

## Timothy D. Herbert

Professor

Department of Geological Sciences

Center for Environmental Studies

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### WORK ADDRESS

Brown University, Box 1846  
Providence, RI 02912  
(401) 863-1207

### EDUCATION

Ph.D., Princeton University, 1987, Geological Sciences  
B.S., Yale College, 1980 (Magna Cum Laude, Distinction in Geology)

### PROFESSIONAL APPOINTMENTS

Professor, Brown University, 2006- present  
Associate Professor, Brown University, 1995-2005  
Assistant and Associate Professor, Scripps Institution of Oceanography, 1988 to 1995  
Visiting Scientist, Program in Atmospheric and Oceanic Sciences, Princeton University, 1988  
Visiting Scientist, Woods Hole Oceanographic Institution, 1987  
Exploration Geologist, Ammonite Petroleum Corp., 1980-1981

### PUBLICATIONS

#### BOOK CHAPTERS:

Lawrence, K.T. , T.D. Herbert, P.S. Dekens, and A.C. Ravelo, 2007, The application of the alkenone organic Proxy to the study of Plio-Pleistocene climate, In Williams, M., Haywood, A., Gregory, J. Deep-Time Perspectives on Climate Change: Marrying the Signal from Computer Models and Biological Proxies . The Geological Society.

Ravelo, A.C., Billups, K., Dekens, P.S., Herbert, T., Lawrence, K. , 2007, Onto the Ice Ages: Proxy evidence for the onset of Northern Hemisphere Glaciation. In Williams, M., Haywood, A., Gregory, J. Deep-Time Perspectives on Climate Change: Marrying the Signal from Computer Models and Biological Proxies . The Geological Society.

Herbert, T.D., 2003, Alkenone Paleotemperature Determinations, Chapter in Treatise in Marine Geochemistry, H. Elderfield and K.K. Turekian (eds.), Elsevier, p. 391-432

D'Hondt, S., T.D. Herbert, J. King, and C. Gibson, 1996, Planktic foraminifera, asteroids, and marine production: Death and recovery at the Cretaceous-Tertiary boundary, in G. Ryder, D. Fastovsky, and S. Gartner (eds.) The Cretaceous-Tertiary Event and Other Catastrophes in Earth History, Geological Society of America Special Paper 307, p. 303-317.

Herbert, T.D., J.S. Gee, and S. DiDonna, 1999, Precessional climatic cycles in the late Cretaceous South Atlantic: Long-term consequences of high-frequency variations, in E. Barrera and C. Johnson (eds.) Late Cretaceous Climates, S.E.P.M. Special Volume #322, p. 105-120.

Herbert, T.D., I. Premoli Silva, E. Erba, and A.G. Fischer, 1995, Orbital chronology of Cretaceous- Paleogene marine strata, in D.V. Kent and W.A. Berggren (eds.), Geochronology, Time Scales, and Global Stratigraphic Correlation, SEPM Special Publication no. 54, p. 81-93.

Herbert, T.D., 1994, Reading orbital signals distorted by sedimentation: Models and examples, in P.L. deBoer and D.G. Smith (eds.), Orbital Forcing and Cyclic Sequences, Special Publication of the International Association of Sedimentologists 19, p. 483-507.

Herbert, T.D., W.B. Curry, J. Barron, L. Codispotti, R. Keir, A. Mix, B. Mycke, H. Schrader, R. Stein, and H.R. Thierstein, 1989, The geological record of marine paleoproductivity, In: W.H. Berger, E. Suess, and G. Wefer (eds.) Productivity of the World Ocean: Past and Present, Dahlem Workshop Report, J. Wiley, N.Y. pp. 409-428.

Fischer, A.G., T.D. Herbert, and I. Premoli Silva, 1985, Carbonate bedding cycles in Cretaceous pelagic and hemipelagic sequences, In: L.M. Pratt, E.G. Kauffman, and F.B. Zelt (eds.) Deposits and Biofacies of the Cretaceous Western Interior Seaway: Evidence of Cyclic Sedimentary Processes (S.E.P.M. Field Trip Guidebook no.4), 1-10.

