

## Publications – Martin Thullner

### Peer reviewed articles:

**Sun F, A. Mellage, Z. Wang, R. Bakkour, C. Griebler, M. Thullner, O. Cirpka, and M. Elsner:** “Response of BAM-degradation activity to concentration and flow changes in a bench-scale sediment tank” Environmental Science & Technology 56: 4050-4061. 2022.

**Khurana S., F. Heße, A. Hildebrandt and M. Thullner:** “Should we worry about surficial dynamics when assessing nutrient cycling in the groundwater?” Frontiers in Water 4: 780297. doi:10.3389/frwa.2022.780297. 2022.

**Khurana S., F. Heße, A. Hildebrandt and M. Thullner:** “Predicting the impact of spatial heterogeneity on microbial redox dynamics and nutrient cycling in the subsurface” Biogeosciences 19: 665-688. 2022.

**Sun, F., A. Mellage, M. Gharasoo, A. Melsbach, X. Cao, R. Zimmermann, C. Griebler, M. Thullner, O. A. Cirpka and M. Elsner:** “Mass transfer-limited biodegradation – evidence from reactive transport modeling of isotope profiles in a mesoscale aquifer” Environmental Science & Technology 55: 7386-7397. 2021.

**Sun, F., J. Peters, M. Thullner, O. Cirpka and M. Elsner:** “Magnitude of diffusion- and transverse dispersion-induced isotope fractionation of organic compounds in aqueous systems” Environmental Science & Technology 55, 4772-4782. 2021.

**Golparvar, A., M. Kästner and M. Thullner:** “Pore-scale Modelling of Microbial Activity: What We Have and What We Need” Vadose Zone Journal e20087, doi:10.1002/vzj2.20087. 2021.

**Calabrese, F., I. Voloshynovska, F. Musat, M. Thullner, M. Schlömann, H. H. Richnow, J. Lambrecht, S. Müller, L. Y. Wick, N. Musat and H. Stryhanyuk:** “Quantitation and comparison of phenotypic heterogeneity among single cells of monoclonal microbial populations” Frontiers in Microbiology 10: 2814. doi:10.3389/fmicb.2019.02814. 2019.

**Druhan, J. L., M. J. Winnick and M. Thullner:** “Stable isotope fractionation by transport and transformation” Reviews in Mineralogy and Geochemistry 85: 239-264. 2019.

**Thullner M., and P. Regnier:** "Microbial controls on the dynamics of biogeochemistry in the terrestrial and marine subsurface" *Reviews in Mineralogy and Geochemistry* 85: 265-302. 2019

**König S., M. C. Köhnke, A.-L. Firle, T. Banitz, F. Centler, K. Frank and M. Thullner:** "Disturbance size can be compensated for by spatial fragmentation in soil microbial ecosystems" *Frontiers in Ecology and Evolution* 7:290. doi: 10.3389/fevo.2019.00290. 2019.

**Khan A. M., Lukas Y. Wick and M. Thullner:** "Applying the Rayleigh approach for stable isotope-based analysis of VOC biodegradation in diffusion-dominated systems" *Environmental Science & Technology* 52: 7785-7795. 2018.

**König S., A. Worrlich, T. Banitz, F. Centler, H. Harms, M. Kästner, A. Miltner, L. Y. Wick, M. Thullner and K. Frank:** "On the edge of collapse: Modelling microbial ecosystems afflicted by recurrent spatially heterogeneous disturbances" *Scientific Reports* 8: 9488. doi: 10.1038/s41598-018-27785-4. 2018.

**Schmidt S. I., J.-U. Kreft, R. Mackay, C. Picoreanu and M. Thullner:** "Elucidating the impact of micro-scale heterogeneous bacterial distribution on biodegradation" *Advances in Water Resources* 116: 67-76. 2018.

**Newcomer M. E., S. S. Hubbard, J. H. Fleckenstein, U. Maier, C. Schmidt, M. Thullner, C. Ulrich, N. Filipo and Y. Rubin:** "Influence of hydrological perturbations and riverbed sediment characteristics on hyporheic zone respiration of CO<sub>2</sub> and N<sub>2</sub>" *JGR Biogeosciences* 123: 902-922. 2018.

