

Monique Messié

Curriculum Vitae – January 2020

Monterey Bay Aquarium Research Institute
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Research interests

My research combines satellite products, model outputs and *in situ* data to study ecosystem processes, from physics to top predators and carbon export with a stronger focus on phytoplankton. Topics include physical and biological variability at regional and global scales, response to climate and ocean change, island effects on phytoplankton biomass and taxonomy, bioluminescence in the upper ocean, zooplankton hotspots, and connections between surface, midwater and benthic communities.

Education

- 2006 **PhD in Physical / Biological Oceanography**
Université Toulouse III, Laboratoire d'Etudes en Géophysique et Océanographie Spatiales (LEGOS), France. Graduated with honors (Very honorable).
Supervisor: Marie-Hélène Radenac
Thesis: *Physical controls on phytoplankton biomass in the western tropical Pacific.*
- 2003 **MSc in Oceanography, Meteorology and Environment**
Université Paris VI, France. Option marine biogeochemistry. Graduated with honors (Very good, rank 1st).
- 2003 **Engineer's diploma (BSc and MSc in Environmental Engineering)**
Ecole Centrale Paris, France. Option processes and environment, field conception, development, research. Graduated with honors (Good).

Research and professional experience

- 2014-present **Research specialist (MBARI)**
(Monterey Bay Aquarium Research Institute, Moss Landing, California, USA)
Integrating data from several MBARI research groups to study ecosystem processes. Topics include bioluminescence in the upper ocean, connections between surface, midwater and benthos, and process studies in Monterey Bay.
- 2018-2019 **Marie Curie research fellow (MIO)**
(Mediterranean Institute of Oceanography, Marseille, France)
Systematic analysis of island effects on phytoplankton biomass and taxonomy in the tropical Pacific (SAPPHIRE project, <https://sapphire.mio.osupytheas.fr>).
- 2010-2013 **Research associate (MBARI)**
Biological Oceanography Group, Francisco P. Chavez lab.
- 2007-2010 **Post-doctoral fellow (MBARI)**
Biological Oceanography Group, Francisco P. Chavez lab.
Primary production regulation in upwelling systems and in the world ocean. Description of low-frequency variability in physical and biological variables. Phytoplankton and primary production response to climate and ocean variability.

- 2003-2006 **PhD student (LEGOS)**
(Laboratoire d'Etudes en Géophysiques et Océanographie Spatiales, Toulouse, France)
Thesis: Contrôle de la dynamique de la biomasse phytoplanctonique dans le Pacifique tropical ouest. PhD thesis, Université Paul Sabatier (Toulouse, France), 263pp.
http://horizon.documentation.ird.fr/exl-doc/pleins_textes/divers11-03/010045462.pdf.
Use of multi-satellite data, in-situ data, and a physical regional modeling system to investigate chlorophyll variability in the western tropical Pacific, and to explain it by means of physical forcing.
- 2003 **Master / 3rd year engineering 6-months internship (LODYC)**
(Laboratoire d'Océanographie Dynamique et de Climatologie, Paris, France)
Altimetric data study of the Antarctic Circumpolar Current in the Drake Passage.