#### REFEREED JOURNAL ARTICLES:

L. C. Cleaveland, and T.D. Herbert, Preservation of the alkenone paleotemperature proxy in uplifted marine sequences: a test from the Vrica outcrop, Crotona, Italy, accepted by *Geology*.

Liu, Z., M. A. Altabet, and T. D. Herbert, Plio-Pleistocene Denitrification in the Eastern North Tropical Pacific: Intensification at 2.1 Ma, accepted, *Earth and Planetary Science Letters*.

Li, Y.-X., T. J. Bralower, I. P. Montañez, D.A. Osleger, M.A. Arthur, D.M. Bice, T.D. Herbert, E. Erba, I. Premoli Silva, 2008, Toward an orbital chronology for the early Aptian Oceanic Anoxic Event (OAE1a, ~120 Ma), *Earth and Planetary Science Letters*. 271: 88-100.

Agnihotri R., M.A. Altabet, T.D. Herbert, and J.E. Tierney, 2008, Subdecadally resolved paleoceanography of the Peru margin during the last two millennia, *GEOCHEMISTRY GEOPHYSICS GEOSYSTEMS* Volume: 9 Article Number: Q05013.

Z. Liu, L. C. Cleaveland, and T.D. Herbert, 2008, Early onset and origin of 100-kyr cycles in Pleistocene tropical SST records, *Earth and Planetary Science Letters* 265: 703–715.

- Lisiecki, L., and T.D. Herbert, 2007, Automated composite depth scale construction and an analysis of deformation in sediment cores from the Ocean Drilling Program, *Paleoceanography*, 22, PA4213, doi:10.1029/2006PA001401.
- Cleaveland, L.C., and T.D. Herbert, 2007, Coherent obliquity band and heterogeneous precession band responses in early Pleistocene tropical sea surface temperatures, *Paleoceanography* 22: Art. No. PA2216.
- D'Andrea, W.J., Z. Liu, M. Da Rosa Alexandre, S. Wattleley, T. D. Herbert, and Y. Huang, 2007, An efficient method for isolating individual long-chain alkenones for compound-specific hydrogen isotope analysis, *Anal. Chem.* 2007, 79: 3430-3435.
- Agnihotri, R., M.A. Altabet, and T.D. Herbert, 2006, Influence of marine denitrification on atmospheric N<sub>2</sub>O variability during the Holocene, accepted, *Geophys. Res. Lett.*, 33: Art. No. L13704.
- Lawrence, K.T., Z. Liu, and T.D. Herbert, 2006, Evolution of the Eastern Tropical Pacific through Plio-Pleistocene glaciation, *Science* 312: 79-83.
- Liu, Z., M.A. Altabet, and T.D. Herbert, 2005, Glacial-Interglacial Modulation of Eastern Tropical North Pacific Denitrification over the Last 1.8-Myr, *Geophys. Res. Lett.* 32, L23607, 10.1029/2005GL024439
- Lawrence, K.T. and T.D. Herbert, 2005, Late Quaternary sea-surface temperatures in the western Coral Sea: Implications for the growth of the Australian Great Barrier Reef, *Geology* 33: 677-680.
- Higginson, M. J., M.A. Altabet, L. Wincze, T.D. Herbert, and D.W. Murray, 2004b, A solar (irradiance) trigger for millennial-scale abrupt changes in the southwest monsoon? *Paleoceanography*, 19, PA3015, 10.1029/2004PA001031.
- Higginson, M.J., M.A. Altabet, D.W. Murray, R.W. Murray, and T.D. Herbert, 2004a, Geochemical evidence for abrupt changes in relative strength of the Arabian monsoons during a stadial/interstadial climate transition, *Geochimica Cosmochimica Acta*, 68: 3807-3826.
- Liu, Z., and T.D. Herbert, 2004, High latitude signature in Eastern Equatorial Pacific Climate during the Early Pleistocene Epoch, *Nature*, 427: 720-723.
- Barron, J. A., L. Heusser, T. Herbert, and M. Lyle, 2003, High-Resolution Climatic Evolution of Coastal Northern California During the Past 16,000 Years, *Paleoceanography*, 18, 10.1029/2002PA000768.
- Kukla, G., M.Bender, J.-L. de Beaulieu, G. Bond, W. Broecker, P. Cleveringa, J. E. Garvin, T. Herbert, J. Imbrie, J. Jouzel, L.D. Keigwin, K.L. Knudsen, J. McManus, J. Merkt, D.R. Muhs, H. Muller, R.Z. Poore, S.C. Porter, G. Seret, N.J. Shackleton, C. Turner, P.C. Tzedakis, I. Winograd., 2002, Last Interglacial climates, *Quaternary Research*, 58: 2-13.
- Herbert, T.D., J.D. Schuffert, D. Andreasen, L. Heusser, M. Lyle, A. Mix, A.C. Ravelo, L.D. Stott, and J.C. Herguera, 2001, The California Current, Devils Hole and Pleistocene Climate, response, *Science*, 296: 7.

