

Mathias Middelboe
Professor

Marine Biology

Postal address:
Strandpromenaden 5
3000

Helsingør

Email: mmiddelboe@bio.ku.dk

Phone: +4535321991

Web address: <https://www1.bio.ku.dk/staff/mmiddelboe/>, <https://www.bio.ku.dk>,
<https://www.bio.ku.dk/english/research/mbs/middelboe-lab/>



Employment

Professor

Marine Biology

Helsingør, Denmark

1 Feb 2015 → nu

Research outputs

Hydrostatic pressure induces transformations in the organic matter and microbial community composition of marine snow particles

Stief, P., Schauburger, C., Becker, K. W., Elvert, M., Balmonte, J. P., Franco-Cisterna, B., Middelboe, Mathias & Glud, R. N., 2023, In: Communications Earth and Environment. 4, 1, 14 p., 377.

Staying below the Radar: Unraveling a New Family of Ubiquitous “Cryptic” Non-Tailed Temperate Vibriophages and Implications for Their Bacterial Hosts

Kalatzis, P. G., Mauritzen, Jesper Juel, Winther-Have, Caroline Sophie W, Michniewski, S., Millard, A., Tsertou, M. I., Katharios, P. & Middelboe, Mathias, 2023, In: International Journal of Molecular Sciences. 24, 4, 23 p., 3937.

Strain-specific quorum-sensing responses determine virulence properties in *Vibrio anguillarum*

Mauritzen, Jesper Juel, Søndberg, E., Kalatzis, Panagiotis, Roager, L., Gram, L., Svenningsen, Sine Lo & Middelboe, Mathias, 2023, In: Environmental Microbiology. 25, 7, 19 p.

In Vitro* Evolution of Specific Phages Infecting the Fish Pathogen *Flavobacterium psychrophilum

Castillo, D., Højsting, A. R., Roosvall, A., Smyrlis, G., Jørgensen, J. & Middelboe, Mathias, 2022, In: PHAGE: Therapy, Applications, and Research. 3, 1, p. 28-37 10 p.

On Single-Cell Enzyme Assays in Marine Microbial Ecology and Biogeochemistry

Traving, Sachia Jo, Balmonte, J. P., Seale, D., Arnosti, C., Glud, R. N., Hallam, S. J. & Middelboe, Mathias, 2022, In: Frontiers in Marine Science. 9, 9 p., 846656.

Prevalence of genetically similar *Flavobacterium columnare* phages across aquaculture environments reveals a strong potential for pathogen control

Runtuvuori-Salmela, A., Kunttu, H. M. T., Laanto, E., Almeida, G. M. F., Mäkelä, K., Middelboe, Mathias & Sundberg, L., 2022, In: Environmental Microbiology. 24, 5, p. 2404-2420 17 p.

Reversible mutations in gliding motility and virulence genes: A flexible and efficient phage defence mechanism in *Flavobacterium psychrophilum*

Jørgensen, J., Sundell, K., Castillo, D., Dramshøj, L. S., Jørgensen, N. B., Madsen, S. B., Landor, L., Wiklund, T., Donati, V. L., Madsen, L., Dalsgaard, I. & Middelboe, Mathias, 2022, In: Environmental Microbiology. 24, 10, p. 4915-4930

The Gut Microbiota of Healthy and *Flavobacterium psychrophilum*-Infected Rainbow Trout Fry Is Shaped by Antibiotics and Phage Therapies

Donati, V. L., Madsen, L., Middelboe, Mathias, Strube, M. L. & Dalsgaard, I., 2022, In: Frontiers in Microbiology. 13, 21 p., 771296.

Bacteriophage Resistance Affects *Flavobacterium columnare* Virulence Partly via Mutations in Genes Related to Gliding Motility and the Type IX Secretion System

Kunttu, H. M. T., Runtuvuori-Salmela, A., Sundell, K., Wiklund, T., Middelboe, Mathias, Landor, L., Ashrafi, R., Hoikkala, V. & Sundberg, L., 2021, In: Applied and Environmental Microbiology. 87, 16, 19 p., e00812-21 .

Comparative Genomic Analyses of *Flavobacterium psychrophilum* Isolates Reveals New Putative Genetic Determinants of Virulence Traits

Castillo, D., Donati, V. L., Jørgensen, J., Sundell, K., Dalsgaard, I., Madsen, L., Wiklund, T. & Middelboe, Mathias, 2021, In: Microorganisms. 9, 8, 15 p., 1658.

Comparison of Delivery Methods in Phage Therapy against *Flavobacterium columnare* Infections in Rainbow Trout

Kunttu, H. M. T., Runtuvuori-Salmela, A., Middelboe, Mathias, Clark, J. & Sundberg, L. R., 2021, In: Antibiotics. 10, 8, 19 p., 914.

Dynamics of Baltic Sea phages driven by environmental changes

Hoetzing, M., Nilsson, E., Arabi, R., Osbeck, C. M. G., Pontiller, B., Hutinet, G., Bayfield, O. W., Traving, S., Kisand, V., Lundin, D., Pinhassi, J., Middelboe, Mathias & Holmfeldt, K., 2021, In: Environmental Microbiology. 23, 8, p. 4576-4594 19 p.

Genome-informed approach to identify genetic determinants of *Flavobacterium psychrophilum* phage susceptibility

Castillo, D., Jørgensen, J., Sundell, K., Madsen, L., Dalsgaard, I., Wiklund, T. & Middelboe, Mathias, 2021, In: Environmental Microbiology. 23, 8, p. 4185-4199 15 p.

