IVAN D. LIMA

WOODS HOLE OCEANOGRAPHIC INSTITUTION – MARINE CHEMISTRY & GEOCHEMISTRY MS#25
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EDUCATION

Ph.D. Biological Oceanography — 1999
University of Miami, Rosenstiel School of Marine and Atmospheric Sciences — Miami, FL

M.S. Biological Oceanography — 1992
University of Rio Grande — Rio Grande, Brazil

B.S. Marine Science/Biology — 1988
University of Rio Grande — Rio Grande, Brazil

RESEARCH EXPERIENCE

Woods Hole Oceanographic Institution, Department of Marine Chemistry and Geochemistry — Woods Hole, MA
Research Specialist — August 2010 – present
Information Systems Associate III — March 2003 – August 2010

University of Washington, School of Oceanography — Seattle, WA
Research Associate, Postdoctoral — March 2002 – February 2003

National Center for Atmospheric Research, Climate and Global Dynamics Division — Boulder, CO
Postdoctoral Fellow — June 1999 – February 2002

National Oceanic and Atmospheric Administration
Atlantic Oceanographic and Meteorological Laboratory (NOAA–AOML) — Miami, FL
Research Assistant — March 1998 – April 1999

University of Miami, Rosenstiel School of Marine and Atmospheric Sciences — Miami, FL
Research Assistant — August 1996 – February 1998

TEACHING EXPERIENCE

Peruvian Marine Institute (IMARPE) — Lima, Peru
Invited Lecturer — Summer 2000
Designed, prepared and taught graduate level intensive course on marine food web modeling and coupled physical-biological models of marine ecosystems.

University of Miami, Rosenstiel School of Marine and Atmospheric Sciences — Miami, FL
Teaching Assistant — Fall 1996 – Fall 1998
Designed, prepared, and taught graduate and undergraduate level laboratory classes in: Introduction to Physical Oceanography, Biometrics in Marine Science and Advanced Biometrics in Marine Science

AWARDS AND AFFILIATIONS

RSMAS Fellowship. University of Miami, 1997
Graduate Fellowship (Ph.D.), Brazilian National Research Council, 1993
Graduate Fellowship (M.S.), Brazilian National Research Council, 1989

Undergraduate Research Scholarship, Brazilian Inter-Ministerial Commission for Marine Resources, 1986
American Geophysical Union, 1993 - present

Professional Services

Reviewer for the journals: *Fisheries Oceanography*, *Global Biogeochemical Cycles*, *Journal of Geophysical Research–Oceans*, *Journal of Plankton Research*, *Caribbean Journal of Science*, *Ecological Modelling*, *Progress in Oceanography*, *Journal of Marine Systems*, *Biogeosciences*

Proposal reviews for NSF

Refereed Publications

I. Marinov, S. C. Doney, I. D. Lima, K. Lindsey, K. Moore, N. Mahowald. North-South asymmetry in the response of ocean ecology and biogeochemistry to climate change over the 21st century. *Global Biogeochemical Cycles*, submitted.

L. A. Anderson, D. J. McGillicuddy Jr., M. E. Maltrud, I. D. Lima, S. C. Doney. Impact of eddy-wind interaction on eddy demographics and phytoplankton community structure in a model of the North Atlantic Ocean. *Dynamics of Atmospheres and Oceans* **2011**, *52*, 80–94.

N. M. Levine, S. C. Doney, I. Lima, R. Wanninkhof, N. R. Bates, R. A. Feely. The impact of the North Atlantic Oscillation on the uptake and accumulation of anthropogenic CO_2 in the North Atlantic Ocean thermocline. *Global Biogeochemical Cycles* **2011**, *25*, doi:10.1029/2010GB003892.

I. Marinov, S. C. Doney, I. D. Lima. Response of ocean phytoplankton community structure to climate change over the 21st century: partitioning the effects of nutrients, temperature and light. *Biogeosciences* **2010**, *7*, 3941–3959, doi:10.5194/bg-7-3941-2010.

J. A. Yoder, M. A. Kennelly, S. C. Doney, I. D. Lima. Are trends in SeaWiFS chlorophyll time-series unusual relative to historic variability? *Acta Oceanologica Sinica* **2010**, *29*, 1–4, doi: 10.1007/s13131-010-0016-o.

