

Hugh William Ducklow

Curriculum Vitae

Personal Information

1. Name: Hugh William Ducklow Date: 18 September, 2009
2. Office address: The Ecosystems Center, Starr 223
MBL, Woods Hole, MA 02543
- Phone: (508) 289-7193 Fax: (508) 457-1548
Email: hducklow@mbl.edu
WWW: <http://ecosystems.mbl.edu/Staff/ducklow.html>
3. Position: Director, The Ecosystems Center

Education and Postdoctoral Training:

- 1977:** Postdoctoral Fellowship. Harvard University. Research: Biocontrol of Schistosomiasis vector snails. Supervisor: Ralph Mitchell.
- 1977:** Ph.D.; Harvard University, Cambridge, MA; Division of Applied Sciences; Major field: Environmental Engineering. Advisor: Ralph Mitchell.
- 1974:** AM; Harvard University, Cambridge, MA; Division of Engineering and Applied Physics; Major field: Environmental biology.
- 1972:** AB; Harvard College, Cambridge, MA; summa cum laude; Phi Beta Kappa; Concentration: History and Science.

Professional Positions:

- 1977:** Post-doctoral research fellow, Division of Applied Sciences, Harvard University. Advisor: Professor Ralph Mitchell.
- 1980:** Research Associate, Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY.
- 1984:** Associate Research Scientist, Horn Point Environmental Laboratory, Cambridge, MD.
- 1991:** Full Professor, University of Maryland Horn Point Environmental Laboratory, Cambridge, MD.
- 1994:** Glucksman Professor of Marine Science, The College of William and Mary School of Marine Sciences and Virginia Institute of Marine Science, Gloucester Point VA.
- 2007:** Director, The Ecosystems Center, MBL, Woods Hole Ma 02543
- 2007:** Professor, Dept of Ecology and Evolutionary Biology, Brown University

Honors and Awards:

- 1972:** Graduated Summa cum laude, Phi Beta Kappa, Harvard College.
- 2002:** Elected Fellow of AAAS

Invited Talks, past five years

- 2009** Ducklow, **HW**. “Organic Matter Utilization in Polar Seas” Ocean Carbon Biogeochemistry Southern Ocean Scoping Workshop, Princeton University. Invited Plenary
- 2009** Ducklow, **HW**. “Rapid Climate Warming and Ecosystem Response on the West Antarctic Peninsula.” Harvard Forest, Petersham, MA. Invited seminar.
- 2009** Ducklow, **HW**. “Rapid Climate Warming and Ecosystem Response on the West Antarctic Peninsula.” Harvard Extension School. Invited lecture.
- 2009** Ducklow, **HW**. “Crossing Decadal Time Scales: Antarctica” Gordon Conference on Polar Oceanography. Lucca, Italy. Invited Plenary.
- 2008** Ducklow, **HW**. “Rapid Climate Warming and Ecosystem Response on the West Antarctic Peninsula.” University of MA-Boston, Dept of Earth and Oceans. Invited seminar.
- 2008** Ducklow, **HW**. “Rapid Climate Warming and Ecosystem Response on the West Antarctic Peninsula.” Brown University, Dept. of Geology. Invited seminar.
- 2008** Ducklow, **HW**. “Rapid Climate Warming and Ecosystem Response on the West Antarctic Peninsula.” MIT Dept Civil Engg, Cambridge, MA. Invited seminar.
- 2008** Ducklow, H.W. W. B. Lyons and D. Wall. Antarctica: Global Connections and Impacts. LTER Minisymposium at NSF. 28 February, 2008. Invited Lecture.
- 2007** Ducklow, H. W. “Microbial services: challenges for microbial ecologists in a changing world. Society for Aquatic Microbial Ecology (10th meeting). Faro, Portugal, Sept 2-7. Invited Opening Keynote Address.
- 2007** Ducklow, H.W. The Ice is Burning: Climate Change and Ecosystem Response on The West Antarctic Peninsula. MBL Friday Night Lecture, 29 June, 2007.
- 2007** George Bush, Sr. US-China Relations Conference. International Polar Year Roundtable. Washnigton, DC, October 2007. Invited participant.
- 2005** Ducklow, H. W. and S. L. McCallister. Continental shelves as major sinks for atmospheric CO₂. The Oceanography Society. 2005 International Ocean Research Conference. UNESCO. Paris. June 2005. Invited Plenary.
- 2004** Ducklow, **HW** and RM Daniels. *WATER COLUMN PROCESSES: Comparative Plankton Ecology In the Antarctic Sea Ice Zone*. Final Symposium, Ecology of the Antarctic Sea Ice Zone. Korcula, Croatia. Sept 2004 (Invited Opening Keynote Address).
- NB:** List does not include numerous talks to local civic, private and school groups.