Genomic Analysis of *Pasteurella atlantica* Provides Insight on Its Virulence Factors and Phylogeny and Highlights the Potential of Reverse Vaccinology in Aquaculture

Ellul, R. M., Kalatzis, Panagiotis, Frantzen, C., Haugland, G. T., Gulla, S., Colquhoun, D. J., Middelboe, Mathias, Wergeland, H. I. & Rønneseth, A., 2021, In: Microorganisms. 9, 6, 22 p., 1215.

Interactions between Rainbow Trout Eyed Eggs and *Flavobacterium* spp. Using a Bath Challenge Model: Preliminary Evaluation of Bacteriophages as Pathogen Control Agents

Donati, V. L., Dalsgaard, I., Runtuvuori-Salmela, A., Kunttu, H., Jørgensen, J., Castillo, D., Sundberg, L., Middelboe, Mathias & Madsen, L., 2021, In: Microorganisms. 9, 5, 31 p., 971.

Interactions between the Prophage 919TP and Its *Vibrio cholerae* Host: Implications of *gmd* Mutation for Phage Resistance, Cell Auto-Aggregation, and Motility

Li, N., Zeng, Y., Hu, B., Zhu, T., Svenningsen, Sine Lo, Middelboe, Mathias & Tan, D., 2021, In: Viruses. 13, 12, 15 p., 2342.

Phage-Mediated Control of *Flavobacterium psychrophilum* in Aquaculture: *In vivo* Experiments to Compare Delivery Methods

Donati, V. L., Dalsgaard, I., Sundell, K., Castillo, D., Er-Rafik, M., Clark, J., Wiklund, T., Middelboe, Mathias & Madsen, L., 2021, In: Frontiers in Microbiology. 12, 16 p., 628309.

Spatial variability of prokaryotic and viral abundances in the Kermadec and Atacama Trench regions

Schauberger, C., Middelboe, Mathias, Larsen, M., Peoples, L. M., Bartlett, D. H., Kirpekar, F., Rowden, A. A., Wenzhöfer, F., Thamdrup, B. & Glud, R. N., 2021, In: Limnology and Oceanography. 66, 6, p. 2095-2109 15 p.

Bacteriophages: Emerging Applications in Medicine, Food, and Biotechnology

Sohail, H. A., Coffey, A., Debrowska, K., Meyer, I. M., Middelboe, Mathias, Sohail, M. & Clokie, M. R. J., 2020, In: PHAGE: Therapy, Applications, and Research. 1, 2, p. 75-82 8 p.

Bacteriophages as Biocontrol Agents for *Flavobacterium psychrophilum* Biofilms and Rainbow Trout Infections

Sundell, K., Landor, L., Castillo, D., Middelboe, Mathias & Wiklund, T., 2020, In: PHAGE: Therapy, Applications, and Research. 1, 4, p. 198-204 7 p.

Beyond Cholera: Characterization of *zof*-Encoding Filamentous Phages in the Marine Fish Pathogen *Vibrio anguillarum*
Mauritzen, Jesper Juel, Castillo, D., Tan, D., Svenningsen, Sine Lo & Middelboe, Mathias, 2020, In: Viruses. 12, 7, 17 p., 730.

High cell densities favor lysogeny: induction of an H2O prophage is repressed by quorum sensing and enhances biofilm formation in *Vibrio anguillarum*

Tan, D., Hansen, Mads Frederik, de Carvalho, L. N., Røder, Henriette Lyng, Burmølle, Mette, Middelboe, Mathias & Svenningsen, Sine Lo, 2020, In: The ISME Journal. 14, 7, p. 1731-1742 12 p.

Sharp contrasts between freshwater and marine microbial enzymatic capabilities, community composition, and DOM pools in a NE Greenland fjord

Balmonte, J. P., Hasler-Sheetal, H., Glud, R. N., Andersen, Thorbjørn Joest, Sejr, M. K., Middelboe, Mathias, Teske, A. & Arnosti, C., 2020, In: Limnology and Oceanography. 65, 1, p. 77-95 19 p.

***P. aeruginosa* flow-cell biofilms are enhanced by repeated phage treatments but can be eradicated by phage-ciprofloxacin combination: —monitoring the phage–*P. aeruginosa* biofilms interactions**

Henriksen, K., Rørbo, N., Rybtke, Morten Levin, Martinet, M. G., Tolker-Nielsen, Tim, Høiby, Niels, Middelboe, Mathias & Ciofu, Oana, 2019, In: Pathogens and Disease. 77, 2, 11 p., ftz011.

Big Impact of the Tiny: Bacteriophage–Bacteria Interactions in Biofilms

Hansen, Mads Frederik, Svenningsen, Sine Lo, Røder, Henriette Lyng, Middelboe, Mathias & Burmølle, Mette, 2019, In: Trends in Microbiology. 27, 9, p. 739-752 14 p.

Biological transformation of Arctic dissolved organic matter in a NE Greenland fjord

Paulsen, M. L., Müller, O., Larsen, A., Møller, E. F., Middelboe, Mathias, Sejr, M. K. & Stedmon, C., 2019, In: Limnology and Oceanography. 64, 3, p. 1014-1033

Combining probiotic *Phaeobacter inhibens* DSM17395 and broad-host-range vibriophage KVP40 against fish pathogenic vibrios

Rasmussen, B. B., Kalatzis, Panagiotis, Middelboe, Mathias & Gram, L., 2019, In: Aquaculture. 513, 7 p., 734415.

Complete Genome Sequence of *Vibrio anguillarum* Nontailed Bacteriophage NO16

Kalatzis, Panagiotis, Carstens, A. B., Katharios, P., Castillo, D., Hansen, L. H. & Middelboe, Mathias, 2019, In: Microbiology resource announcements. 8, 15, p. 1-2 e00020-19.