G. Park, R. Wanninkhof, S. C. Doney, T. Takahashi, K. Lee, R. A. Feely, C. L. Sabine, J. Triñanes, I. D. Lima. Variability of global net sea-air CO_2 fluxes over the last three decades. *Tellus B* **2010**, *62B*, 352–368, doi:10.1111/j.1600-0889.2010.00498.x.

V. S. Saba, M. A. M. Friedrichs, M. E. Carr, D. Antoine, R. A. Armstrong, I. Asanuma, O. Aumont, N. R. Bates, M. J. Behrenfeld, V. Bennington, L. Bopp, J. Bruggeman, E. T. Buitenhuis, M. J. Church, A. M. Ciotti, S. C. Doney, M. Dowell, J. Dunne, S. Dutkiewicz, W. Gregg, N. Hoepffner, K. J. W. Hyde, J. Ishizaka, T. Kameda, D. M. Karl, I. Lima, M. W. Lomas, J. Marra, G. A. McKinley, F. Mélin, J. K. Moore, A. Morel, J. O'Reilly, B. Salihoglu, M. Scardi, T. J. Smyth, S. Tang, J. Tjiputra, J. Uitz, M. Vichi, K. Waters, T. K. Westberry, A. Yool. The challenges of modeling depth-integrated marine primary productivity over multiple decades: a case study at BATS and HOT. *Global Biogeochemical Cycles* **2010**, *24*, doi:10.1029/2009GB003655.

I. A. Udovydchenkov, T. F. Duda, S. C. Doney, I. D. Lima. Modeling deep ocean shipping noise in varying acidity conditions. *JASA-Express Letters* **2010**, *128*, doi:10.1121/1.3402284.

S. A. Henson, J. L. Sarmiento, J. P. Dunne, L. Bopp, I. D. Lima, S. C. Doney, J. John, C. Beaulieu. Detection of anthropogenic climate change in satellite records of ocean chlorophyll and productivity. *Biogeosciences* **2010**, *7*, 621–640.

A. Paytan, K. R. M. Mackey, Y. Chen, I. D. Lima, S. C. Doney, N. Mahowald, A. F. Post. Toxicity of atmospheric aerosols on marine phytoplankton. *Proceedings of the National Academy of Sciences of the United States* **2009**, *106*, 4601–4605, doi:10.1073/pnas.0811486106.

S. C. Doney, I. Lima, J. K. Moore, K. Lindsay, M. Behrenfeld, T. K. Westberry, N. Mahowald, D. M. Glover, D. McGillicuddy Jr., T. Takahashi. Skill metrics for confronting global upper ocean ecosystem bio-

geochemistry models against field and remote sensing data. *Journal of Marine Systems* **2009**, *76*, 95–112, doi:10.1016/j.jmarsys.2008.05.015.

S. C. Doney, I. Lima, R. A. Feely, D. M. Glover, K. Lindsay, N. Mahowald, J. K. Moore, R. Wanninkhof. Mechanisms governing interannual variability in the upper ocean inorganic carbon system and air-sea CO_2 fluxes: physical climate and atmospheric dust. *Deep-Sea Research II* **2009**, *56*, 640–655, doi:10.1016/j.dsr2.2008.12.006.

M. J. Behrenfeld, T. K. Westberry, E. S. Boss, R. T. O'Malley, D. A. Siegel, J. D. Wiggert, B. A. Franz, C. R. McClain, G. C. Feldman, S. C. Doney, J. K. Moore, G. Dall'Olmo, A. J. Milligan, I. Lima, N. Mahowald. Satellite-detected chlorophyll fluorescence reveals physiology of global ocean phytoplankton. *Biogeosciences* **2009**, *6*, 779–794.

