



Jens Daniel Müller

POSTDOCTORAL RESEARCHER

ETH Zurich | Department of Environmental Systems Science

✉ jensdaniel.mueller@usys.ethz.ch

🏠 jens-daniel-mueller.github.io | ☎ 0000-0003-3137-0883 | 📄 jens-daniel-mueller | 🐦 Jens_D_Mueller

Ocean biogeochemist with a favour for carbon, observations and a pinch of data science

Brief bio

Key publications

Gruber, N., Bakker, D. C. E., DeVries, T., Gregor, L., Hauck, J., Landschützer, P., McKinley, G. A., and Müller, J. D.: Trends and variability in the ocean carbon sink, *Nature Reviews Earth & Environment*, 1–16, <https://doi.org/10.1038/s43017-022-00381-x>, 2023.

Müller, J. D., Gruber, N., Carter, B. R., Feely, R. A., Ishii, M., Lange, N., Lauvset, S. K., Murata, A. M., Olsen, A., Pérez, F. F., Sabine, C. L., Tanhua, T., Wanninkhof, R., and Zhu, D.: Decadal Trends in the Oceanic Storage of Anthropogenic Carbon from 1994 to 2014, *Preprints*, <https://doi.org/10.22541/essoar.167525217.76035050/v1>, 2023.

Müller, J. D. and Rehder, G.: Metrology of pH Measurements in Brackish Waters—Part 2: Experimental Characterization of Purified meta-Cresol Purple for Spectrophotometric pHT Measurements, *Frontiers in Marine Science*, 5, 177, <https://doi.org/10.3389/fmars.2018.00177>, 2018.

Schneider, B. and Müller, J. D.: *Biogeochemical Transformations in the Baltic Sea*, Springer International Publishing, Cham, <https://doi.org/10.1007/978-3-319-61699-5>, 2018.

Müller, J. D., Schneider, B., and Rehder, G.: Long-term alkalinity trends in the Baltic Sea and their implications for CO₂-induced acidification, *Limnology and Oceanography*, 61, 1984–2002, <https://doi.org/10.1002/lno.10349>, 2016.

Education

PhD Chemical Oceanography

LEIBNIZ-INSTITUTE FOR BALTIC SEA RESEARCH WARNEMÜNDE (IOW)

Warnemünde, Germany

07/2014 – 06/2018

- Ocean Acidification in the Baltic Sea: Involved Processes, Metrology of pH in Brackish Waters, and Calcification under Fluctuating Conditions
- Grade: With honors (Summa cum laude)

MSc Biological Oceanography

GEOMAR HELMHOLTZ CENTRE FOR OCEAN RESEARCH KIEL

Kiel, Germany

09/2010 – 08/2012

- Grade: 1.2 (ECTS grade, A Excellent)

BSc Chemistry

PHILLIPS-UNIVERSITY MARBURG

Marburg, Germany

09/2008 – 08/2009

- Grade: 1.7 (ECTS grade B “Very good”)

Employment and occupation

Postdoctoral researcher

ETH ZÜRICH

Zurich, Switzerland

07/2020 – present

- Environmental Physics | Prof. Dr. Nicolas Gruber

Postdoctoral researcher

LEIBNIZ-INSTITUTE FOR BALTIC SEA RESEARCH WARNEMÜNDE (IOW)

Warnemünde, Germany

07/2018 – 06/2020

- Trace gas biogeochemistry | Prof. Dr. Gregor Rehder

Scientific Employee

GEOMAR HELMHOLTZ CENTRE FOR OCEAN RESEARCH KIEL

Kiel, Germany

10/2013 – 03/2014

- Benthic Ecology | Prof. Dr. M. Wahl
- Marine Biogeochemistry | Prof. Dr. U. Riebesell

Sailing Instructor

KIEL MARKETING GMBH | CAMP 24/7

Kiel, Germany

07 – 10 / 2013

Divemaster

AL DIVE DIVE CENTRE

Loubiere, Dominica

01 – 03 / 2013

Research Assistant

GEOMAR HELMHOLTZ CENTRE FOR OCEAN RESEARCH KIEL

Kiel, Germany

05 – 08 / 2010

• Evolutionary Ecology of Marine Fishes | Prof. Dr. T. Reusch

Publications

PEER REVIEWED

Gruber, N., Bakker, D. C. E., DeVries, T., Gregor, L., Hauck, J., Landschützer, P., McKinley, G. A., and Müller, J. D.: Trends and variability in the ocean carbon sink, *Nature Reviews Earth & Environment*, 1–16, <https://doi.org/10.1038/s43017-022-00381-x>, 2023.