**König S., A. Worrlich, T. Banitz, H. Harms, M. Kästner, A. Miltner, L. Y. Wick, K. Frank, M. Thullner and F. Centler:** "Dynamic response of biodegradation to recurrent disturbances – Mechanistic insights into functional resistance from a model analysis" *Frontiers in Microbiology* 9: 734. doi: 10.3389/fmicb.2018.00734. 2018.

**Gharasoo M., M. Thullner and M. Elsner:** "ReKinSim: A numerical platform for parameter estimation of kinetically complex biochemical systems" *Environmental Modelling and Software* 98: 12-20. 2017.

**Worrlich A., H. Stryhanyuk, N. Musat, S. König, T. Banitz, F. Centler, K. Frank, M. Thullner, H. Harms, H.-H. Richnow, A. Miltner, M. Kästner and L. Y. Wick:** "Mycelium-mediated transfer of water and nutrients stimulates bacterial activity in dry and oligotrophic environments" *Nature Communications* 8: 15472, doi: 10.1038/ncomms15472. 2017.

**König S., A. Worrlich, F. Centler, L. Y. Wick, A. Miltner, M. Kästner, M. Thullner, K. Frank and T. Banitz:** "Modelling functional resilience of microbial ecosystems: analysis of governing processes" Environmental Modelling and Software 89: 31-39. 2017.

**Berthold T., F. Centler, T. Hübschmann, R. Remer, M. Thullner, H. Harms and L. Y. Wick:** "Matchmaking on the fast lane: Mycelia as focal point of bacterial horizontal gene transfer" Scientific Reports 6: 36390, doi:10.1038/srep36390. 2016.

**Worrlich A., S. König, T. Banitz, F. Centler, K. Frank, M. Thullner, H. Harms, A. Miltner, L. Y. Wick and M. Kästner:** "Bacterial dispersal promotes biodegradation in heterogeneous systems exposed to osmotic stress" Frontiers in Microbiology 7: 1214, doi: 10.3389/fmicb.2016.01214. 2016.

**Stefanakis A., E. Seeger, C. Dorer, A. Sinke and M. Thullner:** "Performance of pilot-scale horizontal subsurface flow constructed wetlands treating groundwater contaminated with phenols and petroleum derivatives" Ecological Engineering 95: 514-526. 2016.

**Otto S., T. Banitz, M. Thullner, H. Harms and L. Y. Wick:** "Effects of facilitated bacterial dispersal on the degradation and emission of a matrix-bound contaminant" Environmental Science & Technology 50: 6320-6326. 2016.

**Newcomer M. E., S. S. Hubbard, J. H. Fleckenstein, U. Maier, C. Schmidt, M. Thullner, C. Ulrich, N. Filipo and Y. Rubin:** "Simulating bioclogging effects on dynamic riverbed permeability and infiltration" Water Resources Research 52: 2883–2900. 2016.

**Worrlich A., S. König, A. Miltner, T. Banitz, F. Centler, K. Frank, M. Thullner, H. Harms, M. Kästner and L. Y. Wick:** "Dispersal networks increase the functional performance of ecosystems at varying water potentials" Applied and Environmental Microbiology 82: 2902-2908. 2016.

**Stolpovsky K., I. Fetzer, P. Van Cappellen and M. Thullner:** "Microbial competition under intermittent substrate supply: Insights from model simulations" FEMS Microbiology Ecology 92, fiw067. 2016.

**Alvarez-Zaldívar P., F. Centler, U. Maier, M. Thullner and G. Imfeld:** "Biogeochemical modelling of in situ biodegradation and stable isotope fractionation of intermediate chloroethenes in a horizontal subsurface flow wetland" Ecological Engineering 90: 170-179. 2016.

**Khan A. M., L. Y. Wick, H. Harms and M. Thullner:** "Biodegradation of vapor-phase toluene in unsaturated porous media: column experiments" Environmental Pollution 211: 325-331. 2016.

**Richter S., I. Fetzer, M. Thullner, F. Centler and P. Dittrich:** "Towards rule-based metabolic databases - a requirement analysis based on KEGG" International Journal of Data Mining and Bioinformatics 13: 289-319. 2015.

**Gharasoo M., F. Centler, P. Van Cappellen, L. Y. Wick and M. Thullner:** "Kinetics of substrate biodegradation under the cumulative effects of bioavailability and self-inhibition" Environmental Science & Technology 49: 5529-5537. 2015.