M. A. M. Friedrichs, M. E. Carr, R. T. Barber, M. Scardi, D. Antoine, R. A. Armstrong, I. Asanuma, M. J. Behrenfeld, E. T. Buitenhuis, F. Chai, J. R. Christian, A. M. Ciotti, S. C. Doney, M. Dowell, J. Dunne, B. Gentili, W. Gregg, N. Hoepffner, J. Ishizaka, T. Kameda, I. Lima, J. Marra, F. Mélin, J. K. Moore, A. Morel, R. T. O'Malley, J. O'Reilly, V. S. Saba, M. Schmeltz, T. J. Smyth, J. Tjiputra, K. Waters, T. K. Westberry, A. Winguth. Assessing the uncertainties of model estimates of primary productivity in the tropical Pacific Ocean. *Journal of Marine Systems* **2009**, *76*, 113–133, doi:10.1016/j.jmarsys.2008.05.010.

H. Thomas, A. E. F. Prowe, I. D. Lima, S. C. Doney, R. Wanninkhof, R. J. Greatbatch. Changes in the North Atlantic Oscillation influence CO_2 uptake in the North Atlantic over the past 2 decades. *Global Biogeochemical Cycles* **2008**, *22*, doi:10.1029/2007GB003167.

C. D. Nevison, N. M. Mahowald, S. C. Doney, I. D. Lima. Impact of variable air-sea O_2 and CO_2 fluxes on atmospheric potential oxygen (APO) and land-ocean carbon sink partitioning. *Biogeosciences* **2008**, *5*, 875–889.

C. D. Nevison, N. M. Mahowald, S. C. Doney, I. D. Lima, G. R. van der Werf, J. T. Randerson, D. F. Baker, P. K. Kasibhatla, G. A. McKinley. Contribution of ocean, fossil fuel, land biosphere and biomass burning carbon fluxes to seasonal and interannual variability in atmospheric CO_2. *Journal of Geophysical Research* **2008**, *113*, doi:10.1029/2007JG000408.

H. Thomas, F. Prowe, S. van Heuven, Y. Bozec, H. J. W. de Baar, L. S. Schiettecatte, K. Suykens, M. Koné, A. V. Borges, I. D. Lima, S. C. Doney. Rapid decline of the CO_2 buffering capacity in the North Sea and implications for the North Atlantic Ocean. *Global Biogeochemical Cycles* **2007**, *21*, doi:10.1029/2006GB002825.

S. C. Doney, N. Mahowald, I. Lima, R. A. Feely, F. T. Mackenzie, J. F. Lamarque, P. J. Rasch. The impact of anthropogenic atmospheric nitrogen and sulphur deposition on ocean acidification and the inorganic carbon system. *Proceedings of the National Academy of Sciences of the United States* **2007**, *104*, doi:10.1073/pnas.0702218104.

N. S. Lovenduski, N. Gruber, S. C. Doney, I. D. Lima. Enhanced CO_2 outgassing in the Southern Ocean from a positive phase of the Southern Annular Mode. *Global Biogeochemical Cycles* **2007**, *21*, doi:10.1029/2006GB002900.

G. A. McKinley, T. Takahashi, E. Butenhuis, F. Chai, J. R. Christian, S. C. Doney, C. L. Quéré, I. Lima, R. Murtugudde, L. Shi, P. Wetzel. North Pacific carbon cycle response to climate variability on seasonal to decadal timescales. *Journal of Geophysical Research* **2006**, *111*, doi:10.1029/2005JC003173.

L. Rothstein, M. Abbott, E. Chassignet, J. Cullen, K. Denman, S. Doney, H. Ducklow, K. Fennel, M. Follows, D. Haidvogel, E. Hofmann, D. Karl, J. Kindle, I. Lima, M. Maltrud, C. McClain, D. McGillicuddy, J. Olascoaga, Y. Spitz, J. Wiggert, J. Yoder. Modeling ocean ecosystems: the PARADIGM program. *Oceanography* **2006**, *19*, 16–45.

I. D. Lima, S. C. Doney. A three-dimensional, multi-nutrient, size-structured ecosystem model for the North Atlantic. *Global Biogeochemical Cycles* **2004**, *18*, doi:10.1029/2003GB002146.

B. A. Bailey, S. C. Doney, I. D. Lima. Quantifying the effects of dynamical noise on the predictability of a simple ecosystem model. *Environmetrics* **2004**, *15*, 337–355,, doi:10.1002/env.645.

