Ketil Koop-Jakobsen, PhD

Assistant Scientist
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Google Scholar: 1,219 citations | h-index: 18 | i10-index: 19
Citation metrics as of November 12, 2026

KEY RESEARCH INTERESTS:

Wetlands biogeochemistry and nutrient cycling

Plant-soil-microbe interactions

Chemical gradients in soils and sediments

KEY RESEARCH METHODS AND TECHNOLOGY:

Optode imaging of O_2, pH, and CO_2in rhizospheres, soil, and sediments

Microprofiling of O_2, pH, CO_2, H_2S, N_2O and redox in soil and sediments

^{15}N tracing and Isotope pairing for nitrogen research in soil and sediments

WORK EXPERIENCE:

2022-Present	Assistant Scientist, Marine Biological Laboratory, Woods Hole, Massachusetts, USA Research: Rhizosphere processes, nutrient turnover, and GHG release
2020-2022	Postdoc, Alfred Wegener Institute - Wadden Sea Station, Sylt, Germany Research: Carbon Sequestration in salt marshes and sea grasses
2018-2020	Scientific Employee, Data Publisher - PANGAEA, University of Bremen, Germany Project management: Data projects on "Mesopelagic production" and "persistent identifiers in scientific data"
2012-2018	Scientific Employee, MARUM - Center for Marine Environmental Sciences, University of Bremen, Germany. Project management: Projects improving international collaboration and interoperability among environmental research infrastructures (2012-2018). Projects: COOPEUS and AtlantOS. Research: Optode imaging of rhizosphere processes (2015-2018)
2010-2012	Postdoc, Max Planck Institute for Marine Microbiology, Bremen, Germany Sensor development: Multifiber oxygen optode system Research: Oxygen dynamics in salt marsh rhizospheres

EDUCATION:

2008 PhD, Biology, Boston University Marine Program. Research conducted at Marine Biological Laboratory, Woods Hole, Massachusetts, USA
Research: Nitrogen cycling in salt marshes.

2003 Master's, Chemistry and Environmental biology, Roskilde University, Denmark
Research: Ammonium adsorption dynamics in sediments

PUBLICATIONS:

Manuscripts in Review:

2026 Garcia, K., **Koop-Jakobsen, K.**, & Lloret, J. Sea level rise alters salt marsh organic matter storage in sediments with implications for long-term carbon and nitrogen sequestration. Under review at *Estuaries and Coasts*.

2026 Wilson, M., Frei, A., Lenzewski, N., Mueller, P., Jensen, K., Meier, R. J., & **Koop-Jakobsen, K.** Contrasting gas exchange traits in aquatic and terrestrial life forms of *Littorella uniflora* (L.) Asch. Under review at Freshwater Biology

Preprints:

2026 **(preprint):** Moynihan, M. A., Mathieson, O. L., Crowley, C. A., Greene, E., Vanderscheuren, H., Dumit, D., Weed, R., **Koop-Jakobsen, K.**, Kleiner, M., & Ruff, S. E. Anoxygenic phototrophic Chlorobi use broad metabolic and resource acquisition strategies to support stable near-clonal blooms. *bioRxiv*. https://doi.org/10.64898/2026.09.24.754110

Published Papers:

2024 Buschbaum, C. L. N. S. Shama, F. L. L. Amorim, S. Brand, C. M. A. Broquard, N. Camillini, A. Cornelius, T. Dolch, A. Dummermuth, J. Feldner, M. S. Guignard, J. Habedank, J. J. L. Hoffmann, S. Horn, G. Konyssova, K. Koop-Jakobsen, R. Lauerburg, K. Mehler, V. Odongo, M. Petri, S. Reents, J. J. Rick, S. Rubinetti, M. Salahi, K. H. Wiltshire Climate change impacts on a sedimentary coast—a regional synthesis from genes to ecosystems. Marine Biodiversity, 2024. 54(4): p. 64.