Service on Committees and Institutional Boards

Long Term Ecological Research Program, Executive Board, **2009 -**

Committee on the Design of the Martha Muse Award to Support the Advancement of Antarctic Researchers. US National Academy of Sciences, Polar Research Board. April, 2008. Washington DC.

Long Term Ecological Research Program, Science Council, **2002 -**

Scientific Committee for the IGBP, Member, **2000 - 2003**

US National Academy of Sciences Panel on Smithsonian Scientific Research, **2002-3.**

Advisor: NATO Science for Stability Project, "TU-Black Sea" **1993 - 2000 .**

Interagency Carbon Cycle Science Plan Steering Committee (C. Field, Chair), **2000 - 2004**

Nominee, President-elect, American Society for Limnology and Oceanography (ASLO), **2000**

US National Academy of Sciences Panel on Oceanic Carbon (T. Takahashi, Chair). term **1992-1995.**

NATO Advanced Study Institute on Biogeochemical Modeling, Member, Organizing Committee, **1991 - 92.** (G. T. Evans, Chair, meeting in Bonas France, May **1992**).

ICSU/IGBP/SCOR Committee for the Joint Global Ocean Flux Study (JGOFS) Member, Scientific Steering Committee, terms **1990 - 1992, 1996-1998**, Executive Scientist, **1993-94.** Vice-Chair, **1996-99; Chair, 2000-2003**

NATO Advanced Research Institute on Protozoans and Their Roles in Marine Processes, Plymouth, UK, **1988.** Member, Organizing Committee - (P.C. Reid, Chair, meeting in Plymouth, UK, August 1988).

US National Academy of Sciences review panel for the National Oceanographic Data Center (V. Zlotnicki, Chair). **1990.**

United States Senate Panel on Global Change and the Oceans, Sen. John Kerry, Chmn., April, **1989.** (Expert testimony).

US National Academy of Sciences panel on "Reducing global warming by enhancing oceanic primary production," (R. Barber, chair.) **1989.**

US National Academy of Sciences Committee on Global Change, working group on biogeochemical processes (J. Baker, chair), **1989.**

Joint Global Ocean Flux Study (US JGOFS), Member of Steering Committee Oct. **1985-2002;** Member US JGOFS Executive Committee, **1989-2002.** Chair, **1995 -1999.**

NASA SeaWiFS Prelaunch Science Advisory Working Group, **1988.**

Service on MBL Committees

MBL Center Directors, 2007 –

MBL Institutional Committee, 2009 -

Editorial Boards

Editor (Biology), *Journal of Geophysical Research (Oceans)*, (American Geophysical Union), term **1991-1994**.

Guest Editor, *Deep-Sea Research II* Special Volumes **1992, 2002, 2006, 2008**.

Editor Selection Board, *Global Biogeochemical Cycles*, (American Geophysical Union), **1995, 1997**.

Editorial Board, *Microbial Ecology*, **1994 - 2006**

Editorial Board, *Marine Microbial Foodwebs*, **1992** - (now *Aquatic Microbial Foodwebs*).

Editorial Board, *Applied and Environmental Microbiology*, (American Society of Microbiology), **1981- 87**.