Peer-reviewed articles

- (25) **Messié, M.**, A. Petrenko, A.M. Doglioli, C. Aldebert, E. Martinez, G. Koenig, S. Bonnet and T. Moutin, 2020. The delayed island mass effect: How islands can remotely trigger blooms in the oligotrophic ocean. *Geophysical Research Letters*, in press, doi:[10.1029/2019GL085282](https://doi.org/10.1029/2019GL085282)
- (24) **Messié, M.**, I. Shulman, S. Martini and S.H.D. Haddock, 2019. Using fluorescence and bioluminescence sensors to characterize auto- and heterotrophic plankton communities. *Progress in Oceanography*, 171, 76-92, doi:[10.1016/j.pocean.2018.12.010](https://doi.org/10.1016/j.pocean.2018.12.010)
- (23) Smith Jr, K.L., Ruhl, H.A., Huffard, C.L., **Messié, M.** and Kahru, M., 2018. Episodic organic carbon fluxes from surface ocean to abyssal depths during long-term monitoring in NE Pacific. *Proceedings of the National Academy of Sciences*, 115(48), 12235-12240, doi:[10.1073/pnas.1814559115](https://doi.org/10.1073/pnas.1814559115)
- (22) Chavez, F.P., J.T. Pennington, R. Michisaki, M. Blum, G.M. Chavez, J. Friederich, B. Jones, R. Herliem, B. Kieft, B. Hobson, A. Ren, J. Ryan, J. Sevadjian, C. Wahl, K.R. Walz, K. Yamahara, G. Friederich and **M. Messié**, 2017. Climate variability and change: Response of a coastal ocean ecosystem. *Oceanography*, 30(4), 128-145, doi:[10.5670/oceanog.2017.429](https://doi.org/10.5670/oceanog.2017.429)
- (21) Haddock, S.H.D., L.M. Christianson, W.R. Francis, S. Martini, M.L. Powers, C.W. Dunn, P.R. Pugh, C.E. Mills, K.J. Osborn, B.A. Seibel, C.A. Choy, C.E. Schnitzler, G.I. Matsumoto, **M. Messié** et al., 2017. Insights into the biodiversity, behavior, and bioluminescence of deep-sea organisms using molecular and maritime technology. *Oceanography*, 30(4), 38-47, doi:[10.5670/oceanog.2017.422](https://doi.org/10.5670/oceanog.2017.422)
- (20) **Messié, M.** and F.P. Chavez, 2017. Nutrient supply, surface currents and plankton dynamics predict zooplankton hotspots in coastal upwelling systems. *Geophysical Research Letters*, 44(17), 8979-8986, doi:[10.1002/2017GL074322](https://doi.org/10.1002/2017GL074322)
- (19) Zhang, Y., B. Kieft, M.J. Stanway, R.S. McEwen, B.W. Hobson, J.G. Bellingham, J.P. Ryan, T.C. O'Reilly, B.Y. Raanan, **M. Messié**, J.M. Smith and F.P. Chavez, 2017. Isothermal tracking by an autonomous underwater vehicle in drift mode. *IEEE Journal of Oceanic Engineering*, 42(4), 808-817, doi:[10.1109/JOE.2016.2625058](https://doi.org/10.1109/JOE.2016.2625058)
- (18) Radenac, M.-H., F. Léger, **M. Messié**, P. Dutrieux, C. Menkes and G. Eldin, 2016. Wind-driven changes of surface current, temperature, and chlorophyll observed by satellites north of New Guinea. *Journal Geophysical Research: Oceans*, 121, 2231-2252, doi:[10.1002/2015JC011438](https://doi.org/10.1002/2015JC011438)
- (17) Smith Jr, K.L., **M. Messié**, A.D. Sherman, C.L. Huffard, B.W. Hobson, H.A. Ruhl and A. Boetius, 2015. Navigating the uncertain future of global oceanic time series. *Eos*, 96, doi:[10.1029/2015EO038095](https://doi.org/10.1029/2015EO038095)
- (16) Miljutin, D., M. Miljutina and **M. Messié**, 2015. Changes in abundance and community structure of nematodes from the abyssal polymetallic nodule field, Tropical Northeast Pacific. *Deep Sea Research Part I*, 106, 126-135, doi:[10.1016/j.dsr.2015.10.009](https://doi.org/10.1016/j.dsr.2015.10.009)
- (15) **Messié, M.** and F.P. Chavez, 2015. Seasonal regulation of primary production in eastern boundary upwelling systems. *Progress in Oceanography*, 134, 1-18, doi:[10.1016/j.pocean.2014.10.011](https://doi.org/10.1016/j.pocean.2014.10.011)

