Isabela Le Bras

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RESEARCH INTERESTS

I am an observational physical oceanographer studying the Atlantic Meridional Overturning Circulation. In particular, I aim to understand how dense waters are formed and spread into the deep North Atlantic. I also ... as well as the impacts of Arctic freshwater.

EDUCATION

Ph.D. in Physical Oceanography 2011–2017
Massachusetts Institute of Technology – Woods Hole Oceanographic Institution Joint Program
"Dynamics of North Atlantic Western Boundary Currents"
Thesis adviser: John M. Toole

B.A. in Physics, Minor in Mathematics 2006–2010
University of California, Berkeley
Highest honors in physics and general scholarship

APPOINTMENTS

Assistant Scientist 2020–present
Woods Hole Oceanographic Insitution
tenure-track position

Postdoctoral Scholar 2017–2020
Scripps Institution of Oceanography
Postdoctoral adviser: Fiamma Straneo

Postdoctoral Investigator Jan-Aug 2017
Woods Hole Oceanographic Institution
Postdoctoral adviser: John M. Toole

Graduate Research Assistant 2011–2017
Woods Hole Oceanographic Institution
Graduate supervisor: John M. Toole

PUBLICATIONS

24. **I. A. Le Bras**, "Labrador Sea Water spreading and the Atlantic Meridional Overturning Circulation", *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* doi:10.1098/rsta.2022.0189, (2023).

23. D. G. Evans, N. P. Holliday, S. Bacon, **I. A. Le Bras**, "Mixing and air-sea buoyancy fluxes set the time-mean overturning circulation in the subpolar North Atlantic", *Ocean Sciences* doi:10.5194/os-19-745-2023, 19 (3) (2023).
Role: Contributed to the interpretation of results and manuscript editing.

22. **I. A. Le Bras**, I. Fenty, J. Willis, "The Atlantic meridional overturning circulation at 35N from deep moorings, floats, and satellite altimeter", *Geophysical Research Letters* doi:10.1029/2022GL101931, 50, e2022GL101931 (2023).

21. H. Palevsky, S. Clayton and coauthors (including **I. A. Le Bras**), "OOI Biogeochemical Sensor Data Best Practices and User Guide. Version 1.0.0.", *Ocean Best Practices Repository* doi:10.25607/OBP-1865, (2022).
Role: Contributed to the formulation of the oxygen section.

20. A. Arroyo, M. L. Timmermans, **I. A. Le Bras**, A. Proshutinsky, W. Williams, S. Zimmerman, "Declining O2 in the Canada Basin halocline consistent with physical and biogeochemical effects of Pacific Summer Water warming", *submitted to Journal of Geophysical Research: Oceans* doi:10.1029/2022JC019418, 128 (4) (2022).
Role: Contributed to the interpretation of results and manuscript editing.

19. **I. A. Le Bras**, J. Callies, T.C. Biló, F. Straneo, J. Holte, H. L. Johnson, "Slantwise Convection in the Irminger Sea", *Journal of Geophysical Research: Oceans, editor highlight in EOS magazine* doi:10.1029/2022JC019071, 127 (2022).

18. T.C. Biló , F. Straneo, J. Holte, **I. A. Le Bras**, "Arrival of New Great Salinity Anomaly Weakens Convection in the Irminger Sea", *Geophysical Research Letters* doi.org/10.1029/2022GL098857, (2022).
Role: Contributed to the interpretation of results and manuscript editing.

17. D. Atamanchuk, J. Palter, H. Palevsky, **I. A. Le Bras**, J. Koelling, and D. Nicholson., "Linking Oxygen and Carbon Uptake with the Meridional Overturning Circulation Using a Transport Mooring Array", *Oceanography* doi.org/10.5670/oceanog.2021.supplement.02-03, (2021).
Role: Participated in the project and contributed to manuscript editing.

16. B. Berx, and coauthors (including **I. A. Le Bras**), "Climate-Relevant Ocean Transport Measurements in the Atlantic and Arctic Oceans", *Oceanography* **doi.org:10.5670/oceanog.2021.supplement.004**, (2021).
Role: Participated in the project and contributed to manuscript editing.

