Damien Desbruyères

Physical Oceanographer

Laboratoire d'Océanographie Physique et Spatiale (LOPS) UMR 6523 IFREMER-UBO-CNRS-IRD

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Research Experience

IFREMER — ***Plouzané, France***
Permanent Research Scientist in Physical Oceanography — *May 2017 - present*

National Oceanography Centre — ***Southampton, UK***
Postdoctoral Research Assistant in Physical Oceanography — *September 2013 - April 2017*

Education

IFREMER — ***Brest, France***
PhD in Physical Oceanography — *September 2009 - January 2013*

Université de Bretagne Occidentale — ***Brest, France***
Master in Physical Oceanography (second year) — *September 2008 - August 2009*

University of Southampton — ***Southampton, UK***
Master of Science (MSc) in Oceanography — *September 2007 - August 2008*

Selected Projects

Climatic Role of Subpolar-Subtropical Exchanges: a Regional Observational Array off NewfoundlanD (CROSSROAD) — ***IFREMER, Plouzané, France***
Principal Investigator — *Kickoff planned in May 2022*

- A mechanistic analysis of North Atlantic Deep Water pathways and transformation across the subpolar-subtropical boundary.
- Novel observational *in situ* array (hydrography, moorings, gliders, floats, ...).
- Very high-resolution (km) numerical modelling
- Proposal to be submitted to ANR (funding) and CNFH (ship time)

Configuration of an Experimental in Situ Array in a high-Resolution simulation (CROSSROAD-CESAR) — ***IFREMER, Plouzané, France***
Principal Investigator — *December 2020 - December 2022*

- Guidance for observational CROSSROAD network (tests of various mooring and instrumental configurations in km-resolution simulations)
- Analysis of water mass transformation off Newfoundland in km-resolution simulations

Observations lagrangiennes de la dynamique océanique profonde en Atlantique Nord-Ouest (OBLADY) — ***IFREMER, Plouzané, France***
Principal Investigator — *January 2018 - December 2020*

- Argo and Deep-Argo float deployments off Newfoundland
- Study of vertical coherence of North Atlantic Deep Water pathways
- Initiate collaborations with DFO researchers for CROSSROAD

Euro-Argo Research Infrastructure Sustainability and Enhancement - H2020 (Euro-Argo RISE) — ***IFREMER, Plouzané, France***
Task leader - Work Package 3 : Extension of Argo to the Deep Ocean — *January 2019 - December 2022*

- Deep sensor inter-comparison experiment for international Deep-Argo program recommendations
- Analysis of abyssal water mass property changes in the Irminger Sea

Diagnosing Earth's Energy Pathways in the Climate system (DEEP-C) — ***NOC, Southampton, UK***

POSTDOCTORAL FELLOW — *September 2013 - August 2016*

- Analysis of global and regional ocean heat content (OHC) trends from observational data (Argo and repeat hydrography)
- Mechanistic focus on vertical structure of OHC in the deeo ocean

Securing Multidisciplinary UndeRstanding and Prediction of Hiatus and Surge events (SMURPHS) — ***NOC, Southampton, UK***

POSTDOCTORAL FELLOW — *December 2014 - December 2018*

- Mechanistic analysis of Deep OHC changes in the subpolar North Atlantic
- Mechanistic focus on vertical structure of OHC in the deeo ocean

Publications

1. **Damien Desbruyères**, Léon Chafik and Guillaume Maze, A shift in the ocean circulation has warmed the subpolar North Atlantic Ocean since 2016, **2021**, *Communications earth and environment*, `https://doi.org/10.1038/s43247-021-00120-y`

2. Le Traon Pierre-Yves, D'Ortenzio Fabrizio, Babin Marcel, Leymarie Edouard, Marec Claudie, Pouliquen Sylvie, Thierry Virginie, Cabanes Cecile, Claustre Hervé, **Desbruyeres Damien**, Lacour Leo, Lagunas Jose-Luis, Maze Guillaume, Mercier Herle, Penkerc'h Christophe, Poffa Noe, Poteau Antoine, Prieur Louis, Racape Virginie, Randelhoff Achim, Rehm Eric, Schmechtig Catherine Marie, Taillandier Vincent, Wagener Thibaut, Xing Xiaogang, Preparing the New Phase of Argo: Scientific Achievements of the NAOS Project, **2020**, *Frontiers in Marine Science*, `https://doi.org/10.3389/fmars.2020.577408`