2024 Borchers, M., J. Förster, D. Thrän, S. Beck, T. Thoni, K. Korte, E. Gawel, T. Markus, R. Schaller, I. Rhoden, Y. Chi, N. Dahmen, R. Dittmeyer, T. Dolch, C. Dold, M. Herbst, D. Heß, A. Kalhori, K. Koop-Jakobsen, Z. Li, N. Mengis, T.B.H. Reusch, I. Rhoden, T. Sachs, C. Schmidt-Hattenberger, A. Stevenson, T. Thoni, J. Wu, and C. Yeates, A Comprehensive Assessment of Carbon Dioxide Removal Options for Germany. Earth's Future, 2024. 12(5): p. e2023EF003986.

2023 Koop-Jakobsen, K. and T. Dolch, Future climate conditions alter biomass of salt marsh plants in the Wadden Sea. Marine Biodiversity, 2023. 53(3): p. 41.

2022 Paul, M., C. Bischoff, and K. Koop-Jakobsen, Biomechanical traits of salt marsh vegetation are insensitive to future climate scenarios. Scientific Reports, 2022. 12(1): p. 21272.

2022 Borchers, M., D. Thrän, Y. Chi, N. Dahmen, R. Dittmeyer, T. Dolch, C. Dold, J. Förster, M. Herbst, D. Heß, A. Kalhori, K. Koop-Jakobsen, Z. Li, N. Mengis, T.B.H.

Reusch, I. Rhoden, T. Sachs, C. Schmidt-Hattenberger, A. Stevenson, T. Thoni, J. Wu, and C. Yeates, Scoping carbon dioxide removal options for Germany–What is their potential contribution to Net-Zero CO_2? Frontiers in Climate, 2022. 4.

2022 Granse, D., Titschack, J., Ainouche, M., Jensen, K., and Koop-Jakobsen, K. (2022). Subsurface aeration of tidal wetland soils: Root-system structure and aerenchyma connectivity in Spartina (Poaceae). Science of The Total Environment, 802, 149771. DOI: 10.1016/j.scitotenv.2021.149771

2021 Koop-Jakobsen, Ketil, Robert Meier, Peter Mueller "Plant-mediated rhizosphere oxygenation in the native invasive salt marsh grass Elymus athericus" Frontiers in Plant Science. DOI: 10.3389/fpls.2021.669751

2020 Keshta A, Koop-Jakobsen K, Titschack J, Mueller P, Jensen K, Baldwin A, Nolte S (2020). Ungrazed saltmarsh has well connected soil pores, higher soil porosity, and less dense sediment compared with grazed saltmarsh: A CT scanning study. Estuarine Coastal Shelf Science, Vol 145: 106987. DOI: 10.1016/j.ecss.2020.106987

2019 Koop-Jakobsen, Ketil and Gutbrod, Martin (2019) Shallow salt marsh tidal ponds - an environment with extreme oxygen dynamics. Frontiers in Environmental Science. https://doi.org/10.3389/fenvs.2019.00137

2018 Koop-Jakobsen, Ketil, Peter Mueller, Robert Meier, Gregor Liebsch and Kai Jensen. Plant-sediment interactions in salt marshes - An optode imaging study of O_2pH and CO_2gradients in the rhizosphere. Frontiers in Plant Science. DOI: 10.3389/fpls.2018.00541

2018 Lenzewski, Nikola, Peter Mueller, Robert Meier, Gregor Liebsch, Kai Jensen, Ketil Koop-Jakobsen (2018). Dynamics of Oxygen and Carbon dioxide in rhizospheres of Lobelia dortmanna - A planar optode study of belowground gas exchange between plants and sediment. New Phytologist 218: 131-141. DOI: 10.1111/nph.14973

2017 Koop-Jakobsen, Ketil, Jan P. Fischer and Frank Wenzhöfer (2017). Survey of sediment oxygenation in rhizospheres of the saltmarsh grass - Spartina anglica. Science of The Total Environment 589: 191-199. DOI: 10.1016/j.scitotenv.2017.02.147

2015 Koop-Jakobsen, Ketil, and Frank Wenzhöfer (2015). The Dynamics of Plant-mediated Sediment Oxygenation in Spartina anglica Rhizosperes - a Planar Optode Study. Estuaries and Coasts. Vol 38, Iss 3, pp 951-963.DOI:10.1007/s12237-014-9861-y

