARY MARKER (TURBOROTALIA AMPLIAPERTURA LAD)		30.28				
30.33				TEXTULARIA SELIGI			30.33				
30.40				CIBICIDES PSEUDOUNGERIANUS			30.40				
30.62				ANOMALINA BILATERALIS			30.62				
31.12				UVIGERINA VICKSBURGENSIS			31.12				
31.19							RETICULOFENESTRA CIRCUS	31.19			
31.30				SECONDARY MARKER (CIBICIDES 10)			31.30				
31.51							SPHENOLITHUS AKROPODUS	31.51			
31.60							DICTYOCOCCITES STAVENSIS ACME	31.60			
31.72				DISCORBIS 6			31.72				
32.02							RETICULOFENESTRA HILLAE	32.02			
32.02							RETICULOFENESTRA UMBILICA	32.02			
32.05				TEXTULARIA MISSISSIPPIENSIS			32.05				
32.10					SECONDARY MARKER (PSEUDOHASTIGERINA NAGUEWICHIENSIS)		32.10				
32.17				TEXTULARIA TUMIDULA			32.17				
32.27				TEXTULARIA WARRENI			32.27				
32.34					SECONDARY MARKER (PSEUDOHASTIGERINA MICRA)		32.34				
32.38						SECONDARY MARKER (BLACKITES SPP. PERSISTENT)	32.38				
32.38					TURBOROTALIA AMPLIAPERTURA PERSISTENT (IN GoM)		32.38				
32.45				LOXOSTOMA B			32.45				
32.92				CIBICIDES PIPPENI			32.92				
32.92					TURBOROTALIA INCREBESCENS		32.92				
32.92						ERICSONIA FORMOSA	32.92				
33.10				GYROIDINA VK			33.10				
33.23				UVIGERINA K			33.23				
33.84				ROBULUS GUTTICOSTATUS			33.84				
33.90				33.90 Ma	33.90 Ma	33.90 Ma	HANTKENINA ALABAMENSIS		33.90	NP21	P18
33.91							LOCAL MARKER (BULIMINA JACKSONENSIS), UVIGERINA COCOAENSIS		33.91		
33.92							SECONDARY MARKER (TURBOROTALIA CERROAZULENSIS CUNIALENSIS)		33.92		
34.01				MARGINULINA COCOAENSIS		34.01					
34.04				TURBOROTALIA CERROAZULENSIS CERROAZULENSIS		34.04					
34.04				TURBOROTALIA CERROAZULENSIS COCOAENSIS		34.04					
34.22				MASSILINA PRATTI		34.22					
34.44				MARGINULINA FRAGARIA TEXASENSIS		34.44					
34.44					DISCOASTER SAIPANENSIS	34.44					
34.48				TEXTULARIA HOCKLEYENSIS		34.48					

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34.72	Cenozoic	LATE	PRIABONIAN	DISCORBIS HEMISPHAERICA VAR. PLUGGED			34.72	NP18	P16			
34.77						DISCOASTER BARBADIENSIS	34.77					
35.24						CRIBROCENTRUM RETICULATA	35.24					
35.26						TEXTULARIA DIBOLLENSIS	35.26					
35.29						GLOBIGERINATHEKA TROPICALIS	35.29					
35.44						TURBOROTALIA CERROAZULENSIS POMEROLI	35.44					
35.63						CAMERINA MOODYSBRANCHENSIS	35.63					
35.89						GLOBIGERINATHEKA SEMIINVOLUTA	35.89					
36.31						GLOBIGERINATHEKA MEXICANA	36.31					
36.47						GLOBIGERINATHEKA BARRI	36.47					
37.17						SECONDARY MARKER (TURBOROTALIA ALTIPIROIDES)	37.17					
37.17					37.71 Ma	37.71 Ma					SPHENOLITHUS OBTUSUS	37.17
37.49							NONIONELLA COCKFIELDENSIS				37.49	