15. F. Li, M. S. Lozier, N. P. Holliday, W. Johns, **I. A. Le Bras**, B. Moat, S. Cunningham, M. F. de Jong, "Observation-based estimates of heat and freshwater exchanges from the subtropical North Atlantic to the Arctic", *Progress in Oceanography* doi:10.1016/J.POCEAN.2021.102640, (2021).
Role: Contributed to the interpretation of results and manuscript editing.

14. A. Pacini, R. S. Pickart, **I. A. Le Bras**, F. Straneo, and N. P. Holliday, "Cyclonic eddies in the West Greenland Boundary Current System", *Journal of Physical Oceanography* doi:10.1175/JPO-D-20-0255.1, 2087–2102 (2021).
Role: Provided a calibrated moored dataset and contributed to the interpretation of results and manuscript editing.

13. F. Li, and coauthors (including **I. A. Le Bras**), "Subpolar North Atlantic western boundary density anomalies and the Meridional Overturning Circulation", *Nature Communications* doi:10.1038/s41467-021-23350-2, (2021).
Role: Provided a calibrated moored dataset and contributed to manuscript editing.

12. **I. A. Le Bras**, F. Straneo, M. Muilwijk, L. H. Smedsrud, F. Li, M. S. Lozier, and N. P. Holliday, "How much Arctic fresh water participates in the subpolar overturning circulation?", *Journal of Physical Oceanography* doi:10.1175/JPO-D-20-0240.1, 955–973 (2021).

11. A. Pacini, R. S. Pickart, F. Bahr, D. J. Torres, A. Ramsey, J. Holte, J. Karstensen, M. Oltmanns, F. Straneo, **I. A. Le Bras**, G. W. K. Moore, M. F. de Jong, "Mean Conditions and Seasonality of the West Greenland Boundary Current System near Cape Farewell", *Journal of Physical Oceanography* doi:10.1175/JPO-D-20-0086.1, 2849–2871 (2020).
Role: Provided a calibrated moored dataset and contributed to the interpretation of results and manuscript editing.

10. **I. A. Le Bras**, F. Straneo, J. Holte, M.F. de Jong, and N. P. Holliday , "Rapid export of waters formed by convection near the Irminger Sea's western boundary", *Geophysical Research Letters, editor highlight in EOS magazine* doi.org/10.1029/2019GL085989, (2020).

9. **I. A. Le Bras**, M. Sonnewald, and J.M. Toole, "A barotropic vorticity budget for the subtropical North Atlantic based on observations", *Journal of Physical Oceanography* doi:10.1175/JPO-D-19-0111.1, (2019).

8. E. Frajka-Williams, and coauthors (including **I. A. Le Bras**), "Atlantic Meridional Overturning Circulation: Observed transports and variability", *Frontiers in Marine Science* **6**, (2019).
Role: Contributed to manuscript writing and editing.

7. J. Hopkins, N. P. Holliday, D. Rayner, L. Houpert, **I. A. Le Bras**, F. Straneo, C. Wilson, and S. Bacon, "Transport variability of the Irminger Sea Deep Western Boundary Current from a mooring array", *Journal of Geophysical Research: Oceans* **124**, (2019).
Role: Provided a gridded LADCP dataset and contributed to the interpretation of results and manuscript editing.

6. M. S. Lozier, F. Li, and coauthors (including **I. A. Le Bras**), "A sea change in our view of overturning– first results from the Overturning in the Subpolar North Atlantic Program", *Science* **363**, 516–521 (2019).
Role: Provided a calibrated moored dataset and contributed to manuscript editing.

5. **I. A. Le Bras**, F. Straneo, J. Holte, and N. P. Holliday , "Seasonality of Freshwater in the East Greenland Current System from 2014 to 2016", *Journal of Geophysical Research: Oceans* **123**, (2018).

4. **I. A. Le Bras**, S. Jayne, and J. M. Toole, "The interaction of recirculation gyres and a deep boundary current", *Journal of Physical Oceanography* **48**, 573-590 (2018).

3. J. M. Toole, M. Andres, **I. A. Le Bras**, T. Joyce and M. McCartney, "Moored observations of the Deep Western Boundary Current in the NW Atlantic: 2004-2014", *Journal of Geophysical Research: Oceans* **122**, 7488-7505 (2017).
Role: Contributed to data preparation, figure production, and manuscript editing.

2. **I. A. Le Bras**, I. Yashayaev, and J. M. Toole, "Tracking Labrador Sea Water property signals along the Deep Western Boundary Current", *Journal of Geophysical Research: Oceans* **122**, 5348-5366 (2017).