2014 Hofmann, Laurie C, Kai Bischof, Cecilia Baggini, Andrew Johnson, Ketil Koop-Jakobsen and Mirta Teichberg (2014). $CO_2$and inorganic nutrient enrichment affect the performance of a calcifying green alga and its noncalcifying epiphyte. Oecologia 177:1157-1169. DOI: 10.1007/s00442-015-3242-5

2012 Fischer, Jan P., Ketil Koop-Jakobsen (2012) - The multi fiber optode (MuFO): A novel system for simultaneous analysis of multiple fiber optic oxygen sensors - Sensors and Actuators B: Chemical, Volume 168, 20 June 2012, pp 354-359. DOI: 10.1016/j.snb.2012.04.034

2010 Koop-Jakobsen, K and A.E. Giblin (2010) - The effect of increased nitrate loading on nitrate reduction via denitrification and DNRA in salt marsh sediments - Limnology and Oceanography vol.55(2), pp789-802. DOI: 10.4319/lo.2009.55.2.0789

2009 Koop-Jakobsen, K. and A.E. Giblin, 2009 "Anammox in tidal marsh sediments: The role of salinity, nitrogen loading and marsh vegetation", Estuaries and Coasts. Vol. 32, No.2, p238-245. DOI: 10.1007/s12237-008-9131-

2009 Koop-Jakobsen, K and A.E. Giblin (2009) - A new approach to measuring denitrification in the rhizosphere of vegetated marsh sediments - Limnology and Oceanography methods, vol 7, pp626-637. DOI: 10.4319/lom.2009.7.626

2009 D.C. Drake, Bruce J. Peterson, Kari A. Galván, Linda A. Deegan, John W. Fleeger, Carl T. Friedrichs, John Hobbie, Charles Hopkinson, J. Michael Johnson, Koop-Jakobsen, K., Lynsey E. Lemay, Erin E. Miller, Christian Picard, R. Scott Warren. "Salt marsh ecosystem responses to nutrient enrichment: A paired ^{15}N tracer study". Ecology Vol.90, No.9. pp2535-2546. DOI: 10.1890/08-1051.1

2002 Koop-Jakobsen, K. and A.E. Giblin, "Tidal flushing of ammonium from intertidal salt marsh sediments: The relative importance of adsorbed ammonium", Biological Bulletin, 203, p. 258-259. DOI: 10.2307/1543429

Other Publications (Non Peer-reviewed):

2017 Koop-Jakobsen, Ketil and Martin Gutbrod. O_2pH and CO_2Dynamics in Salt Marsh Tidal Ponds - Technical report on novel O_2, pH and CO_2needle optode profiling. DOI: 10.13140/RG.2.2.33109.32483

2014 Koop-Jakobsen, Ketil, Lindsay Powers, Robert Huber, Christoph Waldmann, and Henry W. Loescher "COOPEUS - Building the framework for information exchange between the US and EU Environmental Research Infrastructures", 2014 ILEAPS Newsletter P31-33.

RESEARCH FUNDING:

2026 “Evaluating seagrass restoration success: Measuring carbon sequestration and greenhouse-gas fluxes in natural, recovering, and restored eelgrass meadows” (Co-PI) - Award Number: CT-EQE-5000-CMTCARBONEELGRASSMBL - Commonwealth of Massachusetts (06/2026 - 06/2028). ($499,988)

2026 “Integrated Water Quality Monitoring and Nitrogen Source Identification for Martha’s Vineyard Ponds” - University of Maryland Center for Environmental Science (06/2026 - 04/2027). ($17,795)

2025 NASA: “OxyMoRon: Understanding dioxygen production and consumption in apparently anoxic environments” (PI) - Award Number: 80NSSC26K0272 - NASA (07/2025 - 07/2030). ($4,002,517). Assumed Principal Investigator responsibility following the departure of original PI S. Emil Ruff.

2025 “Laying the Foundation for Island Coastal Pond Restoration” (PI) - Award Number: GR101527_CON-00001951 - University of Maryland Center for Environmental Science (06/2025 - 08/2026). ($58,515)

2024 “Restoration and Recovery of the Little Pond Ecosystem after Nutrient Load Reduction following Sewer Construction and Wastewater Diversion” (Co-PI) - Award Number: A101658/22015607 - NOAA via WHOI Sea Grant (02/2024 - 01/2026). ($154,910)

2023 Title: LTREB Renewal: Nutrients and climate as drivers of carbon sequestration and ecosystem metabolism in a nitrogen-enriched, shallow coastal ecosystem (Co-PI). Award Number: 2311106 - NSF (08/2023 - 07/2028). Project Amount: ($610,649).