37.50											CAMPYLOSPHAERA DELA	37.50
37.53											SECONDARY MARKER (ACARININA SPP.)	37.53
37.57							DISCORBIS YEGUAENSIS				37.57	
37.75											SECONDARY MARKER (ACARININA COLLECTEA)	37.75
37.77											CHIASMOLITHUS GRANDIS	37.77
37.93							ANOMALINA X				37.93	
38.06											SECONDARY MARKER (FAD DICTYOCOCCITES BISECTUS)	38.06
38.17					EPONIDES YEGUAENSIS		38.17					
38.17					GYROIDINA OCTOCAMERATA		38.17					
38.24					NODOSARIA MEXICANA		38.24					
38.29							SECONDARY MARKER (MOROZOVELLA SPINULOSA)	38.29				
38.29							MOROZOVELLA CRASSATUS	38.29				
38.37							ACARININA SPINULOINFLATA	38.37				
38.47					ANOMALINA UMBONATA		38.47					
38.47							TRUNCOROTALOIDES ROHRI	38.47				
38.49				BARTONIAN	EGGERELLA CUSHMANI		38.49					
38.52					CERATOBULIMINA EXIMIA		38.52					
38.56					EPONIDES GUAYABALENSIS		38.56					
38.64							TRUNCOROTALOIDES TOPILENSIS	38.64				
38.88					CLAVULINOIDES GUAYABALENSIS		38.88					
39.97							ORBULINOIDES BECKMANNI	39.97				
40.20							SPHENOLITHUS FURCATOLITHOIDES	40.20				
40.25					OPERCULINOIDES SABINENSIS		40.25					
40.26							MOROZOVELLA LEHNERI	40.26				
40.42							SECONDARY MARKER (DISCOASTER BIFAX)	40.42				
40.44							CHIASMOLITHUS SOLITUS	40.44				
40.55			MIDDLE			ACARININA BULLBROOKI	40.55					
40.67							SPHENOLITHUS SPINIGER	40.67				
41.07						SECONDARY MARKER (RADIOLARIAN ACME A)	41.07					
41.11						SPHENOLITHUS RADIANS	41.11					
41.11				41.03 Ma		TURBOROTALIA FRONTOSA	41.11					

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42.03	EOCENE		LUTETIAN			SECONDARY MARKER (FAD CRIBROCENTRUM RETICULATA)	42.03	NP16	P12
42.03					ACARININA PENTACAMERATA SL	42.03			
42.36					IGORINA BROEDERMANNI	42.36			
42.42					DISCOASTER WEMMELENSIS	42.42			
42.42					ANOMALINA B (COCOAENSIS)	42.42			
42.50					ASTIGERINA TEXANA	42.50			
42.88					GLOBIGERINOIDES HIGGINSI	42.88			
42.90					MARGINULINA VARIATA	42.90			
42.96						42.96	SECONDARY MARKER (NANNOTETRINA FULGENS)		
42.98					CYCLAMMINA CANERIVERENSIS	42.98			
43.11					TEXTULARIA SMITHVILLENSIS (TX ONLY)	43.11			
43.26					MOROZOVELLA ARAGONENSIS	43.26	NP15	P11	
43.32					FAD RETICULOFENESTRA HILLAE	43.32			
43.32					FAD RETICULOFENESTRA UMBILICA	43.32			
43.45					FAD CYCLICARGOLITHUS FLORIDANUS	43.45		P10 (43.88-44.49)	
43.64					CHIASMOLITHUS GIGAS	43.64			
46.55					DISCOASTER SUBLODOENSIS	46.55	NP14	P9	
47.13					CYCLAMMINA E	47.13			
47.37					MOROZOVELLA CAUCASICA	47.37			
48.05					HAPLOCYTHERIDEA STENZELI (O)	48.05			
48.22					DISCOASTER LODOENSIS	48.22			
48.68					DISCOASTER KUEPPERI	48.68			
