Dr. Pierre Marrec

PhD in Biogeochemical Oceanography

Graduate School of Oceanography – University of Rhode Island Menden-Deuer Lab Bay Campus, Narragansett, RI 02882, USA

Research Activities

- Oct. 2018 Present: Post-Doctoral position
 Graduate School of Oceanography University of Rhode Island Menden-Deuer Lab
 Plankton population dynamics across the Northeast continental shelf. Northeast U.S. Shelf Long-Term Ecological Research, NES-LTER project.
 Supervisor : Prof. Susanne Menden-Deuer
- Sept. 2015 Jul. 2018: Post-Doctoral position Mediterranean Institute of Oceanography – Aix Marseille University – CYBELE Team Submesoscale dynamics of the phytoplankton community structure in the western Mediterranean Sea from *in-situ* observations. AMIDEX funding – CHROME project. Supervisors: Dr. Melilotus Thyssen and Dr. Gérald Grégori
- Jan. 2015 Jul. 2015: Post-Doctoral position
 Biological Station of Roscoff UMR7144 CNRS/UPMC Marine Chemistry Team
 Continuity of PhD works
 Supervisor: Dr. Yann Bozec
- Oct. 2011 Dec. 2014: PhD Chemical Oceanography Biological Station of Roscoff - UMR7144 CNRS/UPMC - Marine Chemistry Team Paris VI University (UPMC)
 Dynamics of the carbonate system and air-sea CO₂ fluxes in north-western European shelf waters: A multi-scale approach.

Supervisors: Dr Pascal Morin and Dr Yann Bozec

Education

- Master's Degree in Chemistry of Marine Environments (2009-2011), European Institute of Marine Studies (IUEM), Plouzané, Brest, France.
- Licence of Chemistry (2006-2009), University of Brest (UBO), France.

French 401-874-6140 pmarrec@uri.edu

Publications

- P. Marrec, H. McNair, G. Franzè, F. Morison, J.P. Strock and S. Menden-Deuer. *Seasonal variability in planktonic food web structure and function of the Northeast U.S. Shelf.* 2021, Limnology and Oceanography.
- J.-P. Gac, **P. Marrec**, T. Cariou, É. Macé, M. Vernet, Y. Bozec. *Cardinal Buoys: An opportunity for the study of air-sea CO*₂ *fluxes in coastal ecosystems*. 2020, Frontiers in Marine Science.
- S. Menden-Deuer, F. Morrison, A. L. Montalbano, G. Franzè, J. Strock, E. T. Rubin, H. McNair, C. Mouw, P. Marrec. *Multi-instrument assessment of phytoplankton abundance and cell size in mono-specific laboratory cultures and whole plankton community composition in the North Atlantic.* 2020, Frontiers in Marine Science – Marine Ecosystem Ecology, 7:254.
- C. Wimart-Rousseau, K. Lajaunie-Salla, P. Marrec, T. Wagener, P. Raimbault, V. Lagadec, M. Lafont, N. Garcia, F. Diaz, C. Pinazo, C. Yohia, F. Garcia, I. Xueref-Remy, P.-E. Blanc, A. Armengaud, D. Lefèvre. *Temporal variability of the carbonate system and air-sea CO2 exchanges in the Bay of Marseille over a two-year period*. 2020, Estuarine Coastal and Shelf Sciences, 236, 106641.
- L. Rousselet, A.M. Doglioli, A. de Verneil, A. Pietri, A. Della Penna, L. Berline, P. Marrec, G. Grégori, M. Thyssen, F. Carlotti, S. Barrillon, F. Simon-Bot, M. Bonal, F. d'Ovidio, A. Petrenko. *Vertical motions and their effects on a biogeochemical tracer in a cyclonic structure finely observed in the Ligurian Sea*. 2019, Journal of Geophysical Research: Oceans, 124, 3561–3574.
- P. Marrec, A.M. Doglioli, G. Grégori, M. Dugenne, A. Della Penna, N. Bhairy, T. Cariou, S. Hélias Nunige, S. Lahbib, G. Rougier, T. Wagener, M. Thyssen. *Coupling physics and biogeochemistry thanks to high resolution observations of the phytoplankton community structure in the North-Western Mediterranean Sea.* 2018, Biogeosciences, 15, 1579-1606.
- P. Marrec, T. Cariou, E. Macé, P. Morin, L. Salt, M. Vernet, B. Taylor, K. Paxman, Y. Bozec. Dynamics of air-sea CO₂ fluxes in the northwestern European Shelf based on Voluntary Observing Ship and satellite observations. 2015, Biogeosciences, 12, 5371-5391.
- P. Marrec, T. Cariou, M. Latimier, E. Macé, P. Morin, M. Vernet, Y. Bozec. Spatio-temporal dynamics of biogeochemical processes and air-sea CO₂ fluxes in the Western English Channel based on two years of FerryBox deployment. 2014, Journal of Marine System, FerryBox Special Issue, 140A, 26-38.
- P. Marrec, T. Cariou, E. Collin, A. Durand, M. Latimier, E. Macé, P. Morin, S. Raimund, M. Vernet, Y. Bozec. Seasonal and latitudinal variability of the CO₂ system in the western English Channel based on Voluntary Observing Ship (VOS) measurements. 2013, Marine Chemistry, 155, 29-41.