- (14) Ryan, J.P., M.A. McManus, R.M. Kudela, M. Lara Artigas, J.G. Bellingham, F.P. Chavez, G. Doucette, D. Foley, M. Godin, J.B.J. Harvey, R. Marin III, **M. Messié et al.**, 2014. Boundary influences on phytoplankton ecology in a stratification-enhanced upwelling shadow. *Deep-Sea Research Part II*, 101, 63-79, doi:[10.1016/j.dsr2.2013.01.017](https://doi.org/10.1016/j.dsr2.2013.01.017)
- (13) Gierach, M.M., **M. Messié**, T. Lee, K.B. Karnauskas and M.-H. Radenac, 2013. Biophysical responses near equatorial islands in the western Pacific ocean during El Niño/La Niña transitions. *Geophysical Research Letters*, 40(20), 5473-5479, doi:[10.1029/2012GL051103](https://doi.org/10.1029/2012GL051103)
- (12) **Messié, M.** and F.P. Chavez, 2013. Physical-biological synchrony in the global ocean associated with recent variability in the central and western equatorial Pacific. *Journal of Geophysical Research*, 118(8), 3782-3794, doi:[10.1002/jgrc.20278](https://doi.org/10.1002/jgrc.20278)
- (11) Santora, J.A., W.J. Sydeman, **M. Messié**, F. Chai, Y. Chao, S.A. Thompson, B.K. Wells and F.P. Chavez, 2013. Triple check: observations verify structural realism of an ocean ecosystem model. *Geophysical Research Letters*, 40(7), 1367-1372, doi:[10.1002/grl.50312](https://doi.org/10.1002/grl.50312)
- (10) Radenac, M.-H., **M. Messié**, F. Léger and C. Bosc, 2013. A very oligotrophic zone observed from space in the equatorial Pacific warm pool. *Remote Sensing of Environment*, 134, 224-233, doi:[10.1016/j.rse.2013.03.007](https://doi.org/10.1016/j.rse.2013.03.007)
- (9) **Messié, M.** and F.P. Chavez, 2012. A global analysis of ENSO synchrony: the oceans biological response to physical forcing. *Journal of Geophysical Research: Oceans*, 117, C09001, doi:[10.1029/2012JC007938](https://doi.org/10.1029/2012JC007938)
- (8) Das, J., F. Py, T. Maughan, T. O'Reilly, **M. Messié**, J. Ryan, G.S. Sukhatme and K. Rajan, 2012. Coordinated sampling of dynamic oceanographic features with underwater vehicles and drifters. *International Journal of Robotics Research: Oceans*, 31, 626-646, doi:[10.1177/0278364912440736](https://doi.org/10.1177/0278364912440736)
- (7) **Messié, M.** and F.P. Chavez, 2011. Global modes of sea surface temperature variability in relation to regional climate indices. *Journal of Climate*, 24(16), 4313-4330, doi:[10.1175/2011JCLI3941.1](https://doi.org/10.1175/2011JCLI3941.1)
- (6) Chavez, F.P., **M. Messié** and J.T. Pennington, 2011. Marine primary production in relation to climate variability and change. *Annual Review of Marine Science*, 3, 227-260, doi:[10.1146/annurev.marine.010908.163917](https://doi.org/10.1146/annurev.marine.010908.163917)
- (5) Cuvelier, M.L., A.E. Allen, A. Monier, J.P. McCrow, **M. Messié et al.**, 2010. Targeted metagenomics and ecology of globally important uncultured eukaryotic phytoplankton. *Proceedings of the National Academy of Sciences*, 107(33), 14679-14684, doi:[10.1073/pnas.1001665107](https://doi.org/10.1073/pnas.1001665107)
- (4) **Messié, M.**, J. Ledesma, D.D. Kolber, R.P. Michisaki, D.G. Foley and F.P. Chavez, 2009. Potential new production estimates in four eastern boundary upwelling systems. *Progress in Oceanography*, 83(1-4), 151-158, doi:[10.1016/j.pocean.2009.07.018](https://doi.org/10.1016/j.pocean.2009.07.018)
- (3) Chavez, F.P. and **M. Messié**, 2009. A comparison of eastern boundary upwelling ecosystems. *Progress in Oceanography*, 83(1-4), 80-96, doi:[10.1016/j.pocean.2009.07.032](https://doi.org/10.1016/j.pocean.2009.07.032)
- (2) **Messié, M.** and M.-H. Radenac, 2006. Seasonal variability of the surface chlorophyll in the western tropical Pacific from SeaWiFS data. *Deep-Sea Research Part I*, 53(10), 1581-1600, doi:[10.1016/j.dsr.2006.06.007](https://doi.org/10.1016/j.dsr.2006.06.007)
- (1) **Messié, M.**, M.-H. Radenac, J. Lefèvre and P. Marchesiello, 2006. Chlorophyll bloom in the western Pacific at the end of the 1997-98 El Niño: the role of the Kiribati Islands. *Geophysical Research Letters*, 33, L14601, doi:[10.1029/2006GL026033](https://doi.org/10.1029/2006GL026033)