3. Von Schuckmann Karina, Cheng Lijing, Palmer Matthew D., Hansen James, Tassone Caterina, Aich Valentin, Adusumilli Susheel, Beltrami Hugo, Boyer Tim, Cuesta-Valero Francisco José, **Desbruyères Damien**, Domingues Catia, García-García Almudena, Gentine Pierre, Gilson John, Gorfer Maximilian, Haimberger Leopold, Ishii Masayoshi, Johnson Gregory C., Killick Rachel, King Brian A., Kirchengast Gottfried, Kolodziejczyk Nicolas, Lyman John, Marzeion Ben, Mayer Michael, Monier Maeva, Monselesan Didier Paolo, Purkey Sarah, Roemmich Dean, Schweiger Axel, Seneviratne Sonia I., Shepherd Andrew, Slater Donald A., Steiner Andrea K., Straneo Fiammetta, Timmermans Mary-Louise, Wijffels Susan E., Heat stored in the Earth system: where does the energy go?, **2020**, *Earth System Science Data*, `https://doi.org/10.5194/essd-12-2013-2020`

4. Moat, B. I., Smeed, D. A., Frajka-Williams, E., **Desbruyères, D. G.**, Beaulieu, C., Johns, W. E., Rayner, D., Sanchez-Franks, A., Baringer, M. O., Volkov, D., and Bryden, H. L., Pending recovery in the strength of the meridional overturning circulation at 26N, **2020**, *Ocean Science*, `https://doi.org/10.5194/os-16-863-2020`

5. Chunlei Liu, Richard P. Allan, Michael Mayer, Pat Hyder, **Damien Desbruyères**, Lijing Cheng, Jianjun Xu, Feng Xu and Yu Zhang, Variability in the global energy budget and transports 1985-2017, **2020**, *Climate Dynamics*, `https://doi.org/10.1007/s00382-020-05451-8`

6. **Desbruyères Damien**, B. Sinha, E. L. McDonagh, S. A. Josey, N. P. Holliday, D. A. Smeed, A. L. New, A. Megann, B. I. Moat, Importance of boundary processes for heat uptake in the Subpolar North Atlantic, **2020**, *Journal of Geophysical Research: Oceans, 125*, `https://doi.org/10.1029/2020JC016366`

7. Beal L. M., J. Vialard, M.K. Roxy, J. Li, M. Andres, H. Annamalai, M. Feng, W. Han, R. Hood, T. Lee, M. Lengaigne, R. Lumpkin, Y. Masumoto, M.J. McPhaden, M. Ravichandran, T. Shinoda, B.M. Sloyan, P.G. Strutton, A.C. Subramanian, T. Tozuka, C.C. Ummenhofer, A.S. Unnikrishnan, J. Wiggert, L.Yu, L. Cheng, **D.G. Desbruyères**, V. Parvathi, A roadmap to IndOOS-2: Better observations of the rapidly-warming Indian Ocean, **2020**, *Bulletin of the American Meteorological Society*, `https://doi.org/10.1175/BAMS-D-19-0209.1`

8. **Desbruyères Damien**, Mercier Herle, Maze Guillaume, Daniault Nathalie, Surface predictor of overturning circulation and heat content change in the subpolar North Atlantic, **2019**, *Ocean Science , 15(3), 809-817*, `https://doi.org/10.5194/os-15-809-2019`

