Datashare 104

Biochronology, paleoenvironments, and stratigraphic sequences of the late Albian–middle Eocene fore-arc Vizcaino basin, western Baja California, Mexico

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APPENDIX 1: BIOSTRATIGRAPHIC TABLES

The following tables list the microfossil taxa used to establish sedimentary rock ages in wells A, B, C, D, E, F, G, and H drilled in the Vizcaino basin, Baja California, Mexico. List of the complete names of microfossil taxa used in Appendix 2. Microfossil groups represented are indicated as follows: Planktonic Foraminifera (~); Benthonic Foraminifera (~b); Calcareous Nannofossils (#); Dinoflagellates (*); Pollen and Spores (+). Numbers in parentheses after each taxa indicate their respective age range in Ma. CP = depth of Casing Points.

Table S1. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well A

		Well: A
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
295–300 (968–984)	Zanclean–Burdigalian (3.6–16.3)	295–300 m **C. elliptica* (3.6–16.3).
300–320 (984–1050)	Langhian–Burdigalian (14.2–16.3)	300–320 m ~*P. glomerosa* (14.2–16.3).
	Unconformity (Hiatus > 24.3 Ma)	
370–400 (1214–1312)	Bartonian–Lutetian (40.6–43.4)	370–400 m ~*G.* cf. *inaequispira* (40.6–52) and ~*D. yeguaensis* (26.4–43.4). CP 398.4 m (1307.08 ft)
755–780 (2477–2559)	Lutetian–Ypresian (43.3–50.3)	755–780 m; ~*M. aragonensis* (43.3–52.6) and ~*A. bullbrooki* (38.7–50.3).
920–940 (3018–3084)	Ypresian (50.5–51.5)	920–940 m ~*M. formosa* (50.5–51.5).
940–960 (3084–3150)	Ypresian–Thanetian (50.7–56.1)	940–960 m ~*M. formosa-gracilis* (50.7–56.1).
980–1060 (3215–3478)	Ypresian–Thanetian (54.6–56.6)	980–1000 m ~*M. velascoensis* (54.6–60.6). CP 991.5 m (3252.9 ft) 1040 (3412 ft) –1060 m ~*G. abundocamerata* (51.5–56.6).
1130–1160 (3707–3806)	Selandian–Danian (60.6–62.4)	1130–1160 m ~*P. compressa* (60.6–64) and ~*M. angulata* (57.2–62.4).
1275 (4183)	Maastrichtian (66–70.2)	1275 m ~*b O. clarki* (66–100.5).
1325–1340 (4347–4396)	Maastrichtian (67.3–70.2)	1325–1340 m ~*C. contusa* (67.3–70.2).
1345–1360 (4413–4462)	late Campanian (72.5–76.2)	1345–1360 m ~*G. linneiana* (72.5–85).
1445–1450 (4741–4757)	late Campanian (75.7–76.2)	1445–1450 m ~*G. calcarata* (75.7–76.2).
1680–1700 (5512–5577)	late Santonian (83.64–85.2)	1680–1700 m ~*W. inornata* (83.64–94.48) and ~*G. lapparenti* (77.6–85.2).
1720–1740 (5643–5709)	late Santonian–early Turonian (83.6–93)	1720–1740 m ~*M.* cf. *schneegansi* (83.6–93).
	Probable Unconformity	
1840–1860 (6037–6102)	middle Turonian–late Cenomanian (92.58–95)	1840–1860 m ~*H. praehelvetica* (92.58–95).
3630–3635 (11,910–11,926)	early Turonian–early Albian (92.9–113)	CP 2490 m (8169.3 ft) 3630–3635 m +*P. potomacensis* (92.9–130.8) and +*C. brasiliensis* (89.8–113).
3750–3768 (12,303–12,362)	Undetermined	3570 (11,713 ft) –3750 m – Conglomerates and Igneous rocks. 3750–3768 m – Basalt, Spilite rocks.

Abbreviations: ~b = Benthonic Foraminifera; * = Dinoflagellates; ~ = Planktonic Foraminifera; + = Pollen and Spores.