Peer-reviewed conferences and proceedings

- Das, J., F. Py, T. Maughan, T. O'Reilly, **M. Messié**, J. Ryan, K. Rajan, and G.S. Sukhatme, 2014. Simultaneous tracking and sampling of dynamic oceanographic features with autonomous underwater vehicles and lagrangian drifters. In *Experimental Robotics, the 12th International Symposium on Experimental Robotics*, Springer Tracts in Advanced Robotics volume 79, p.541-555, Springer Berlin Heidelberg, doi:[10.1007/978-3-642-28572-1_37](https://doi.org/10.1007/978-3-642-28572-1_37)

- Gomes, K., D. Cline, D. Edgington, M. Godin, T. Maughan, M. McCann, T. O'Reilly, F. Bahr, F. Chavez, **M. Messié**, J. Das and K. Rajan, 2013. ODSS: A Decision Support System for Ocean Exploration. *Proceedings of the Workshop on Data-Driven Decision Guidance and Support Systems (DGSS)*, held as part of the *29th IEEE International Conference on Data Engineering (ICDE)* in April 2013 in Brisbane, Australia, doi:[10.1109/ICDEW.2013.6547450](https://doi.org/10.1109/ICDEW.2013.6547450)
- Das, J., T. Maughan, M. McCann, M. Godin, T. O'Reilly, **M. Messié**, F. Bahr, K. Gomes, F. Py, J. Bellingham, G.S. Sukhatme and K. Rajan, 2011. Towards mixed-initiative, multi-robot field experiments: design, deployment, and lessons learned. *International Conference on Intelligent Robots and Systems (IROS)*, San Francisco, USA, doi:[10.1109/IROS.2011.6095068](https://doi.org/10.1109/IROS.2011.6095068)

Submitted / in preparation

- Fiechter, J., J.A. Santora, F.P. Chavez, D. Northcott and **M. Messié**. Krill hotspots in a moving ocean: environmental drivers and ecosystem significance.

Presentations (first author only)

