

# Curriculum Vitae

## Carlos E. Del Castillo

**Chief, The Ocean Ecology Laboratory  
NASA Goddard Space Flight Center**

### Summary

Dr. Carlos E. Del Castillo is the Chief of the Ocean Ecology Laboratory at NASA Goddard Space Flight Center, and an Associate Research Professor at the Department of Earth and Planetary Sciences, The Johns Hopkins University. He was previously a member of the Senior Professional Staff and Section Supervisor with the Space Department of the Johns Hopkins University Applied Physics Laboratory. Dr. Del Castillo started his career at the University of Puerto Rico studying the effects of oil pollution in tropical marine environments. Later, at the University of South Florida, he became interested in organic carbon biogeochemistry and the carbon cycle. This led him to study biogeochemical and physical processes in the oceans through a combination of remote sensing and field and laboratory experiments. While working at NASA as a researcher, Dr. Del Castillo served as Project Manager at Stennis Space Center, MS, and served twice as Program Scientist at NASA HQ (2004-2005; 2011). Dr. Del Castillo has chaired NASA and NSF workshops, served in several inter-agency working groups, NASA Senior Reviews for Continuation of Missions, the NASA's Carbon Cycle and Ecosystem Management and Operations Working Group, and three National Research Council panels. Dr. Del Castillo chaired the Science Definition Team for a new NASA satellite mission, PACE, and was elected Chair for the Ocean Optics XXI Conference in Glasgow, Scotland (2012). Dr. Del Castillo has several well-cited publications, co-edited a book on the application of remote sensing techniques. He is a frequent reviewer for technical journals, and served as associate editor for the Journal of Geophysical Research. Dr. Del Castillo received the William Sackett Prize for Innovation and Excellence in Research from the University of South Florida (1999), the NASA Presidential Early Career Award for Scientists and Engineers (2004), and the Emerald Honors Trailblazer Award (2007), and other awards.

### Positions and Employment

- 2013 - Present **Chief, The Ocean Ecology Laboratory**  
NASA Goddard Space Flight Center  
Greenbelt, Maryland
- 2008 - Present **Associate Research Professor**  
Department of Earth and Planetary Sciences, The Johns Hopkins University  
Baltimore, Maryland
- 2012 - 2013 **Researcher and Section Supervisor**  
The Johns Hopkins University Applied Physics Laboratory  
Laurel, Maryland
- 2011 - 2011 **Program Scientist**

- 2005 - 2013 NASA Ocean Biology and Biogeochemistry Program  
NASA Head Quarters, Washington DC IPA assignment  
**Senior Professional Staff - Research Scientist**  
The Johns Hopkins University Applied Physics Laboratory  
Laurel, Maryland
- 2004 - 2005 **Program Scientist**  
NASA Ocean Biology and Biogeochemistry Program  
NASA Head Quarters, Washington DC. Detail assignment from NASA Stennis  
Space Center
- 2000 - 2005 **Research Scientist**  
NASA Applied Science Directorate  
Stennis Space Center, Mississippi
- 1999 - 2000 **Associate in Research**  
Department of Marine Science, University of South Florida  
St. Petersburg, Florida

## Teaching Experience

Laboratory Instructor of General Biology and Zoology – Department of Biology, University of Puerto Rico – Mayagüez, P.R. 1988-89.

High School teacher of Physical Sciences (9th grade) and Advance Physics-college level (12th grade) 1992-1993 -Academia Inmaculada Concepción, Mayagüez, P.R.

General Oceanography –2008-2010- An introductory course offered to graduate and undergraduate students. Department of Earth and Planetary Sciences, Johns Hopkins University.

Remote Sensing of the Environment – 2008-2016 -An advanced undergraduate –graduate course offered at the Department of Earth and Planetary Sciences, Johns Hopkins University.

Advanced Remote Sensing – 2008-2016 – An advanced seminar course offered to graduate students. Department of Earth and Planetary Sciences, Johns Hopkins University.