9. Roemmich Dean, Alford Matthew H., Claustre Hervé, Johnson Kenneth, King Brian, Moum James, Oke Peter, Owens W. Brechner, Pouliquen Sylvie, Purkey Sarah, Scanderbeg Megan, Suga Toshio, Wijffels Susan, Zilberman Nathalie, Bakker Dorothee, Baringer Molly, Belbeoch Mathieu, Bittig Henry C., Boss Emmanuel, Calil Paulo, Carse Fiona, Carval Thierry, Chai Fei, Conchubhair Diarmuid Ó., D'ortenzio Fabrizio, Dall'olmo Giorgio, **Desbruyeres Damien**, Fennel Katja, Fer Ilker, Ferrari Raffaele, Forget Gael, Freeland Howard, Fujiki Tetsuichi, Gehlen Marion, Greenan Blair, Hallberg Robert, Hibiya Toshiyuki, Hosoda Shigeki, Jayne Steven, Jochum Markus, Johnson Gregory C., Kang Kiryong, Kolodziejczyk Nicolas, Körtzinger Arne, Traon Pierre-Yves Le, Lenn Yueng-Djern, Maze Guillaume, Mork Kjell Arne, Morris Tamaryn, Nagai Takeyoshi, Nash Jonathan, Garabato Alberto Naveira, Olsen Are, Pattabhi Rama Rao, Prakash Satya, Riser Stephen, Schmechtig Catherine, Schmid Claudia, Shroyer Emily, Sterl Andreas, Sutton Philip, Talley Lynne, Tanhua Toste, Thierry Virginie, Thomalla Sandy, Toole John, Troisi Ariel, Trull Thomas W., Turton Jon, Velez-Belchi Pedro Joaquin, Walczowski Waldemar, Wang Haili, Wanninkhof Rik, Waterhouse Amy F., Waterman Stephanie, Watson Andrew, Wilson Cara, Wong Annie P. S., Xu Jianping, Yasuda Ichiro, On the Future of Argo: A Global, Full-Depth, Multi-Disciplinary Array, **2019**, *Frontiers In Marine Science , 6(439), 28p*, `https://doi.org/10.3389/fmars.2019.00439`

10. Garry F. K., McDonagh E. L., Blaker A. T., Roberts C. D., **Desbruyères Damien**, Frajka-Williams E., King B. A., Model derived uncertainties in deep ocean temperature trends between 1990-2010, **2019**, *Journal Of Geophysical Research-oceans , 124(2), 1155-1169*, `https://doi.org/10.1029/2018JC014225`

11. Robson Jon, Sutton Rowan T., Archibald Alex, Cooper Fenwick, Christensen Matthew, Gray Lesley J., Holliday N. Penny, Macintosh Claire, McMillan Malcolm, Moat Ben, Russo Maria, Tilling Rachel, Carslaw Ken, **Desbruyeres Damien**, Embury Owen, Feltham Daniel L., Grosvenor Daniel P., Josey Simon, King Brian, Lewis Alastair, McCarthy Gerard D., Merchant Chris, New Adrian L., O'Reilly Christopher H., Osprey Scott M., Read Katie, Scaife Adam, Shepherd Andrew, Sinha Bablu, Smeed David, Smith Doug, Ridout Andrew, Woollings Tim, Yang Mingxi, Recent multivariate changes in the North Atlantic climate system, with a focus on 2005-2016, **2018**, *International Journal Of Climatology , 38(14), 5050-5076*, `https://doi.org/10.1002/joc.5815`