Table S2. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well B

		Well: B
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
500–545 (1640–1788)	Lutetian–Ypresian (43.9–50.3)	500–545 m ~*A. decepta* (43.9–50.3) and ~*T. frontosa* (40.6–50.3).
580–585 (1903–1919)	Ypresian (50.6–50.7)	580–585 m ~*M. lensiformis* (50.6–54.6) and ~*A. pentacamerata* (40.6–50.7).
600–645 (1969–2116)	Ypresian (52.6–54.5)	600–605 m (1985 ft) (~*M. aequa* (52.6–60.6). 620–625 m (2034–2051 ft); 640 (2100 ft) –645 m ~*A. wilcoxensis* (50.2–54.5).
700–725 (2297–2379)	Thanetian (57.2–58)	700–705 m (2297–2313 ft) ~*P. pseudomenardii* (57.2–60.6). 720 (2313 ft) –725 m ~*A. coalingensis* (45.8–58).
740–785 (2428–2575)	Thanetian–Selandian (57.2–59.7)	780 (2559 ft) –785 m ~*S. velascoensis* (52.6–59.7).
840–885 (2756–2904)	Thanetian–Selandian (58–59.7)	840–845 (2772 ft) m ~*M. acutispira* (58–60.7). 880 (2887 ft) –885 m **C. diebelii* (56–83.6) and CAVING? ~*S. velascoensis* (52.6–59.7).
	Unconformity (Hiatus > 6.3 Ma)	
920–1065 (3019–3494)	Maastrichtian (66–72.1)	920–925 m (3035 ft) **C. albertii* (66–72.1) and **H. fluens* (33.9–72.1). CP 1000 m (3280.8 ft) 1000–1040 m (3280–3281 ft) ~*b O. clarki* (66–100.5). 1060–1065 m (3478–3494 ft) **G. espiritosantensis* (66–93.9).
1090–1455 (3576–4774)	early Maastrichtian (69.9–72.1)	1090–1095 m (3576–3592 ft) **P. aliferum* (69.9–139.4). 1270–1275 m (4167–4183 ft) **P. cf. benjaminii* (61.6–72.1).
1480–1485 (4856–4872)	Campanian (72.1–80.6)	1480–1485 m **D. heterocostatum* (72.1–81.69) and **P. kozlowskii* (56–80.6).
1480–1635 (4856–5364)	Campanian (72.1–81.69)	1510–1515 m (4954–4971 ft) ~*G. bulloides* (72.1–84). 1630–1635 m (5348–5364 ft) **D. cretaceum* (66–81.69).
1720–1725 (5643–5660)	Campanian (72.1–83.6)	1720–1725 m **P. magnificum* (47.9–83.6).
1780–1905 (5840–6250)	Campanian (72.5–83.6)	1780–1785 m (5840–5856 ft) ~*G. linneiana* (72.5–85). 1810–1815 m (5938–5955 ft) **A. coronata* (37.8–83.6).
1990–1995 (6529–6545)	middle–early Campanian (76.4–83.6)	1990–1995 m **F. ferox* (76.4–123) and **I. bakeri* (56–83.6).
	Unconformity (Hiatus from 6.2 TO 24.1 Ma)	
2080–2085 (6824–6841)	Turonian–Cenomanian (89.8–100.5)	2080–2085 m +*C. brasiliensis* (89.8–113) and **Isabelidinium* sp. (56–100.5).
2380–2475 (7808–8120)	Albian–Hauterivian (100.5–130.8)	2380–2385 m (7808–7825 ft) +*C.* cf. *subrotundus* (100.5–157.3). 2470–2475 m (8104–8120 ft) +*C. venustus* (89.8–130.8).

(*continued*)

Table S2. Continued

		Well: B
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
2530–2535 (8301–8317)	Albian–Berriasian (100.5–145)	CP 2486.71 m (8158.5 ft) 2530–2535 m +*C.* cf. *potomacensis* (83.6–145) and +*A. australis* (66–145).
2710–2715 (8891–8908)	early Albian–Berriasian (126–145)	2679–2693 m (8789–8835 ft) Radiometric dating in igneous rock: K/Ar 135 ± 9 Ma.

Abbreviations: ~b = Benthonic Foraminifera; * = Dinoflagellates; ~ = Planktonic Foraminifera; + = Pollen and Spores.

Table S3. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well C

		Well: C
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
200–555 (656–1821)	Ypresian (50.5–50.7)	CP 196.67 m (645.24 ft) 200–220 m (656–722 ft) ~*A. esnaensis* (50.5–57.1). 550–555 m ~*A. pentacamerata* (40.6–50.7).
570–585 (1870–1919)	Ypresian (55.2–55.3)	570–575 m (1887 ft); 580 (1903 ft) –585 m ~*M. acuta* (55.2–59.1) and ~*M. subbotinae* (44.5–55.3).
700–945 (2297–3100)	Thanetian (56–58)	700–705 m (2297–2313 ft) **Paleoperidinium* sp. (56–138). 940–945 m (3084–3100 ft) ~*A. coalingensis* (45.8–58).
1000–1035 (3281–3396)	Danian (61.6–62.4)	CP 999.8 m (3280.2 ft) 1000–1005 m (3281–3297 ft) **P. benjaminii* (61.6–72.1). 1030–1035 m (3379–3396 ft) ~*M. angulata* (57.2–62.4).
1090–1155 (3576–3789)	Maastrichtian (66–72.1)	1090–1095 m (3576–3593 ft) **D. cerviculum* (66–86.3) and **C. boloniense* (66–100.5). 1150–1155 m (3773–3789 ft) **H. fluens* (33.9–72.1).
1210–1455 (3970–4774)	early Maastrichtian (69.9–72.1)	1210–1215 m (3970–3986 ft) **O. operculata* (69.9–133.9). 1300–1305 m (4265–4282 ft) **O. porifera* (69.4–86.9). 1450–1455 m (4757–4774 ft) **H. fluens* (33.9–72.1).
1530–1560 (5020–5118)	late Campanian (73.1–76.2)	1530–1540 m (5053 ft) ~*G. ventricosa* (73.1–76.4).
1540–1560 (5053–5118)	late Campanian (75.7–76.2)	1540–1560 m ~*G. calcarata* (75.7–76.2).
1570–1575 (5151–5167)	late–early Campanian (75.7–83.6)	1570–1575 m **C. diebelii* (56–83.6) and **D. digitus* (66–83.6).
1670–1680 (5479–5512)	Campanian–middle Coniacian (75.7–88.2)	1670–1680 m ~*C. fornicata* (68.4–88.2)
1990–2000 (6529–6561)	late Coniacian–middle Turonian (86.67–89.8)	1990–1995 m (6545 ft) ~*W. archaeocretacea* (86.67–94.48). 1995–2000 m ~*G. cachensis* (85.6–89.8).
2160–2180 (7087–7152)	middle Turonian (91–92.5)	2160–2180 m; 2170–2175 m ~*H. helvetica* (91–92.5).
2350–2440 (7710–8005)	Cenomanian–late Albian (93.9–101.9)	2350–2355 m (7710–7726 ft) +*E. klaszi* (93.9–113). 2410–2415 m (7907–7923 ft) REWORKING **S. perlucida* (100.5–130.8).
2440–2505 (8005–8219)	Cenomanian–late Albian (94.5–101.9)	2440–2469 m (8005–8100 ft) ~*R. appenninica* (94.5–101.9), and ~*G. ultramicra* (70.4–101.9). CP 2492 m (8175.8 ft) 2500–2505 m (8202–8219 ft): **A. grande* (93.9–139.4)
3060–3615 (10,039–11,860)	Albian (100.5–113)	3060–3065 m (10,039–10,056 ft) ~*R.* cf. *evoluta* (100.5–101.9). 3430–3495 m (11,253–11,467 ft): **A. grande* (93.9–139.4) 3490–3495 m (11,450–11,467 ft) +*C. brasiliensis* (89.8–113). 3610–3615 m (11,844–11,860 ft) +*C. trilobatus* (100.5–145) and +*C. brasiliensis* (89.8–113).

