LOUISE DELAIGUE, PhD

Ocean biogeochemist specializing in surface CO_2 fluxes, autonomous observing systems, and the biological carbon pump.

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Education

2020 – 2025 **PhD**, Ocean Systems, Universiteit Utrecht, Utrecht, The Netherlands.
Dissertation: *Filling the gaps: anthropogenic CO_2 and the changing biological carbon pump through integrated observations and machine learning. Supervisor: M. P. Humphreys.*

2016 – 2018 **MSc**, Earth and Planetary Sciences, McGill University, Montreal, Canada.
Dissertation: *Inorganic carbon dynamics and CO_2 fluxes in the Saguenay Fjord (Québec, Canada). Supervisor: A. Mucci.*

2012 – 2016 **BSc**, Environmental Science, Concordia University, Montreal, Canada.

Research Positions

2025 – present **Postdoctoral Fellow**, Sorbonne Université – CNRS, Laboratoire d'Océanographie de Villefranche, France.
Role: *Developing methods to integrate acoustic and biogeochemical float observations for improved quantification of air–sea CO_2 fluxes (TRICUSO, EU Horizon Europe). WP3 co-lead.*

2020 – 2025 **PhD Candidate**, NIOZ Royal Netherlands Institute for Sea Research, Texel, The Netherlands.
2016 – 2018 **Research and teaching assistant**, McGill University, Montreal, Canada.
2016 **Intern**, South African Shark Conservancy, South Africa.

Collaborative Networks

2025 – present **Steering Committee member, SOCONET:** Surface Ocean CO_2 Reference Observing Network.

2025 – present **Participant, Antarctica InSync:** International Science & Infrastructure for Synchronous Observation *(UNESCO-led UN Ocean Decade Programme)*

2024 – present **Associate member, SCOR Working Group 4D-BGC:** *Coordinating the Development of Gridded Four-Dimensional Data Products from Biogeochemical-Argo Observations*.

Competitive Funding and Awards

2023 **Best SOLAS Summer School Presentation**, Mindelo, Cape Verde
2017 **McGill Graduate Research Enhancement and Travel Award:** 4000 $.

Supervision

2022 – 2023 Anne Roozendaal, Universiteit Utrecht — MSc Thesis: *Anthropogenic carbon in the Atlantic Ocean at 40 °S from 1972 to 2014.* **Role: co-supervisor**.

2022 *Marine Masters Summer Course* (NIOZ) — **Role: co-PI**.

Publications

In review Gledhill, M., Gosnell, K., Humphreys, M. P., **Delaigue, L**, Helle, N., Zhu, K., Lodeiro, P., Rey-Castro, C. and Achterberg, E. P. Chemical controls on iron distributions across the subsurface South Pacific Ocean ***Nature Communications***. https://doi.org/10.26434/chemrxiv-2025-2xl81.

In review **Delaigue, L**., Cauchy, P., Cazau, D., Bonnel, J., Pensieri, S., Bozzano, R., Gros-Martial, A., Leymarie, E. and Claustre, H. Subsurface acoustics from profiling floats as a pathway to scalable autonomous observations of global surface wind. ***Ocean Science.*** https://doi.org/10.5194/egusphere-2025-4174.

2025 **Delaigue, L**., Reichart, G.-J., Qiu, L., Achterberg, E. P., Ourradi, Y., Galley, C., Mutzberg, A., and Humphreys, M. P.: From small-scale variability to mesoscale stability in surface ocean pH: implications for air–sea CO_2 equilibration, ***Biogeosciences***, 22, 5103–5121, https://doi.org/10.5194/bg-22-5103-2025, 2025.

2025 Gros-Martial, A., **Delaigue, L.,** Cauchy, P., Pensieri, S., Bozzano, R., Bonnel, J., Leymarie, E., Guinet, C., Baumgartner, M., Bazin, S., & Cazau, D. (2025). Benchmarking models for ocean

wind speed estimation using passive acoustic monitoring. ***OCEANS 2025 Brest***, BREST, France, 2025, pp. 1-10, https://doi.org/10.1109/OCEANS58557.2025.11104747.

2024 **Delaigue, L.**, Sulpis, O., Reichart, G.-J., & Humphreys, M. P. (2024). The changing biological carbon pump of the South Atlantic Ocean. ***Global Biogeochemical Cycles***, 38, e2024GB008202. https://doi.org/10.1029/2024GB008202.

2023 van de Mortel, H., **Delaigue, L.**, Humphreys, M. P., Middelburg, J. J., Ossebaar, S., Bakker, K., et al. (2024). Laboratory observation of the buffering effect of aragonite dissolution at the seafloor. ***Journal of Geophysical Research: Biogeosciences***, 129, e2023JG007581. https://doi.org/10.1029/2023JG007581.