Invited presentations

- 2019 EGU General Assembly, Vienna, Austria: "*Biological production and zooplankton hotspots in Eastern Boundary Upwelling Systems*"
- 2019 LOPS, Brest, France: "*Réponse biologique au phénomène d'upwelling : phytoplancton, zooplancton et écosystèmes*"
- 2018 LEGOS, Toulouse, France: "*Réponse biologique au phénomène d'upwelling : phytoplancton, zooplancton et écosystèmes*"
- 2018 MIO, Marseille, France: "*Réponse biologique au phénomène d'upwelling : phytoplancton, zooplancton et écosystèmes*"
- 2017 CoastWatch annual meeting, Santa Cruz, CA, USA: "*Using satellite data to study phytoplankton and zooplankton seasonal regulation in the California Current System*"
- 2016 Process Study and Model Improvement U.S. CLIVAR panel (remote presentation): "*Observing biophysical interactions*"
- 2016 MIO, Marseille, France: "*Variabilité basse fréquence de l'océan mondial : modes climatiques, forçage physique et réponse biologique*"
- 2016 EEBUS summer school, Saint-Louis, Senegal: "*Global analysis of ENSO synchrony: the oceans' biological response to physical forcing*"
- 2016 EEBUS summer school, Saint-Louis, Senegal: "*Seasonal regulation of primary production in Eastern Boundary Upwelling Systems*"
- 2012 2nd ICES/PICES conference for early career scientists, Calvià, Majorca, Spain: "*Synchronous global-scale patterns of variability in ocean color and physical variables: ecosystem functioning in relation to climate variability and change*"
- 2009 LOCEAN, Paris, France: "*Production primaire dans les écosystèmes d'upwelling de bord est : variabilité et contrôle*"
- 2009 LEGOS, Toulouse, France: "*Production primaire dans les écosystèmes d'upwelling de bord est : variabilité et contrôle*"
- 2005 SOEST, Honolulu, Hawaii, USA: "*Chlorophyll bloom in the western Pacific at the end of the 1997-98 El Niño: the role of Kiribati Islands*"

Other oral presentations

- 2019 EBUS webinar series (remote presentation): "*Ecosystem response to upwelling from surface to seafloor in the California Current System*"
- 2019 Eastern Pacific Ocean Conference, South Lake Tahoe, California, USA: "*Temporal variability and environmental forcing of surface, midwater and benthic communities in the California Current System*"

- 2018 Ocean sciences meeting, Portland, Oregon, USA: *“Ocean temporal variability and environmental forcing of surface, midwater and benthic communities in the California Current System”*
- 2016 Ocean sciences meeting, New Orleans, Louisiana, USA: *“High-resolution sampling of plankton diversity using fluorescence and bioluminescence sensors”*
- 2015 IMBIZO IV workshop, Trieste, Italy: *“Towards satellite-based indicators of climate-driven changes in the California Current upwelling ecosystem”*
- 2013 45th international Liège colloquium, Liège, Belgium: *“Regulation of seasonal primary production in eastern boundary upwelling systems”*
- 2011 ASLO aquatic sciences meeting, San Juan, Puerto Rico: *“Global temporal and spatial patterns of variability in ocean color: synchrony with physical variables and underlying mechanisms”*
- 2008 Eastern boundary upwelling ecosystems meeting, Las Palmas, Spain: *“Nitrate supply and potential primary productivity estimates in four eastern boundary upwelling systems”*
- 2008 Ocean sciences meeting, Orlando, Florida, USA: *“Interannual variability and long term trends in eastern Pacific upwelling ecosystems”*
- 2006 15 years of progress in radar altimetry symposium, Venice, Italy: *“Chlorophyll bloom in the western equatorial Pacific during the 1998 El Niño / La Niña transition: the role of Kiribati Islands as seen from satellite, in-situ data, and a high-resolution simulation”*