Abbreviations: * = Dinoflagellates; ~ = Planktonic Foraminifera; + = Pollen and Spores.

Table S4. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well D

		Well: D
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
80–85 (262–279)	Gelasian–Aquitanian (1.81–23)	80–85 m **S. dionaeacysta* (1.81–23).
	Unconformity? (Hiatus from 0 TO 24.8 Ma)	
115–150 (377–492)	Chattian–Lutetian (23–47.8)	115–120 m (377–394 ft) **O. microtriainum* (23–66). 145–150 m (476–492 ft) **H. truncatum* (11.63–47.9). CP 150 m (492 ft)
190–195 (623–640)	Priabonian–Lutetian (37.8–47.8)	190–195 m **C.* cf. *coniunctum* (37.8–47.8).
385–390 (1263–1280)	Bartonian–Ypresian (40.5–50.6)	385–390 m ~*G. inaequispira* (40.5–50.6).
	UNCONFORMITY (HIATUS FROM 6.5 TO 22.8 Ma)	
395–400 (1296–1312)	Thanetian–Selandian (57.2–60.6)	395–400 m ~*P. pseudomenardii* (57.2–60.6).
430–435 (1411–1427)	Selandian (59.6–60.6)	430–435 m ~*S. triloculinoides* (59.6–62) and ~*G. chapmani* (50.75–60.6).
450–455 (1476–1493)	Danian (61.6–66)	450–455 m **A.* cf. *crescentis* (61.6–66).
	Probable Unconformity (Undetermined Age, No Samples Available)	
985–990 (323–3248)	middle Turonian–middle Albian (92–110.2)	CP 748.5 m (2455.7 ft) 985–990 m ~*H.* cf. *planispira* (92–127).
1105–1110 (3625–3642)	early Cenomanian–middle Albian (96.3–110.2)	1105–1110 m #*B. africana* (96.3–113).
1112–1150 (3648–3773)	late–middle Albian (101.7–110.2)	(C) 1112–1168.5 m (3648–3834 ft) ~*b O. texana* (101.7–118). 1145 m (3757 ft) #*R. planus* (96.3–110.2). 1150 m (3773 ft) #*R.* cf. *planus* (96.3–110.2).
1215–1224 (3986–4016)	late–early Albian (101.7–113)	(C) 1215–1224 m **C. intricatum* (96.3–113).
1224–1242 (4016–4075)	late Albian–late Aptian (101.7–118)	(C) 1224–1233 m (4016–4045 ft) ~*b O. texana* (101.7–118). (C) 1233–1242 m (4045–4075 ft) ~*b O. texana* (101.7–118).
1244–1255 (4081–4118)	late Albian–late Pennsylvanian (101.7–299)	(C) 1244–1248.5 m (4081–4096 ft) Unfossiliferous (C) 1255 m +*S. antiguasporites* (56–299).
1255–1944 (4118–6378)	Undetermined	No samples available

Abbreviations: ~b = Benthonic Foraminifera; # = Calcareous Nannofossils; * = Dinoflagellates; ~ = Planktonic Foraminifera; + = Pollen and Spores.

Table S5. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well E

		Well: E
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
60–65 (197–213)	Messinian–Ypresian (5.33–50.3)	60–65 m **D.* cf. *pastielsii* (5.33–56).
90–95 (295–312)	Chattian–Ypresian (28–50.3)	90–95 m **A. biformoides* (28–66).
	Unconformity?	
95–100 (213–328)	Bartonian–Ypresian (38.7–50.3)	95–100 m ~*A. rohri* (38.7–50.3).
125–130 (410–427)	Ypresian (47.9–55.3)	125–130 m **S. microgranulatum* (47.9–76.4). CP 153.5 m (503.6 ft)
200–205 (427–673)	Ypresian (52.3–55.3)	200–205 m ~*A. aquiensis* (52.3–59.2) and ~*A. soldadoensis* (44.5–55.3).
260–265 (853–869)	Ypresian (52.3–56)	260–265 m **O. microtriainum* (23–66) and ** D. pseudocolligerum* (5.33–56).
430–615 (1411–2018)	Thanetian–Selandian (57.2–60.6)	430–435 m (1411–1427 ft) ~*P. pseudomenardii* (57.2–60.6) and ~*M. velascoensis* (54.6–60.6). 610–615 m (2001–2018 ft) ~*S. linaperta* (34–60.6).
640–645 (2100–2116)	Thanetian–Selandian (57.2–61.6)	640–645 m **A. campoensis* (47.9–61.6).
670–675 (2198–2215)	Thanetian–Danian (57.2–66)	670–675 m **D. phosphoritica* (23–66).
700–845 (2297–2772)	Maastrichtian (66–72.1)	700–705 m **H. difficile* (66–113). 725–730 m ~*b Orthokarstenia* sp. (66–100.5). 730–735 m **C.* cf. *speciosum* (47.9–72.1). 780–785; 790–795 m ~*Globotruncana* sp. (66–89.8). 840–845 m **P. benjaminii* (61.6–72.1).
915–920 (3002–3018)	Maastrichtian–middle Campanian (66–80.6)	915–920 m **C. pannuceum* (47.9–80.6). CP 1010 m (3313.6 ft)
	Probable Unconformity	
1470–1475 (4823–4839)	early Maastrichtian – Albian (69.9–113)	1470–1475 m **O.* cf. *operculata* (69.9–133.9). 1500–1505 m (4921–4938 ft) **O. operculata* (69.9–133.9) and Reworking? ~*B.* cf. *infracretacea* (109–126.3).
1530–1635 (5020–5364)	Turonian–Albian (89.8–113)	1530–1535 m (5020–5036 ft) +*C. venustus* (89.8–130.8) y **A. maculatum* (72.1–163.5). 1630–1635 m (5348–5364 ft) #*Watznaueria* sp. (60.9–195.3) and #*Zygodiscus* sp. (52.85–137).
1673–2315 (5364–7595)	early Cenomanian–Albian (98.9–113)	(C) 1630–1646m (5348–5400 ft) ~*b Orbitolina sp.* (98.9–127). (C) 1663–1672m (5456–5486 ft) ~*b Orbitolina sp.* (98.9–127). 1920–1925 m (6299–6316 ft) +*C. brasiliensis* (89.8–113). 2310–2315 m (7579–7595 ft)+*C.* cf. *brasiliensis* (89.8–113).