I. D. Lima, D. B. Olson, S. C. Doney. Biological response to frontal dynamics and mesoscale variability in oligotrophic environments: biological production and community structure. *Journal of Geophysical Research* **2002**, *107*, doi:10.1029/2000JC000393.

I. D. Lima, D. B. Olson, S. C. Doney. Intrinsic dynamics and stability properties of size-structured pelagic ecosystem models. *Journal of Plankton Research* **2002**, *24*, 533–556.

S. C. Doney, I. D. Lima, K. Lindsay, J. K. Moore, S. Dutkiewicz, M. A. M. Frieddrichs, R. J. Matear. Marine biogeochemical modeling. *Oceanography* **2001**, *14*, 93–107.

I. D. Lima, C. A. E. Garcia, O. O. Möller. Ocean surface processes on the southern Brazilian shelf: characterization and seasonal variability. *Continental Shelf Research* **1996**, *16*, 1307–1317.

I. D. Lima, J. P. Castello. Distribution and abundance of Southwest Atlantic anchovy spawners (*Engraulis anchoita*) in relation to oceanographic processes in the southern Brazilian shelf. *Fisheries Oceanography* **1995**, *4*, 1–16.

I. D. Lima, J. P. Castello. Distribucion y abundancia de la anchoita (*Engraulis anchoita*) en el extremo sur de Brasil. *Frente Maritimo* **1994**, *15*, 87–100.

J. P. Castello, R. P. Habiaga, J. C. Amaral, I. D. Lima. Distribuição e abundância de sardinha verdadeira (*Sardinella brasiliensis*) e anchoita (*Engraulis anchoita*) entre Macaé (RJ) e Araranguá (SC). *Publicação Especial do Instituto Oceanográfico da Universidade de São Paulo* **1991**, *8*, 15–29.

Abstracts and Presentations

S. Sailley, M. Vogt, S. C. Doney, T. Hashioka, C. L. Quéré, L. Bopp, E. T. Buitenhuis, I. Lima, M. N. Aita, Y. Yamanaka, *MAREMIP (phase 0): The second trophic level (zooplankton) in different DGOMs* in *AMEMR III Symposium*, Plymouth, UK, June 2011.

S. Sailley, M. Vogt, S. C. Doney, T. Hashioka, C. L. Quéré, L. Bopp, E. T. Buitenhuis, I. Lima, M. N. Aita, Y. Yamanaka, *MAREMIP (phase 0): The second trophic level (zooplankton) in different DGOMs* in *MAREMIP Short Meeting*, Plymouth, UK, June 2011.

I. D. Lima, S. C. Doney, *Modelando a física, química e biologia dos oceanos: avaliação do modelo e estudo da variação interanual do fluxo de CO_2 e carbono inorgânico na camada superior do oceano* in *IV Congresso Brasileiro de Oceanografia*, Rio Grande, Brazil, May 2010.

M. Vogt, C. L. Quéré, S. Alvain, L. Bopp, E. T. Buitenhuis, S. C. Doney, T. Hashioka, I. Lima, M. N. Aita, Y. Yamanaka, *First results from the MARine Ecosystem Model Inter-comparison Project (MAREMIP)* in *Ocean Sciences Meeting*, Portland, OR, February 2010.

T. Hashioka, Y. Yamanaka, M. N. Aita, M. Vogt, C. L. Quéré, S. Alvain, L. Bopp, E. T. Buitenhuis, S. C. Doney, I. Lima, *Spatio-temporal differences in plankton compositions among models from the first results of MARine Ecosystem Model Inter-comparison Project (MAREMIP)* in *Ocean Sciences Meeting*, Portland, OR, February 2010.

I. Marinov, S. C. Doney, I. Lima, K. Lindsay, J. K. Moore, *Response of ocean ecology to climate change over the 21st century* in *Ocean Carbon Biogeochemistry Workshop*, Woods Hole, MA, July 20-23, 2009.

D. J. McGillicuddy, L. A. Anderson, S. C. Doney, I. Lima, M. Maltrud, *Carbon cycling in the North Atlantic from regional to basin scales: Eddy-driven changes in phytoplankton species composition* in *Ocean Carbon Biogeochemistry Workshop*, Woods Hole, MA, July 20-23, 2009.