12. Cazenave Anny, Meyssignac Benoit, Ablain Michael, Balmaseda Magdalena, Bamber Jonathan, Barletta Valentina, Beckley Brian, Benveniste Jerome, Berthier Etienne, Blazquez Alejandro, Boyer Tim, Caceres Denise, Chambers Don, Champollion Nicolas, Chao Ben, Chen Jianli, Cheng Lijing, Church John A., Chuter Stephen, Cogley J. Graham, Dangendorf Soenke, **Desbruyeres Damien**, Doell Petra, Domingues Catia, Falk Ulrike, Famiglietti James, Fenoglio-Marc Luciana, Forsberg Rene, Galassi Gaia, Gardner Alex, Groh Andreas, Hamlington Benjamin, Hogg Anna, Horwath Martin, Humphrey Vincent, Husson Laurent, Ishii Masayoshi, Jaeggi Adrian, Jevrejeva Svetlana, Johnson Gregory, Kolodziejczyk Nicolas, Kusche Juergen, Lambeck Kurt, Landerer Felix, Leclercq Paul, Legresy Benoit, Leuliette Eric, Llovel William, Longuevergne Laurent, Loomis Bryant D., Luthcke Scott B., Marcos Marta, Marzeion Ben, Merchant Chris, Merrifield Mark, Milne Glenn, Mitchum Gary, Mohajerani Yara, Monier Maeva, Monselesan Didier, Nerem Steve, Palanisamy Hindumathi, Paul Frank, Perez Begona, Piecuch Christopher G., Ponte Rui M., Purkey Sarah G., Reager John T., Rietbroek Roelof, Rignot Eric, Riva Riccardo, Roemmich Dean H., Sorensen Louise Sandberg, Sasgen Ingo, Schrama E. J. O., Seneviratne Sonia I., Shum C. K., Spada Giorgio, Stammer Detlef, Van De Wal Roderic, Velicogna Isabella, Von Schuckmann Karina, Wada Yoshihide, Wang Yiguo, Watson Christopher, Wiese David, Wijffels Susan, Westaway Richard, Woppelmann Guy, Wouters Bert, Global sea-level budget 1993-present, **2018**, *Earth System Science Data , 10(3), 1551-1590*, `https://doi.org/10.5194/essd-10-1551-2018`

13. **Desbruyeres Damien**, McDonagh Elaine L., King Brian A., Thierry Virginie, Global and Full-depth Ocean Temperature Trends during the early 21 st century from Argo and Repeat Hydrography, **2017**, *Journal Of Climate , 30(6), 1985-1997*, `https://doi.org/10.1175/JCLI-D-16-0396.1`

14. Firing Yvonne L., McDonagh Elaine L., King Brian A., **Desbruyeres Damien**, Deep temperature variability in Drake Passage, **2017**, *Journal Of Geophysical Research-oceans , 30(6), 1985-1997*, `https://doi.org/10.1002/2016JC012452`

15. Roberts C. D., Palmer M. D., Allan R. P., **Desbruyeres Damien**, Hyder P., Liu C., Smith D., Surface flux and ocean heat transport convergence contributions to seasonal and interannual variations of ocean heat content, **2017**, *Journal Of Geophysical Research-oceans , 122(1), 726-744*, https://doi.org/10.1002/2016JC012278

16. **Desbruyeres Damien**, Purkey Sarah G., McDonagh Elaine L., Johnson Gregory C., King Brian A., Deep and abyssal ocean warming from 35 years of repeat hydrography, **2016**, *Geophysical Research Letters , 43(19), 10356-10365*, https://doi.org/10.1002/2016GL070413

17. **Desbruyères Damien**, McDonagh Elaine L., King Brian A., Observational Advances in Estimates of Oceanic Heating, **2016**, *Current Climate Change Reports , 2(3), 127-134*, https://doi.org/10.1007/s40641-016-0037-7

18. Duchez Aurélie, **Damien G. Desbruyères**, Joël J.-M. Hirschi, Eleanor Frajka-Williams, Simon A. Josey, Dafydd Gwyn Evans, The tale of a surprisingly cold blob in the North Atlantic, **2016**, *VARIATIONS , 14 (2), 19-23*, US CLIVAR

19. **Desbruyeres Damien**, Mercier Herle, Thierry Virginie, On the mechanisms behind decadal heat content changes in the eastern subpolar gyre, **2015**, *Progress In Oceanography , 132, 262-272*, https://doi.org/10.1016/j.pocean.2014.02.005

20. Mercier Herle, Lherminier Pascale, Sarafanov Artem, Gaillard Fabienne, Daniault Nathalie, **Desbruyeres Damien**, Falina Anastasia, Ferron Bruno, Gourcuff Claire, Huck Thierry, Thierry Virginie, Variability of the meridional overturning circulation at the Greenland–Portugal OVIDE section from 1993 to 2010, **2015**, *Progress In Oceanography , 132, 250-261*, https://doi.org/10.1016/j.pocean.2013.11.001

21. Purkey Sarah, **Desbruyeres Damien**, Zilberman Nathalie, Warming the abyss: The deep ocean's contribution to global warming, **2015**, *VARIATIONS , 13(3), 15-20*, US CLIVAR