Abbreviations: ~b = Benthonic Foraminifera; # = Calcareous Nannofossils; * = Dinoflagellates; ~ = Planktonic Foraminifera; + = Pollen and Spores.

Table S6. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well F

		Well: F
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
55–60 (180–197)	Lutetian–Ypresian (41.2–48.4)	55–60 m (180–197) ~*I. broedermanni* (41.2–50.6).
80–395 (26–1296)	Lutetian–Ypresian (44.5–48.4)	80–85 m (263–279 ft) ~*A. soldadoensis* (44.5–55.3). CP 151 m (495 ft) 390–395 m (1280–1296 ft) ~*T. frontosa* (40.4–48.4).
420–425 (1378–1394)	Lutetian–Ypresian (44.5–54.7)	420–425 m ~*A. soldadoensis* (44.5–55.3) and ~*S.linaperta* (34–60.6).
650–660 (2133–2165)	Ypresian (52.6–54.7)	650–660 m ~*M. aequa* (52.6–60.6) and ~*A. triplex* (44.5–54.7).
800–805 (2625–2641)	Ypresian (52.6–56)	800–805 m (2625–2641) **D. pseudocolligerum* (5.33–56).
	Probable Unconformity (Hiatus from 4.4–14.9 Ma)	
905–910 (2969–2986)	Danian (62.2–62.4)	905–910 m ~*E. spiralis* (62.2–63) and ~*M. angulata* (57.2–62.4).
950–1015 (2969–3330)	Danian (62.2–66)	950–955 m (2969–3133 ft) (**A. homomorphum* (37.8–66). 1010–1015 m (3314–3330 ft)**R.* cf. *draco* (16–66).
1195–1300 (3921–4265)	late Maastrichtian (66–69.3)	1195–1200 m (3921–3937 ft) ~b *O. clarki* (66–100.5). 1270–1275 m (4167–4183 ft) **Dinogymnium* sp. (66–93.9). 1295–1300 m (4249–4265 ft) ~*G. petaloidea* (66–69.3). CP 1296 m (4251.9 ft)
1330–1335 (4364–4380)	late–early Maastrichtian (66–72.1)	1330–1335 m **C. boloniense* (66–100.5).
1360–1395 (4462–4577	late–early Maastrichtian (68.4–72.1)	1360–1380 m (4462–4528 ft) (~*C. fornicata* (68.4–88.2). 1390–1395 m (4560–4577 ft) (**H. fluens* (33.9–72.1).
147–1475 (4823–4839)	late–early Campanian (72.1–81.69)	1470–1475 m **D. heterocostatum* (72.1–81.69).
1500–1535 (4921–5036)	late Campanian–early Santonian (80.6–86.3)	1500–1505 m (4921–4938 ft) **C. chetiensis* (80.6–89.8). 1530–1535 m (5020–5036 ft) **P.* cf. *rhomboides* (66–86.3).
1700–1720 (5577–5643)	Coniacian–early Turonian (86.3–93.4)	1700–1720 m ~*H. kingi* (86.3–95.5).
1740–1745 (5709–5725)	late–early Turonian (89.8–93.4)	1740–1745 m +*C. pseudotripartitus* (89.8–139.4).
1865–2365 (6119–7759)	middle–early Turonian (92.58–93.4)	1865–1880 m (6119–6168 ft) ~*H. praehelvetica* (92.58–95) and ~*H. planispira* (92–127). 2130–2135 m (6988–7005 ft) ~*D. hagni* (90–93.4). 2360–2365 m (7743–7759 ft) ~*D. hagni* (90–93.4).
2700–2705 (8858–8875)	middle Turonian–late Albian (92.58–104)	2700–2705 m ~*Praeglobotruncana*? sp. (91.2–104).
2730–2985 (8957–9793)	Cenomanian–Albian (93.9–113)	2730–2735 m (8957–8973 ft) **Pareodinia* sp. (93.9–141.1). 2980–2985 m (9777–9793 ft) +*C. brasiliensis* (89.8–113).

Abbreviations: ~b = Benthonic Foraminifera; # = Calcareous Nannofossils; * = Dinoflagellates; ~ = Planktonic Foraminifera; + = Pollen and Spores.