Teaching

College of William & Mary, School of Marine Sciences:

2007 MS 526, “Principles of Biol. Oceanography,” (co-taught with E. Duffy), 3 cr., 15 students

2006 PUBP 600, “Principles of Environmental Science with D Taylor. (3 cr, 8 students)

2005 PUBP 600, “Principles of Environmental Science with D Taylor. (3 cr, 8 students)

2005 MS 652, “Plankton Ecology” with W Smith and K Tang (3 cr, 5 students)

2005 MS 526, “Principles of Biol. Oceanography,” (co-taught with E. Duffy), 3 cr., 15 students

2004 no courses taught

2003 INTR150W-03 Freshman Seminar (at W&M), Fall, 4 credits, 15 students

2003 MS 652, “Topics in plankton ecology” 3 cr. , Fall, 5 students (with D Steinberg)

2003 MS 526, “Principles of Biol. Oceanography,” (co-taught with E. Duffy), 4 cr., 8 students

2002 MS 526, “Principles of Biol. Oceanography,” (co-taught with E. Duffy), 4 cr., 9 students

2001 MS 652, “Topics in plankton ecology” 3 cr. , Fall, 6 students (with D Steinberg)

2001 MS 697-X, “Antarctic Sea Ice Processes” (2 cr, 2 students)

2000 MS 698-4, “Ideas on Nature in American Society” (co- w/ Bronk, Taylor), 1 cr, 7 students

2000 MS 526, “Principles of Biol. Oceanography,” (co-taught with E. Duffy), 4 cr., 9 students

1999 MS 652, “Topics in plankton ecology” 3 cr. , Fall, 6 students

1999 MS 598, “Modeling in FORTRAN,” 1 cr., Summer, 2 students

1999 MS 597, “Polar Oceanography,” w/ W. Smith, 1 cr., Spring, 9 students.

1999 MS 698, “Modeling of Nature,” w/ E. Duffy, 2 cr., Spring, 5 students.
1998 MS 697, “Ecological Plankton Modeling,” 3 cr., Spring, 1 student
1998 MS 526, “Principles of Biol. Oceanography,” (co-taught with E. Duffy), 4 cr., 8 students.
1998 MS 697, “Methods and techniques in microbial ecology,” 3 cr., Spring, 4 students
1997 MS 652, “Topics in plankton ecology” 3 cr. , Fall, 7 students
1997 MS 698-02, “Biogeochemistry Seminar” 1 cr., Spring, (team taught) 18 students.
1997 MS 697-??, “Methods and techniques in bacterioplankton ecology” 3 cr. 5 students.
1997 MS 526, "Principles of Biological Oceanography" 3 cr., Spring, (co-instructor) 10 students
1996 MS 526, "Principles of Biological Oceanography" 3 cr., Spring, (co-instructor) 12 students
1995 MS 526, "Principles of Biological Oceanography" 3 cr., Spring, (co-instructor) 12 students

Invited lectures in other schools & classes:

Harvard Extension School, ENVR E-130. “Global Climate Change: The Science, Social Impact and Diplomacy of a World Environmental Crisis” (W Moomaw and T Weiskel). April, 2009

Sea Education Association, Woods Hole, 25-26 February, 2008.

Brown University; ENVS 0490 Environmental Science in a Changing World (O. Sala), 19 March, 2008, 2009.

Brown University; BIOL1460. “Microbial Diversity in the Environment.” (J. Rich), April 2009.

Univ of New Mexico, BIOL 405/505 Ecosystem Dynamics (R Waide), 30 April, 2008.

Funding (\$11,690,858 since 1999):

Award term:	2008 - 2014
Title:	Palmer Antarctica Long Term Ecological Research Program
Agency:	NSF-OPP
Amount:	\$5,640,000 (Lead PI with 7 other PIs). plus various supplements
Award term:	2007 - 2010
Title:	IPY: Collaborative Research: Bacterioplankton genomic adaptations to Antarctic winter
Agency:	NSF-OPP (PI)
Amount:	\$230,000 (MBL portion, with A. Murray, Desert Research Inst, NV)
Award term:	2002 - 2008
Title:	Palmer Antarctica Long Term Ecological Research Program
Agency:	NSF-OPP
Amount:	\$4,200,000 (Lead PI with 7 other PIs). plus various supplements
Award term:	2002 - 2007

Title: "PARADIGM: The Partnership for Advancing Interdisciplinary Global Modeling." (with L Rothstein, URI and many co-PI's)

Agency: ONR - NOPP
Amount: \$353,805 of \$5,000,000

Award term: 2001-2004
Title: Collaborative Research: Ecosystem structure, biogeochemical fluxes and vulnerability to climate change perturbations.