Research skills

• Coupling Biogeochemistry and phytoplankton community structure

3D fine-scale variability of physical, chemical and biological parameters using adaptative sampling strategy. Coupling model outputs, remote sensing data, high-frequency monitoring and discrete measurements at (sub)mesoscale.

• Plankton ecology

Study key mechanisms linking changes in the physical environment, planktonic food webs and higher trophic levels. Phytoplankton growth and protist grazing. Photoacclimation. Mixotrophy.

- Coastal oceanography
- Carbonate system and air-sea CO₂ fluxes dynamics

Dynamics of the CO_2 systems in European continental shelf waters from tidal to multi-annual time scales using multiple ocean observing platforms (moorings, voluntary observing ships, satellite).

• Autonomous observing platforms, innovative biogeochemical sensors and data management

Including automated flow cytometry with image acquisition. High throughput image processing and analysis. Development of standard procedures for flow cytometry data storage and availability. Close collaboration with oceanographic innovative sensors manufacturers.

Conferences – Oral and Poster Presentations

- Plankton population dynamics and food web structure on the Northeast US Shelf (NES-LTER): early indication of seasonal shifts in production regimes. Ocean Sciences Meeting, San Diego, CA, 16-21 February 2020. Poster
- *Plankton population dynamics and food web structure of the coast of Rhode Island*. RI C-AIM 2019 All-Hands Meeting, Narragansett, RI, 25 October 2019. Oral (Soundbite talk) presentation.
- Plankton population dynamics and food web structure on the Northeast US Shelf (NES-LTER): early indications of seasonal shifts in production regimes. Ocean Carbon Biogeochemistry Meeting, Woods Hole, MA, 24-27 June 2019. Poster.
- Dynamics of phytoplankton community structure using automated flow cytometry: From singlecell analysis to fine-scale physical and biogeochemical variability. Bio@Noon Seminar, GSO-URI, Narragansett, RI, US, 23 January 2019. Oral presentation.
- High-frequency observations of the phytoplankton community structure in the Mediterranean Sea. 3rd JERICO-NEXT Workshop on Phytoplankton Automated Observation, MIO, Marseille, France, 19-21 March 2018. Oral presentation.