- Lyle, M., L. Heusser, T. Herbert, A. Mix, and J. Barron, 2001, Interglacial theme and variations: 500 k.y. of orbital forcing and associated responses from the terrestrial and marine biosphere, U.S. Pacific Northwest, *Geology*, 29: 1115-1118.
- Herbert, T.D., J.D. Schuffert, D. Andreasen, L. Heusser, M. Lyle, A. Mix, A.C. Ravelo, L.D. Stott, and J.C. Herguera, 2001, Collapse of the California current during glacial maxima linked to climate change on land, *Science*, 293: 71-76.
- Herbert, T.D., 2001, Paleoceanography: Orbitally tuned time scales, Encyclopedia of Ocean Sciences, J. Steele, S. Thorpe and K. Turekian (eds.), Academic Press, pp. 2048-2054.
- Rossell-Mele, A., E. Bard, E-C. Emeis, J.O. Grimalt, P. Muller, R. Schneider, I. Bouloubassi, B. Epstein, K. Fahl, A. Fluegge, K. Freeman, M. Goni, U. Guntner, D. Hartz, S. Hellebust, T. Herbert, M. Ikehara, R. Ishiwatari, K. Kawamura, F. Kenig, J. de Leeuw, S. Lehman, L. Mejanelle, N. Ohkouchi, R.D. Pancost, C. Peljero, F. Prahl, J. Quinn, J.F. Rontani, F. Rostek, J. Rulkotter, J. Sachs, T. Blanz, K. Sawada, D. Schulz-Bull, E. Sikes, C. Sonzogni, Y. Ternois, G. Versteegh, J.K. Volkman, and S. Wakeham, 2001, Precision of the current methods to measure the alkenone proxy  $U^k_{37}$  and absolute alkenone abundance in sediments: results of an inter-laboratory comparison study, *Geochem., Geophys., Geosyst.* 1. [electronic journal of the AGU].
- Lee, K.Y, N. Slowey, and T.D. Herbert, 2001, Glacial sea surface temperatures in the subtropical North Pacific: A comparison of  $U^k_{37}$ ,  $\delta^{18}O$ , and foraminiferal assemblage temperature estimates, *Paleoceanography* 16: 268-279.
- Herbert, T.D., 2000, Review of alkenone calibrations (culture, water column, and sediments), *Geochem., Geophys., Geosyst.* [electronic journal of the AGU].
- Prahl, F., T. Herbert, S.C. Brassell, N. Ohkouchi, M. Pagani, D. Repeta, A. Rossell-Mele, and E. Sikes, 2000, Status of alkenone paleothermometer calibration: Report from Working Group 3, *Geochem., Geophys., Geosyst.* 1. [electronic journal of the AGU].
- Kreitz, S.F., T.D. Herbert and J.D. Schuffert, 2000, Alkenone paleothermometry and orbital scale changes in sea surface temperatures at Site 1020, northern California Margin, Proceedings of the Ocean Drilling Program, Scientific Results, v. 167, p. 153-161.
- Herbert, T.D. and J.D. Schuffert, 2000, History of sea surface temperature variations in Cariaco Basin over a full glacial-interglacial cycle, Proceedings of the Ocean Drilling Program, Scientific Results, v. 165, p. 239- 247.
- Herbert, T.D., 1999, Toward a composite orbital chronology for the late Cretaceous and early Palaeocene GPTS, *Philosophical Transactions of the Royal Society*, 357: 1891-1905.
- Herbert, T.D., and J. Schuffert, 1998, Alkenone unsaturation estimates of late Miocene through late Pliocene sea surface temperature changes, ODP Site 958, Proceedings of the Ocean Drilling Program, Scientific Results, v. 159T, p. 17-22.
- Herbert, T.D., J.D. Schuffert, D. Thomas, K. Lange, A. Weinheimer, and J.-C. Herguera, 1998, Depth and seasonality of alkenone production along the California margin inferred from a core-top transect, *Paleoceanography*, 13, p. 263-271.