Effects of allochthonous dissolved organic matter input on microbial composition and nitrogen-cycling genes at two contrasting estuarine sites

Happel, E. M., Markussen, T. M., Teikari, J. E., Huchaiah, V., Alneberg, J., Andersson, A. F., Sivonen, K., Middelboe, Mathias, Kisand, V. & Riemann, Lasse, 2019, In: F E M S Microbiology Ecology. 95, 9, 10 p., fiz123.

Large Phenotypic and Genetic Diversity of Prophages Induced from the Fish Pathogen *Vibrio anguillarum*

Castillo, D., Andersen, N., Kalatzis, Panagiotis & Middelboe, Mathias, 2019, In: Viruses. 11, 11, 15 p., 983.

Phage defense mechanisms and their genomic and phenotypic implications in the fish pathogen *Vibrio anguillarum*

Castillo, D., Rørbo, N., Jørgensen, J., Lange, J., Tan, D., Kalatzis, Panagiotis, Svenningsen, Sine Lo & Middelboe, Mathias, 2019, In: FEMS Microbiology Ecology. 95, 3, fiz004.

Phenotypic and Genetic Predictors of Pathogenicity and Virulence in *Flavobacterium psychrophilum*

Sundell, K., Landor, L., Nicolas, P., Jørgensen, J., Castillo, D., Middelboe, Mathias, Dalsgaard, I., Donati, V. L., Madsen, L. & Wiklund, T., 2019, In: Frontiers in Microbiology. 10, 14 p., 1711.

Bacteriophage Interactions with Marine Pathogenic Vibrios: Implications for Phage Therapy

Kalatzis, Panagiotis, Castillo Bermúdez, D. E., Katharios, P. & Middelboe, Mathias, 2018, In: Antibiotics. 7, 1, 23 p., 15.

Coupling biogeochemical process rates and metagenomic blueprints of coastal bacterial assemblages in the context of environmental change

Markussen, T. M., Happel, E. M., Teikari, J. E., Huchaiah, V., Alneberg, J., Andersson, A. F., Sivonen, K., Riemann, Lasse, Middelboe, Mathias & Kisand, V., 2018, In: Environmental Microbiology. 20, 8, p. 3083-3099

Draft Genome Sequences of Six *Vibrio diazotrophicus* Strains Isolated from Deep Subsurface Sediments of the Baltic Sea

Castillo, D., Vandieken, V., Engelen, B., Engelhardt, T. & Middelboe, Mathias, 2018, In: Genome Announcements. 6, 10, p. 1-2 e00081-18.

Exploring the Effect of Phage Therapy in Preventing *Vibrio anguillarum* Infections in Cod and Turbot Larvae

Rørbo, N. I., Rønneseth, A., Kalatzis, Panagiotis, Rasmussen, B. B., Engell-Sørensen, K., Kleppen, H. P., Wergeland, H. I., Gram, L. & Middelboe, Mathias, 2018, In: Antibiotics. 7, 2, 15 p., 42.

Widespread distribution of prophage-encoded virulence factors in marine *Vibrio* communities

Castillo, D., Kauffman, K., Hussain, F., Kalatzis, Panagiotis, Rørbo, N., Polz, M. F. & Middelboe, Mathias, 2018, In: Scientific Reports. 8, p. 1-9 9973.

Isolation and characterization of a N4-like lytic bacteriophage infecting *Vibrio splendidus*, a pathogen of fish and bivalves

Katharios, P., Kalatzis, Panagiotis, Kokkari, C., Sarropoulou, E. & Middelboe, Mathias, 28 Dec 2017, In: PLoS ONE. 12, 14 p., e0190083.

Marine viruses: key players in marine ecosystems

Middelboe, Mathias & Brussaard, C. P. D., Oct 2017, In: Viruses. 9, 10, 6 p., 302.

Stumbling across the same phage: comparative genomics of widespread temperate phages infecting the fish pathogen *Vibrio anguillarum*

Kalatzis, Panagiotis, Rørbo, N. I., Castillo Bermúdez, D. E., Mauritzen, Jesper Juel, Jørgensen, J., Kokkari, C., Zhang, F., Katharios, P. & Middelboe, Mathias, 20 May 2017, In: Viruses. 9, 5, 19 p., 122.

Comparative genome analyses of *Vibrio anguillarum* strains reveal a link with pathogenicity traits

Castillo Bermúdez, D. E., Alvisé, P. D., Xu, R., Zhang, F., Middelboe, Mathias & Gram, L., 28 Feb 2017, In: mSystems. 2, 1, 14 p., e00001-17.

Carbon bioavailability in a high arctic fjord influenced by glacial meltwater, NE Greenland

Paulsen, M. L., Nielsen, S. E. B., Müller, O., Møller, E. F., Stedmon, C. A., Juul-Pedersen, T., Markager, S., Sejr, M. K., Delgado Huertas, A., Larsen, A. & Middelboe, Mathias, 2017, In: Frontiers in Marine Science. 4, 19 p., 176.

Global occurrence and heterogeneity of the *Roseobacter*-clade species *Ruegeria mobilis*

Sonnenschein, E. C., Nielsen, K. F., D'Alvisé, P., Porsby, C. H., Melchiorson, J., Heilmann, J., Kalatzis, Panagiotis, López-Pérez, M., Bunk, B., Spröer, C., Middelboe, Mathias & Gram, L., 2017, In: The ISME Journal. 11, p. 569-583 15 p.