48.70				48.07 Ma	DISCORBIS 5	48.70			
48.86					ACARININA PSEUDOTOPILENSIS	48.86			
48.86					ACARININA QUETRA	48.86			
48.86					ACARININA SOLDADOENSIS ANGULOSA	48.86			
48.86					ACARININA PENTACAMERATA SS	48.86			
48.86					ACARININA SOLDADOENSIS SOLDADOENSIS	48.86			
48.86					TOWEIUS GAMMATION	48.86			
49.07					CIBICIDES HILGARDI (CIBICIDES F)	49.07			
49.14					SECONDARY MARKER (RADIOLARIAN ACME B)	49.14			
50.14						50.14	SECONDARY MARKER (DISCOASTER BINODOSUS)		
50.22			50.22	SPHENOLITHUS ANARRHOPUS					
50.63			50.63	TOWEIUS CRASSUS					
50.65			50.65	TRIBRACHIATUS ORTHOSTYLUS					
50.66		EPONIDES IOTUS	50.66	NP13	P8				
50.66		CRISTELLARIA HATCHITTIGBEENSIS	50.66						
50.81		MOROZOVELLA FORMOSA FORMOSA	50.81						
50.81		MOROZOVELLA SUBBOTINAE	50.81						
50.81		LOCAL WILCOX MARKER (BATHYSIPHON EOCENICUS)	50.81						
50.88		MOROZOVELLA FORMOSA GRACILIS	50.88						
51.11		ACARININA WILCOXENSIS	51.11						
51.11			51.11			TOWEIUS CALLOSUS			
51.45			51.45	TOWEIUS PERTUSUS					
52.85			52.85	MOROZOVELLA MARGINODENTATA					
53.12			53.12	SECONDARY MARKER (MOROZOVELLA LENSIFORMIS)					

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53.48	CENOZOIC	EARLY	YPRESIAN			DISCOASTER MULTIRADIATUS	53.48	NP11	P6b	
53.98				CYTHERIDEA SABINENSIS (O)		53.98				
54.07					SECONDARY MARKER (PLANOROTALITES CHAPMANI)	54.07				
54.09						TRIBRACHIATUS CONTORTUS	54.09			
54.12						MOROZOVELLA AEQUA	54.12			
54.30						FAD TRIBRACHIATUS ORTHOSTYLUS	54.30			
54.33						TOWEIUS EMINENS	54.33			
54.35						TRIBRACHIATUS BRAMLETTEI	54.35			
54.43						SECONDARY MARKER (MOROZOVELLA EDGARI)	54.43			
54.49							PRINSIUS BISULCUS			54.49
54.95							FASCICULITHUS INVOLUTUS			54.95
55.02						SECONDARY MARKER (SUBBOTINA VELASCOENSIS)	55.02			
55.15						MOROZOVELLA VELASCOENSIS	55.15			
55.20							CHIASMOLITHUS BIDENS			55.20
55.30						GYROIDINA LASSUS	55.30			
55.34						SECONDARY MARKER (MOROZOVELLA ACUTA)	55.34			
55.35					ERICSONIA SUBPERTUSA	55.35				
55.39				SECONDARY MARKER (RADIOLARIAN ACME C)	55.39					
55.43					PRINSIUS MARTINII PERSISTENT	55.43				
55.43				SECONDARY MARKER (MOROZOVELLA OCCLUSA)	55.43					
55.50					CRUCIPLACOLITHUS FREQUENS	55.50				
55.58					ELLIPSOLITHUS DISTICHUS	55.58				
55.59				DISCORBIS WASHBURNI	55.59					
55.60					FASCICULITHUS TYMPANIFORMIS	55.60				
55.60		56.0 Ma	56.0 Ma	56.0 Ma		TOWEIUS TOVAE	55.60	NP10	P5	
56.32						HELIOLITHUS CANTABRIAE	56.32			
57.09					ROBULUS MIDWAYENSIS		57.09			
57.10						PLANOROTALITES PSEUDOMENARDII	57.10			
57.22						SECONDARY MARKER (FAD DISCOASTER MULTIRADIATUS)	57.22			