Dai, M., Su, J., Zhao, Y., Hofmann, E. E., Cao, Z., Cai, W.-J., Gan, J., Lacroix, F., Laruelle, G. G., Meng, F., Müller, J. D., Regnier, P. A. G., Wang, G., and Wang, Z.: Carbon Fluxes in the Coastal Ocean: Synthesis, Boundary Processes, and Future Trends, *Annual Review of Earth and Planetary Sciences*, 50, 593–626, <https://doi.org/10.1146/annurev-earth-032320-090746>, 2022.

Lauvset, S. K., Lange, N., Tanhua, T., Bittig, H. C., Olsen, A., Kozyr, A., Alin, S., Álvarez, M., Azetsu-Scott, K., Barbero, L., Becker, S., Brown, P. J., Carter, B. R., Cunha, L. C. da, Feely, R. A., Hoppema, M., Humphreys, M. P., Ishii, M., Jeansson, E., Jiang, L.-Q., Jones, S. D., Lo Monaco, C., Murata, A., Müller, J. D., Pérez, F. F., Pfeil, B., Schirnack, C., Steinfeldt, R., Suzuki, T., Tilbrook, B., Ulfsbo, A., Velo, A., Woosley, R. J., and Key, R. M.: GLODAPv2.2022: The latest version of the global interior ocean biogeochemical data product, *Earth System Science Data*, 14, 5543–5572, <https://doi.org/10.5194/essd-14-5543-2022>, 2022.

Poulter, B., Bastos, A., Canadell, J., Ciais, P., Gruber, N., Hauck, J., Jackson, R., Ishii, M., Müller, J., Jens Daniel, Patra, P., and Tian, H.: Inventorying Earth's Land and Ocean Greenhouse Gases, *Eos*, 103, <https://doi.org/10.1029/2022eo179084>, 2022.

Honkanen, M., Müller, J. D., Seppälä, J., Rehder, G., Kielosto, S., Ylöstalo, P., Mäkelä, T., Hatakka, J., and Laakso, L.: The diurnal cycle of pCO₂ in the coastal region of the Baltic Sea, *Ocean Science*, 17, 1657–1675, <https://doi.org/10.5194/os-17-1657-2021>, 2021.

Jacobs, E., Bittig, H. C., Gräwe, U., Graves, C. A., Glockzin, M., Müller, J. D., Schneider, B., and Rehder, G.: Upwelling-induced trace gas dynamics in the Baltic Sea inferred from 8 years of autonomous measurements on a ship of opportunity, *Biogeosciences*, 18, 2679–2709, <https://doi.org/10.5194/bg-18-2679-2021>, 2021.

Müller, J. D., Schneider, B., Gräwe, U., Fietzek, P., Wallin, M. B., Rutgersson, A., Wasmund, N., Krüger, S., and Rehder, G.: Cyanobacteria net community production in the Baltic Sea as inferred from profiling pCO₂ measurements, *Biogeosciences*, 18, 4889–4917, <https://doi.org/10.5194/bg-18-4889-2021>, 2021.

Sanders, T., Thomsen, J., Müller, J. D., Rehder, G., and Melzner, F.: Decoupling salinity and carbonate chemistry: Low calcium ion concentration rather than salinity limits calcification in Baltic Sea mussels, *Biogeosciences*, 18, 2573–2590, <https://doi.org/10.5194/bg-18-2573-2021>, 2021.

Wanninkhof, R., Pickers, P. A., Omar, A. M., Sutton, A., Murata, A., Olsen, A., Stephens, B. B., Tilbrook, B., Munro, D., Pierrot, D., Rehder, G., Santana-Casiano, J. M., Müller, J. D., Trinanes, J., Tedesco, K., O'Brien, K., Currie, K., Barbero, L., Telszewski, M., Hoppema, M., Ishii, M., González-Dávila, M., Bates, N. R., Metzl, N., Suntharalingam, P., Feely, R. A., Nakaoka, S., Lauvset, S. K., Takahashi, T., Steinhoff, T., and Schuster, U.: A Surface Ocean CO₂ Reference Network, SOCONET and Associated Marine Boundary Layer CO₂ Measurements, *Frontiers in Marine Science*, 6, 2019.

Müller, J. D. and Rehder, G.: Metrology of pH Measurements in Brackish Waters—Part 2: Experimental Characterization of Purified meta-Cresol Purple for Spectrophotometric pHT Measurements, *Frontiers in Marine Science*, 5, 177, <https://doi.org/10.3389/fmars.2018.00177>, 2018.

Müller, J. D., Bastkowski, F., Sander, B., Seitz, S., Turner, D. R., Dickson, A. G., and Rehder, G.: Metrology for pH Measurements in Brackish Waters—Part 1: Extending Electrochemical pHT Measurements of TRIS Buffers to Salinities 5–20, *Frontiers in Marine Science*, 5, 176, <https://doi.org/10.3389/fmars.2018.00176>, 2018a.