**Centler F. and M. Thullner:** "Chemotactic preferences govern competition and pattern formation in simulated two-strain microbial communities" Frontiers in Microbiology 6:40, doi:10.3389/fmicb.2015.00040. 2015.

**Heße F., V. Prykhodko, S. Attinger and M. Thullner:** "Assessment of the impact of pore-scale mass-transfer restrictions on microbially-induced stable-isotope fractionation" Advances in Water Resources 74: 79-90. 2014.

**Gharasoo M., F. Centler, I. Fetzer and M. Thullner:** "How the chemotactic characteristics of bacteria can determine their population patterns" Soil Biology and Biochemistry 69: 346-358. 2014.

**De Biase C., A. Carminati, S. Oswald and M. Thullner:** "Numerical modeling analysis of VOCs removal processes in different vertical flow systems for groundwater remediation" Journal of Contaminant Hydrology 154: 53-69. 2013.

**Regnier P., P. Friedlingstein, P. Ciais, F. T. Mackenzie, N. Gruber, I. A. Janssens, G. G. Laruelle, R. Lauerwald, S. Luyssaert, A. J. Andersson, S. Arndt, C. Arnosti, A. V. Borges, A. W. Dale, A. Gallego-Sala, Y. Goddérus, N. Goossens, J. Hartmann, C. Heinze, T. Illyina, F. Joos, D. E. LaRowe, J. Leifeld, F. J. R. Meysman, G. Munhoven, P. A. Raymond, R. Spahni, P. Suntharalingam and M. Thullner:** "The anthropogenic perturbation of the carbon fluxes from land to ocean" Nature Geosciences 6: 597-607. 2013.

**Centler F., F. Heße and M. Thullner:** "Estimating pathway-specific contributions to biodegradation in aquifers based on dual isotope analysis" Journal of Contaminant Hydrology 152: 97-116. 2013.

**Leibeling S., M. B. Maeß, F. Centler, S. Kleinsteuber, M. von Bergen, M. Thullner, H. Harms and R. H. Müller:** "Adaptation of (R)-2,4-dichlorophenoxypropionate/α-ketoglutarate-dioxygenase (RdPA) during long-term cultivation targeting 2,4-dichlorophenoxyacetate (2,4-D) as a substrate" *Engineering in Life Sciences* 13: 278-291. 2013.

**Nick H. M., A. Raoof, F. Centler, M. Thullner and P. A. G. Regnier:** "Reactive dispersive contaminant transport in coastal aquifers: numerical simulation of a reactive Henry problem" *Journal of Contaminant Hydrology* 145: 90-104. 2013.

**Thullner, M., A. Fischer, H.-H. Richnow and L. Y. Wick:** "Influence of Mass Transfer on Stable Isotope Fractionation" *Applied Microbiology and Biotechnology* 97: 441-452. 2013.

**Stolpovsky K., M. Gharasoo and M. Thullner:** "The impact of pore scale heterogeneity on the spatio-temporal variation of microbial metabolic activity in porous media" *Soil Science* 177: 98-110. 2012.

**De Biase C., U. Maier, O. Baeder-Bederski, P. Bayer, S. E. Oswald and M. Thullner:** "Removal of volatile organic compounds in vertical flow filters: predictions from reactive transport modeling" *Ground Water and Remediation* 32: 106-121. 2012.

**Gharasoo M., F. Centler, P. Regnier, H. Harms and M. Thullner:** "A reactive transport modeling approach to simulate biogeochemical processes in pore structures with pore-scale heterogeneities" *Environmental Modelling & Software* 30: 102-114. 2012.

**Thullner M., F. Centler, H.-H. Richnow and A. Fischer:** "Quantification of organic pollutant degradation in contaminated aquifers using compound specific stable isotope analysis – Review of recent developments" *Organic Geochemistry* 42: 1440-1460. 2012.

**Hanzel, J., M. Thullner, H. Harms and L. Y. Wick:** "Walking the tightrope of bioavailability: Growth dynamics of PAH degraders on vapour-phase PAH" *Microbial Biotechnology* 5: 79-86. 2012.