2022 LTER: Plum Island Ecosystems, the impact of changing landscapes and climate on interconnected coastal ecosystems - (Co-PI) - Award Number: 2224608 - NSF - (10/2022 - 09/2028). ($7,649,999)

2021 Sea4Society: searching for solutions for Carbon-sequestration in coastal ecosystems. (PI). Deutschen Allianz Meeresforschung (DAM)/ Bundesministerium für Bildung und Forschung (BMBF) 710.000€

2018 SUMMER: Sustainable management of mesopelagic resources. European Commission H2020-programm. 202.000€ (PI)

2014 (Co-PI) COOP+ Cooperation of research Infrastructures to address global challenges in the environmental field. European Commission H2020-programm. 195.000€. (Co-PI)

COLLABORATIVE PROJECTS (research based on internships, fellowships, and collaboration)

2026–present | MBL/Buzzards Bay Coalition collaboration on seagrass research in West Falmouth Harbor; Support: Brenninkmeyer Postdoctoral fellowship awarded to Melanie Hayn. Role: Postdoctoral supervisor.

2024 | Ecological changes in Salt marsh carbon storage capacity. Collaborator: Javier Lloret (MBL/UMCES). Support: Post-baccalaureate research internship funded through a Maxwell-Hanrahan grant to Kayla Garcia. Role: Mentor of post-baccalaureate researcher Kayla Garcia.

2024–present | Belowground biomass structure and function in salt marshes
Collaborator: Argonne National Laboratory (Zou Finfrock). Support: Awarded instrument time: CT scanning at EMSL and carbon K-edge spectroscopy at Canadian Light Source. Role: Research collaborator; co-applicant for instrument time.

2022–2023 | Chironomids in beaver ponds Impacts on sediment chemistry and methane emissions. Collaborators: MBL/UGeorgia. Support: Master's research project. Role: Research collaborator.

2022–2024 | Trunk River Research Project on Chlorobi phototrophic blooms and biogeochemical gradients. Collaborators: Emil Ruff (MBL), Molly Moynihan, Roo Weed (UChicago).
Support: Collaborative research. Role: Research collaborator.

2022–2023 | BEACON project - Diel microbial activity and chemical gradients in microbial mats. Collaborators: Cathy Pfister, Roo Weed, David Mark Welch, Bailey Fallon, Emily Curio, Emil Ruff. Support: Institutional research support from UChicago and MBL; Role: Research collaborator.

TEACHING EXPERIENCE:

MBL Semester in Environmental Science (SES):

SES – teaching: From 2022-2024: Lectures and lab: Terrestrial biogeochemistry; 2025: Lectures and lab: Terrestrial biogeochemistry and Aquatic biogeochemistry. 2026: Instructor, SES courses "Fundamentals in Ecosystem Science" and "Individual Student Research Project".

SES – Individual Student Project Mentorship: Keiona Williams (2022), Audrey Maxim-Rumley (2023), Chanda Cragnotti (2023), Kayla Garcia (2023), Sean Greeby (2024), Helena Mandeville (2025), Ethan Zhu (2026)

MBL REU/internship mentoring: Lauryn Moore (2024– NSF REU program at MBL), Vinessa Fressola (2024 - Metcalf Student), Kayla Garcia (2024 post-bach. internship (4mo) from Maxwell-Hanrahan), Destanie McCready (2025 – Hamden Fellowship), Land Johnson, FAU/MBL internship (2026) , Nathan Meyer, Metcalf (2026

Postdoctoral Supervision:

2026	Supervisor of Emeline Vidal, postdoctoral researcher, Marine Biological Laboratory.
2026–present	Supervisor of Melanie Hayn, postdoctoral researcher, Marine Biological Laboratory.