S. C. Doney, N. M. Levine, I. Lima, R. Wanninkhof, C. S. R. Feeley, *Observational and model estimates of changes in anthropogenic carbon in the Atlantic and Pacific oceans* in *AGU Fall Meeting*, San Francisco, CA, 15–19 December 2008.

I. Marinov, S. C. Doney, I. Lima, *Response of ocean plankton ecology and carbon cycle to climate change over the 21st century* in *AGU Fall Meeting*, San Francisco, CA, 15–19 December 2008.

H. Thomas, F. Prowe, S. van Heuven, Y. Bozec, H. J. W. de Baar, L. S. Schiettecatte, K. Suykens, M. Koné, A. V. Borges, I. D. Lima, S. C. Doney, *Rising CO_2 conditions and ocean acidification - a severe threat to high latitude coastal ecosystems* in *Ocean Carbon Biogeochemistry Workshop*, Woods Hole, MA, July 2007.

N. Gruber, N. Lovenduski, H. Brix, S. C. Doney, I. Lima, D. W. J. Thompson, *Recent biogeochemical trends in the Southern Ocean: Signs of a positive feedback in the climate system?* in *European Geosciences Union General Assembly*, Vienna, Austria, 15–20 April 2007.

S. C. Doney, I. D. Lima, J. K. Moore, K. Lindsay, N. Mahowald, M. Maltrud, *A generalized model-data evaluation scheme for global ocean ecosystem-biogeochemistry models* in *Workshop on Skill Assessment for Coupled Biological/Physical Models of Marine Systems*, Chapel Hill, NC, July 2006.

S. C. Doney, I. D. Lima, K. Lindsay, N. Mahowald, C. Nevison, J. K. Moore, M. Maltrud, N. Gruber, N. Lovenduski, J. Carton, R. Feely, *Quantifying the mechanisms governing interannual variability in air-sea CO_2 flux* in *Ocean Carbon Biogeochemistry Workshop*, Woods Hole, MA, July 2006.

S. C. Doney, I. Lima, K. Lindsay, N. Mahowald, J. K. Moore, M. Maltrud, *Quantifying the mechanisms governing interannual variability in air-sea CO_2 flux* in *NASA's Ocean Color Research Team Meeting*, Newport, RI, April 2006.

G. A. McKinley, T. Takahashi, E. Butenhuis, F. Chai, J. R. Christian, S. C. Doney, C. L. Quéré, I. Lima, R. Murtugudde, L. Shi, P. Wetzel, *North Pacific carbon cycle response to climate variability on seasonal to decadal timescales* in *Ocean Sciences Meeting*, Honolulu, HI, February 2006.

G. A. McKinley, T. Takahashi, E. Butenhuis, F. Chai, J. R. Christian, S. C. Doney, C. L. Quéré, I. Lima, R. Murtugudde, L. Shi, P. Wetzel, *North Pacific carbon cycle response to climate variability on seasonal to decadal timescales* in *The Ocean Carbon System Recent Advances and Future Opportunities: An Ocean Carbon and Climate Change (OCCC) Workshop*, Woods Hole, MA, August 2005.

J. A. Yoder, M. A. Kennelly, S. Doney, I. Lima, *Similarities and differences of ocean observatory sites as determined from ocean data and a PARADIGM model* in *The Oceanography Society's International Ocean Research Conference*, Paris, France, June 2005.

M. Maltrud, S. Doney, I. Lima, D. McGillicuddy, J. K. Moore, *A global eddy-permitting physical/biological ocean simulation* in *European Geosciences Union, General Assembly*, Vienna, Austria, 24–29 April 2005.

L. Thompson, I. D. Lima, S. Emerson, *Changes in apparent oxygen utilization in the North Pacific: Physical or biological causes?* in *Ocean Sciences Meeting*, Portland, OR, January 2004.

I. D. Lima, S. C. Doney, *The role of silica limitation and community structure in a marine ecosystem model for the North Atlantic* in *U.S. JGOFS Synthesis and Modeling Project Principal Investigator Meeting*, Woods Hole, MA.

I. D. Lima, L. Thompson, S. Emerson, P. Quay, *Thermocline ventilation and apparent oxygen utilization in the North Pacific: A numerical modeling investigation* in *JGOFS Final Open Science Conference*, Washington, DC, May 2003.