Table S7. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well G

		Well: G
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
55–60 (181–197)	Bartonia–Lutetian (41.2–47.4)	55–60 m ~*I. broedermanni* (41.2–50.6) and ~*A. topilensis* (38.7–47.4).
80–90 (263–295)	Ypresian (50.5–51.5)	80–90 m ~*M. formosa* (50.5–51.5).
180–200 (591–656)	Thanetian–Selandian (57.2–60.6)	CP 151.2 m (496.1 ft) 180–200 m ~*P. pseudomenardii* (57.2–60.6).
430–440 (1411–1444)	Thanetian–Danian (57.2–62.4)	430–440 m ~*M. angulata* (57.2–62.4).
750–770 (2461–2526)	Danian (62.4–63.4)	750–770 m ~*G.* cf. *daubjergensis* (62.6–63.4). CP 894 m (2933 ft)
970–1195 (3182–3921)	late Maastrichtian (66–69.3)	970–990 m (3182–3284 ft) ~b *O. clarki* (66–100.5). 1190–1195 m (3904–3921ft) ~*G. petaloidea* (66–69.3).
1215–1235 (3986–4052)	late Maastrichtian–late Campanian (66–76.2)	1215–1235 m ~b *D. oxycona* (23–100.5)
1290–1295 (4232–4249)	late Campanian (75.7–76.2)	1290–1295 m ~*G. calcarata* (75.7–76.2).
1475–1480 (4839–4856)	late Santonian–late Turonian (83.6–91.2)	1475–1480 m ~*D. concavata* (83.6–91.2).
1575–1580 (5167–5184)	middle Turonian–early Albian (92–110.4)	1575–1580 m ~*H. planispira* (92–127) and ~*H. simplex* (91.11–110.4).
1745–1763 (5725–5784)	middle Turonian–early Albian (92–113)	(N) 1745–1754 m (5725–5755 ft) +*C.* cf. *brasiliensis* (89.8–113). (N) 1745–1763 m (5755–5784 ft) +*C. brasiliensis* (89.8–113).
1810–2405 (5938–7891)	Undetermined	CP 2074 m (6804 ft) 1810–2404.7 m (TD) Unfossiliferous.

Abbreviations: ~b = Benthonic Foraminifera; ~ = Planktonic Foraminifera; + = Pollen and Spores.

Table S8. List of the Microfossil Taxa Used to Establish Sedimentary Rock Ages in Well H

		Well: H
Depth, m (ft)	Age (Ma)	Bioevents and Important Notes (Ma)
55–65 (181–213)	Bartonian–Ypresian (38.7–47.9)	55–60 m ~*A. rohri* (38.7–50.3). 60–65 m **C. funiculatum* (33.9–47.9).
85–145 (279–476)	Bartonian–Ypresian (41.2–47.9)	85–90 m (279–295 ft) ~*A. pseudotopilensis* (41.2–51.8). 140–145 m (459–476 ft) **H. floripes* (11.63–47.9).
160–165 (525–541)	Lutetian–Ypresian (43.9–50.3)	CP 157 m (515 ft) 160–165 m ~*A. decepta* (43.9–50.3).
180–190 (591–623)	Ypresian–Selandian (54.6–60)	180–190 m ~*M. aequa-velascoensis* (54.6–60.6)
545–555 (1788–1821)	Thanetian–Danian (57.2–62)	545–555 m ~*M. angulata* (57.2–62.4).
555–635 (1821–2083)	Selandian–Danian (60.6–62)	555–560 m (1821–1837 ft) ~*I. pusilla* (60.6–64).
960–965 (3150–3166)	Danian (61.6–62)	CP 950 m (3116.8 ft) 960–965 m **P. benjaminii* (61.6–72.1) and ~*S. triloculinoides* (59.6–62).
995–1000 (3264–3281)	Danian (61.6–66)	995–1000 m **O. microtriainum* (23–66).
1010–1445 (3314–4741)	Maastrichtian (66–72.1)	1010–1025 m (3314–3363 ft) ~*b Orthokarstenia* sp. (66–100.5). 1020–1025 m (3347–3363 ft) **Circulodinium* sp. (66–136.5). 1305–1310 m (4282–4298 ft) **C. subquadrum* (66–86.3) and **P. benjaminii* (61.6–72.1). 1440–1445 m (4724–4741 ft) **H. fluens* (33.9–72.1).
1600–1630 (5249–5348)	Maastrichtian–Campanian (66–83.6)	1600–1605 m (5249–5266 ft) **P. tricuspe* (56–83.6). 1625–1630 m (5331–5348 ft) **C. diebelii* (56–83.6).
1655–1660 (5430–5446)	Campanian–late Albian (72.1–102)	1655–1660 m* *C.* cf. *granulifera* (72.1–89.8).
1705–1725 (5594–5660)	Santonian–late Albian (83.6–102)	1705–1715 m (5594–5627 ft) +*C. pannuceus* (83.6–126.3). 1720–1725 m (5643–5660 ft) **A. sagena* (23–102).
	Probable Unconformity	
1740–1745 (5709–5725)	late Turonian–late Albian (89.8–107.6)	1740–1745 m **C.* cf. *brevispinatum* (89.8–163.5).
1905–1980 (6250–6496)	late Cenomanian–late Albian (93.9–107.6)	1905–1910 m (6250–6266 ft) +*C. variverrucatus* (93.9–174.1). 1975–1980 m (6480–6496 ft) **C.* cf. *vannophorum* (86.3–107.6).
2015–2020 (6611–6627)	late Cenomanian–early Albian (93.9–112)	2015–2020 m + *A. jardinus* (93.9–130.8).
2065–2145 (6775–7037)	middle Cenomanian–early Albian (95.5–112)	2140–2145 m **Gonyaulacysta* sp. (95.5–159.7). CP 2172.1 m (7126.3 ft)
2212–2225 (7257–7300)	middle Cenomanian–early Albian (95.5–112)	(C) 2212–2215 (7257–7300 ft); 2265–2266 (7431–7434 ft) and 2316–2325 (7598–7628 ft) m Unfossiliferous. Radiometric age on igneous rock 102 ± 10 Ma.