57.22						ACARININA NITIDA	57.22			
57.56						ACARININA MCKANNAI	57.56			
58.72						HELIOLITHUS KLEINPELLI	58.72			
58.79					SECONDARY MARKER (MOROZOVELLA ANGULATA)	58.79				
58.79					SECONDARY MARKER (MOROZOVELLA CONICOTRUNCATA)	58.79				
58.79				TRIFARINA HERBERTI		58.79				
59.09					SUBBOTINA TRILOCULINOIDES	59.09				
59.12		59.24 Ma	59.24 Ma			FASCICULITHUS ULII	59.12			
59.35				GYROIDINA AERIS		59.35				
59.65						CHIASMOLITHUS DANICUS	59.65			
59.81						IGORINA PUSILLA PUSILLA	59.81			
59.87				GYROIDINA BREVIS		59.87				
60.27					PLANOROTALITES COMPRESSA	60.27				
61.68		MIDDLE	SELANDIAN			CRUCIPLACOLITHUS EDWARDSII	61.68	NP6	P4	
								NP5	P3	

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61.46	PALEO	61.66 Ma	61.66 Ma	LOCAL MARKER (ROBOLOS MIDWAYENSIS CARINATA)			61.46	NP4	P3	
61.95				MARGINULINA TUBERCULATA			61.95			
62.24				VAGINULINA LONGIFORMA, V. ROBUSTA			62.24			
62.43				VAGINULINA MIDWAYENSIS			62.43			
62.57					PRAEMURICA PSEUDOINCONSTANS		62.57			
62.63				VAGINULINA GRACILIS			62.63			
62.69					PARASUBBOTINA PSEDOBULLOIDES		62.69			
62.69					PRAEMURICA PRAEBULLOIDES		62.69			
62.73					SECONDARY MARKER (PRAEMURICA PRAECURSORIA)		62.73			
62.73					SECONDARY MARKER (PRAEMURICA UNCINATA)		62.73			
62.85			PRAEMURICA INCONSTANS		62.85					
62.85			SECONDARY MARKER (PRAEMURICA TRINIDADENSIS)		62.85					
62.87				FASCICULITHUS MAGNICORDIS	62.87					
64.03				GLOBOCONTUSA DAUBJERGENSIS	64.03	NP3				
64.72				PARVULARUGLOBIGERINA FRINGA	64.72	NP2				
64.85				PRAEMURICA TAURICA	64.85	NP1				
65.00				DISCORBIS NEWMANAE	65.00					
65.73				SECONDARY MARKER (PARVULARUGLOBIGERINA EUGIBINA)	65.73					
65.76		66.0 Ma	66.0 Ma	66.0 Ma	FAD PARASUBBOTINA PSEDOBULLOIDES		65.76		Pa	
66.00		EARLY	66.0 Ma	66.0 Ma	GLOBOTRUNCANA AEGYPTICA			66.00	CC26	
66.00	PSEUDOGUEMBELINA EXCOLATA						66.00			
66.00	RACEMIGUEMBELINA FRUCTICOSA						66.00			
66.00	GLOBOTRUNCANA ARCA						66.00			
66.00	ROSITA CONTUSA						66.00			
66.00	GLOBOTRUNCANA SPP.						66.00			
66.00	GLOBOTRUNCANITA STUARTI						66.00			
66.00					EIFFELLITHUS TURRISEIFFELII		66.00			
66.00					MICULA DECUSSATA		66.00			
66.00					MICULA MURUS		66.00			
66.00					MICULA PRINSII		66.00			
66.00					QUADNUM GARTNERI		66.00			
66.00					WATZNAUERIA BARNESAE		66.00			
66.49						ABATHOMPHALUS MAYAROENSIS		66.35	67.84 Ma	
68.37						GANSSEERINA GANSSEERI		66.49	CC25	
68.82						GLOBOTRUNCANA LINNEIANA		68.37		
68.86						GLOBOTRUNCANA BULLOIDES		68.82		
69.13						RUGOGLOBIGERINA PENNYI		68.86		
69.13						GLOBOTRUNCANA LAPPARENTI		69.13		