1. **I. A. Le Bras** and T. Karin (co-first authors), A. Kehlberger, K. Singer, N. Daniilidis, and H. Haeffner, "Transport of charged particles by adjusting RF voltage amplitudes", *Applied Physics B* **106**, 117-125 (2012).

MENTORING

Postdoctoral scholars
Leo Middleton: 2023-present (co-advised by Tom Farrar)

MIT-WHOI Joint Program Ph.D. students
Hiroki Nagao: 2022-present
Marta Faulkner: 2023-present (co-advised by Mike Spall)

Ph.D. thesis committees
Ashley Arroyo (Yale): 2020-present
Ellen Park (MIT-WHOI Joint Program): 2022-present

Undergraduate students
Megan Knight (WHOI SSF): 2021
Nash Keyes (Yale): 2021 (co-advised by Mary-Louise Timmermans)

SEMINARS

Series of virtual seminars:
NOAA GFDL formal seminar **(invited)**
WHOI physical oceanography seminar Nov 2022
''Slantwise convection in the Irminger Sea"

Series of virtual seminars:
University of Rhode Island, physical oceanography seminar **(invited)**
NASA Goddard Institute for Space Studies, sea level rise seminar **(invited)**
WHOI physical oceanography seminar March 2021
''How much Arctic fresh water participates in the subpolar overturning circulation?"

CLIVAR POS panel webinar Oct 2020
''How much Arctic fresh water participates in the subpolar overturning circulation?"

Caltech oceanography group seminar January 2020
''Freshwater, Convection, and Overturning in the Irminger Sea"

U Mass Dartmouth Oct 2019

''The East Greenland Current System: Seasonality of Freshwater and Boundary Current - Convection Interactions"

Applied Physics Laboratory - University of Washington seminar — June 2019
''Seasonality of Freshwater in the East Greenland Current System"

Woods Hole Oceanographic Institution — Mar 2019
''Seasonality of Freshwater in the East Greenland Current System"

Scripps Institution of Oceanography, CASPO Seminar — Jan 2019
''Seasonality of Freshwater in the East Greenland Current System"

Lamont Doherty Earth Observatory, Ocean and Climate Physics Seminar — Nov 2018
''Seasonality of Freshwater in the East Greenland Current System"

Oregon State University, College of Earth, Ocean and Atmospheric Sciences — Oct 2018
''Seasonality of Freshwater in the East Greenland Current System"

Scripps Institution of Oceanography, CASPO Seminar — Oct 2017
''Advection and Stirring of the Deep Western Boundary Current"

Bjerknes Center, GFI seminar, Bergen, Norway — May 2017
''Observing and modeling sitrring of the Deep Western Boundary Curent"

Oregon State University, College of Earth, Ocean and Atmospheric Sciences — Mar 2017
''Stirring in the Deep Western Boundary Current"

Series of seminars in Germany
1. GEOMAR, Kiel; 2. Marum, Universität Bremen; 3. Universität Hamburg — Jan 2016
''Observing and Modeling Stirring of the Deep Western Boundary Current"

University of California, Los Angeles — Dec 2015
''Observing and Modeling Stirring of the Deep Western Boundary Current"

CONFERENCE PRESENTATIONS

European Geoscience Union (**invited** virtual presentation) — April 2023
I. A. Le Bras "The AMOC at 35N from deep moorings, floats, and satellite altimeter"

Royal Society AMOC meeting (**invited** virtual presentation) — Dec 2022
I. A. Le Bras "Labrador Sea Water spreading and the Atlantic Meridional Overturning Circulation"

AGU OOI-OSNAP special session (virtual presentation) — Dec 2021
I. A. Le Bras "Boundary Current Ventilation in the Irminger Sea"

Arctic and Subarctic Ocean Fluxes (virtual presentation) — Oct 2021
I. A. Le Bras "Revisiting the Arctic freshwater budget from 2004 to 2010"

Ocean Carbon Biogeochemistry Meeting (virtual presentation) — June 2021

I. A. Le Bras "Boundary Current Ventilation in the Irminger Sea"

European Geoscience Union (virtual Pico presentation) April 2021
I. A. Le Bras, F. Straneo, M. Muilwijk, L.H. Smedsrud, F.Li, M.S. Lozier and N. P. Holliday
"How much Arctic fresh water participates in the subpolar overturning circulation?"