- Herbert, T.D., F. Bassinot, J. Gruetzner, and K. Moran, 1997, The life cycle(s) of sediment physical properties, Ceara Rise, Proceedings of the Ocean Drilling Program, Scientific Results, v. 154, p. 157-168.
- Herbert, T.D., 1997, A long history of marine carbon cycle modulation by orbital climatic change, *Proceedings National Academy of Sciences*, 94: 8362-8369.
- Tauxe, L., T.D. Herbert, and N.J. Shackleton, 1996, The age of the Matuyama- Brunhes boundary: Consequences for magnetic lock-in depth and the loess-ocean connection, *Earth & Planetary Science Letters*, 140: 133-146.
- Herbert, T.D., M. Yasuda, and C. Burnett, 1995, Glacial-Interglacial sea surface temperature record as inferred from alkenone unsaturation indices, Site 893, Santa Barbara Basin, in Proceedings of the Ocean Drilling Program, Scientific Results, v. 146, p. 257-264.
- Martin, E.E., J.D. Macdougall, T.D. Herbert, A. Paytan, and M. Kastner, 1995, Strontium and neodymium isotopic analyses of marine barite separates, *Geochimica Cosmochimica Acta*, 59: 1353-1361.
- Hartl, P., L. Tauxe, and T. Herbert, (1995, Earliest Oligocene increase in South Atlantic productivity as interpreted from "rock magnetism" at Deep Sea Drilling Project Site 522, *Paleoceanography*, 10: 311-325.
- Paytan, A., E.E. Martin, M. Kastner, J.D. Macdougall and T. Herbert, 1993, Marine barite as a monitor of seawater strontium isotope composition, *Nature*, 366: 445-449.
- Herbert, T.D., 1993, Differential compaction in lithified deep-sea sediments is not evidence for "diagenetic unmixing", *Sedimentary Geology*, 84: 115-122.
- Herbert, T.D., 1992, Paleomagnetic calibration of Milankovitch cyclicity in lower Cretaceous sediments, *Earth & Planetary Science Letters*, 112: 15-28.
- Herbert, T.D., B.A. Tom, and C. Burnett, 1992, Precise major component determinations in deep-sea sediments using Fourier Transform Infrared Spectroscopy, *Geochimica Cosmochimica Acta*, 56: 1759-1763.
- Herbert, T.D., and L. Mayer, 1991, Long climatic time series from DSDP/ODP physical property measurements, *Journal of Sedimentary Petrology*, 61: 1089-1108.
- Herbert, T.D., and J.L. Sarmiento, 1991, Ocean nutrient distribution and oxygenation: Limits on the formation of warm, saline bottom water over past 91 M.y., *Geology*, 19: 702-705.
- Herbert, T.D., and S.L. D'Hondt, 1990, Precessional climate cyclicity in late Cretaceous-early Tertiary marine sediments: a high resolution chronometer of Cretaceous-Tertiary boundary events, *Earth & Planetary Science Letters*, 99: 263-275.
- Sarmiento, J.L., T.D. Herbert, and J.R. Toggweiler, 1988, Mediterranean nutrient balance and episodes of anoxia, *Global Biogeochemical Cycles*, 2: 427-444.
- Sarmiento, J.L., T.D. Herbert, and J.R. Toggweiler, 1988, Causes of anoxia in the world ocean, *Global Biogeochemical Cycles*, 2: 115-128.