Agency: NSF OCE (Co-PI)
Amount: \$101,188 (w/ M. Roman HPEL & G. Jackson, TAMU).

Award term: 2001-2003
Title: Transport and Fate of Persistent Organic Pollutants (POPs) in Coastal Antarctic Seas
Agency: NSF OPP (co-PI)
Amount: \$294,636 (w/ R. Dickhut).

Award term: 2001-2003
Title: Transport and transformation of DOC in the NE Atlantic Ocean
Agency: NSF OCE (PI).
Amount: \$143,318

Award term: 2001-2003
Title: Bacterial and DOC responses to iron enrichment in the Southern Ocean
Agency: NSF OCE/OPP
Amount: \$303,172 (w/ W. Smith, co-PI).

Award term: 2000 - 2002
Title: "Dissertation Research: Identifying the sources and ages of organic matter supporting estuarine bacterial production: A novel multiple isotope approach."
Agency: NSF-DEB (L McCallister Diss Res. Improv. Grant, PI)
Amount: \$9,495.

Award term: 1999 - 2002
Title: Modeling Physical-Biogeochemical Interactions in the Black Sea Pelagic Ecosystem."
Agency: NSF-OCE (PI)
Amount: \$105,614.

Award term: 1999 - 2002
Title: "US JGOFS SMP: Constraining and understanding bacterial biomass and production variability in ocean ecosystems."
Agency: NSF-OCE (PI)
Amount: \$300,000.

Award term: 1999 - 2000
Title: Planning for Coupled Physical Biological Modeling Node: A 'Phase A' National Ocean Partnership Program.
Agency: ONR (URI Subcontract) (Co-PI)
Amount: \$9,630.

Training Record (graduate students advised)

Name Position*	Graduated	Degree	Thesis Topic	Current
University of Maryland:				
Fuh-Kwo Shiah	1994	PhD	Estuarine Microbial Ecology	Nat Univ Taiwan
Craig Carlson	1994	PhD	Oceanic bacterial production	UCSB
Alison Bryant	1996	MSc	Experimental microbial ecology	Horn Point, MD (RA)
College of Wm & Mary:				
Gary Schultz.	1999	Ph.D.	York River Bacteria	
Matthew Church	1999	MS	Antarctic bacteria	Univ Hawaii
Peter Countway	1999	MS	Coral reef bacteria	USC (Post doc)
Leigh McCallister	2002	Ph.D.	Estuary biogeochem	VA Commonwealth
Jessica Morgan	2003	MS	Microb. Ecol of the Black Sea	NOAA
Matthew Church	2003	Ph.D.	Microb Ecol of the N. Pacific	Univ Hawaii
Jacques Oliver	2005	Ph.D.	Bacterial growth and iron limitation	NOAA
Robert Daniels	2003	MS	Foodweb modeling	NOAA
Amy Chiuchiolo	2003	MS	Antarctic microbial ecology	Univ Montana (RA)
Heidi Geisz		PhD	Antarctic seabird ecology	--
Brown-MBL:				
Yawei Luo (postdoc)	2009	Ph.D.	Ecological Modeling (Oceanic bacteria)	WHOI
Kristen Myers	2009	MSc	Antarctic microbial ecology	Univ Oregon (RA)

* Professor unless noted.