Arctic and Subarctic Ocean Fluxes (ASOF) (virtual oral presentation) Oct 2020
I. A. Le Bras, F. Straneo, M. Muilwijk, L.H. Smedsrud, F.Li, M.S. Lozier and N. P. Holliday
"How much Arctic fresh water participates in the subpolar overturning circulation?"

Ocean Sciences Meeting, San Diego, CA (oral presentation) Feb 2020
I. A. Le Bras, F. Straneo, J. Holte, M. F. de Jong and N. P. Holliday
"Rapid export of waters formed by convection near the Irminger Sea's western boundary"

Ocean Obs'19, Honolulu, HI (poster presentation) Sep 2019
I. A. Le Bras, F. Straneo, J. Holte, M. F. de Jong and N. P. Holliday
"Observing the link between convection and deep water export"

EGU Meeting, Vienna, Austria (poster presentation) Apr 2019
I. A. Le Bras, F. Straneo, J. Holte, and N. P. Holliday
"Convection and deep water export in the Irminger Sea"

AGU Fall Meeting, Washington D.C. (poster presentation) Dec 2018
I. A. Le Bras, N. Beaird, and F. Straneo
"Freshwater budgets for the ocean east of Greenland"

Ocean Sciences Meeting, Portland, OR (oral presentation) Feb 2018
I. A. Le Bras, F. Straneo, J. Holte and N. P. Holliday
"Seasonality of Freshwater in East Greenland Current System"

Ocean Sciences Meeting, Portland, Oregon Feb 2018
''Observing and Modeling the Deep Western Boundary Current"

Irminger Sea Workshop, Southampton, UK (oral presentation) Nov 2017
I. A. Le Bras, F. Straneo, J. Holte and N. P. Holliday
"Seasonality of Freshwater in East Greenland Current System"

USAMOC meeting, Santa Fe, NM (oral presentation) May 2017
I. A. Le Bras, I. Yashayaev, and J.M. Toole
"Labrador Sea Water property changes along the Deep Western Boundary Current"

EGU meeting, Vienna, Austria (poster presentation) Apr 2017
I. A. Le Bras and J.M. Toole "A vorticity budget for the Gulf Stream"

Ocean Sciences Meeting, New Orleans, LA (poster presentation) Feb 2016
I. A. Le Bras and J.M. Toole "Line W Measurements of the Deep Western Boundary Current reflect changes in Labrador Sea Convection"

Ocean Sciences Meeting, New Orleans, LA (poster presentation) Feb 2016
I. A. Le Bras "Clubes de Ciencia: Intensive science workshops in Mexico provide a unique opportunity for teaching, scientific and cultural exchange"

RAPID-USAMOC International Science Meeting, Bristol, UK (oral presentation) Jul 2015

I. A. Le Bras and J. M. Toole
"A decade of Line W observations of the Deep Western Boundary Current"

Graduate Climate Conference, Pack Forest, WA (poster presentation) Oct 2014
I. A. Le Bras and J. M. Toole
"Deep western boundary current exchange with the interior"

Ocean Sciences Meeting, Honolulu, HI (poster presentation) Feb 2014
I. A. Le Bras and J. M. Toole
"Testing classic theories of western boundary currents in the North Atlantic"

MEDIA

- ECCO website featured publication, "Deep Ocean Slowdown? Yes and no, as ECCO helps to show.", `https://ecco-group.org/storymaps.htm?id=88`, (2023).
- Derouin, S, "When winds and currents align, ocean mixing goes deep", *Eos* , `https://doi.org/10.1029/2022EO220515` (2022).
- Showstack, R., "Waiting on the next freshwater flush", *Oceanus* , `https://www.whoi.edu/oceanus/feature/waiting-on-the-next-freshwater-flush/` (2022).
- Interview with I. A. Le Bras, B. Keisling, and B. Ludka, "A conversation on building safe spaces for the LGBTQ+ community in the geosciences", *Nature Communications* **12**, 4058 (2021).
- Pratt, S.E., "Larger role for shallow intermediate waters in ocean circulation", *Eos* **101**, `https://doi.org/10.1029/2020EO141674` (2020).
- Le Bras, I.A., "Detours on the Oceanic Highway", *Oceanus* , `https://www.whoi.edu/oceanus/feature/deep-western-boundary-current/` (2014).