Benthic carbon mineralization in hadal trenches: assessment by in situ O₂ microprofile measurements

Wenzhöfer, F., Oguri, K., Middelboe, Mathias, Turnewitsch, R., Toyofuku, T., Kitazato, H. & Glud, R. N., 2016, In: Deep-Sea Research. Part 1: Oceanographic Research Papers. 116, p. 276-286 11 p.

Comparative genome analysis provides insights into the pathogenicity of *Flavobacterium psychrophilum*

Castillo Bermúdez, D. E., Christiansen, R. H., Dalsgaard, I., Madsen, L., Espejo, R. & Middelboe, Mathias, 2016, In: PLoS One. 11, 4, 18 p., e0152515.

Effect of bacteriophages on the growth of *Flavobacterium psychrophilum* and development of phage-resistant strains

Christiansen, R. H., Madsen, L., Dalsgaard, I., Castillo Bermúdez, D. E., Kalatzis, P. G. & Middelboe, Mathias, 2016, In: Microbial Ecology. 71, 4, p. 845-859 15 p.

Genomic diversity of bacteriophages infecting the fish pathogen *Flavobacterium psychrophilum*

Castillo Bermúdez, D. E. & Middelboe, Mathias, 2016, In: F E M S Microbiology Letters. 363, 24, 6 p., fnw272.

Predation and selection for antibiotic resistance in natural environments

Leisner, Jørgen, Jørgensen, Niels O. G. & Middelboe, Mathias, 2016, In: Evolutionary Applications (Online). 9, 3, p. 427-434 8 p.

Quantification of viral and prokaryotic production rates in benthic ecosystems: a methods comparison

Rastelli, E., Dell'Anno, A., Corinaldesi, C., Middelboe, Mathias, Noble, R. T. & Danovaro, R., 2016, In: Frontiers in Microbiology. 7, 11 p., 1501.

Re-examination of the relationship between marine virus and microbial cell abundances

Wigington, C. H., Sonderegger, D., Brussaard, C. P. D., Buchan, A., Finke, J. F., Fuhrman, J. A., Lennon, J. T., Middelboe, Mathias, Suttle, C. A., Wilson, W. H., Wommack, K. E., Wilhelm, S. W. & Weitz, J. S., 2016, In: Nature Microbiology. 1, 8 p., 15024 .

A multitrophic model to quantify the effects of marine viruses on microbial food webs and ecosystem processes

Weitz, J. S., Stock, C. A., Wilhelm, S. W., Bourouiba, L., Coleman, M. L., Buchan, A., Follows, M. J., Fuhrman, J. A., Jover, L. F., Lennon, J. T., Middelboe, Mathias, Sonderegger, D. L., Suttle, C. A., Taylor, B. P., Frede Thingstad, T., Wilson, W. H. & Eric Wommack, K., 2015, In: ISME Journal. 9, p. 1352–1364 13 p.

Autofluorescence imaging system to discriminate and quantify the distribution of benthic cyanobacteria and diatoms

Carreira, C., Staal, M. J., Middelboe, Mathias & Brussaard, C. P. D., 2015, In: Limnology and Oceanography: Methods. 13, 4, p. 169-177 9 p.

Bacteriophage resistance mechanisms in the fish pathogen *Flavobacterium psychrophilum*: linking genomic mutations to changes in bacterial virulence factors

Castillo Bermúdez, D. E., Christiansen, R. H., Dalsgaard, I., Madsen, L. & Middelboe, Mathias, 2015, In: Applied and Environmental Microbiology. 81, 3, p. 1157-1167 11 p.

Changes in the composition and bioavailability of dissolved organic matter during sea ice formation

Jørgensen, L., Stedmon, C. A., Kaartokallio, H., Middelboe, Mathias & Thomas, D. N., 2015, In: Limnology and Oceanography. 60, 3, p. 817-830 14 p.

Counting viruses and bacteria in photosynthetic microbial mats

Carreira, C., Staal, M. J., Middelboe, Mathias & Brussaard, C. P. D., 2015, In: Applied and Environmental Microbiology. 81, 6, p. 2149-2155 7 p.

Disruption of photoautotrophic intertidal mats by filamentous fungi

Carreira, C., Staal, M. J., Falkoski, D., de Vries, R. P., Middelboe, Mathias & Brussaard, C. P. D., 2015, In: Environmental Microbiology. 17, 8, p. 2910-2921 12 p.

Draft genome sequence of *Vibrio parahaemolyticus* VH3, isolated from an Aquaculture environment in Greece

Castillo Bermúdez, D. E., Jun, J. W., D'Alvise, P., Middelboe, Mathias, Gram, L., Liu, S. & Katharios, P., 2015, In: Genome Announcements. 3, 4, 2 p., e00731-15.

Draft genome sequences of *Vibrio alginolyticus* strains V1 and V2, opportunistic marine pathogens

Castillo Bermúdez, D. E., D'Alvise, P., Kalatzis, Panagiotis, Kokkari, C., Middelboe, Mathias, Gram, L., Liu, S. & Katharios, P., 2015, In: Genome Announcements. 3, 4, 2 p., e00729-15.

Draft genome sequences of the fish pathogen *Vibrio harveyi* strains VH2 and VH5

Castillo Bermúdez, D. E., D'Alvise, P., Middelboe, Mathias, Gram, L., Liu, S., Kalatzis, Panagiotis, Kokkari, C. & Katharios, P., 2015, In: Genome Announcements. 3, 5, 2 p., e01062-15.

Microscale spatial distributions of microbes and viruses in intertidal photosynthetic microbial mats

Carreira, C., Piel, T., Staal, M. J., Stuu, J. W., Middelboe, Mathias & Brussaard, C. P. D., 2015, In: SpringerPlus. 4, 11 p., 239.