## Graduate Committee Experience

Supervised several doctoral and master students at the University of Southern Mississippi, and The Johns Hopkins University.

## Education

1998 Ph.D. Oceanography, Department of Marine Science, University of South Florida (Optical Characteristics of the Colored Dissolved Organic Matter in the Eastern Caribbean, West Florida Shelf, and the Arabian Sea: Relationship Between Chemical Characteristics and Optical Response. Dr. P.G. Coble, advisor)

1991 M.S. Marine Chemistry, Department of Marine Science, University of Puerto Rico, Mayagüez Campus (Accumulation and Depuration Rates of Hydrocarbons in the Mangrove Oyster *Crassostrea rizophorae*. Dr J.E. Corredor, advisor)

1987 B.S. Biology, Department of Biology, University of Puerto Rico, Mayagüez Campus

## Synergistic Activities

Member Advisory Board– Joint Center for Earth Systems Technology - UMBC

## Publications

### Refereed

Scott, J. P., S. Crooke, I. Cetinić, C. E. Del Castillo, and C. L. Gentemann. 2020. "Correcting non-photochemical quenching of Sairdron chlorophyll-a fluorescence for evaluation of satellite ocean color retrievals." *Optics Express*, **28 (3)**: 4274 [10.1364/oe.382029]

Del Castillo, C. E., S. R. Signorini, E. M. Karaköylü, and S. Rivero-Calle. 2019. "Is the Southern Ocean Getting Greener?" *Geophysical Research Letters*, **46 (11)**: 6034-6040 [10.1029/2019gl083163]

Hooker, S.B., C.E. Del Castillo, R.N. Lind, J.H. Morrow, C.R. Booth, J.M. Brown, R.M. Kudela, R.A. Armstrong, and K. Suzuki. 2018. The HARPOONS Vicarious Calibration Project. NASA Technical Manual

Kim, G.E., A. Gnanadesikan, C.E. Del Castillo, and M-A. Pradal. 2018. Upper-ocean cooling in a coupled model due to light attenuation by yellowing materials. *Geophysical Research Letters*. DOI: 10.1029/2018GL077297

Del Castillo, C.E., S. Dwivedi, T.W.N. Haine, and D.T. Ho. 2017. Estimating the distribution of colored dissolved organic matter during the Southern Ocean Gas Exchange Experiment using 4-dimensional variational data assimilation. *Journal of Geophysical Research: Oceans* [10.1002/2016JC012406]

Rivero-Calle, S., C. E. Del Castillo, A. Gnanadesikan, A. Dezfali, B. Zaitchik, and D. G. Johns. 2016. Interdecadal Trichodesmium variability in cold North Atlantic waters. *Global Biogeochemical Cycles* [10.1002/2015gb005361]

Rivero-Calle, S., A. Gnanadesikan, C. E. Del Castillo, W. M. Balch, and S. D. Guikema. 2015. Multidecadal increase in North Atlantic coccolithophores and the potential role of rising CO<sub>2</sub>. *Science* **350 (6267)**: 1533-1537 [10.1126/science.aaa8026]