PROFESSIONAL ACTIVITIES

WHOI commitees: PO website commitee (2020-2022), CDEI subcommitee for faculty hiring (2020-2022), Ad hoc hiring committee (2021)

Panel member: CLIVAR POS panel (2020-2022)

Reviewer: National Science Foundation; Nature; Journal of Physical Oceanography; Geophysical Research Letters; Science Advances; Journal of Geophysical Research: Oceans; Journal of Climate; Nature Scientific Reports; Ocean Modelling; Ocean Science Discussions; Earth System Science Data Discussions (ESSDD)

Session chair: EGU meeting 2019, Ocean Circulation and Climate Open Session; Graduate Climate Conference 2013, Physical Oceanography session

Steering committee member: Mentoring Physical Oceanography Women to Increase Retention (2016-2020)

RESEARCH CRUISES

Fall 2021: Beaufort Gyre Observing System aboard CCGS Louis S. St Laurent
Responsible party for WHOI moorings and ice stations.
Chief Scientist: Sarah Zimmerman; Cambridge Bay, Canada. (30 days)

Summer 2020: Overturning in the Subpolar North Atlantic Program (OSNAP) cruise AR45.
Responsible party for cruise dissolved gas component and CTD watchstander.
Chief Scientist: Robert Pickart; Woods Hole, MA. (35 days)

Fall 2018: Overturning in the Subpolar North Atlantic Program (OSNAP) cruise AR30-06.
Cape Farewell mooring specialist and responsible party for CTD χ-pod measurements.
Chief Scientist: Robert Pickart; Reykjavik, Iceland (42 days)

July 2017: Sermilik fjord research expedition. CTD specialist.
Chief Scientist: Fiamma Straneo; Tassilaq, Greenland (14 days)

May 2014: Line W research cruise KN218. CTD watch leader.
Chief Scientist: John M. Toole; Woods Hole, MA (14 days)

Aug 2012: Line W research cruise KN208. CTD watch stander.
Chief Scientist: John M. Toole; Woods Hole, MA (14 days)

May 2012: WOCE/CLIVAR A22 hydrography cruise AT20-1A. CTD watch stander.
Chief Scientist: Ruth Curry; Woods Hole, MA - Bridgetown, Barbados (30 days)

OUTREACH

2021: Panelist for Boston College SACNAS chapter (Society for Advancement of Chicanos/Hispanics and Native Americans in Science) career path discussion

2020: Two presentations to summer undergraduate students from underrepresented backgrounds "Chimneys into the deep ocean: measuring the ocean circulation around Greenland"

2018, 2020: Organized LGBTQ+ networking event at Ocean Sciences Meeting

2019: Talked about science careers and did experiments with groups of underrepresented sixth graders from San Diego on the Scripps Pier in collaboration with Birch Aquarium.

2018: Did experiments with students at Ocean Beach Elementary School for their "Science Night".

2015-2016: Judge for Falmouth High School Science Fair.

2014: Submerge! New York City marine science festival. Manned booth of hands-on activities for WHOI. Estimated more than 4000 people in attendance.

2014: Article for the general public: "Detours on the oceanic highway" Oceanus Magazine

TEACHING

October 2020: Guest lecture on ocean convection in Boston College Oceanography class (virtual). Professor Hilary Palevsky.

April 2018: Guest lecture on water mass analysis and the overturning circulation for ice-ocean interactions course, Scripps Institution of Oceanography, CA. Professor Fiamma Straneo.

September 2016: Teaching assistant for introductory course on github and python through the Software Carpentry program, Woods Hole, MA.

January 2016: Designed and taught 3 lectures of an undergraduate short-course entitled "Anthropocene", Woods Hole, MA.

January 2015: Created curriculum and taught a week-long, all-day workshop on ocean physics to college and high school students using lab experiments and numerical simulations (in English and Spanish) at UABC in Ensenada, Mexico through Clubes de Cienca program.

Spring 2014: Took course through MIT's Teaching and Learning Laboratory on teaching methods culminating in MIT Teaching Certificate, Cambridge, MA.

Fall 2013: Teaching assistant for introduction to observational physical oceanography, MIT course 12.808 with Dr. Magdalena Andres and Dr. Jake Gebbie. MIT-WHOI Joint Program.

Summer 2013 and 2015: Short Course Instructor for graduate student math refresher.
MIT-WHOI Joint Program.