Oceanography and the base of the pelagic food web in the southern Indian Ocean

Visser, A. W., Nielsen, T. G., Middelboe, Mathias, Høyer, J. L. & Markager, S., 2015, In: Journal of Plankton Research. 37, 3, p. 571-583 13 p.

Quorum sensing determines the choice of antiphage defense strategy in *Vibrio anguillarum*

Tan, D., Svenningsen, Sine Lo & Middelboe, Mathias, 2015, In: mBio. 6, 3, 10 p., e00627-15.

Vibriophages differentially influence biofilm formation by *Vibrio anguillarum* strains

Tan, D., Dahl, A. & Middelboe, Mathias, 2015, In: Applied and Environmental Microbiology. 81, 13, p. 4489-4497 9 p.

Antagonistic coevolution of marine planktonic viruses and their hosts

Martiny, J. B. H., Riemann, Lasse, Marston, M. F. & Middelboe, Mathias, 2014, In: Annual Review of Marine Science. 6, p. 393-414 22 p.

Complete genome sequence of *Vibrio anguillarum* phage CHOED successfully used for phage therapy in aquaculture

Romero, J., Higuera, G., Gajardo, F., Castillo Bermúdez, D. E., Middelboe, Mathias, García, K., Ramírez, C. & Espejo, R. T., 2014, In: Genome Announcements. 2, 4, 2 p.

Detection and quantification of *Flavobacterium psychrophilum*-specific bacteriophages *In Vivo* in rainbow trout upon oral administration: implications for disease control in aquaculture

Christiansen, R. H., Dalsgaard, I., Middelboe, Mathias, Lauritsen, A. H. & Madsen, L., 2014, In: Applied and Environmental Microbiology. 80, 24, p. 7683-7693 11 p.

Dissecting the role of viruses in marine nutrient cycling: bacterial uptake of D- and L-amino acids released by viral lysis

Shelford, E. J., Jørgensen, Niels O. G., Rasmussen, S., Suttle, C. A. & Middelboe, Mathias, 2014, In: Aquatic Microbial Ecology. 73, 3, p. 235-243 9 p.

Diversity and geographical distribution of *Flavobacterium psychrophilum* isolates and their phages: patterns of susceptibility to phage infection and phage host range

Castillo Bermúdez, D. E., Christiansen, R. H., Espejo, R. & Middelboe, Mathias, 2014, In: Microbial Ecology. 67, 4, p. 748-757 10 p.

Genomic structure of bacteriophage 6H and its distribution as prophage in *Flavobacterium psychrophilum* strains

Castillo Bermúdez, D. E., Espejo, R. & Middelboe, Mathias, 2014, In: FEMS Microbiology Letters. 351, 1, p. 51-58 8 p.

Increased acidification has a profound effect on the interactions between the cyanobacterium *Synechococcus* sp. WH7803 and its viruses

Traving, Sachia Jo, Clokie, M. R. J. & Middelboe, Mathias, 2014, In: F E M S Microbiology Ecology. 87, 1, p. 133-141 9 p.

Production and transformation of dissolved neutral sugars and amino acids by bacteria in seawater

Jørgensen, L., Lechtenfeld, O. J., Benner, R., Middelboe, Mathias & Stedmon, C. A., 2014, In: Biogeosciences. 11, p. 5349-5363 15 p.

Recent sediment dynamics in hadal trenches: evidence for the influence of higher-frequency (tidal, near-inertial) fluid dynamics

Turnewitsch, R., Falahat, S., Stehlikova, J., Oguri, K., Glud, R. N., Middelboe, Mathias, Kitazato, H., Wenzhoefer, F., Ando, K., Fujio, S. & Yanagimoto, D., 2014, In: Deep-Sea Research Part I: Oceanographic Research Papers. 90, p. 125-138 14 p.

Seasonal dynamics of autotrophic and heterotrophic plankton metabolism and P_{CO_2} in a subarctic Greenland fjord

Sejr, M. K., Krause-Jensen, D., Dalsgaard, T., Ruiz-Halpern, S., Duarte, C. M., Middelboe, Mathias, Glud, R. N., Bendtsen, J., Balsby, T. J. S. & Rysgaard, S., 2014, In: Limnology and Oceanography. 59, 5, p. 1764-1778 15 p.

Tracing the long-term microbial production of recalcitrant fluorescent dissolved organic matter in seawater

Jørgensen, L., Stedmon, C. A., Granskog, M. A. & Middelboe, Mathias, 2014, In: Geophysical Research Letters. 41, 7, p. 2481-2488 8 p.

Vibriophages and their interactions with the fish pathogen *Vibrio anguillarum*

Tan, D., Gram, L. & Middelboe, Mathias, 2014, In: Applied and Environmental Microbiology. 80, 10, p. 3128-3140 13 p.

Dispersal and survival of *Flavobacterium psychrophilum* phages *In Vivo* in rainbow trout and *In Vitro* under laboratory conditions: implications for their use in phage therapy

Madsen, L., Bertelsen, S. K., Dalsgaard, I. & Middelboe, Mathias, 2013, In: Applied and Environmental Microbiology. 79, 16, p. 4853-4861 9 p.

Heterogeneous distribution of prokaryotes and viruses at the microscale in a tidal sediment

Carreira, C., Larsen, M., Glud, R. N., Brussaard, C. P. D. & Middelboe, Mathias, 2013, In: Aquatic Microbial Ecology. 69, 3, p. 183-192 10 p.

High rates of microbial carbon turnover in sediments in the deepest oceanic trench on Earth

Glud, R. N., Wenzhöfer, F., Middelboe, Mathias, Oguri, K., Turnewitsch, R., Canfield, D. E. & Kitazato, H., 2013, In: Nature Geoscience. 6, p. 284-288 5 p.