- Turpie, K. R., R. E. Eplee, B. A. Franz, and C. Del Castillo. 2014. Calibration uncertainty in ocean color satellite sensors and trends in long-term environmental records. *Ocean Sensing and Monitoring VI* **9111** [[10.1117/12.2053427](https://doi.org/10.1117/12.2053427)]
- Urquhart, E. A., B. F. Zaitchik, D. W. Waugh, S. D. Guikema, and C. E. Del Castillo. 2014. Uncertainty in Model Predictions of *Vibrio vulnificus* Response to Climate Variability and Change: A Chesapeake Bay Case Study." *PLOS ONE* [[10.1371/journal.pone.0098256](https://doi.org/10.1371/journal.pone.0098256)]
- López, R., C. E. Del Castillo, J. Miller, and D. Wisser. 2012. Examining organic carbon transport by the Orinoco River using SeaWiFS imagery. *J. Geophys. Res* **117** (G03022): [[10.1029/2012JG001986](https://doi.org/10.1029/2012JG001986)]
- Zhongping, L., V. Lance, S. Shang, R. Vailancourt, S. Freeman, B. Lubac, B. Hargraves, C. E. Del Castillo, R. L. Miller, M. Twardowski, and G. Wei. 2011. An Assessment of Optical Properties and Primary Production Derived from Remote Sensing in the Southern Ocean (SO GasEx). *JGR-Oceans* **116** (C00F03): [[10.1029/2010JC006747](https://doi.org/10.1029/2010JC006747)]
- Dwivedi, S., T. N. Haine, and C. E. Del Castillo. 2011. Ocean State Estimation in the Southern Ocean Gas Exchange Experiment Region Using 4DVAR. *JGR-Oceans* **116** (C00F02): [[10.1029/2009JC005615](https://doi.org/10.1029/2009JC005615)]
- Del Castillo, C. E., and R. L. Miller. 2011. Horizontal and Vertical Distribution of Colored Dissolved Organic Carbon During the Southern Ocean GasEx Expedition. *Journal of Geophysical Research -Oceans* **116** (C00F07): [[10.1029/2010JC006781](https://doi.org/10.1029/2010JC006781)]
- Miller, R. L., C. Buonassisi, C. E. Del Castillo, and M. Belz. 2011. A portable fiber optic system for measuring particle absorption using the quantified filter technique (QFT). *Limnology and Oceanography: Methods* **9** 554-564 [[10.4319/lom.2011.9.554](https://doi.org/10.4319/lom.2011.9.554)]
- Del Castillo, C. E., and R. L. Miller. 2008. On the use of ocean color remote sensing to measure the transport of dissolved organic carbon by the Mississippi River Plume. *Remote Sensing of Environment* **112** (3): 836–844 [[10.1016/j.rse.2007.06.015](https://doi.org/10.1016/j.rse.2007.06.015)]
- Roelke, D. L., J. B. Cotner, J. V. Montoya, C. E. Del Castillo, S. E. Davis, J. A. Snider, G. M. Gable, and K. O. Winemiller. 2006. Optically determined sources of allochthonous organic matter and metabolic characterizations in a tropical oligotrophic river and associated lagoon. *Journal of the North American Benthological Society* **25** (1): 185-197 [[10.1899/0887-3593\(2006\)25\[185:ODSOAO\]2.0.CO;2](https://doi.org/10.1899/0887-3593(2006)25[185:ODSOAO]2.0.CO;2)]
- D'Sa, E., R. L. Miller, and C. E. Del Castillo. 2006. An Assessment of Short-term Physical Influences on the Bio-optical Properties and Ocean Color Algorithms in Coastal Waters Influenced by the Mississippi River. *Applied Optics* **45** (28): 7410-7428.
- Powell, M. J., J. N. Sutton, C. E. Del Castillo, and A. T. Timperman. 2005. Marine proteomics: generation of sequence tags for dissolved proteins in seawater using tandem mass spectrometry. *Marine Chemistry* **95** (3-4): 183-198 [[10.1016/j.marchem.2004.09.004](https://doi.org/10.1016/j.marchem.2004.09.004)]