2022 Humphreys, M. P., Meesters, E. H., de Haas, H., Karancz, S., **Delaigue, L.**, Bakker, K., Duineveld, G., de Goeyse, S., Haas, A. F., Mienis, F., Ossebaar, S., and van Duyl, F. C.: Dissolution of a submarine carbonate platform by a submerged lake of acidic seawater, ***Biogeosciences***, 19, 347–358, https://doi.org/10.5194/bg-19-347-2022.

2020 **Delaigue, L.**, Thomas, H., and Mucci, A.: Spatial variations in CO_2 fluxes in the Saguenay Fjord (Quebec, Canada) and results of a water mixing model, ***Biogeosciences***, 17, 547–566, https://doi.org/10.5194/bg-17-547-2020.

Conferences and seminars

Chaired sessions

2026 *(confirmed)* **Session HE014 -** The Southern Ocean Carbon Sink: processes, observations, and change. **Ocean Science Meeting**, Glasgow, United Kingdom. **Chairs:** Wimart-Rousseau, C., Meyer, M., Bell, T. G., Trucco-Pignata, P. and **Delaigue, L.**

Oral presentations

2026 *(confirmed)* **Delaigue, L.**, Sauzède, R., Sulpis, O., Boyd, P. W., Claustre, H., Reichart, G-J. and Humphreys, M.P. Uncovering the spatial redistribution of the biological carbon pump. **Ocean Science Meeting**, Glasgow, United Kingdom.

2025 **Delaigue, L.***, Sauzède, R., Sulpis, O., Boyd, P. W., Claustre, H., Reichart, G-J. and Humphreys, M.P. Secret shifts in the ocean's biological carbon pump. **SCOR Working Group 168**, online. ***invited**

2025 **Delaigue, L.**, Landschützer, P., Bushinsky, S., Sallée, J-B., Bakker, D., Wimart-Rousseau, C., Sauzède, R. and Claustre, H. Revisiting the Southern Ocean CO_2 sink with BGC-Argo floats. **SOLAS France**, Institut de Physique du Globe de Paris, France.

2024 **Delaigue, L.**, Sauzède, R., Renosh, PR., Claustre, H. and Humphreys, M.P. Bridging observational gaps in ocean carbon dynamics with the SOCA-CO_2 framework. **Ocean Science Meeting**, New Orleans, Louisiana, USA.

2023 **Delaigue, L.**, Sulpis, O., Reichart, G-J., and Humphreys, M.P. Multidecadal change in natural carbon dynamics at the interface between Atlantic and Southern Ocean. **EGU General Assembly**, Vienna, Austria.

2023 **Delaigue, L.***, Sulpis, O., Reichart, G-J., and Humphreys, M.P. Multidecadal change in natural carbon dynamics at the interface between Atlantic and Southern Ocean. **BGC-Argo Seminars**, online. ***invited**

2022 **Delaigue, L.**, Reichart, G-J., and Humphreys, M.P. Variability in the biological pump in the South Atlantic Ocean. **NAC Congress**, Utrecht, The Netherlands

Poster presentations

2022 **Delaigue, L.**, Sulpis, O., Reichart, G.-J., Humphreys, M. P. Variability in the biological pump in the South Atlantic Ocean. **OCB Summer Workshop**, Woods Hole Oceanographic Institution, Woods Hole MA, USA.

2021 **Delaigue, L.**, Reichart, G.-J., Humphreys, M. P. Mesoscale variability in surface ocean pH during winter storms. **NAC Congress**, Utrecht, The Netherlands.

2018 **Delaigue, L.**, Thomas, H., and Mucci, A.: Spatial variations in CO_2 fluxes in the Saguenay Fjord (Quebec, Canada) and results of a water mixing model. **CMOS Congress**, Halifax, Nova Scotia, Canada.

2018 **Delaigue, L.**, Thomas, H., and Mucci, A.: Spatial variations in CO_2 fluxes in the Saguenay Fjord (Quebec, Canada) and results of a water mixing model. **GEOTOP Congress**, La Malbaie, Québec, Canada.

2018 **Delaigue, L.**, Thomas, H., and Mucci, A.: Spatial variations in CO_2 fluxes in the Saguenay Fjord (Quebec, Canada) and results of a water mixing model. **Ocean Science Meeting**, Portland, Oregon, USA.