Publications: 156 Refereed publications in journals and books (student and postdoc coauthors underlined)

- 2009** Amaral-Zettler LA, McCliment EA, **Ducklow H W**, Huse SM (2009) A Method for Studying Protistan Diversity Using Massively Parallel Sequencing of V9 Hypervariable Regions of Small-Subunit Ribosomal RNA Genes. PLoS ONE 4(7): e6372. doi:10.1371/journal.pone.0006372.
- 2009** Straza, T. R. A., M. T. Cottrell, **H. W. Ducklow**, and D. L. Kirchman. 2009. Geographic and phylogenetic variation in bacterial biovolume using protein and nucleic acid staining. Appl. Environ. Microbiol.:AEM.00183-00109.
- 2009** Kirchman, D.L., X.A.G. Moran, and **H. Ducklow**, Microbial growth in the polar oceans role of temperature and potential impact of climate change. Nat Rev Micro, 2009. 7(6): p. 451-459.
- 2009** Montes-Hugo M, **Ducklow H**, Schofield O (2009) Contribution by different marine bacterial communities to particulate beam attenuation. Aquatic Microbial Ecology 379:13-22

- 2009 Montes-Hugo M, Doney SC, **Ducklow HW**, Fraser W, Martinson D, Stammerjohn SE, Schofield O (2009) Recent Changes in Phytoplankton Communities Associated with Rapid Regional Climate Change Along the Western Antarctic Peninsula. *Science* 323:1470-1473
- 2009 **Ducklow, H.W.**, S.C. Doney and D. K. Steinberg. Contributions of Long Term Research and Time Series Observations. *Annual Reviews of Marine Science*. 1:279-302
- 2008 **Ducklow, H. W.** Microbial services: challenges for microbial ecologists in a changing world. *Aquatic Microbial Ecology* 53:13-19.
- 2008 Gasol, J.M., Pinhassi, J., Alonso-Sáez, L., **Ducklow, H.W.**, Herndl, G.J., Koblížek, M., Labrenz, M., Luo, Y., Morán, X.A.G., Reinthaler, T., Simon, M., 2008. Towards a better understanding of microbial carbon flux in the sea. *Aquatic Microbial Ecology* 53:21-38.
- 2008 Geisz, H.N., Dickhut, R.M., Cochran, M.A., Fraser, W.R., **Ducklow, H.W.**, 2008. Melting Glaciers: A Probable Source of DDT to the Antarctic Marine Ecosystem. *Environ. Sci. Technol.* 42: 3958–3962.
- 2008 **Ducklow, H.W.** Preface to: Long-term studies of the marine ecosystem along the west Antarctic Peninsula. *Deep-Sea Research II*. 55:1945-48.
- 2008 **Ducklow HW**, Erickson M, Kelly J, Smith RC, Stammerjohn SE, M. Vernet, D. M. Karl. Particle export from the upper ocean over the continental shelf of the west Antarctic Peninsula: A long-term record, 1992-2006. *Deep Sea Research II* 55: 2118-2131.
- 2008 McClintock, J., **H.W. Ducklow** and W. Fraser. Ecological responses to climate change on the Antarctic Peninsula. *American Scientist* 96:414-422.
- 2007 **Ducklow, H. W.** “Southern Ocean: Biogeochemistry.” Pp 942-45 In: B. Riffenburgh, Ed., *Encyclopedia of the Antarctic*. New York: Routledge. 2 vols. 1146 pp.
- 2007 Oliver, Jacques L., Walker O. Smith, **H. W. Ducklow**, and Richard T. Barber Rejoinder to: “Interpreting the results of oceanic mesoscale enrichment experiments: Caveats and lessons from limnology and coastal ecology” *Limnology and Oceanography* 52(2):919-20.
- 2007 **Ducklow, H.W.**, Hansell, D. A. and Morgan. J. A. 2007. Dissolved organic carbon and nitrogen in the Western Black Sea. *Marine Chemistry* 105:140-150.
- 2007 **Ducklow, H. W.** and others. Marine ecosystems: The West Antarctic Peninsula. *Philosophical Transactions of the Royal Society of London*, 362(1477):67-94.
- 2007 **Ducklow, H. W.** and P. L. Yager. Pelagic bacterial processes in polynyas. In *Polynyas: Windows into Polar Oceans*. W. O. Smith and D. Barber. eds. Elsevier/CRC. New York. Chapter 10, pp. 323-362.
- 2007 Crump, B. C., **H. W. Ducklow** and J. E. Hobbie. “The Microbial Foodweb”, Chapter X, pp 000-000 In. J. W. Day (Ed), *Estuarine Ecology* (2nd edition in press).
- 2006 Tang, K. W., H.-P. Grossart, E. M. Yam, G. A. Jackson, **H. W. Ducklow** and T. Kiørboe. Mesocosm study of particle dynamics and control of particle-associated bacteria by flagellate grazing. *Marine Ecology – Progress Series* 325:15-27
- 2006 Church, M. J., **H. W. Ducklow**, R. M. Letelier and D. M. Karl. Temporal and vertical dynamics in picoplankton photoheterotrophic production in the subtropical North Pacific Ocean. *Aquatic Microbial Ecology*, 45:41-53.