Müller, J. D., Schneider, B., Aßmann, S., and Rehder, G.: Spectrophotometric pH measurements in the presence of dissolved organic matter and hydrogen sulfide: Perturbations of spec pH measurements, *Limnology and Oceanography: Methods*, 16, 68–82, <https://doi.org/10.1002/lom3.10227>, 2018b.

Staudinger, C., Strobl, M., Fischer, J. P., Thar, R., Mayr, T., Aigner, D., Müller, B. J., Müller, B., Lehner, P., Mistlberger, G., Fritzsche, E., Ehgartner, J., Zach, P. W., Clarke, J. S., Geißler, F., Mutzberg, A., Müller, J. D., Achterberg, E. P., Borisov, S. M., and Klimant, I.: A versatile optode system for oxygen, carbon dioxide, and pH measurements in seawater with integrated battery and logger: A versatile optode system for O₂, CO₂, and pH, *Limnology and Oceanography: Methods*, 16, 459–473, <https://doi.org/10.1002/lom3.10260>, 2018.

Wahl, M., Schneider Covachã, S., Saderne, V., Hiebenthal, C., Müller, J. D., Pansch, C., and Sawall, Y.: Macroalgae may mitigate ocean acidification effects on mussel calcification by increasing pH and its fluctuations: Biogenic fluctuations mitigate OA effects, *Limnology and Oceanography*, 63, 3–21, <https://doi.org/10.1002/lno.10608>, 2018.

Fritzsche, E., Gruber, P., Schutting, S., P. Fischer, J., Strobl, M., D. Müller, J., M. Borisov, S., and Klimant, I.: Highly sensitive poisoning-resistant optical carbon dioxide sensors for environmental monitoring, *Analytical Methods*, 9, 55–65, <https://doi.org/10.1039/C6AY02949C>, 2017.

Saderne, V., Fietzek, P., Müller, J. D., Körtzinger, A., and Hiebenthal, C.: Intense pCO₂ and [O₂] Oscillations in a Mussel-Seagrass Habitat: Implications for Calcification., *Biogeosciences Discussions*, 1–33, <https://doi.org/10.5194/bg-2017-351>, 2017.

Müller, J. D., Schneider, B., and Rehder, G.: Long-term alkalinity trends in the Baltic Sea and their implications for CO₂-induced acidification, *Limnology and Oceanography*, 61, 1984–2002, <https://doi.org/10.1002/lno.10349>, 2016.

Schulz, J., Möller, K. O., Bracher, A., Hieronymi, M., Cisewski, B., Zielinski, O., Voss, D., Gutzeit, E., Dolereit, T., Niedzwiedz, G., Kohlberg, G., Schories, D., Kiko, R., Körtzinger, A., Falldorf, C., Fischer, P., Nowald, N., Beisiegel, K., Martinez-Arbizu, Pedro, Rüssmeier, N., Röttgers, R., Büdenbender, J., Jordt-Sedlazeck, A., Koch, R., Riebesell, U., Iversen, M., Köser, K., Kwasnitschka, T., Wellhausen, J., Thoma, C., Barz, K., Rhode, S., Nattkemper, T. W., Schoening, T., Peeters, F., Hofmann, H., Busch, J., Hirche, H.-J., Niehoff, B., Hildebrandt, N., Stohr, E., Winter, C., Herbst, G., Konrad, C., Schmidt, M., Linke, P., Brey, T., Bange, H. W., Nolle, L., Krägersky, S., Gröger, J., Sauter, E., Schulz, M., Müller, J., Rehder, G., Stepputtis, D., Beszteri, B., Kloster, M., Kauer, G., Göritz, A., Gege, P., Freiherr von Lukas, U., and Bathmann, U. V.: Aquatische Optische Technologien in Deutschland, *Marine Science Reports - Meereswissenschaftliche Berichte*, 97, 1–83, <https://doi.org/10.12754/msr-2015-97>, 2015.

Wahl, M., Buchholz, B., Winde, V., Golomb, D., Guy-Haim, T., Müller, J., Rilov, G., Scotti, M., and Böttcher, M. E.: A mesocosm concept for the simulation of near-natural shallow underwater climates: The Kiel Outdoor Benthocosms (KOB): Mesocosms with natural fluctuations and delta treatments, *Limnology and Oceanography: Methods*, 13, 651–663, <https://doi.org/10.1002/lom3.10055>, 2015.

IN REVIEW

Müller, J. D., Gruber, N., Carter, B. R., Feely, R. A., Ishii, M., Lange, N., Lauvset, S. K., Murata, A. M., Olsen, A., Pérez, F. F., Sabine, C. L., Tanhua, T., Wanninkhof, R., and Zhu, D.: Decadal Trends in the Oceanic Storage of Anthropogenic Carbon from 1994 to 2014, *Preprints*, <https://doi.org/10.22541/essoar.167525217.76035050/v1>, 2023.