Low virus to prokaryote ratios in the cold: benthic viruses and prokaryotes in a subpolar marine ecosystem (Hornsund, Svalbard)

Wrobel, B., Filippini, M., Piwowarczyk, J., Kedra, M., Kulinski, K. & Middelboe, Mathias, 2013, In: International Microbiology. 16, p. 45-52 8 p.

Viral lysis of *Micromonas pusilla*: impacts on dissolved organic matter production and composition

Lonborg, C., Middelboe, Mathias & Brussaard, C. P. D., 2013, In: Biogeochemistry. 116, 1-3, p. 231-240 10 p.

Bacterial carbon cycling in a subarctic fjord: a seasonal study on microbial activity, growth efficiency, and virus-induced mortality in Kobbefjord, Greenland

Middelboe, Mathias, Glud, R. N. & Sejr, M. K., 2012, In: Limnology and Oceanography. 57, 6, p. 1732-1742 11 p.

Cultivated single stranded DNA phages that infect marine *Bacteroidetes* prove difficult to detect with DNA binding stains

Holmfeldt, K., Odic, D., Sullivan, M. B., Middelboe, Mathias & Riemann, Lasse, 2012, In: Applied and Environmental Microbiology. 78, 3, p. 892-894

Diversity of *Flavobacterium psychrophilum* and the potential use of its phages for protection against bacterial cold water disease in salmonids

Castillo, D., Higuera, G., Villa, M., Middelboe, Mathias, Dalsgaard, I., Madsen, L. & Espejo, R. T., 2012, In: Journal of Fish Diseases Online. 35, 3, p. 193-201 9 p.

Proteinase production in *Pseudomonas fluorescens* ON2 is affected by carbon sources and allows surface-attached but not planktonic cells to utilize protein for growth in lake water

Nicolaisen, Mette Haubjerg, Worm, J., Jørgensen, Niels O. G., Middelboe, Mathias & Nybroe, O., 2012, In: F E M S Microbiology Ecology. 80, 1, p. 168-178 11 p.

Virus-driven nitrogen cycling enhances phytoplankton growth

Shelford, E. J., Middelboe, Mathias, Møller, E. F. & Suttle, C. A., 2012, In: Aquatic Microbial Ecology. 66, 1, p. 41-46 6 p.

Global trends in the fluorescence characteristics and distribution of marine dissolved organic matter

Jørgensen, L., Stedmon, C., Kragh, T., Markager, S., Middelboe, Mathias & Søndergaard, M., 2011, In: Marine Chemistry. 126, 1-4, p. 139-148 10 p.

Viral abundance and activity in the deep sub-seafloor biosphere

Middelboe, Mathias, Glud, R. N. & Filippini, M., 2011, In: Aquatic Microbial Ecology. 63, 1, p. 1-8

Microbial disease in the sea: Effects of viruses on carbon and nutrient cycling

Middelboe, Mathias, 16 Dec 2010, *Infectious Disease Ecology: Effects of Ecosystems on Disease and of Disease on Ecosystems*. Princeton University Press, p. 242-259 18 p.

Isolation and life cycle characterization of lytic viruses infecting heterotrophic bacteria and cyanobacteria

Middelboe, Mathias, Chan, A. & Bertelsen, S. K., 2010, *Manual of aquatic viral ecology*. Wilhelm, S. W., Weinbauer, M. G. & Suttle, C. A. (eds.). Waco, Tex: American Society of Limnology and Oceanography, Inc., p. 118-33 16 p.

Separation of free virus from sediments in aquatic systems

Danovaro, R. & Middelboe, Mathias, 2010, *Manual of Aquatic Viral Ecology*. Wilhelm, S. W., Weinbauer, M. G. & Suttle, C. A. (eds.). ASLO, p. 74-81 8 p.

Bacteriophages drive strain diversification in a marine *Flavobacterium*: implications for phage resistance and physiological properties

Middelboe, Mathias, Holmfeldt, K., Riemann, Lasse, Nybroe, O. & Haaber, J. B. B., 2009, In: Environmental Microbiology. 11, 8, p. 1971-1982 12 p.

Viral lysis of *Phaeocystis pouchetii*: implications for algal population dynamics and heterotrophic C, N and P cycling

Haaber, J. B. B. & Middelboe, Mathias, 2009, In: ISME Journal. 3, 4, p. 430-441 12 p.

Bacterial and viral dynamics during a mass coral spawning period on the Great Barrier Reef

Patten, N. L., Mitchell, J. G., Middelboe, Mathias, Eyre, B. D., Seuront, L., Harrison, P. L. & Glud, R. N., 2008, In: Aquatic Microbial Ecology. 50, p. 209-220

Global-scale processes with a nanoscale drive - the role of marine viruses

Brussard, C. P. D., Wilhelm, S. W., Thinhstad, T. F., Weinbauer, T. F., Bratbak, M. G., Heldal, M., Kimmance, S. A., Middelboe, Mathias, Nagasaki, K., Paul, J. H., Schroeder, D. C., Suttle, C. A., Vaque, D. & Wommack, K. E., 2008, In: ISME Journal. 2, p. 575-578

Isolation and characterization of bacteriophages infecting the fish pathogen *Flavobacterium psychrophilum*

Stenholm, A. R., Dalsgaard, I. & Middelboe, Mathias, 2008, In: Applied and Environmental Microbiology. 74, 13, p. 4070-4078