Other poster presentations

- 2020 Ocean sciences meeting, San Diego, California, USA: *“Utilizing satellite information and a simple plankton model to predict zooplankton hotspots in the California Current Ecosystem”*
- 2019 EGU General Assembly, Vienna, Austria: *“Revisiting the island mass effect: a systematic study in the tropical Pacific”*
- 2018 Ocean Optics XXIV conference, Dubrovnik, Croatia: *“Delayed island effects can trigger nitrogen fixer blooms”*
- 2017 Aquatic sciences meeting, Honolulu, Hawaii, USA: *“Plankton growth and grazing coupled with winds and surface currents describe zooplankton distribution and hotspots in upwelling systems”*
- 2014 Ocean sciences meeting, Honolulu, Hawaii, USA: *“Simple math describes coastal to offshore phytoplankton/zooplankton distributions and ecosystem dynamics”*
- 2012 Ocean sciences meeting, Salt Lake City, Utah, USA: *“Horizontal and vertical distribution of sharks as characterized by the TOPP program in relation to Pacific oxygen minimum zones”*
- 2010 Ocean sciences meeting, Portland, Oregon, USA: *“Global temporal and spatial patterns of variability in sea surface temperature, sea level and chlorophyll”*
- 2008 CLIMECO workshop, Brest, France: *“Physical/biological variability and interactions at the decadal scale in eastern Pacific upwelling ecosystems”*
- 2006 Ocean sciences meeting, Honolulu, Hawaii, USA: *“A chlorophyll bloom in the western equatorial Pacific at the end of the 1997-98 El Niño: the role of Kiribati Islands”*, presented by M.-H. Radenac.
- 2005 EGU General assembly, Vienna, Austria: *“Ocean color seasonal variability of the western tropical Pacific basin”*, presented by M.-H. Radenac.
- 2004 AGU Fall meeting, San Francisco, California, USA: *“Seasonal variability of the SeaWiFS chlorophyll in the western tropical Pacific”*. Outstanding student paper award.
- 2004 GODAE summer school, Lalonde, France: *“Seasonal variability of the SeaWiFS chlorophyll in the western tropical Pacific”*

Recently funded research

- 2019-2022 NOPP: *“The CeNCOOS MBON: Integrating remote sensing, in situ data and models to understand central California ecosystem responses to environmental change”* (co-PI)
- 2017-2019 NASA (ROSES-2016): *Utilizing remote sensing, models and in situ data to elucidate ecosystem hotspots in a moving ocean* (lead PI, \$736,242)
- 2018-2019 Horizon2020 (Marie Skłodowska-Curie Individual Fellowship): *Systematic analysis of Pacific phytoplankton and islands regional effects* (108,173€)

Fellowships and awards

- 2017 Marie Skłodowska-Curie Individual Fellowship
- 2004 Outstanding student paper award received at the AGU Fall Meeting
- 2003 MENRT doctoral fellowship

Experience at sea

- Benthic cruise to Station M (off California): **Nov 2016** (R/V Western Flyer)
- CANON cruise off Monterey Bay, CA: **Sep 2010, Sep 2013, Sep 2014** and **Sep 2015** (R/V Western Flyer): CTD casts, primary production measurements
- Gulf of California expedition from Monterey Bay to La Paz, Mexico, **Feb 2012** and **Feb 2015**, onboard the MBARI R/V Western Flyer: CTD casts.
- CalCOFI cruises along line 67 off Monterey Bay, CA: **Jul 2007** (R/V Western Flyer), **Jun 2008** and **Nov 2010** (R/V Point Sur): CTD casts, primary production measurements
- TAO cruise along the 125°W and 140°W longitudes, **Aug-Oct 2005**, onboard the NOAA R/V Ka'imimoana: maintenance of the TAO buoy array, CTD casts, biological measurements.

Mentoring

- 2019 Ibrahima Coly, M2 master student (5 months), "*Seasonal and interannual variability of phytoplankton blooms in the Southwest Pacific*"
- 2017 Ashaar Sanchez, MBARI/REU summer intern (10 weeks), "*Environmental factors influencing zooplankton diel vertical migration in Monterey Bay, California*"
- 2016 Alaina Smith, MBARI summer intern (10 weeks), "*Factors affecting plankton type dominance in Monterey Bay*"

Professional activities

Journal reviews: Nature Climate Change, Nature Communications, Nature Geoscience, Scientific Reports, Geophysical Research Letters, Journal of Geophysical Research, Limnology & Oceanography, Frontiers in Marine Science, Remote Sensing of Environment, Progress in Oceanography, Deep-Sea Research Part II, Climate Research, Remote Sensing, Current Climate Change Reports, Journal of Marine Systems.

Panel reviews: NASA (ROSES-2016, ROSES-2019), Latvian Science Council (2012 Call for Research Projects).

Editorial board: PeerJ (Environmental Science section).