- Herbert, T.D., 1987, Eccentricity and precessional orbital climate cycles in a mid-Cretaceous deep-sea sequence: application to quantitative paleoclimatology, Ph.D. dissertation, Princeton University.
- Park, J., and T.D. Herbert, 1987, Hunting for paleoclimatic periodicities in a sedimentary series with uncertain time scale, *Journal of Geophysical Research*, 92B: 14,027-14,040.
- Keller, G., T. Herbert, R. Dorsey, S. D'Hondt, M. Johnsson, and W.R. Chi, 1987, Global distribution of late Paleogene hiatuses, *Geology*, 15: 199-203.
- Fischer, A.G., and T.D. Herbert, 1986, Stratification rhythms: Italo-American studies in the Umbrian facies, *Mem. Soc. Geol. Italy*, 31: 45-51.
- Herbert, T.D., R.F. Stallard, and A.G. Fischer, 1986, Anoxic events, productivity rhythms, and the orbital signature in a mid-Cretaceous pelagic core, *Paleoceanography*, 1: 495-506.
- Herbert, T.D., and A.G. Fischer, 1986, Milankovitch climatic origin of mid-Cretaceous black shale rhythms in central Italy, *Nature*, 321: 739-743.
- Scientific Staff of the Bannock cruise, including T.D. Herbert, 1985, Gypsum precipitation from cold brines in an anoxic basin in the eastern Mediterranean, *Nature*, 314: 152-154.

#### WORK IN REVIEW;

- Caissie, B.E., J. Brigham-Grette, K.T. Lawrence, and T.D. Herbert, Deglaciation to Holocene sea surface conditions at Umnak Plateau, Bering Sea as inferred by diatom, alkenone, and stable isotope records, to be submitted to *Paleoceanography*.
- J. C. Herguera, T. Herbert, M. Kashgarian, C. Charles: Enhanced ventilation of upper intermediate waters in the north Pacific during the last Glacial Maximum, submitted to *G<sup>3</sup>*.
- Ruggieri, E., Herbert, K. T. Lawrence and C. E. Lawrence: in review, The Change Point Method for Detecting Regime Shifts in Paleoclimatic Time Series: Application to Plio-Pleistocene, submitted to *Paleoceanography*.

#### Invited Lectures last 5 years:

Woods Hole Oceanographic Institution, 2002; Goldschmitt Conference 2002; Princeton University 2003; Duke University 2003; Boston University 2004; 2005; American Geophysical Union Fall 2004; Yale University 2005; SUNY Albany 2006; Lamont-Doherty Earth Observatory, 2007; Harvard University 2007, Harvard University 2008, Yale University 2008

#### Research Cruises:

R/V Bannock (1985), R/V New Horizon (1991), R/V Joides Resolution (Leg 154, 1994)

## RESEARCH IN PROGRESS:

Alkenone paleotemperature estimates from marine sediments; History of the El Nino phenomenon from geological records, Evolution of pre-Pleistocene “Milankovitch” climate sensitivity; Application of orbital cyclicity to quantitative stratigraphy; Sediment fluxes in the ocean on  $10^4$ - $10^7$  yr time scales; Simple ocean carbon-nutrient-oxygen models for paleoceanography; Carbonate diagenesis.