- 2006 McCallister, S.L., Bauer, J.E., **Ducklow, H.W.** and Canuel, E.A. Sources of estuarine dissolved and particulate organic matter: A multi-tracer approach. *Organic Geochemistry*, 37(4): 454-468.
- 2006 Rothstein, L. M., J. J. Cullen, M. R. Abbott, E. P. Chassignet, K. Denman, S. C. Doney, **H. Ducklow**, K. Fennel, M. Follows, D. Haidvogel, E. Hoffman, D. M. Karl, J. Kindle, I. Lima, M. Maltrud, C. R. McClain, D. J. McGillicuddy, M. J. Olascoaga, Y. Spitz, J. Wiggert and J. Yoder. 2006. Modeling Ocean Ecosystems: The PARADIGM Program. *Oceanography*, **19**, 22-51.
- 2006 **Ducklow, H. W.**, W. Fraser, D. M. Karl, L. B. Quetin, R.M. Ross, R C. Smith, S.E. Stammerjohn, M. Vernet and R. M. Daniels. Water column processes in the West Antarctic Peninsula and the Ross Sea: foodweb structure and interannual variability. *Deep-Sea Research II*, 53:834-52.
- 2006 Doney, S. C. and **H. W. Ducklow**. A Decade of Synthesis and Modeling in the U.S. Joint Global Ocean Flux Study. *Deep-Sea Research II*, 53:451-458
- 2006 Jessica A. Morgan, J. A., H. L. Quinby and **H. W. Ducklow**. Bacterial Abundance and Production in the Western Black Sea. *Deep-Sea Research II* 53:1945-60.
- 2006 Daniels, RM, **HW Ducklow** and TL Richardson. Food web structure and biogeochemical processes during oceanic phytoplankton blooms: An inverse model analysis. *Deep-Sea Research II* 53:532-554.
- 2006 Richardson, T. L., G. A. Jackson, **H. W. Ducklow** and M. R. Roman. Spatial and seasonal patterns of carbon cycling through planktonic food webs of the Arabian Sea determined by inverse analysis. *Deep-Sea Research II* 53:555-575.
- 2005 Chapin, F. S. III, Berman, M., Callaghan, T.V., Convey, P., Crepin, A.-S., Danell, K., **Ducklow, H.**, Forbes, B., Kofinas, G., McGuire, A.D., Nuttall, M., Virginia, R., Young, O. and Zimov, S.A. Chapter 25. Polar Systems. Pp 717-743 in: Hassan, R., Scholes, R. and Ash, N., Eds. Millennium Assessment. Ecosystems and Human Well-being: Current State and Trends, Volume 1. Island Press Washington 2005 xxi + 919 pp.
- 2005 Rebecca M. Dickhut, Alessandra Cincinelli, Michele Cochran, and **Hugh W. Ducklow**. Atmospheric Concentrations and Air-Water Flux of Organochlorine Pesticides along the Western Antarctic Peninsula. *Environmental Science and Technology* 39(2); 465-470.
- 2005 McCallister, SL, James E. Bauer, Joann Kelly and **Hugh W. Ducklow**. Effects of sunlight on decomposition of estuarine dissolved organic C, N and P and bacterial metabolism. *Aquatic Microbial Ecology* 40:25-35.
- 2004 Oliver, Jacques L., Richard T. Barber, Walker O. Smith, Jr., and **Hugh W. Ducklow**. The heterotrophic bacterial response during the Southern Ocean Iron Experiment (SOFEX). *Limnol. Oceanogr.* 49: 2129-2140.
- 2004 **Ducklow, H. W.** and S. L. McCallister. The biogeochemistry of carbon dioxide in the coastal oceans. Chapter 9. In *The Sea. Volume 13 - The Global Coastal Ocean: Multiscale Interdisciplinary Processes*. A. R. Robinson, K. Brink, and B. J. Rothschild. eds. Harvard University Press. Cambridge, MA. pp. 269-315

