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M A R Y - L O U I S E E . T I M M E R M A N S

EDUCATION

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2000 Ph.D., Trinity College, Cambridge University, Department of Applied Mathematics and Theoretical Physics, Cambridge, UK

1996 M.S., Cambridge University, Department of Applied Mathematics and Theoretical Physics, Certificate of Advanced Studies in Mathematics, Cambridge, UK

1994 B.S., University of Victoria, Department of Physics and Astronomy, Victoria, BC, Canada

POSITIONS HELD

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2023-Present: Director of Graduate Studies, Earth & Planetary Sciences, Yale University

2020-Present: Damon Wells Professor of Earth & Planetary Sciences, Yale University

2017-Present: Professor, Department of Geology & Geophysics / Earth & Planetary Sciences, Yale University

2017-2021: Director of Undergraduate Studies, Department of Geology & Geophysics / Earth & Planetary Sciences, Yale University

2015-2017: Associate Professor, Department of Geology and Geophysics, Yale University

2009-2015: Assistant Professor, Department of Geology and Geophysics, Yale University

2014-Present: Adjunct Scientist, Woods Hole Oceanographic Institution, Department of Physical Oceanography, Woods Hole, Massachusetts

2005-2009: Assistant Scientist, Physical Oceanography Department, Woods Hole Oceanographic Institution, USA

2005: Research Associate, Department of Physics and Astronomy, University of Victoria, BC, Canada

2004: Lecturer in Geophysical Fluid Dynamics, Ocean University of China, Qingdao, China

2002-2004: Postdoctoral Scholar, Physical Oceanography Department, Woods Hole Oceanographic Institution, USA

2001-2002: Postdoctoral Fellow, Institute of Ocean Sciences & University of Victoria, BC, Canada

FELLOWSHIPS and AWARDS

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2020 Sverdrup Award Lecture, AGU Ocean Sciences

2019 Presidential Early Career Award for Scientists and Engineers (PECASE)

2015 Dylan Hixon '88 Prize for Teaching Excellence in the Natural Sciences & Mathematics, Yale

2017, 2015 & 2014 AGU Editors' Citation for Excellence in Refereeing

2015 Kirby Laing Fellow, Bangor University UK  
2014-2019 National Science Foundation CAREER Award  
2013 Arthur Greer Memorial Prize for Outstanding Scholarly Publication or Research, Yale  
2002 Woods Hole Oceanographic Institution Postdoctoral Scholar  
1997 Summer Fellow in the Geophysical Fluid Dynamics Summer Program, Woods Hole Oceanographic Institution  
1996-2000 Doctoral Student Fellowship, Trinity College, Cambridge University, UK  
1995 Summer School in Geophysical and Environmental Fluid Dynamics, Department of Applied Mathematics and Theoretical Physics, Cambridge University, UK  
1995 Cambridge Commonwealth Trust Scholarship for Graduate Studies at Cambridge University  
1996-2000 Doctoral Student Fellowship, Trinity College, Cambridge University, UK  
1995 Summer School in Geophysical and Environmental Fluid Dynamics, Department of Applied Mathematics and Theoretical Physics, Cambridge University, UK  
1995 Cambridge Commonwealth Trust Scholarship for Graduate Studies at Cambridge University UK

## PUBLICATIONS

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- Gaina, C., M. Jakobsson, E.O. Straume, M.-L. Timmermans, K. Boggild, S. Bünz, V. Schlindwein, and A. Døssing, 2025. Arctic Ocean bathymetry and its connections to tectonics and climate. In press, *Nature Reviews Earth & Environment*.
- Guo, Y. and M.-L. Timmermans, 2025. Swirling Currents: How ocean eddies affect carbon dioxide absorption and fight climate change. In press, *Frontiers for Young Minds*.
- Le Bras, I.A.-A., & Timmermans, M.-L., 2025. Can the marked Arctic Ocean freshwater content increases of the last two decades be explained within observational uncertainty? *Journal of Geophysical Research: Oceans*, 130, <https://doi.org/10.1029/2024JC021061>.
- Yang, J.K., M.-L. Timmermans, J. Olsthoorn, and A. Kaminski, 2025. The influence of stratified shear instabilities on particle sedimentation in three-dimensional simulations with application to marine carbon dioxide removal. *Physical Review Fluids*, 10(1), 10.1103/PhysRevFluids.10.014501.
- Timmermans, M.-L. and Z.M. Labe, 2024. Sea surface temperature [in “Arctic Report Card 2024”], NOAA, DOI:10.25923/9z96-aq19.
- Buckley, E.M., M.-L. Timmermans, L. Cañuelas, and M. Martinez Wilhelmus, 2024. Seasonal Evolution of the Sea Ice Floe Size Distribution from Two Decades of MODIS Data. *The Cryosphere*, 18, 5031–5043, <https://doi.org/10.5194/tc-18-5031-2024>.
- Margevich, A., M.-L. Timmermans, and S. Danielson, 2024. Pacific-Arctic connections: Assessing flow through Bering Strait in context with dynamic ocean topography and surface stress. *Journal of Geophysical Research, Oceans*, 129(8), p.e2024JC021132.