Leadership and scientific communication

2025 **Speaker, TEDx,** Nice, France. *Listening to the ocean's climate clues.* [https://www.youtube.com/watch?v=mPi08_HC6cg].
2023 – present **Speaker, Adopt a float**, IMEV, Sorbonne Université – CNRS.
2021 **Invited speaker on cultural intelligence at various events:**
International Conference for YOUNG Marine Researchers, European Marine Board
Sailing for Impact
All-Atlantic Ocean Youth Ambassadors induction training, JPI Oceans
2019 **Participant, Cultural intelligence (CQ) Accelerator,** Common Purpose.
2017 **Coordinator, Global Leadership Experience**, Common Purpose.
2017 – 2018 **President, McGill University Young Greens,** Green Party of Canada.
2017 **Québec Youth Leader. Federal Council,** Green Party of Canada.
2016 **Participant, Model United Nations Framework Convention on Climate Change**.
2015 – 2016 **President, Concordia University Young Greens**, Green Party of Canada.
2015 **Participant, Global Leadership Experience**, Common Purpose.

Sea going experience — 87 days at sea

2026 (*planned*) **M/V Pharos,** Southern Ocean, Atlantic Sector
2020 **FS Sonne**, North Atlantic (35 days)
2018 **CCGS Amundsen icebreaker**, Canadian Arctic (10 days)
2018 **RV Coriolis II**, St Lawrence Gulf and Estuary, Saguenay Fjord (12 days)
2017 **CCGS Amundsen icebreaker**, Canadian Arctic (10 days)
2017 **RV Coriolis II**, St Lawrence Gulf and Estuary, Saguenay Fjord (20 days)

Workshops and training

2025 **GEORGE Technical Forum II: Sensors**, Flanders Marine Institute – VLIZ, Belgium.
2023 **SOLAS Summer School. Ocean Science Centre Mindelo**, Mindelo, Cape Verde.
2022 **POGO Observational Training:** Best Practices in Biogeochemical Ocean Observation: instrumentation, operation, quality control. **Scottish Association for Marine Science**, UK.

Community service

Software development

2024 Humphreys, M. P., **Delaigue, L.**, Ourradi, Y., Brandon, M., & Ádler, M. A. (2024). optopHyre: processing optode datasets from Pyroscience sensors (v0.1). Zenodo. https://doi.org/10.5281/zenodo.13885219

Journal roles

2025 - 2026 **Guest editor**, Biogeosciences Special Issue: Effects of ocean alkalinity enhancement (OAE) on plankton communities – results from the "OAE Pelagic Impact Intercomparison Project (OAEPIIP)"

2020 - present **Referee** for Biogeosciences, Ocean Science, Global Biogeochemical Cycles, Journal of Geophysical Research, Communications Earth & Environment

Published datasets

2023 **Delaigue, L.**, Ourradi, Y., Ossebar, S., Battermann, P., Galley, C., Humphreys, M. P. "CTD seawater dissolved inorganic carbon and total alkalinity for R/V Sonne cruise SO289.", https://doi.org/10.25850/nioz/7b.b.tf, NIOZ, V6

2023 **Delaigue, L.**, Ourradi, Y., Bakker, K., Battermann, P., Galley, C., Humphreys, M. P. "Underway surface seawater high-resolution pH time series for R/V Sonne cruise SO289.", https://doi.org/10.25850/nioz/7b.b.uf, NIOZ, V2

2023 **Delaigue, L.**, Liu, H., Browning, T., Humphreys, M. P. "SO289 Alkalinity Enhancement Experiment on R/V Sonne.", https://doi.org/10.25850/nioz/7b.b.wf, NIOZ, V4

2021 Humphreys, M. P., Bakker, K., **Delaigue, L.**, Ossebaar, S. "Seawater hydrography and biogeochemistry data from Luymes Bank Sinkhole Expedition 64PE20191205", https://doi.org/10.25850/nioz/7b.b.yc, NIOZ, V1

2021 **Delaigue, L.**, van Ooijen, J., Humphreys, M. P. "Discrete underway surface seawater dissolved inorganic carbon, total alkalinity and nutrients for R/V Sonne cruise SO279.", https://doi.org/10.25850/nioz/7b.b.lc, NIOZ, V2

2021 **Delaigue, L.**, van Ooijen, J., Humphreys, M. P. (2021) "CTD seawater dissolved inorganic carbon, total alkalinity and nutrients for R/V Sonne cruise SO279.", https://doi.org/10.25850/nioz/7b.b.kc, NIOZ, V2

2021 **Delaigue, L.**, van Ooijen, J., Humphreys, M. P. (2021) "Underway surface seawater high-resolution pH time series for R/V Sonne cruise SO279.", https://doi.org/10.25850/nioz/7b.b.mc, NIOZ, V2