Marine Viruses: Community Dynamics, Diversity and Impact on Microbial Processes

Breitbart, M., Middelboe, Mathias & Rohwer, F., 2008, *Microbial Ecology of the Oceans*. Second Edition ed. IEEE Computer Society Press, p. 443-479

Microbial Disease in the Sea: Effects of Viruses on Marine Carbon and Nutrient Cycling

Middelboe, Mathias, 2008, *Infectious Disease Ecology*. Princeton University Press, p. 242-260

Struktur og funktion af plankton fødekæden i det Indiske Ocean fra Cape Town til Broome i Australien. Dansk Ekspeditionsfond 2008

Nielsen, T. G., Visser, A., Jonasdottir, S., Friis Møller, E., Andersen, M., Larsen, L., Søborg, B., Satapoomin, S., Jaspers, C., Markager, S., Middelboe, M., Martinsen, W., Berendt, A., Hansen, O. S., Hansen, P. J., Woraporn, T., Daugbjerg, N., Hansen, G., Hastrup Jensen, M., Jakobsen, H. H. & 4 others, Henriksen, P., Schlüter, L., Hilligsøe, K. M. & Olesen, Michael, 2008.

Viral dynamics in a coastal sediment: seasonal pattern, controlling factors and relations to the pelagic-benthic coupling
Siem-Jørgensen, M., Glud, R. N. & Middelboe, Mathias, 2008, In: Marine Biology Research. 4, 3, p. 165-179

Viruses in freshwater ecosystems: An introduction to the exploration of viruses in new aquatic habitats
Middelboe, Mathias, Jacquet, S. & Weinbauer, M., 2008, In: Freshwater Biology. 53, 6, p. 1069-1075

First Record of Viral Abundance in Coliumo Bay and the Continental Shelf off Central Chile
Chiang, O. E., Middelboe, Mathias & Quiñones, R. A., 2007, In: Gayana. 71, 1, p. 124-131

Large variabilities in host strain susceptibility and phage host range govern interactions between lytic marine phages and their *Flavobacterium* hosts
Holmfeldt, K., Middelboe, Mathias, Nybroe, O. & Riemann, L., 2007, In: Applied and Environmental Microbiology. 73, 21, p. 6730-6739 10 p.

Ny viden om virus' betydning for Jordens kulstofomsætning.
Drejet, L. & Middelboe, Mathias, 2007, In: Dansk Kemi. 88, 2, p. 11-13

Primer Registro de Abundancia Viral en Bahía Coliumo y Plataforma Continental Frente a Chile Central: First Record of Viral Abundance in Coliumo Bay and the Continental Shelf off Central Chile.
Chiang, O. E., Middelboe, Mathias & Quiñones, R. A., 2007, In: Gayana. 71, 1, p. 124-131

Viral abundance and genome size distribution in the sediment and water column of marine and freshwater ecosystems
Filippini, M. & Middelboe, Mathias, 2007, In: FEMS Microbiology Ecology. 60, p. 397-410

Viral activity along a trophic gradient in continental margin sediments off central Chile
Middelboe, Mathias & Glud, R. N., Mar 2006, In: Marine Biology Research. 2, 1, p. 41-51 11 p.

De frie vandmassers stofomsætning
Middelboe, Mathias & Olesen, Michael, 2006, *HAVET: Naturen i Danmark*. Fenchel, T. (ed.). Gyldendal, p. 351-369

Havbunden - et levested for vigtige aktører i havets husholdning
Glud, R. N. & Middelboe, Mathias, 2006, In: Naturens Verden. 11/12, p. 2-9

Occurrence and bacterial cycling of D amino acid isomers in an estuarine environment
Jørgensen, Niels O. G. & Middelboe, Mathias, 2006, In: Biogeochemistry. 81, 1, p. 77-94 18 p.

Spatial distribution and activity of viruses in the deep-sea sediments of Sagami Bay, Japan
Middelboe, Mathias, Glud, R. N., Wenzhöfer, F., Oguri, K. & Kitazato, H., 2006, In: Deep-Sea Res. I. 53, p. 1-13

Viral lysis of bacteria: an important source of dissolved amino acids and cell wall compounds
Middelboe, Mathias & Jørgensen, Niels O. G., 2006, In: Journal of the Marine Biological Association of the United Kingdom. 86, 3, p. 605-612 8 p.

Virus - havbundens mindste beboere
Middelboe, Mathias & Glud, R. N., 2006, In: Naturens Verden. 4, p. 32-40

Distribution of oxygen in surface sediments from central Sagami Bay, Japan: In situ measurements by microelectrodes and planar optodes
Glud, R. N., Wenzhöfer, F., Tengberg, A., Middelboe, Mathias, Oguri, K. & Kitazato, H., 2005, In: Deep Sea Research - Part I - Oceanographic Research Papers. Part I (52), p. 1974-1987

Virus and bacteria dynamics of a coastal sediment: Implication for benthic carbon cycling.

Glud, R. N. & Middelboe, Mathias, 2004, In: *Limnology and Oceanography*. 49(6), p. 2073-2081

Distribution of viruses and bacteria in relation to diagenetic activity in an estuarine sediment

Middelboe, Mathias, Glud, R. N. & Finster, K., 2003, In: *Limnology and Oceanography*. 48(4), p. 1447-1456

Microbial activity in the Greenland Sea: role of DOC lability, mineral nutrients and temperature.

Middelboe, Mathias & Lundsgaard, C., 2003, In: *Aquatic Microbial Ecology*. 32, p. 151-163

Virus - de mindste biologiske strukturer i havet.

Middelboe, Mathias, 2003, In: *Carlsbergfondets Årsskrift*. IV, p. 28-35

Virus-induced transfer of organic carbon between marine bacteria in a model community.