- Guo, Y., & Timmermans, M.-L., 2024. The role of ocean mesoscale variability in air-sea CO<sub>2</sub> exchange: A global perspective. *Geophysical Research Letters*, 51, e2024GL108373. <https://doi.org/10.1029/2024GL108373>.
- Arroyo, A., M.-L. Timmermans and M. DeGrandpre, 2024. Quantifying drivers of seasonal and interannual variability of dissolved oxygen in the Canada Basin Mixed Layer. *Journal of Geophysical Research: Oceans*, 129, e2024JC020903. <https://doi.org/10.1029/2024JC020903>.
- Timmermans, M.-L. and Z.M. Labe, 2024. [The Arctic] Sea surface temperature [in “State of the Climate in 2023”]. *Bull. Amer. Meteor. Soc.*, DOI:10.1175/BAMS-D-24-0101.1.
- Guo, Y., and M.-L. Timmermans, 2024. Global ocean pCO<sub>2</sub> variation regimes: Spatial patterns and the emergence of a hybrid regime. *Journal of Geophysical Research: Oceans*, 129, e2023JC020679. <https://doi.org/10.1029/2023JC020679>.
- Yang, J.K. and M.-L. Timmermans, 2024. Assessing the effective settling of mineral particles in the ocean with application to ocean-based carbon-dioxide removal. *Environmental Research Letters*, 10.1088/1748-9326/ad2236.
- Yang, J.K., M.-L. Timmermans, and G.A. Lawrence, 2024. Asymmetric Kelvin-Helmholtz instabilities in stratified shear flows. *Phys. Rev. Fluids* 9, <https://doi.org/10.1103/PhysRevFluids.9.014501>.
- Timmermans, M. -L., and Z. M. Labe, 2023. Sea surface temperature. *Arctic Report Card 2023*, T. A. Moon, M. L. Druckenmiller, and R. L. Thoman, Eds., DOI: 10.25923/e8jc-f342.
- Yang, J.K., J. Olsthoorn, M.-L. Timmermans, 2023. Sedimentation in particle-laden flows with and without velocity shear. *Physics of Fluids*, 35 (8), <https://doi.org/10.1063/5.0159676>.
- Timmermans, M.-L., & R.S. Pickart, 2023. The Arctic Ocean’s Changing Beaufort Gyre System: An Assessment of Current Understanding, Open Questions and Future Research Directions. *Bull. Amer. Meteor. Soc.*, 104, E1282–E1289, <https://doi.org/10.1175/BAMS-D-23-0129.1>.
- Timmermans, M.-L. & Z. Labe, 2023. Sea Surface Temperature [in “State of the Climate in 2022”]. *Bull. Amer. Meteor. Soc.*, 104 (8), S17–S19, <https://doi.org/10.1175/BAMS-D-23-0079.1>.
- O’Brien, J.K., R.A. Krishfield, M.-L. Timmermans and J.M. Toole, 2023. The Tethered Ocean Profiler, TOP. *OCEANS 2023 - Limerick, Limerick, Ireland*, pp. 1-10, doi: 10.1109/OCEANSLimerick52467.2023.10244491.
- Arroyo, A., Timmermans, M.-L., Le Bras, I., Williams, W. & Zimmermann, S., 2023. Declining O<sub>2</sub> in the Canada Basin halocline consistent with physical and biogeochemical effects of Pacific Summer Water warming. *Journal of Geophysical Research*, 128, e2022JC019418. <https://doi.org/10.1029/2022JC019418>.
- Timmermans, M.-L. and J. Toole, 2023. The Arctic Ocean’s Beaufort Gyre. *Annual Review of Marine Science*. Vol. 15, <https://doi.org/10.1146/annurev-marine-032122-012034>.
- von Schuckmann, K. et al., 2023. Heat stored in the Earth system 1960-2020: Where does the energy go? *Earth Syst. Sci. Data*, 15, 1675–1709, <https://doi.org/10.5194/essd-15-1675-2023>.

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- Carpenter, J.R., Y. Liang, M.-L. Timmermans and E. Heifetz, 2022. Physical mechanisms of the linear stabilisation of convection by rotation. *Physics of Fluids*, 7(8), 10.1103/PhysRevFluids.7.083501
- Shibley, N. C., & M.-L. Timmermans, 2022. The Beaufort Gyre’s diffusive staircase: Finescale signatures of Gyre-scale transport. *Geophysical Research Letters*, 49, e2022GL098621. <https://doi.org/10.1029/2022GL098621>
- Timmermans, M.-L. and Z. Labe, 2022. Sea Surface Temperature [in “State of the Climate in 2021”]. *Bull. Amer. Meteor. Soc.*, 103 (8), S268–S270, <https://doi.org/10.1175/BAMS-D-22-0082.1>
- Denton, A. A. and Timmermans, M.-L., 2022. Characterizing the sea-ice floe size distribution in the Canada Basin from high-resolution optical satellite imagery. *The Cryosphere*, 16, 1563–1578, <https://doi.org/10.5194/tc-16-1563-2022>.
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- Kenigson, J.S. and M.-L. Timmermans, 2021. Arctic Cyclone Activity and the Beaufort High. *Journal of Climate*, 34, 1-22, <https://doi.org/10.1175/JCLI-D-20-0771.1>.

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- Proshutinsky, A., Krishfield, R. and Timmermans, M.-L., 2019. Preface to special issue Forum for Arctic Ocean Modeling and Observational Synthesis (FAMOS) 2: Beaufort Gyre phenomenon. *Journal of Geophysical Research: Oceans*. <https://doi.org/10.1029/2019JC015400>.
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- Meneghello, G., J. Marshall, M.-L. Timmermans, J. Scott, 2018. Observations of seasonal upwelling and downwelling in the Beaufort Sea mediated by sea ice. *Journal of Physical Oceanography*, 48, 795–805, <https://doi.org/10.1175/JPO-D-17-0188.1>.
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