Resplandy, L., Hogikyan, A., Bange, H. W., Bianchi, D., Weber, T. S., Cai, W.-J., Doney, S. C., Fennel, K., Gehlen, M., Hauck, J., Lacroix, F., Landschützer, P., Quéré, C. L., Müller, J. D., Najjar, R. G., Roobaert, A., Berthet, S., Bopp, L., Chau, T. T.-T., Dai, M., Gruber, N., Ilyina, T., Kock, A., Manizza, M., Lachkar, Z., Laruelle, G. G., Liao, E., Lima, I. D., Nissen, C., Rödenbeck, C., Séférian, R., Schwinger, J., Toyama, K., Tsujino, H., and Regnier, P.: A Synthesis of Global Coastal Ocean Greenhouse Gas Fluxes, *Preprints*, <https://doi.org/10.22541/essoar.168182303.39621839/v1>, 2023.

Rodgers, K., Schwinger, J., Fassbender, A., Landschützer, P., Yamaguchi, R., Frenzel, H., Stein, K., Müller, J. D., Goris, N., Sharma, S., Bushinsky, S., Chau, T.-T.-T., Gehlen, M., Gallego, M. A., Gloege, L., Gregor, L., Gruber, N., Hauck, J., Iida, Y., Ishii, M., Keppler, L., Kim, J.-E., Schlunegger, S., Tjiputra, J., Toyama, K., Ayar, P. V., and Vélo, A.: Seasonal variability of the surface ocean carbon cycle: A synthesis, *Preprints*, <https://doi.org/10.22541/essoar.168167394.47800179/v1>, 2023.

Terhaar, J., Goris, N., Müller, J. D., DeVries, T., Gruber, N., Hauck, J., Pérez, F. F., and Séférian, R.: Assessment of

Global Ocean Biogeochemistry Models for Ocean Carbon Sink Estimates in RECCAP2 and Recommendations for Future Studies, Preprints, <https://doi.org/10.22541/essoar.168394734.41886821/v1>, 2023.

Yasunaka, S., Manizza, M., Terhaar, J., Olsen, A., Yamaguchi, R., Landschützer, P., Watanabe, E., Carroll, D., Adiwara, H., Müller, J. D., and Hauck, J.: An assessment of CO₂ uptake in the Arctic Ocean from 1985 to 2018, Preprints, <https://doi.org/10.22541/essoar.168476524.42265823/v1>, 2023.

BOOKS

Schneider, B. and Müller, J. D.: Biogeochemical Transformations in the Baltic Sea, Springer International Publishing, Cham, <https://doi.org/10.1007/978-3-319-61699-5>, 2018.

THESIS

Müller, J. D.: Ocean acidification in the Baltic Sea : Involved processes, metrology of pH in brackish waters, and calcification under fluctuating conditions, Dissertation, Universität Rostock, https://doi.org/10.18453/rosdok_id00002303, 2018.

DATASETS

Müller, J. D.: RECCAP2-ocean data collection, <https://doi.org/10.5281/zenodo.7990823>, 2023.

SELECTED CONFERENCE PRESENTATIONS

Teaching experience

Funding

SPECTROPHABS

SPECTROPHOTOMETRIC PH-MEASUREMENTS FOR MONITORING OF MARINE ACIDIFICATION IN THE BALTIC SEA

- co-applicant

BSH

2019-2022

Early-Career Grant

FINANCIAL AND OUTREACH SUPPORT FOR BLOOMSAIL EXPEDITION

National Geographic Society

2018

Academic Scholarships

MULTIPLE FUNDINGS GRANTED INDEPENDENTLY

- PhD scholarship (ideational)
- Full student scholarship
- Field work grant, Patagonia, Chile
- Advanced English course, Bath, England
- Summer academy, San Giovanni, Italy

*German Academic Scholarship
Foundation*

2010 - 2018

Honors and Awards

Briese Award

OUTSTANDING PHD THESIS IN MARINE RESEARCH

Shipping company Briese

2019

Dissertation award

OUTSTANDING PHD THESIS IN WATER CHEMISTRY, SPONSORED BY WALTER-KÖLLE FOUNDATION

German Water Chemical Society

2019

Dissertation award

OUTSTANDING PHD THESIS IN BALTIC SEA SCIENCE

Baltic Sea Research Foundation

2019

Best poster award

FOR PRESENTATION BY NEWCOMERS

Baltic Sea Science Congress

2017

Book-price

FOR EXTRAORDINARY ACHIEVEMENTS DURING THE ABITUR

Bertha-von-Suttner Gymnasium

2005