CONFERENCE CONTRIBUTIONS:

Talks and Posters:

2025	CERF (The Coastal and Estuarine Research Federation), poster, Lauryn Moore (Hampton University) (Presenter), Mirta Teichberg, Ketil Koop-Jakobsen. “Variation in Eelgrass Belowground Biomass and Morphology Across a Gradient of Environmental Conditions in West Falmouth Harbor, MA”
2025	International symposium on biogeochemistry of wetlands and aquatic systems, Baton Rouge, Louisiana, poster, “Sea level rise alters salt marsh organic matter storage in sediments with implications for long-term carbon and nitrogen sequestration” Garcia, K. (Presenter), Koop-Jakobsen, K., & Lloret, J.
2025	EGU General Assembly – (poster) “The impact of sediment grain size on the carbon storage potential of intertidal seagrass meadows in the northern Wadden Sea” Tobias Dolch (presenter), Ketil Koop-Jakobsen
2023	CERF (The Coastal and Estuarine Research Federation), poster, Presenter Koop-Jakobsen "Future climate conditions alter biomass of salt marsh plants in the Wadden Sea”
2022	EGU General Assembly. “Coastal protection capacity of saltmarshes remains high in the future.” Maike Paul (presenter), Christina Bischoff, Ketil Koop-Jakobsen. Abstract EGU22-2520.
2021	CERF (The Coastal and Estuarine Research Federation), Online, Oral Anchor talk, Presenter Koop-Jakobsen "Plant-mediated sediment oxygenation facilitate the spread of Elymus athericus in European marshes"
2017	CERF (The Coastal and Estuarine Research Federation), Providence, RI, USA, oral presentation, Ketil Koop-Jakobsen and Peter Mueller "Salt marsh rhizospheres - O_2, pH and CO_2gradients in time and space"
2016	ECSA (Estuarine and coastal sciences association), Bremen, Germany, oral pres., "Planar optode studies of marsh rhizospheres"
2016	ASLO (Ocean Sciences Meeting), New Orleans, LA, USA Poster Pres. Koop-Jakobsen "Plant-mediated Sediment Oxygenation in Coastal Wetlands"

2015 EGU (European Geosciences Union General Assembly), Vienna, Austria, Oral Pres. Koop-Jakobsen, C. Waldmann and R. Huber "COOPEUS - connecting research infrastructures in environmental sciences"

2014 AGU (American Geosciences Union General Assembly) San Francisco, Oral Pres., Koop-Jakobsen "The Dynamics of Sediment Oxygenation in Marsh Rhizospheres"

2013 EGI (EGI-Technical Forum) Oral Pres., Koop-Jakobsen "Strengthening the cooperation between EU and US in the field of environmental research infrastructures"

2013 EGU Vienna, Poster Pres Koop-Jakobsen. "The Dynamics of sediment oxygenation in Spartina anglica Rhizospheres - a Planar Optode Study"

2012 EGU (European Geosciences Union General Assembly), Vienna, Oral Pres. Koop-Jakobsen -"A novel Multi-Fiber Optode sensor system (MuFO) for monitoring oxygen"

2007 ERF (Estuarine Research Federation, Providence RI, USA - Oral Presentation -. Koop-Jakobsen Title: "A New Approach To Measuring Denitrification in Vegetated Marsh Sediments".

2007 SIL (30th Congress of the International Association of Theoretical and Applied Limnology) Title: "Nitrogen Retention in Salt Marsh Sediment - A Study of Anaerobic Ammonium Oxidation and Dissimilatory Nitrate Reduction to Ammonium".

2007 ASLO (aquatic sciences meeting) Santa Fe, NM, USA - Oral presentation - Title: "Nitrogen Retention in Salt Marsh Sediment - A Study of Anaerobic Ammonium Oxidation".

WORKSHOPS, COURSES, AND MEETINGS:

2023 Presenter and participant, UniSense Workshop, “Microsensors in environmental science”, UniSense A/S, Aarhus, Denmark.