22. **Desbruyeres Damien**, McDonagh E. L., King B. A., Garry F. K., Blaker A. T., Moat B. I., Mercier Herle, Full-depth temperature trends in the northeastern Atlantic through the early 21st century, **2014**, *Geophysical Research Letters , 41(22), 7971-7979*, https://doi.org/10.1002/2014GL061844

23. **Desbruyeres Damien**, Thierry Virginie, Mercier Herle, Simulated decadal variability of the Meridional Overturning Circulation across the A25-Ovide section, **2013**, *Journal Of Geophysical Research-oceans , 118(1), 462-475*, https://doi.org/10.1029/2012JC008342

24. De Boisseson Eric, Thierry Virginie, Mercier Herle, Caniaux G., **Desbruyeres Damien**, Origin, formation and variability of the Subpolar Mode Water located over the Reykjanes Ridge, **2012**, *Journal Of Geophysical Research-oceans , 117(C12005), 1-14*, https://doi.org/10.1029/2011JC007519

25. Marsh R., **Desbruyeres Damien**, Bamber J. L., De Cuevas B. A., Coward A. C., Aksenov Y., , Short-term impacts of enhanced Greenland freshwater fluxes in an eddy-permitting ocean model, **2010**, *Ocean Science , 6(3), 749-760*, https://doi.org/10.5194/os-6-749-2010

Selected Presentations

Desbruyères Damien, Léon Chafik, Guillaume Maze, A shift in the ocean circulation has warmed the subpolar North Atlantic Ocean since 2016 , **2021**, *European Geoscience Union Conference*, *Vienna, Austria* (Solicited talk)

Desbruyères Damien, Bablu Sinha, Elaine McDonagh, Simon Josey, Alexis Megann, David Smeed, Penny Holliday, Adrian New, Ben Moat, Drivers of deep heat uptake in the North Atlantic Subpolar Gyre , **2020**, *European Geo-*

science Union Conference, *Vienna, Austria* (Poster)

Desbruyères Damien, Herlé Mercier, Guillaume Maze, Nathalie Daniault, Surface predictor of overturning circulation and heat content change in the subpolar North Atlantic, **2019**, *European Geoscience Union Conference*, *Vienna, Austria* (Oral)

Desbruyères Damien, Herle Mercier, Virginie Thierry, Pascale Lherminier, Jonathan Gula, F Cyr, D Kieke, P Holliday, D Smeed, CROSSROAD: Climatic ROle of Subpolar Slopes: a Regional Observational Array off NewfoundlanD, **2019**, *Journées Scientifiques LEFE/GMMC (Groupe Mission Mercator Coriolis)*, *Toulon, France* (Poster)

Desbruyères Damien, Herlé Mercier, Guillaume Maze, Nathalie Daniault, Surface predictor of overturning circulation and heat content change in the subpolar North Atlantic, **2018**, *USAMOC Annual Meeting*, *Miami, USA* (Oral)

Desbruyères Damien, E McDonagh, B Sinha, A Megann, Multi-decadal temperature variability of the deep North Atlantic Subpolar Gyre, **2017**, *European Geoscience Union Conference*, *Vienna, Austria* (Oral)

Desbruyères Damien, E. L. McDonagh, B. Sinha, A. Megann, S. A. Josey, P. N. Holliday, D. Smeed, A. L. New, Great Spice Anomalies Control Deep North Atlantic Heat Uptake, **2017**, *RAPID-OSNAP-ACSIS Meeting*, *Oxford, UK* (Poster)

Desbruyères Damien, E. L. McDonagh, B. A. King and V. Thierry, Global and full-depth Water mass variability based on Argo and hydrographic data, **2015**, *International Deep-Argo Workshop*, *Hobart, AUS* (Oral)

Desbruyères Damien, Daniault, N., Mercier, H., Thierry, V., Yashayaev, I., The Meridional Overturning Circulation in the subpoalr North Atlantic as assessed from repeat measurements at the AR7W and A25- OVIDE lines and altimetry data, **2013**, *AGU Ocean Science Meeting*, *Honolulu, USA* (Poster)