69.88						ROSITA FORNICATA		69.13	70.14 Ma	
70.14			PYRAMIDINA SZAJNOCHE			69.88				
70.14					REINHARDTITES LEVIS	70.14				
70.90				FAD RACEMIGUEMBELINA FRUCTICOSA		70.14				

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71.01	Cretaceous	LATE	CAMPANIAN		FAD GLOBOTRUNCANA LINNEIANA		70.90	CC24				
71.02							TRANOLITHUS ORIONATUS	71.01				
71.31							GLOBOTRUNCANA VENTRICOSA		71.02			
72.02									UNIPLANARIUS TRIFIDUS	71.31	72.32 Ma	
72.97						72.17 Ma			ASPIDOLITHUS PARCUS CONSTRICTUS	72.02		
74.51								FAD GANSSERINA GANSSERI		72.97		
74.59									REINHARDTITES ANTHOPHORUS	74.51	CC23	
74.90									ASPIDOLITHUS PARCUS PARCUS	74.59		
75.64							GLOBOROTALITES CONICUS			74.90		
75.71							FAD PYRAMIDINA SZAJNOCHE			75.64		
75.93								GLOBOTRUNCANITA CALCARATA		75.71	CC22 (75.93-76.82 Ma)	
75.93							PLANULINA TAYLORENSIS			75.93		
75.93							ANOMALINA HENBESTI			75.93	77.61 Ma	
77.79									EIFFELLITHUS EXIMIUS	75.93	CC20	
77.79								GLOBOTRUNCANITA ELEVATA SS		77.79	79.0 Ma	
79.73								ARCHAEOGLOBIGERINA BOSQUENSIS		77.79		
79.99									LITHASTRINUS GRILLII	79.73	CC19	
80.00								MARGINOTRUNCANA ANGUSTICARINATA		79.99	80.97 Ma	
80.97									BUKRYASTER HAYI	80.00	CC18	
81.43									MARTHASTERITES FURCATUS	80.97	81.43 Ma	
82.41									SECONDARY MARKER (FAD ASPIDO. PARCUS PARCUS)	81.43		
82.71									EPROLITHUS FLORALIS	82.41		
82.89								LOCAL MARKER (VENTILABELLA EGGERI)		82.71		
83.08								MARGINOTRUNCANA CORONATA		82.89	CC17	
83.61								WHITEINELLA BALTICA		83.08		
83.64								MARGINOTRUNCANA PSEUDOLINNEIANA		83.61		
83.64								FAD GLOBOTRUNCANITA ELEVATA		83.64		
83.64								DICARINELLA CONCAVATA		83.64		
83.64								MARGINOTRUNCANA RENZI		83.64		
83.80						83.65 Ma		DICARINELLA ASYMETRICA		83.64	84.08 Ma	
84.40								MARGINOTRUNCANA SCHNEEGANSI		83.80		
84.44								DICARINELLA PRIMITIVA		84.40		
84.62			SANTONIAN		SECONDARY MARKER (SIGALIA D. DECORATISSIMA)		84.44					
84.95					MARGINOTRUNCANA SINUOSA		84.62	CC16				
85.56					MARGINOTRUNCANA SIGALI		84.95					
85.57						LITHASTRINUS SEPTENARIUS	85.56					
86.33			85.70 Ma		HEDBERGELLA PORTSDOWNENSIS		85.57					
86.33					WHITEINELLA ARCHAEOCRETACEA		86.33	86.38 Ma				
86.50					WHITEINELLA PARADUBIA		86.33					

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86.74	CRETACEOUS		CONIACIAN			FAD LITHASTRINUS GRILLII	86.50	CC15			
87.71					DICARINELLA IMBRICATA		86.74				
87.86					FAD ARCHAEOLOBIGERINA BOSQUENSIS		87.71		88.14 Ma		
88.85					WHITINELLA APRICA		87.86				
88.92							STOVERIUS ACHYLOSUS		88.85		