Abbreviations: ~b = Benthonic Foraminifera; * = Dinoflagellates; ~ = Planktonic Foraminifera; + = Pollen and Spores.

APPENDIX 2: TAXA REPORTED

A list of the complete names of microfossil taxa used for age and paleoenvironmental analyses of well samples from the Vizcaino Basin, Baja California, Mexico, has been provided in the following tables. The names are arranged alphabetically within each group. See the text for references used to compile age ranges of each taxon. All references related to dinoflagellates, pollen and spores are found in PALYNODATA. References related to planktonic foraminifera can be found at http://www.mikrotax.org/pforams/pf-references.php. References related to all foraminifera can also be found at http://www.marinespecies.org/foraminifera/index.php, or at http://www.marinespecies.org/foraminifera/aphia.php?p=sources. References related to calcareous nannofossils can be found at http://www.mikrotax.org/Nannotax3/ntax-references.php. The microfossil groups represented are indicated as follows: Planktonic Foraminifera (~); Benthonic Foraminifera (~b); Calcareous Nannofossils (#); Dinoflagellates (*); Pollen and Spores (+).

Table S9. Planktonic Foraminifera

Taxa Reported in Tables	Complete Name	Stratigraphic Range in Ma
~*A. aquiensis*	*Acarinina aquiensis* Loeblich and Tappan, 1957	52.3–59.2
~*A. bullbrooki*	*Acarinina bullbrooki* Bolli, 1957	38.7–50.3
~*A. coalingensis*	*Acarinina coalingensis* Cushman and Hanna, 1927	45.8–58
~*A. decepta*	*Acarinina decepta* Martin, 1943	43.9–50.3
~*A. esnaensis*	*Acarinina esnaensis* LeRoy, 1953	50.5–57.1
~*A. pentacamerata*	*Acarinina pentacamerata* Subbotina, 1947	40.6–50.7
~*A. pseudotopilensis*	*Acarinina pseudotopilensis* Subbotina, 1953	41.2–51.8
~*A. rohri*	*Acarinina rohri* Brönnimann and Bermudez, 1953	38.7–50.3
~*A. soldadoensis*	*Acarinina soldadoensis* Brönnimann, 1952	44.5–55.3
~*A. topilensis*	*Acarinina topilensis* Cushman, 1925	38.7–47.4
~*A. triplex*	*Acarinina triplex* Subbotina, 1953	44.5–54.7
~*A. wilcoxensis*	*Acarinina wilcoxensis* Cushman and Ponton 1932	50.2–54.5
~*B.* cf. *infracretacea*	*Blefuscuiana infracretacea* Glaessner, 1937	109–126.3
~*C. contusa*	*Contusotruncana contusa* Cushman, 1926	67.3–70.2
~*C. fornicata*	*Contusotruncana fornicata* Plummer, 1931	68.4–88.2
~*D. concavata*	*Dicarinella concavata* Brotzen, 1934	83.6–91.2
~*D. hagni*	*Dicarinella hagni* Scheibnerova, 1962	90–93.4
~*D. yeguaensis*	*Dentoglobigerina yeguaensis* Weinzierl and Applin, 1929	26.4–43.4
~*E. spiralis*	*Eoglobigerina spiralis* Bolli, 1957	62.2–63
~*G. abundocamerata*	*Globorotalia abundocamerata* Bolli, 1957	51.5–56.6
~*G. bulloides*	*Globotruncana bulloides* Vogler, 1941	72.1–84
~*G. cachensis*	*Globotruncana cachensis* Douglas and Sliter, 1966	85.6–89.8
~*G. calcarata*	*Globotruncanita calcarata* Cushman, 1927	75.7–76.2
~*G. daubjergensis*	*Globoconusa daubjergensis* Bronnimann, 1953	62.6–63.4
~*G. inaequispira*	*Globigerina inaequispira* Subbotina, 1953	40.6–52
~*G. chapmani*	*Globanomalina chapmani* Parr, 1938	50.75–60.6
~*G. lapparenti*	*Globotruncana lapparenti* Brotzen, 1936	77.6–85.2
~*G. linneiana*	*Globotruncana linneiana* d'Orbigny, 1839	72.5–85
~*G. ventricosa*	*Globotruncana ventricosa* White, 1928	73.1–76.4
~*G. lobotruncana* sp.	*Globotruncana* sp. Cushman, 1927	66–89.8
~*G. petaloidea*	*Globotruncanella petaloidea* Gandolfi, 1955	66–69.3
~*G. ultramicra*	*Globigerinelloides ultramicra* Subbotina, 1949	70.4–101.6
~*H. helvetica*	*Helvetoglobotruncana helvetica* Bolli, 1945	92.58–95
~*H. praehelvetica*	*Helvetoglobotruncana praehelvetica* Trujillo, 1960	92.58–95
~*H. kingi*	*Hedbergella kingi* Trujillo, 1960	86.3–95.5

(*continued*)