- Birk, R. J., R. L. Miller, C. E. Del Castillo, T. L. Miller, and J. L. Spann. 2005. NASA Space Systems Enable Science for Society. *Earth Observation Magazine* **24** (3):
- Yuan, J., M. J. Dagg, and C. E. Del Castillo. 2005. In-pixel variations of chl a fluorescence in the Northern Gulf of Mexico and their implications for calibrating remotely sensed chl a and other products. *Continental Shelf Research* **25** (15): 1894–1904 [[10.1016/j.csr.2005.06.003](https://doi.org/10.1016/j.csr.2005.06.003)]
- Conmy, R., P. G. Coble, and C. E. Del Castillo. 2004. Performance and Calibration of the WetLabs SAFire in-situ Fluorometer. *Continental Shelf Research* **24** (3): 431-442.
- Miller, R. L., M. Belz, and C. E. Del Castillo. 2002. Determining CDOM absorption spectra in diverse coastal environments using a multiple pathlength, liquid core waveguide system. *Continental Shelf Research* **22** (9): 1301–1310 [[10.1016/S0278-4343\(02\)00009-2](https://doi.org/10.1016/S0278-4343(02)00009-2)]
- Gilbes, F., F. E. Müller-Karger, and C. E. Del Castillo. 2002. New Evidence for the West Florida Shelf Plume. *Continental Shelf Research* **22** (17): 2479–2496 [[10.1016/S0278-4343\(02\)00102-4](https://doi.org/10.1016/S0278-4343(02)00102-4)]
- Del Castillo, C. E., P. G. Coble, R. N. Conmy, F. E. Müller-Karger, L. Vanderbloemen, and G. A. Vargo. 2001. Multispectral in situ measurements of organic matter and chlorophyll fluorescence in seawater: Documenting the intrusion of the Mississippi River plume in the West Florida Shelf. *Limnology and Oceanography* **46** (7): American Society of Limnology and Oceanography, Inc, 1836-1843 [[10.4319/lo.2001.46.7.1836](https://doi.org/10.4319/lo.2001.46.7.1836)]
- Del Castillo, C. E. 2000. Seasonal Variability of the Colored Dissolved Organic Matter During the 1994-95 NE and SW Monsoons in the Arabian Sea. *Deep Sea Research Part II: Topical Studies in Oceanography* **47** (7-8): 1563-1579 [[10.1016/S0967-0645\(99\)00154-X](https://doi.org/10.1016/S0967-0645(99)00154-X)]
- Del Castillo, C. E., F. Gilbes, P. G. Coble, and F. G. Müller-Karger. 2000. On the dispersal of riverine colored dissolved organic matter over the West Florida Shelf. *Limnol. Oceanogr* **45** (6): 1425-1432 [[10.4319/lo.2000.45.6.1425](https://doi.org/10.4319/lo.2000.45.6.1425)]
- Del Castillo, C. E., P. G. Coble, J. M. Morell, J. M. López, and J. E. Corredor. 1999. Analysis of the Optical Properties of the Orinoco River Plume by Absorption and Fluorescence Spectroscopy. *Marine Chemistry* **66** (1-2): 35–51 [[10.1016/S0304-4203\(99\)00023-7](https://doi.org/10.1016/S0304-4203(99)00023-7)]
- Coble, P. G., C. E. Del Castillo, and B. Avril. 1998. Distribution of CDOM in the Arabian Sea During the 1995 Southwest Monsoon. *Deep Sea Research Part II* **45** 2195-2223 [[10.1016/S0967-0645\(98\)00068-X](https://doi.org/10.1016/S0967-0645(98)00068-X)]
- Del Castillo, C. E., J. Corredor, and J. Morell. 1992. Accumulation and Depuration of Hydrocarbons in the Mangrove Oyster *Crassostrea rhizophorae*. 2. *Conférence Internationale sur la Purification des Coquillages, Rennes (France)*, 6-8 Apr 1992 93-96 [[Full Text \(Link\)](#)]

Corredor, J. E., J. M. Morell, and C. E. Del Castillo. 1990. Persistence of Spilled Crude Oil in a Tropical Intertidal Environment. *Marine Pollution Bulletin* **21** (8): 385-388 [[10.1016/0025-326X\(90\)90647-Q](https://doi.org/10.1016/0025-326X(90)90647-Q)]

## **Non-Refereed**

Dozier, J., C. E. Del Castillo, J. D. Fellows, K. O. Green, J. R. Jensen, D. P. Lettenmaier, B. Moore III, D. E. Pataki, D. S. Schimel, W. S. Scott, W. F. Townsend, H. A. Zebker, and M. L. Zoback. 2013. "Landsat and Beyond: Sustaining and Enhancing the Nation's Land Imaging Program." *National Research Council. Landsat and Beyond: Sustaining and Enhancing the Nation's Land Imaging Program* Washington, DC: The National Academies Press, ISBN: 978-0-309-29001-2.