2019 Workshop "The Old and New - working with existing and emerging PID types". Co-organizer with Tina Dohna. Oct 23rd Research Data Alliance (RDA) plenary meeting, Helsinki Finland (half day)

2017 Workshop, Organizer, "GEOSS for Ocean data providers" PLOCAN, Gran Canarias, Spain, November 24th (full day)

2017 Workshop, Organizer, "AtlantOS workshop on transatlantic Ocean data harmonization" Brussels, Belgium, June 7-8th

2014 Splinter meeting for the environmental research infrastructure community, Organizer, "Connecting research infrastructures through brokering services - EGU Vienna, Austria, April 29th

2013 Splinter meeting for the environmental research infrastructure community, Co-Organizer, "Future harmonization of data sharing among Research Infrastructures" EGU Vienna, Austria, April 11th

2011 Workshop/Course, Organizer, "Use of in situ sensor technology in marine research -A field course", AWI Sylt, Germany September 4-9th.

2010 Workshop/Course, Organizer, "Sensor technology in marine research - A course in general use and data analysis", Max Planck Inst. Bremen, Germany August 23-27th.

INVITED GUEST-SEMINARS, WEBINARS AND LECTURES:

2026 Guest lecture and laboratory demonstration, MBL Microbial Diversity course. Title: "Planar optodes: Practical applications in environmental science."

2025 Guest lecture and laboratory demonstration, MBL Microbial Diversity course. Title: "Planar optodes: Practical applications in environmental science."

2022 Guest lecture, Lafayette College. Title: "The Rhizosphere: How Belowground Processes Control Ecosystem Functions."

2021 Title: "Carbon storage in Wadden Sea seagrasses and salt marshes". Seminar series for Helmholtz Klimainitiative (HI-CAM), Online

2021 Title: "Techniques for Spatiotemporal investigations of rhizosphere processes" - Seminar series for Hamburg University's research training group 'Biota-mediated Effects on Carbon Cycling in Estuaries'

2021 Title: "Searching for solutions for Carbon sequestration in coastal ecosystems" HELCOM Workshop on Blue Carbon in the Baltic Sea region

2021 Title: "Why do plant-sediment interactions in salt marshes affect ecosystem services?" 2nd Themeday NCK-Waddenacademie Webinar

2019 Title: "New developments in the field of Persistent Identifiers" Joint webinar FREYA and OpenAIRE. webinar

2019 Title: "The PID Graph and its Potential: Extending Persistent Identifiers for Research Data" Research data Canada - Webinar

2018 Title: "GEOSS Mirror & GEOSS VIEW - the AtlantOS story" - 3rd GEO Data Providers workshop Data Providers, Rome, Italy, Workshop oral presentation

2017 Title: "Sediment oxygenation and Nitrogen cycling in wetlands" Helmholtz-Zentrum Geesthacht - Centre for Materials and Coastal Research, Geersthacht, Germany - guest-lecture

2016 Title: "Rhizosphere processes in vegetated salt marshes - A planar optode perspective" Biocentrum Klein Flottbek - Hamburg University, Germany - guest-lecture

2016 Title: "The research perspective of underwater ground vehicles - a sensor platform for flux measurements at the sediment-water interface", Robex-Allianz - University of Kaiserslautern, Germany - Workshop oral presentation

2015 Title: "Sediment oxygenation in intertidal Spartina anglica-dominated marshes" Coastal Ecology Workshop Westerhefer, Germany. Workshop oral presentation.

2010 Title: "Nitrogen retention in marsh sediment" - Max Planck Institute for marine microbiology - Bremen, Germany - guest-lecture

SCIENTIFIC SERVICE AND LEADERSHIP:

2024–present Chair, MBL EcoFacilities Committee.

MANUSCRIPT AND PROPOSAL REVIEWING:

Journal manuscript reviews: Journal of Environmental Quality - Plant and Soil - Marine Ecology Progress Series - Estuarine, Coastal and Shelf Science - Limnology and Oceanography, Limnology and Oceanography-Methods - Biogeochemistry - Marine Biology - Estuaries and Coasts - Hydrobiologia - Journal of Experimental Marine Biology and Ecology, Applied and Environmental Microbiology - Frontiers in Plant Science - Frontiers in Marine Science - Journal of plant nutrition and soil - Journal of Marine Research, ACS Sensors

Proposal review: German Research Foundation (DFG); U.S. Department of Energy, Biological and Environmental Research (DOE-BER), including proposal-review panel service (2026).