Table S9. Continued

Taxa Reported in Tables	Complete Name	Stratigraphic Range in Ma
~*H. planispira*	*Hedbergella planispira* Tappan, 1940	92–127
~*H. simplex*	*Hedbergella simplex* Morrow, 1934	91.11–110.4
~*I. broedermanni*	*Igorina broedermanni* Cushman and Bermudez, 1949	41.2–50.6
~*I. pusilla*	*Igorina pusilla* Bolli, 1957; Berggren and Norris, 1997	60.6–64
~*M. schneegansi*	*Marginotruncana schneegansi* Sigal,1952	83.6–93
~*M. acuta*	*Morozovella acuta* Toulmin, 1941	55.2–59.1
~*M. acutispira*	*Morozovella acutispira* Bolli and Citta, 1960	58–60.7
~*M. aequa*	*Morozovella aequa* Renz and Cushman, 1942	52.6–60.6
~*M. aequa-velascoensis*	Transitional forms between *Morozovella aequa* and *Morozovella velascoensis*	52.6–60.6
~*M. angulata*	*Morozovella angulata* White, 1928	57.2–62.4
~*M. aragonensis*	*Morozovella aragonensis* Nuttall, 1930	43.3–52.6
~*M. formosa*	*Morozovella formosa* Bolli, 1957	50.5–51.5
~*M. formosa-gracilis*	*Morozovella formosa gracilis* Bolli, 1957	50.7–56.1
~*M. lensiformis*	*Morozovella lensiformis* Subbotina, 1953; Toumarkine and Luterbacher, 1985	50.6–54.6
~*M. subbotinae*	*Morozovella subbotinae* Renz and Morozova, 1939	44.5–55.3
~*M. velascoensis*	*Morozovella velascoensis* Cushman, 1925; McGowran, 1968	54.6–60.6
~*P. compressa*	*Planorotalites compressa* Plummer, 1926	60.6–64
~*P. pseudomenardii*	*Planorotalites pseudomenardii* Bolli, 1957	57.2–60.6
~*Praeglobotruncana* sp.	*Praeglobotruncana* Bermúdez, 1952	91.2–104
~*P. glomerosa*	*Praeorbulina glomerosa* Blow, 1956	14.2–16.3
~*R. appenninica*	*Rotalipora appenninica* Renz, 1936	94.5–101.9
~*R.* cf. *evoluta*	*Rotalipora evoluta* Sigal, 1948	100.5–101.9
~*S. linaperta*	*Subbotina linaperta* Finlay, 1939	34–60.6
~*S. triloculinoides*	*Subbotina triloculinoides* Plummer, 1926	59.6–62
~*S. velascoensis*	*Subbotina velascoensis* Cushman, 1925	52.6–59.7
~*T. frontosa*	*Turborotalia frontosa* Subbotina, 1953	40.4–48.4
~*W. archaeocretacea*	*Whiteinella archaeocretacea* Pessagno, 1967	86.67–94.48
~*W. inornata*	*Whiteinella inornata* Bolli, 1957	83.64–94.48

Abbreviation: ~ = Planktonic Foraminifera.

Table S10. Benthonic Foraminifera

Taxa Reported in Tables	Complete Name	Stratigraphic Range in Ma
~*b D. oxycona*	*Dorothia oxycona* (Reuss, 1860)	23–100.5
~*b Orbitolina* sp.	*Orbitolina* (d'Orbigny, 1850)	98.9–127
~*b O. texana*	*Orbitolina texana* (Roemer, 1849)	101.7–118
~*b Orthokarstenia* sp.	*Orthokarstenia* (Karsten, 1858)	66–100.5
~*b O. clarki*	*Orhtokarstenia clarki* (Cushman and Campbell, 1936)	66–100.5

Abbreviation: ~b = Benthonic Foraminifera.

Table S11. Calcareous Nannofossils

Taxa Reported in Tables	Complete Name	Stratigraphic Range in Ma
#B. africana	*Braarudosphaera africana* (Stradner, 1961)	96.3–113
#R. planus	*Radiolithus planus* (Stover, 1966)	96.3–110.2
#Watznaueria sp.	*Watznaueria* (Reinhardt, 1964)	60.9–195.3
#Zygodiscus sp.	*Zygodiscus* (Bramlette and Sullivan, 1961)	52.85–137

Abbreviation: # = Calcareous Nannofossils.

Table S12. Dinoflagellates

Taxa Reported in Tables	Complete Name	Stratigraphic Range in Ma
**A. biformoides*	*Achilleodinium biformoides* (Eisenack, 1954)	28–66
**A. sagena*	*Achomosphaera sagena* (Davey and Williams, 1966)	23–102
**A. campoensis*	*Aeroligera campoensis* (Caro, 1973)	47.9–61.6
**A. coronata*	*Areoligera coronata* (Wetzel, 1933)	37.8–83.6
**A. crescentis*	*Aeroligera crescentis* (Damassa, 1979)	61.6–66
**A. homomorphum*	*Apectodinium homomorphum* (Deflandre and Cookson, 1955)	37.8–66
**A. maculatum*	*Apteodinium maculatum* (Eisenack and Cookson 1960)	72.1–163.5
**A. grande*	*Apteodinium maculatum* subsp. *grande* (Cookson and Hughes, 1964; Below, 1981)	93.9–139.4
**C. albertii*	*Cerodinium albertii* (Corradini, 1973)	66–72.1
**C. boloniense*	*Cerodinium boloniense* (Riegel, 1974)	66–100.5
**C. diebelii*	*Cerodinium diebelii* (Lentin and Williams, 1987)	56–83.6
**C. pannuceum*	*Cerodinium pannuceum* (Stanley 1965)	47.9–80.6
**C. speciosum*	*Cerodinium speciosum* (Alberti 1959)	47.9–72.1
**C. subquadrum*	*Cerodinium subquadrum* (Vozzhennikova 1963)	66–86.3)
**C. chetiensis*	*Chatangiella chetiensis* (Vozzhenikova 1967)	80.6–89.8
**C. granulifera*	*Chatangiella granulifera* (Manum, 1963)	72.1–89.8
**C. brevispinatum*	*Circulodinium brevispinatum* (Millioud, 1969)	89.8–163.5
**Circulodinium* sp.	*Circulodinium* (Alberti, 1961)	66–136.5
**C. coniunctum*	*Cooksonidinium coniunctum* (Prössl, 1992)	37.8–47.8
**C. funiculatum*	*Cordosphaeridium funiculatum* (Morgenroth, 1966)	33.9–47.9
**C. intricatum*	*Cribroperidinium intricatum* (Davey, 1969)	96.3–113
**C. elliptica*	*Cyclopsiella elliptica* (Drugg and Loeblich Jr., 1967)	3.6–56
**C. vannophorum*	*Cyclonephelium vannophorum* (Davey, 1969)	86.3–107.6
**D. pastielsii*	*Dapsilidinium pastielsii* (Davey and Williams, 1966)	5.33–56
**D. pseudocolligerum*	*Dapsilidinium pseudocolligerum* (Stover, 1977)	5.33–56
**D. phosphoritica*	*Deflandrea phosphoritica* (Eisenack, 1938)	23–66
**D. cerviculum*	*Dinogymnium cerviculum* (Cookson and Eisenack, 1970)	66–86.3
**D. cretaceum*	*Dinogymnium cretaceum* (Deflandre, 1936)	66–81.69
**D. digitus*	*Dinogymnium digitus* (Deflandre, 1935)	66–83.6
**D. heterocostatum*	*Dinogymnium heterocostatum* (Deflandre, 1936)	72.1–81.69
**Dinogymnium* sp.	*Dinogymnium* (Evitt et al., 1967)	66–93.9
**F. ferox*	*Florentinia ferox* (Deflandre, 1937)	76.4–123
**G. espiritosantensis*	*Glaphyrocysta espiritosantensis* (Regali et al., 1974)	66–93.9
**Gonyaulacysta* sp.	*Gonyaulacysta* (Deflandre, 1964)	95.5–159.7
**H. fluens*	*Hafniasphaera fluens* (Hansen, 1977)	33.9–72.1

