Jens Daniel **Müller**

Postdoctoral Researcher

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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 — *Warnemünde, Germany*

Leibniz-Institute for Baltic Sea Research Warnemünde (IOW) — *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 — *Kiel, Germany*

GEOMAR Helmholtz Centre for Ocean Research Kiel — *09 / 2010 – 08 / 2012*

- Grade: 1.2 (ECTS grade, A Excellent)

BSc Chemistry — *Marburg, Germany*

Phillips-University Marburg — *09 / 2008 – 08 / 2009*

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

Employment and occupation

Postdoctoral researcher — *Zurich, Switzerland*

ETH Zürich — *07 /2020 - present*

- Environmental Physics | Prof. Dr. Nicolas Gruber

Postdoctoral researcher — *Warnemünde, Germany*

Leibniz-Institute for Baltic Sea Research Warnemünde (IOW) — *07 / 2018 – 06 /2020*

- Trace gas biogeochemistry | Prof. Dr. Gregor Rehder

Scientific Employee — *Kiel, Germany*

GEOMAR Helmholtz Centre for Ocean Research Kiel — *10 / 2013 – 03 / 2014*

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

Sailing Instructor — *Kiel, Germany*

Kiel Marketing GmbH | Camp 24/7 — *07 – 10 / 2013*

Divemaster — *Loubiere, Dominica*

Al Dive dive centre — *01 – 03 / 2013*

Research Assistant — *Kiel, Germany*

GEOMAR Helmholtz Centre for Ocean Research Kiel — *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., Schirnick, 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 pCO_{2} 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 pCO_{2} 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 O *{2}*, *CO* {2} , 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., Krägefsky, 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 — *BSH*

Spectrophotometric pH-measurements for monitoring of marine acidification in the Baltic Sea — *2019-2022*

- co-applicant

Early-Career Grant — *National Geographic Society*

Financial and outreach support for Bloomsail expedition — *2018*

Academic Scholarships — *German Academic Scholarship Foundation*

Multiple fundings granted independently — *2010 - 2018*

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

Honors and Awards

Briese Award — *Shipping company Briese*

Outstanding PhD thesis in Marine Research — *2019*

Dissertation award — *German Water Chemical Society*

Outstanding PhD thesis in Water Chemistry, sponsored by Walter-Kölle foundation — *2019*

Dissertation award — *Baltic Sea Research Foundation*

Outstanding PhD thesis in Baltic Sea Science — *2019*

Best poster award — *Baltic Sea Science Congress*

for presentation by newcomers — *2017*

Book-price — *Bertha-von-Suttner Gymnasium*

for extraordinary achievements during the Abitur — *2005*