Middelboe, Mathias, Riemann, Lasse, Steward, G. F., Hansen, V. & Nybroe, O., 2003, In: *Aquatic Microbial Ecology*. 33, 1, p. 1-10 10 p.

Influence of bacterial uptake on deep-ocean dissolved organic carbon

Bendtsen, J., Lundsgaard, C., Middelboe, Mathias & Archer, D., 2002, In: *Global Biogeochemical Cycles*. vol. 16(0), p. 1-13

Regeneration of dissolved organic matter by viral lysis in marine microbial communities

Middelboe, Mathias & Lyck, P. G., 2002, In: *Aquatic Microbial Ecology*. 27, p. 187-194

Stability of bacterial and viral community compositions in Danish coastal waters as depicted by DNA fingerprinting techniques

Riemann, Lasse & Middelboe, Mathias, 2002, In: *Aquatic Microbial Ecology*. 27, p. 219-232

Utilization of marine sedimentary dissolved organic nitrogen by native anaerobic bacteria

Guldberg, L. B., Finster, K., Jørgensen, Niels O. G., Middelboe, Mathias & Lomstein, B. A., 2002, In: *Limnology and Oceanography*. 47, 6, p. 1712-1722 11 p.

Viral Lysis of Marine Bacterioplankton: Implications for Organic Matter Cycling and Bacterial Clonal Composition

Riemann, Lasse & Middelboe, Mathias, 2002, In: *Marine Biology Research*. 56(2), p. 57-68

Viral and bacterial production in the North Water: *in situ* measurements, batch-culture experiments and characterization and distribution of a virus-host system

Middelboe, Mathias, Nielsen, T. G. & Bjørnsen, P. K., 2002, In: *Deep Sea Research - Part II - Topical Studies in Oceanography*. 49, p. 5063-5079

Effects of Bacteriophages on the Population Dynamics of Four Strains of Pelagic Marine Bacteria

Middelboe, Mathias, Hagström, Å., Blackburn, N., Sinn, B., Fischer, U., Borch, N. H., Pinhassi, J., Simu, K. & Lorenz, M. G., 2001, In: *Microbial Ecology*. 42, p. 395-406

Bacterial Growth Rate and Marine Virus-Host Dynamics

Middelboe, Mathias, 2000, In: *Microbial Ecology*. 40, p. 114-124

Virus i havet

Riemann, L. & Middelboe, Mathias, 2000, In: *Vand og Jord*. 4, p. 156-158

Effects of viral enrichment on the mortality and growth of heterotrophic bacterioplankton

Noble, R. T., Middelboe, Mathias & Fuhrman, J. A., 1999, In: *Aquatic Microbial Ecology*. 18, p. 1-13

Influence of sediment on pelagic carbon and nitrogen turnover in a shallow Danish estuary

Middelboe, Mathias, Kroer, Niels, Jørgensen, N. O. G. & Pakulski, D., 1998, In: Microbial Ecology. 14, p. 81-90

Effects of viruses on nutrient turnover and growth efficiency of noninfected marine bacterioplankton

Middelboe, Mathias, Jørgensen, Niels O. G. & Kroer, Niels, 1996, In: Applied and Environmental Microbiology. 62, 6, p. 1991-1997 7 p.

Attached and free-living bacteria: Production and polymer hydrolysis during a diatom bloom

Middelboe, Mathias, Søndergaard, M., Letarte, Y. & Borch, N. H., 1 May 1995, In: Microbial Ecology. 29, 3, p. 231-248 18 p.

Concentration and bacterial utilization of sub-micron particles and dissolved organic carbon in lakes and a coastal area

Middelboe, Mathias & Søndergaard, M., 1 Jan 1995, In: Archiv fur Hydrobiologie. 133, 2, p. 129-147 19 p.

A cross-system analysis of labile dissolved organic carbon

Søndergaard, M. & Middelboe, Mathias, 1995, In: Marine Ecology - Progress Series. 118, p. 283-294

Attached and freeliving bacteria: Production and polymer hydrolysis during a diatom bloom

Middelboe, Mathias, Søndergaard, M., Letarte, Y. & Borch, N. H., 1995, In: Microbial Ecology. 29, p. 231-248

Bacterial utilization of dissolved free amino acids, dissolved combined amino acids and ammonium in the Delaware Bay estuary: effects of carbon and nitrogen limitation

Middelboe, Mathias, Borch, N. H. & Kirchman, D. L., 1995, In: Marine Ecology - Progress Series. 128, p. 109-120 12 p.

Concentration and bacterial utilization of submicron particles and dissolved organic carbon in lakes and a coastal area

Middelboe, Mathias & Søndergaard, M., 1995, In: Polskie Archiwum Hydrobiologii. 133 (2), p. 129-147

Bacterioplankton growth yield: Seasonal variations and coupling to substrate lability and *GB*-glucosidase activity

Middelboe, Mathias & Søndergaard, M., 1993, In: Applied and Environmental Microbiology. 59, p. 3916-3921

Measurements of particulate organic carbon: a note on the use of glass fiber (GF/F) and Anodisc R filters

Søndergaard, M. & Middelboe, Mathias, 1993, In: Polskie Archiwum Hydrobiologii. 127, p. 73-85

Bacterial utilization of dissolved organic carbon (DOC) in coastal waters - determination of growth yield.

Middelboe, Mathias, Nielsen, B. & Søndergaard, M., 1992, In: Arch. Hydrobiol. Beih.. 37, p. 51-61

Nye studier af bakterieplanktonets økologi

Middelboe, Mathias, Nielsen, B. & Søndergaard, M., 1992, In: Vand og miljø. 4, p. 115-118