## SERVICE

### TO THE UNIVERSITY:

Committee on Minority Faculty Recruitment (1996- 2000)  
Chair, CMFR (1999-2000)  
Committee on Student Life (Fall, 1998, 2000-2003)  
Freshman Advisor (2001- )  
Panelist in Career Services event for graduate students, Fall 2000, 2002  
Member, Global Environmental Change ad hoc committee (1999-2003)  
MBL-Brown Joint Ph.D. Program steering committee (2003-2004)  
Committee on the Status of Women (2005- 2006)  
Sharpe Assistant Professor Search in Environmental Studies (2006-2007)  
Environmental Change Initiative Board (2006- present)  
Environmental Change faculty search (2007)  
Environmental Council (2007- )  
Brown Community Council (2008- )

### TO THE DEPARTMENT:

Curriculum Committee (1995-1997)  
Geology-Biology Concentration Advisor (1995-1996; 2006-present)  
Faculty search committee (1997)  
Chair, departmental search committee (1998-1999)  
Chair’s Advisory Council (2000-2003)  
Chair, Admissions & Awards (2001- 2006)  
Chair, Ad-hoc committee for appointment of Steven Clemens as Associate Professor of Research (2004)  
Chair, departmental Assistant Professor search committee (2004-2005)  
Chair (2008- )

### TO THE PROFESSION:

Reviewer of approximately 5 journal articles/year  
Member, Ocean History Panel, Ocean Drilling Program (1991-1994)  
Co-director, SIO summer undergraduate research program for minorities in science  
National Science Foundation Marine Geology and Geophysics panelist  
Member, United States Scientific Advisory Committee for the Ocean Drilling Program (1997-2000)  
Member, “Extreme Climates” international advisory group to the O.D.P. (1998-2000)

Editorial Board Member, *Geology* (Journal of the Geological Society of America) (2002-2005)

TO THE COMMUNITY:

Principal Investigator, N.S.F. GK-12 “Physical Processes in the Environment” outreach program (2007- )

Faculty Advisor, Geological Sciences volunteer outreach program to Vartan Gregorian Elementary School (2005-2007)

HONORS AND AWARDS

Yale College Wilde Prize in Marine Geology, 1980

National Science Foundation Graduate Fellowship, 1982-1985

TEACHING AND MENTORING

COURSES (UNDERGRADUATE & GRADUATE)

GE0240 (Introduction to Earth Systems History) Spring 2005 enrollment 24; Spring 2007 enrollment 30; Spring 2008 enrollment 28

GE1130 (Global Biogeochemical Cycles in the Ocean), Spring 2007 enrollment 20, Fall 2008 enrollment 21

GE1240 (Stratigraphy and Sedimentation), Fall 2005 enrollment 14; Fall 2006 enrollment 13; Fall 2007 enrollment 10

GE2920 (The Enigma of Warm Geological Climates) Spring 2005 enrollment 8, Spring 2008 enrollment 9

FIRST-YEAR ADVISING (LAST 3 YEARS): 2005-2006 (5); 2006-2007 (5); 2007-2008 (6); 2008-2009 (6)

INDEPENDENT STUDY PROJECTS (LAST 3 YEARS):

Anna Mulligan (2005) “Variation of Sea Surface Temperatures and Primary Production in the East Equatorial Atlantic (1.4-4.0 Ma), Honors Thesis

Robert Winton (2007) “Reconstructing El Nino Climate Changes Off Peru” Honors Thesis

Alice Alpert (2007) “Local and Global Signals in Arabian Sea Paleoceanography over the Pleistocene” UTRA and independent study project

Hans DeJong (2007) “Two Modes in the Eastern Pacific: Warm and Steady and Cold and Oscillating” ” UTRA and independent study project

PH.D. STUDENTS:      Zhongui Liu (2004)  
                                 Lorraine Lisiecki (2005)  
                                 Kira Lawrence (2006)  
                                 Laura Cleaveland (2008)

POST-DOCTORAL SCHOLARS:

Zhonghui Liu (2004-2006 )

CURRENT PH.D. STUDENTS: Primary advisor, C. Chazen, Emily Pohlman, and Jeffrey Salacup, member of 13 other graduate student advisory/thesis committees.

DATE OF PREPARATION

January 15, 2009