Desbruyères Damien, Thierry, V., Mercier, H., Simulated decadal variability of the meridional overturning circulation across the A25-Ovide section., **2013**, *European Geoscience Union Conference*, *Vienna, Austria* (Poster)

Desbruyères Damien, Thierry, V., Mercier, H., Long-term variability of the North Atlantic Current system in a realistic simulation., **2011**, *European Geoscience Union Conference*, *Vienna, Austria* (Poster)

Reports and Manuscripts

Gonzalez-Pola C, Larsen Kmh, Fratantoni P, Beszczynska-Moller A., ICES Report on Ocean Climate 2018, **2019**, *ICES cooperative research report , (349), 122p*, `https://doi.org/10.17895/ices.pub.5461`

Gonzalez-Pola C, Larsen Kmh, Fratantoni P, Beszczynska-Moller A., ICES Report on Ocean Climate 2017, **2018**, *ICES cooperative research report , (345), 119p*, `https://doi.org/10.17895/ices.pub.4625`

Kolodziejczyk Nicolas, Reverdin Gilles, **Desbruyeres Damien**, Contribution to the ICES Report on Ocean Climate : North Atlantic Ocean in 2017, **2018**, *National report: France, June 2018. LOPS-WGOH-2018-01*, `https://doi.org/10.13155/59296`

Desbruyeres Damien, The Meridional Overturning Circulation variability and heat content changes in the North Atlantic subpolar gyre, **2013**, *PhD Thesis , Université de Bretagne Occidentale*, `https://archimer.ifremer.fr/doc/00119/23064/`

Cruises

RREX17
R/V Atalante (IFREMER)
Northeast Subpolar Atlantic
June 2017

AZMP-Fall
CCGS Hudson (BIO)
Northwest Atlantic shelf
November 2018

SR1B - Drake Passage
RRS James Clark Ross (BAS)
Southern Ocean
January 2016

SR1B - Drake Passage
RRS James Clark Ross (BAS)
Southern Ocean
January 2015

RAGNARoCC-OSNAP-EEL
RRS James Clark Ross (BAS)
Subpolar North Atlantic
January 2014

OVIDE
N/O Thalassa (IFREMER)
Northeast Subpolar Atlantic
June 2010

RAPID-MOCHA
RSS Discovery (NOC)
Subtropical North Atlantic
July 2008

Collective responsibilities

International and National committee

- International Council for the Exploration of the Sea (**ICES**) - Working Group on Oceanic Hydrography (**WGOH**) / Invited member (ongoing)
- Comité National de la Flotte hauturières (**CNFH**) (French National Fleet) / Reviewer (ongoing)
- Interdisciplinary Graduate School for the blue planet (**IsBlue**) / Committee member in Theme 1 *Ocean and Climate* (ongoing)

Session Chair

- European Geoscience Union Conference 2020 (Vienna) - **Improved Understanding of Ocean Variability and Climate (OS1.6)**

Reviewer

- Nature Communication
- Journal of Climate
- Geophysical Research Letter
- Journal of Geophysical Research - Oceans
- Progress in Oceanography
- Geoscience Data
- Natinonal Environmental Research Council UK (NERC)

Supervision

Yingjie Liu - PhD
Vertical dynamics in the North Atlantic Subpolar Gyre
Brest, France
October 2019 - present

Eva Prieto Bravo - Postdoc
Abyssal water mass variability in the Irminger Sea
Brest, France
January 2020 - present

Outreach Activities

Open days at Ifremer for high-school students
Plouzané, France
Intervention on Climate Sciences, observational oceanography, thermohaline circulation, ...
January 2020

Mer Education 2019
Plouzané, France
Talk on Deep-Argo to secondary school teachers
July 2019

Dessine-moi un bateau - Programme Pédagogique et de P artage de l'Atelier des Tropiques (Titouan Lamazou)
Plouzané, France
Pedagogical paper "L'océan en Mouvement"
2019

Open days of the National Oceanogrpahy Center
Southampton, UK
Presentation of Argo-related science
2015