- Submesoscale dynamics of the phytoplanktonic community structure in the North-Western Mediterranean Sea from in situ observations: The 2015 OSCAHR cruise. FINEMED 2017 Workshop, MIO, Marseille, France, June 2017. Oral presentation.
- Submesoscale dynamics of the phytoplanktonic community structure in the North-Western Mediterranean Sea from in-situ observations: the 2015 OSCAHR cruise. EGU2017, OS2.2. session, Vienna, Austria, 23 Apr.–28 Apr. 2017. Oral presentation.
- Coupling FerryBox and automated flow cytometer: a new approach for studying biogeochemical processes and CO₂ system variability in relation to phytoplankton community structure. Ocean Biogeochemistry, Gordon Research Conference, The Biologically-Driven Ocean Carbon Pumps, Jun. 2016. Poster.
- Coupling FerryBox and automated flow cytometer: a new approach for studying biogeochemical processes and CO₂ system variability in relation to phytoplankton community structure. 7th FerryBox Workshop, Heraklion, Greece, Apr. 2016. Oral presentation.
- FerryBox: observations from voluntary observing ships + Biogeochemical dynamics of coastal ecosystems from FerryBoxes + Coupling automated flow cytometry and CO₂ system measurements on voluntary observing ships. Coastal Coriolis Meeting, RESOMAR, Montpellier, France. Nov. 2015. Oral presentations.
- Dynamics of air-sea CO₂ fluxes based on FerryBox measurements and satellite-based prediction of pCO₂ in the Western English Channel. EGU2014, BG3.1. session, Vienna, Austria, 27 Apr.– 02 May 2014. Oral presentation.
- Spatio-temporal dynamics of air-sea CO₂ fluxes in the Western English Channel (WEC) based on FerryBox measurments. Ocean Fluxes Greenhouse Gazes Science ESA-EGU-SOLAS International Workshop, Plouzané, France. Sept. 2013. Poster.
- Spatio-temporal dynamics of air-sea CO₂ fluxes in the Western English Channel (WEC) based on FerryBox measurments. 6th Internationnal SOLAS Summer School, Xiamen, China. Aug. 23–Sept. 2, 2013. Poster and oral communication (selected for a registration and travel grant, CNES).
- Spatio-temporal dynamics of biogeochemical parameters and air-sea CO₂ fluxes in the Western English Channel (WEC) based on Voluntary Observing Ship (VOS) measurements with a FerryBox system. 5th FerryBox Workshop, Celebrating 20 Years of Alg@line, Finnish Environment Institute (SYKE), Helsinki, Finland. Apr. 24-25, 2013. Poster.
- *Times-series analysis of the CO*₂ *dynamics in the Western English Channel using Voluntary Observing Ships (VOS).* Time-series analysis in marine science and application for industry, Logonna-Daoulas, France. Sept. 17-21, 2012. Poster (selected for a registration grant).

Field Experience

- *Feb. 2019, Aug. 2019, Feb. 2020:* NES-LTER cross-shelf transects. Head of the phytoplankton rates team of the Menden-Deuer Lab.
- 2016: Monthly crossing between Marseille (France) and Tunis (Tunisia) on a voluntary observing ship to collect biogeochemical samples and to calibrate the FerryBox sensors.
- *Oct. 2015:* OSCAHR (Observing Submesoscale Coupling At High Resolution campaign, 8 days) in the Ligurian Sea. In charge of the continuous surface observations from various biogeochemical sensors.
- 2011-2014: More than 60 crossings between Roscoff (France), Plymouth (UK) and Cork (Ireland) on Voluntary Observing Ships to collect biogeochemical samples for my PhD thesis and to calibrate the FerryBox sensors.
- 2011-2014: Bimonthly samplings for the Roscoff Coastal Observatory (SOMLIT)
- 2011-2012: 3 CARBORHONE Cruises (10 days each) in the Gulf of Lion (Mediterranean Sea, France) to study the dynamics of air-sea CO₂ fluxes in the Rhone plume.
- Apr. 2011: Scientific cruise (10 days) in South Tasmania coastal seas. Bio-optical and Chl-a measurements.

Additional information

- Reviews for *Continental Shelf Research*, *Progress in Oceanography*, *Remote Sensing of Environment* and *Limnology & Oceanography* journals.
- Societies Membership: European Geophysical Union EGU, Association for the Sciences of Limnology and Oceanography ASLO.