Yoder, J. A., D. Antoine, C. E. Del Castillo, R. H. Evans, C. Mobley, J. L. Sarmiento, S. Sathyendranath, C. F. Schueler, D. A. Siegel, and C. Wilson. 2011. "Assessing Requirements for sustained Ocean Color Research and Operations." *National Research Council. Assessing Requirements for Sustained Ocean Color Research and Operations*. Washington, DC: The National Academies Press, ISBN: 978-0-309-21044-7.

Baker, D. J., D. N. Baker, D. A. Bearden, C. L. Bennett, S. W. Boland, A. J. Busalacchi Jr, C. E. Del Castillo, A. L. Elias, M. Finarelli, T. R. LaPorte, M. S. Leinen, S. N. Pace, M. R. Schoeberl, G. L. Stephens, A. L. Weigel, M. S. Witherell, and A. T. Young. 2011. "Assessment of Impediments to Interagency Collaboration on Space and Earth Science Missions." *National Research Council. Assessment of Impediments to Interagency Collaboration on Space and Earth Science Missions* Washington, DC: The National Academies Press, ISBN: 978-0-309-16350-7.

Del Castillo, C. E. 2004. "Remote Sensing of Colored Dissolved Organic Matter in Coastal Environments." *Remote Sensing of Aquatic Coastal Environments* Kluwer Academic Publishers.

## **In preparation**

Volta, C., D.T. Ho., R. Wanninkhof, G. Friderich, D.T. Maher, C.E. Del Castillo, and H. Dulail. Seasonally-resolved dissolved carbon budget in a mangrove-dominated environment.

Andrew, A. and C.E. Del Castillo. Quantum photoproduction efficiencies of dissolved inorganic carbon from the photodegradation of colored dissolved organic matter in the mangrove dominated coastal environments. To be submitted to *Marine Chemistry*

Andrew, A. and C.E. Del Castillo. Organic carbon dynamics in a mangrove dominated aquatic environment. To be submitted to *Limnology and Oceanography*

Del Castillo, C.E., A. Andrew, and D. Ho. Total carbon export by the Shark Rive- Everglades National Park: Closing the carbon budget in a mangrove dominated aquatic environment. To be submitted to *Global Biogeochemical Cycles*

## **Honors and Awards**

*Honorably discharged from the U.S. Army* U.S. Army Military Police. Veteran of Operation Desert Shield-Desert Storm -1990-1991 – 240<sup>th</sup> Combat-MP Company – PRNG- Peñuelas, P.R.

*William Sackett Prize for Innovation and Excellence in Research.* Department of Marine Science, University of South Florida (1999)

*NASA John C. Stennis Space Center Special Service Award* (2001, 2002, 2004)

*Presidential Early Career Award for Scientists and Engineers* - PECASE (2004)

*Emerald Honors Trailblazer Award* - 2007

*William S. Parson Professorship* – 2008

*NASA Group Achievement Award* - 2009

*Puerto Rico Distinguished Veterans Hall of Fame* – 2018

## **Other Activities and Qualifications**

- Veteran Operation Desert Shield-Desert Storm – USA Army Military Police
- Over 300 days of open ocean research cruise experience in the Caribbean, Atlantic Ocean, Gulf of Mexico, Arabian Sea, and the Southern Ocean.
- Languages – Full professional proficiency in English and Spanish
- Technical expertise in GC-MS, HPLC, UV-Vis and IR absorption spectroscopy, fluorescence spectroscopy, nutrient analysis, TOC, DIC, field optical instrumentation including ac9, acs, SAFIre, XMF, SeaTech and WetStar fluorimeters, transmissometers, ECO-VSF, PRR, Hydroscat, GER, and OCR submersible radiometers. Image processing using SEADAS, ENVI, and ERDAS. Radiative transfer modeling using Hydrolight. Statistical analyses in R.
- NAUI Advanced Open Water Diver.