88.92							CLAVIHEDBERGELLA SIMPLEX		88.92	CC14	
89.56						89.39 Ma	HEDBERGELLA PLANISPIRA		88.92		
89.57							HEDBERGELLA AMABILIS		89.56		
89.77							DICARINELLA HAGNI		89.57	89.77 Ma	
89.77									SECONDARY MARKER (FAD MICULA DECUSSATA)	89.77	
90.35									PREDISCOSPHAERA COLUMNATA	89.77	
90.38							ANOMALINA W			90.35	CC12
90.62						PLANULINA EAGLEFORDENSIS		90.38			
92.98					TURONIAN		MARGINOTRUNCANA MARIANOSI		90.62	92.99 Ma	
92.99								EPROLITHUS OCTOPETALUS	92.98		
92.99								SECONDARY MARKER (FAD EIFFELLITHUS EXIMIUS)	92.99		
92.99							HELVETOGLOBOTRUNCANA HELVETICA		92.99		
93.13							DICARINELLA ALGERIANA		92.99		CC11
93.14							PRAEGLOBOTRUNCANA STEPHANI		93.13		
93.52							HELVETOGLOBOTRUNCANA PRAEHELIVETICA		93.14		
93.81							FAD HELVETOGLOBOTRUNCANA HELVETICA		93.52		93.55 Ma
93.85								REINHARDTITES FENESTRATUS	93.81		
93.90						93.9 Ma		RHAGODISCUS ASPER	93.85		
93.95								HELENEA CHIASTIA	93.90		
94.20							AMMOBACULITES AGRESTIS		93.95		
94.30							AXOPODORHABDUS ALBIANUS	94.20			
94.64							ROTALIPORA CUSHMANI	94.30			
95.47							COROLLITHION KENNEDYI	94.64	CC10		
95.47							ROTALIAPORA BROTZENI	95.47			
95.47							ROTALIAPORA APPENNINICA	95.47			
95.47							ROTALIAPORA GREENHORNENSIS	95.47			
95.47							SECONDARY MARKER (ROTALIAPORA REICHELI)	95.47			
95.94					CENOMANIAN		ROTALIAPORA GLOBOTRUNCANOIDES		95.47		
95.94							FAD ROTALIAPORA CUSHMANI		95.94		
96.14							FOSSOCYTHERIDEA LENOIRENSIS (O)		96.14	96.16 Ma	
96.16							PERISSOCYTHERIDEA ODOMENSIS (O)		96.14		
96.43						FAD MICRORHABDULUS DECORATUS	96.16				
96.76						ROTALIAPORA GANDOLFI	96.43				
96.76						FAVUSELLA WASHITENSIS	96.76				
96.76						PRAEGLOBOTRUNCANA DELRIOENSIS	96.76				
98.26				EPISTOMINA CHARLOTTAE			96.76				
100.03						FAD GARTNERAGO SEGMENTATUM	98.26				

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100.45	Cenozoic	Cenozoic	Albian			WATZNAUERIA BRITANNICA	100.03	CC9				
100.49						FAD COROLLITHION KENNEDYI	100.45					
100.55						BRAARUDOSPHAERA STENORHETHA	100.49					
100.66						CYTHERIDEA BREVIS (O)	100.55					
100.66						CYTHEREIS FREDERICKSBURGENSIS (O)	100.66					
100.84						LITUOLA INFLATA	100.66					
101.18									HAYESITES ALBIENSIS	100.84		
101.39									PLANOMALINA BUXTORFI	101.18		
101.48							LITUOLA CAMERATA		101.39			
101.51									TICINELLA ROBERTI	101.48		
101.51									TICINELLA PRIMULA	101.51		
101.53									ROTALIPORA TICINENSIS	101.51		
101.59										NANNOCONUS BUCHERI	101.53	
101.59									BITICINELLA BREGGIENSIS	101.59		