(*continued*)

Table S12. Continued

Taxa Reported in Tables	Complete Name	Stratigraphic Range in Ma
**H. floripes*	*Homotryblium floripes* (Deflandre and Cookson, 1955)	11.63–47.9
**H. truncatum*	*Hystrichokolpoma truncatum* (Biffi and Manum, 1988)	11.63–47.9
**H. difficile*	*Hystrichosphaeridium difficile* (Manum and Cookson, 1964)	66–113
**I. bakeri*	*Isabelidinium bakeri* (Lentin and Williams, 1977)	56–83.6
**Isabelidinium* sp.	*Isabelidinium* (Lentin and Williams, 1977)	56–100.5
**O. operculata*	*Odontochitina operculata* (Wetzel, 1933)	69.9–133.9
**O. porifera*	*Odontochitina porifera* (Cookson, 1956)	69.4–86.9
**O. microtriainum*	*Operculodinium microtriainum* (Klumpp, 1953)	23–66
**P. benjaminii*	*Paleocystodinium benjaminii* (Drugg, 1967)	61.6–72.1
**P. rhomboides*	*Paleocystodinium rhomboides* (Lentin and Williams, 1973)	66–86.3
**Paleoperidinium* sp.	*Paleoperidinium* (Deflandre, 1934)	56–138
**Pareodinia* sp.	*Pareodinia* (Deflandre, 1934)	93.9–141.1
**P. kozlowskii*	*Phelodinium kozlowskii* (Górka, 1963)	56–80.6
**P. magnificum*	*Phelodinium magnificum* (Stanley, 1965)	47.9–83.6
**P. tricuspe*	*Phelodinium tricuspe* (Wetzel, 1933)	56–83.6
**P. aliferum*	*Pterodinium aliferum* (Eisenack, 1958)	69.9–139.4
**R. draco*	*Rhombodinium draco* (Gocht, 1955)	16–66
**S. dionaeacysta*	*Selenopemphix dionaeacysta* (Head et al., 1989)	1.81–23
**S. microgranulatum*	*Senegalinium microgranulatum* (Stanley, 1965)	47.9–76.4
**S. perlucida*	*Subtilisphaera perlucida* (Jain and Millepied, 1973)	100.5–130.8

Abbreviation: * = Dinoflagellates.

Table S13. Pollen and Spores

Taxa Reported in Tables	Complete Name	Stratigraphic Range in Ma
+A. jardinus	*Afropollis jardinus* (Brenner, 1968; Doyle, Jardin, and Doerenkamp, 1982)	93.9–130.8
+A. australis	*Araucariacites australis* (Cookson, 1947)	66–145
+C. trilobatus	*Callialasporites trilobatus* (Balme, 1957; Dev, 1961)	100.5–145
+C. potomacensis	*Cicatricosisporites potomacensis* (Brenner, 1963)	83.6–145
+C. pseudotripartitus	*Cicatricosisporites pseudotripartitus* (Bolkhovitina, 1961; Dettmann, 1963)	89.8–139.4
+C. subrotundus	*Cicatricosisporites subrotundus* (Brenner, 1963)	100.5–157.3
+C. venustus	*Cicatricosisporites venustus* (Deak, 1963)	89.8–130.8
+C. brasiliensis	*Classopollis brasiliensis* (Herngreen, 1975)	89.8–113
+C. variverrucatus	*Concavisporites variverrucatus* (Couper, 1958)	93.9–174.1
+C. pannuceus	*Crybelosporites pannuceus* (Brenner, 1963; Srivastava, 1977)	83.6–126.3
+P. potomacensis	*Plicatella potomacensis* (Brenner, 1963; Davies, 1985)	92.9–130.8
+S. antiguasporites	*Stereisporites antiguasporites* (Wilson and Webster, 1946; Dettmann, 1963)	56–299

Abbreviation: + = pollen and spores.

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