- 2004 Robinson, A. R., K. H. Brink, **H. W. Ducklow**, R. A. Jahnke and B. J. Rothschild, 2004. Interdisciplinary Multiscale Coastal Dynamical Processes and Interactions. Chapter 1 In *The Sea. Volume 13 - The Global Coastal Ocean: Multiscale Interdisciplinary Processes*. A. R. Robinson, K. Brink, and B. J. Rothschild. eds. Harvard University Press. Cambridge, MA. pp. 3-35
- 2004 Chiuchiolo, A. L., Rebecca M. Dickhut, Michele A. Cochran, and **Hugh W. Ducklow** Persistent Organic Pollutants at the Base of the Antarctic Marine Food Web. *Environmental Science and Technology* 38:3551-3557.
- 2004 Tammi L. Richardson, T. L., G. A. Jackson, **H. W. Ducklow** and M. R. Roman. 2004. Carbon fluxes through food webs of the eastern equatorial Pacific: an inverse approach. *Deep-Sea Research I*. 51:1245-1274.
- 2004 Church, M. J., **H. W. Ducklow** and D. M. Karl. 2004. Light Dependence of ³H-leucine Incorporation in the Oligotrophic North Pacific Ocean. *Applied and Environmental Microbiology* 70(7): 4079-4087.
- 2004 McCallister, S. L., J. E. Bauer, J. E. Cherrier and **H. W. Ducklow**. Assessing sources and ages of organic matter supporting river and estuarine bacterial production: A multiple isotope (¹⁴C, ¹³C, and ¹⁵N) approach. *Limnol. Oceanogr.* 49:1687 – 1702.
- 2004 Hansell, Dennis A., **Hugh W. Ducklow**, Alison M. Macdonald, and Molly O'Neil Baringer. 2004. Metabolic poise in the North Atlantic Ocean diagnosed from organic matter transports. *Limnol. Oceanogr.* 49: 1084-1094.
- 2003 Steinberg, D. K., **H. W. Ducklow**, K. O. Buesseler and M. C. Bowles. Assessing contributions of JGOFS; Previewing studies in ocean ecology and biogeochemistry. *EOS Transactions American Geophysical union*. 84:413-414.
- 2003 **Ducklow, H. W.**, J. L. Oliver and W. O. Smith, Jr. The role of iron as a limiting nutrient for marine plankton processes. Pp. 295-310 in: J. Melillio, C. Field and B. Moldan, Eds. Interactions of the Major Biogeochemical Cycles: Global Change and Human Impacts. (SCOPE 61). Washington: Island Press. Xxi + 357 p.
- 2003 Temel Oguz, T., T. Cokacar, P. Malanotte-Rizzoli and **H. W. Ducklow**. Climatic warming and accompanying changes in the ecological regime of the Black Sea during 1990s. *Global Biogeochemical Cycles* 17(3): 14-1-10; 1088, doi:10.1029/2003GB002031.
- 2003 **Ducklow, H. W.** Seasonal production and bacterial utilization of DOC in the Ross Sea, Antarctica. **CH**. 9, Pp. 143-158 In. G. Di Tullio, Editor, Biogeochemical Cycles in The Ross Sea. Washington, DC: American Geophysical Union. Antarctic Research Series Volume 78.
- 2003 Church, M. J., E. F. DeLong, **H. W. Ducklow**, M. B. Karner, C. M. Preston and D. M. Karl. Abundance and distribution of planktonic Archaea and Bacteria in the waters west of the Antarctic Peninsula. *Limnology and Oceanography*, **48**, 1893-1902.
- 2003 Tiruponithura V. Padma, Rebecca M. Dickhut, and **Hugh Ducklow**. Variations in α -hexachlorocyclohexane enantiomer ratios in relation to microbial activity in a temperate estuary. *Environmental Toxicology and Chemistry* **22**:1421-1427.