101.59							DICTYOCONUS WALNUTENSIS		101.59			
101.92							LOCAL MARKER (COSKINOLINOIDES TEXANUS)	101.59				
101.92								FAD PLANOMALINA BUXTORFI	101.92			
102.05								FAD ROTALIPORA APPENNINICA	101.92			
102.42							FABANELLA TUMIDOSA	102.05				
103.14								ROTALIPORA SUBTICINENSIS	102.42			
105.29									FAD EIFFELLITHUS TURRISEFFELII	103.14		
105.44								HEDBERGELLA GORBACHIKAE	105.29			
107.50							LOCAL MARKER (EOCYTHEROPTERON TRINITIENSIS) (O)	105.44				
107.55							LOCAL MARKER (BARKERINA BARKERENSIS)	107.50				
107.55							LOCAL MARKER (SCHULERIDEA PUNCTATULA) (O)	107.55				
107.59							LOCAL MARKER (BUCCICRENATA SURGOODLANDENSIS)	107.55				
107.61								FAD BITICINELLA BREGGIENSIS	107.59			
109.94									FAD EIFFELLITHUS MONECHIAE	107.61		
110.73									FAD AXOPODORHABDUS ALBIANUS	109.94		
111.30									FAD TRANOLITHUS ORIONATUS	110.73		
111.84									FAD CRIBROSPHAERELLA EHRENBERGII	111.30		
112.95								FAD TICINELLA PRIMULA	111.84			
113.45									FAD PREDISOSPHERA COLUMNATA	112.95		
114.50									FARHANIA VAROLII	113.45		
116.23							PARASHULERIDEA CURTA (O)	114.50				
116.83						FAD NANNOCONUS REGULARIS	116.23					
118.93						NANNOCONUS ACME	116.83					

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120.57	Cretaceous	Cretaceous	BARREMIAN		GLOBIGERINELLOIDES ALGERIANUS		118.93	CC7				
122.10					TICINELLA BEJAUOENSIS		120.57					
122.10					HEDBERGELLA TROCOIDEA		122.10					
122.25					ORBITOLINA TEXANA		122.10					
123.10							MICRANTHOLITHUS HOSCHULZII		122.25			
123.61							CYTHERIDEA 8 (O)		123.10			
123.88									GLOBIGERINELLOIDES FERREOLENSIS	123.61		
124.49									FAD EPROLITHUS FLORALIS	123.88		
124.61									GLOBIGERINELLOIDES BLOWI	124.49		
124.61									NANNOCONUS STEINMANII	124.61		
125.24							CHOFFATELLA DECIPIENS			124.61		
125.59							EPISTOMINA CARACOLLA			125.24		
125.95										MICRANTHOLITHUS OBTUSUS	125.59	
126.13										CONUSPHAERA ROTHII	125.95	
126.13									HEDBERGELLA SIGALI		126.13	
126.18							GLOBULIGERINA HOTERIVICA		126.13			
126.40					HAUTERIVIAN			NANNOCONNUS STEINMANII > TRUITTI	126.18	126.4 Ma		
127.66								RUCINOLITHUS IRREGULARIS	126.40	CC6		
130.08								FAD RHAGODISCUS ACHLYOSTAURION	127.66	130.08 Ma		
131.51								CALCICALATHINA OBLONGATA	130.08	CC5		
132.54								LITHRAPHIDITES BOLLII	131.51	132.54 Ma		
132.87								SPEETONIA COLLIGATA	132.54			
132.94								CRUCIELLIPSIS CUVILLIERI	132.87	CC4		
133.00						LOCAL MARKER (EVERTOCYCLAMMINA VIRGULINA) (O)			132.94			
133.09					VALANGINIAN	EPISTOMINA HECHTI			133.00			