I. D. Lima, S. C. Doney, *A three-dimensional, multi-nutrient, size-structured ecosystem model for the North Atlantic* in *U.S. JGOFS Synthesis and Modeling Project Principal Investigator Meeting*, Woods Hole, MA, July 2002.

I. D. Lima, L. Thompson, S. Emerson, P. Quay, *Investigation of the physical controls of the biological pump of carbon in the subtropical North Pacific* in *U.S. JGOFS Synthesis and Modeling Project Principal Investigator Meeting*, Woods Hole, MA, July 2002.

I. D. Lima, S. C. Doney, F. B. D. McGillicuddy, L. Anderson, M. Maltrud, *Results from an ecosystem model for the North Atlantic* in *U.S. JGOFS Synthesis and Modeling Project Principal Investigator Meeting*, Woods Hole, MA, July 2000.

D. M. Glover, S. C. Doney, J. K. Moore, I. D. Lima, *Studying the mesoscale to inter-annual variability in ocean color using satellite data and Global Marine Ecosystems* in *SeaWiFS Team Meeting*, Durham, NH, May 2000.

I. D. Lima, S. Doney, F. B. D. McGillicuddy, L. Anderson, M. Maltrud, *Preliminary results from an eddy-resolving ecosystem model for the North Atlantic* in *Ocean Sciences Meeting*, San Antonio, TX, January 2000.

D. B. Olson, I. D. Lima, *Excitation of seasonal to interannual variations in marine populations* in *Mixing and Reactive Turbulence Workshop*, Boulder, CO, July 1999.

I. D. Lima, D. B. Olson, *A three-dimensional coupled physical-biological model of the marine pelagic ecosystem* in *Princeton Ocean Model Users Meeting (POM98)*, Miami, FL, February 1998.

I. D. Lima, D. B. Olson, *A coupled physical-biological model of the marine pelagic ecosystem* in *Conference on the Transports and Linkages of the Intra-Americas Sea*, Cozumel, Mexico, November 1997.

I. D. Lima, C. A. E. Garcia, J. P. Castello, *El ambiente fisico y la anchoita en el sur de Brasil* in *Octavo Simpósio Científico de la Comisión Tecnica Mixta del Frente Maritimo*, Montevideo, Uruguay, December 1991.

M. Vasconcellos, H. A. Agrelli, J. P. Castello, I. D. Lima, *Anillos diarios en larvas de anchoita, tamano y condiciones ambientales en el sur de Brasil* 29^oS in *Octavo Simpósio Científico de la Comisión Tecnica Mixta del Frente Maritimo*, Montevideo, Uruguay, December 1991.

I. D. Lima, J. P. Castello, *Distribucion y abundancia de la anchoita (Engraulis anchoita) en el extremo sur de Brasil* in *Septimo Simpósio Científico de la Comisión Tecnica Mixta del Frente Maritimo*, Mar del Plata, Argentina, December 1990.

P. R. Schwingel, A. Ciotti, I. D. Lima, C. Resgalla, *Alimentacion y distribucion invernal de la anchoita (Engraulis anchoita) en relacion con el fitoplancton y zooplancton en el extremo sur de Brasil* in *Septimo Simpósio Científico de la Comisión Tecnica Mixta del Frente Maritimo*, Mar del Plata, Argentina, December 1990.

Cruise and Field Experience

R/V Edwin Link. Harbor Branch Oceanographic Institute. June 1997. 10 days at sea.
R/V Victor Hensen. Alfred-Wegener Institut für Polar und Meeresforschung, Germany. January 1991. Two weeks at sea.
R/V Meteor. University of Hamburg, Germany. November 1989. 31 days at sea.
R/V Atlântico Sul. University of Rio Grande, Brazil. November 1988. Three weeks at sea.
R/V Atlântico Sul. University of Rio Grande, Brazil. September 1988. Two weeks at sea.
R/V Atlântico Sul. University of Rio Grande, Brazil. June 1986. Two weeks at sea.

Additional Information

Citizenship: U.S., Brazilian.
Languages: English and Portuguese.

September 26, 2011