- 2003 Schultz, G. E., Jr., E. D. White III and H. W. Ducklow. Bacterioplankton dynamics in the York River estuary: primary influence of temperature and freshwater inputs. *Aquatic Microbial Ecology*, **30**, 135-148.
- 2003 Hansell, D. A. and **H.W. Ducklow.** Bacterioplankton distribution and production in the bathypelagic ocean: Directly coupled to particulate organic carbon export?. *Limnol. Oceanogr.* **48**: 150-156.
- 2003 Fasham, M.J.R. and **Ducklow, H. W.** Introduction. Pp. 1-2 In: M. J. R. Fasham, Ed., *Ocean Biogeochemistry: A New Paradigm.* New York. Springer-Verlag.
- 2003 **Ducklow, H. W.** Biogeochemical Provinces: Towards a JGOFS Synthesis. Pp. 3-18 In: M. J. R. Fasham, Ed., *Ocean Biogeochemistry: A New Paradigm.* New York. Springer-Verlag.
- 2002 Oguz, T., P. Malanotte-Rizzoli, **H. W. Ducklow** and J. Murray. Interdisciplinary studies integrating Black Sea biogeochemistry and circulation. *Oceanography* 15(3):4-11.
- 2002 **Ducklow, H. W.,** D. L. Kirchman and T. R. Anderson. The magnitude of the spring bacterial bloom in the North Atlantic Ocean. *Limnology and Oceanography* 47: 1684-1693.
- 2002 Hollibaugh, J. T., N. Bano and **H. W. Ducklow.** Widespread Distribution in Polar Oceans of a 16S rRNA Gene Sequence with Affinity to *Nitrosospira*-like Ammonia-Oxidizing Bacteria. *Applied. Environ. Microbiol.* 68:1478-1484.
- 2002 Church, M., H. W. Ducklow and D. M. Karl. Temporal Variability in Dissolved Organic Matter Stocks in the Central North Pacific Gyre. *Limnol. Oceanogr.* 47:1-10.
- 2001 **Ducklow, H. W.** Preface. Pp. xv-xix In: D. A. Hansell and C. A. Carlson [eds.], *Biogeochemistry of marine dissolved organic matter.* Elsevier Science, USA.
- 2001 Koeve, W. and **H. W. Ducklow.** JGOFS Synthesis and Modeling: The North Atlantic Ocean. *Deep-Sea Res. II* 48:2141-2154.
- 2001 Oguz, T., P. Malanotte-Rizzoli, P. and **H.W. Ducklow.** 2001. Simulations of phytoplankton seasonal cycle with multi-level and multi-layer physical-ecosystem models: the Black Sea example. *Ecological Modelling* 144:295-314.
- 2001 **Ducklow, H. W.,** D. K. Steinberg and K. O. Buesseler. Upper Ocean Carbon Export and the Biological Pump. *Oceanography* 14:50-58.
- 2001 Anderson, T. R. and **H. W. Ducklow.** Microbial loop carbon cycling in ocean environments studied using a simple steady-state model *Aquat. Microb. Ecol.* 26:37-49.
- 2001 **Ducklow, H. W.** Bacterioplankton. Pp. 217-224 In: *Encyclopedia of Ocean Sciences,* John Steele, Karl Turekian and Steve Thorpe, Editors. New York: Academic Press.
- 2001 **Ducklow, HW, C Carlson, M Church, DL Kirchman, DC Smith and GF Steward.** The Seasonal Development of the Bacterioplankton Bloom in the Ross Sea, Antarctica, 1994-97 *Deep-Sea Res.* 48: 4199-4221.
- 2001 Oguz, T., **Ducklow, HW,** Purcell, JE, Malanotte-Rizzoli, P. 2001. Modeling the response of top-down control exerted by gelatinous carnivores on the Black Sea pelagic food web. *J. Geophys. Res.* 106:4543-4564.
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