133.74						EIFFELLITHUS STRIATUS	133.09	134.98 Ma				
136.14						EIFFELLITHUS WINDII	133.74					
137.05						MICRANTHOLITHUS SPEETONENSIS	136.14	CC3				
137.27						CYCLAGELOSPHAERA DEFLANDREI	137.05					
139.42					CONOGLOBIGERINA HELVETOJURASSICA		137.27	139.45 Ma				
139.45			BERRIASIAN	SCHULERIDEA ACUMINATA (O)			139.42					
142.22						FAD CALCICALATHINA OBLONGATA	139.45					
142.72						FAD RETECAPSA ANGUSTIFORATA	142.22					
143.57	143.1 Ma			AMMOMARGINULINA A			142.72					
143.85	Cenozoic	Cenozoic	TIHONIAN				FAD DIADORHOMBUS RECTUS	143.57	CC2			
143.88								FAD NANNOCONUS KAMPTNERI AND N. STEINMANNII		143.85		
144.06										POLYCASTELLA BECKMANNII	143.88	
144.25							EPISTOMINA UHLIGI				144.06	
144.45										SECONDARY MARKER (NANNOCONUS WINTERERI)	144.25	
144.45										SECONDARY MARKER (HEXALITHUS NOELAE)	144.25	
144.62											144.45	144.02 Ma

Bioevent ages - Gulf of Mexico Basin, USA

Mid-latitude global, regional and sub-regional nannofossil and foraminifera-based bioevents typically identified in the Gulf Basin, USA

NOTE: All bioevents are **Highest Occurrence Datums** unless otherwise indicated
 Ages are based on the calibrations of Gradstein et al., 2020. Non-calibrated ages are assigned based on RASC analysis and Cubic Spline Interpolation of the PDI database.
 Secondary events are those either of semi-regional utilization, or are particularly rare, sporadic or infrequently identified.
 Ver. 20210618

AGE (Ma) GTS 2020	EPOCH	SUB-EPOCH	STAGE	BENTHIC FORAM BIOEVENT	PLANKTONIC FORAM BIOEVENT	NANNOFOSSIL BIOEVENT	AGE (Ma) GTS 2020	STANDARD NANNOFOSSIL ZONES (Martini, 1971)	STANDARD FORAMINIFERA ZONES (Bolli, 1969,1979)		
145.50	JURASSIC	LATE	KIMMERIDGIAN			SECONDARY MARKER (FAVICONUS MULTICOLUMNATUS)	144.62	144.95 Ma NJT17b			
145.98					REINHOLDELLA A			145.50	NJT17a (145.52-		
149.81				149.24 Ma			ELLIPSAGELOSPHAERA REINHARDTII	145.98	149.8 Ma		
149.89							FAD POLYCOSTELLA BECKMANNII	149.81	NJT15a		
150.28							SECONDARY MARKER (STEPHANOLITHION BIGOTTI BIGOTTII)	149.89	150.33 Ma		
151.65							SECONDARY MARKER (FAD CONUSPHAERA MEXICANA)	150.28			
152.05							FAD ZEUGRHABDOTUS EMBERGERI	151.65			
152.25							REINHOLDELLA B				
152.65							SECONDARY MARKER (EPISTOMINA MOSQUENSIS)				
152.65								ELLIPSAGELOSPHAERA > WATZNAURIA	152.65	NJT14	
154.51								CALCIVASCULARIS CASSIDYI	152.65		
156.74				154.78 Ma				SECONDARY MARKER (TRISCUTUM BEAMINSTERENSIS)	154.51		
158.88						OXFORDIAN		GLOBULIGERINA OXFORDIANA			
160.85									LOTHARINGIUS HAUFFII	158.88	
									LOTHARINGIUS SIGILLATUS	160.85	