**Smith K. E. C., M. Thullner, L. Y. Wick and H. Harms:** "Dissolved organic carbon enhances the mass transfer of hydrophobic organic compounds from NAPLs into the aqueous phase" *Environmental Science and Technology* 45: 8741-8747. 2011.

**van Afferden M., K. Z. Rahman, P. Mosig, C. De Biase, M. Thullner, S. E. Oswald and R. A. Müller:** "Remediation of groundwater contaminated

with MTBE and benzene: The potential of vertical-flow filter systems" Water Research 45: 5063-5074. 2011.

**Stolpovsky K., P. Martinez-Lavanchy, H. J. Heipieper, P. Van Cappellen and M. Thullner:** "Incorporating dormancy in dynamic microbial community models" Ecological Modelling 222: 3092-3102. 2011.

**Centler F., I. Fetzer and M. Thullner:** "Modeling population patterns of chemotactic bacteria in homogeneous porous media" Journal of Theoretical Biology 287: 82-91. 2011.

**De Biase C., D. Reger, A. Schmidt, S. Jechalke, N. Reiche, P. M. Martinez-Lavanchy, M. Rosell, M. van Afferden, U. Maier, S. E. Oswald and M. Thullner:** "Treatment of volatile organic contaminants in a vertical flow filter: relevance of different removal processes" Ecological Engineering 37: 1292-1303. 2011.

**Hanzel J., M. Thullner, H. Harms, L. Y. Wick:** "Microbial growth with vapor-phase substrate" Environmental Pollution 159: 858-864. 2011.

**Heße F., H. Harms, S. Attinger and M. Thullner:** "A linear exchange model for the description of bioavailability at the pore scale" Environmental Science and Technology 44: 2064-2071. 2010.

**Centler F., H. Shao, C. De Biase, C.-H. Park, P. Regnier, O. Kolditz and M. Thullner:** "GeoSysBRNS – A flexible multidimensional reactive transport model for simulating biogeochemical subsurface processes" Computers & Geosciences 36: 397-405. 2010.

**Thullner M.:** "Comparison of bioclogging effects in saturated porous media within one- and two-dimensional flow systems" Ecological Engineering 36: 176-196. 2010.

**Thullner M., A. W. Dale and P. Regnier:** "Global scale quantification of organic carbon degradation pathways in marine sediments: a reactive transport modeling approach" Geochemistry, Geophysics, Geosystems (G3) 10, Q10012, doi:10.1029/2009GC002484. 2009.

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**Heße F., F. A. Radu, M. Thullner and S. Attinger:** "Upscaling of the Advection-Diffusion-Reaction Equation with Monod Reaction" Advances in Water Resources 32: 1336-1351. 2009.

**Stelzer N., G. Imfeld, M. Thullner, J. Lehmann, A. Poser, H.-H. Richnow and I. Nijenhuis:** "Integrative approach to delineate natural attenuation of chlorinated benzenes in anoxic aquifers" Environmental Pollution 157: 1800-1806. 2009.

**Kampara M., M. Thullner, H. Harms and L. Y. Wick:** "Impact of cell density on microbially induced stable isotope fractionation" Applied Microbiology and Biotechnology 81: 977-985. 2009.

**Kindler R., A. Miltner, M. Thullner, H.-H. Richnow and M. Kästner:** "Microbial transformation and stabilisation of bacterial biomass-derived fatty acids in soil and their contribution to soil organic matter" Organic Geochemistry 40: 29-37. 2009.

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**Kampara M., M. Thullner, H. H. Richnow, H. Harms and L. Y. Wick:** "Impact of bioavailability restrictions on microbially induced stable isotope fractionation: 2. Experimental evidence" Environmental Science and Technology 42: 6552-6558. 2008.

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**Thullner M. and P. Baveye:** "Computational pore network modeling of the influence of biofilm permeability on bioclogging in porous media" Biotechnology and Bioengineering 99: 1337-1351. 2008.

**Thullner M., P. Regnier and P. Van Cappellen:** "Modeling microbially induced carbon degradation in redox stratified subsurface environments: concepts and open questions" Geomicrobiology Journal 24: 139-155. 2007.

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**Dathe A. and M. Thullner:** "The relationship between the fractal properties of solid matrix and pore space in porous media" Geoderma 129: 279-290. 2005.

**Thullner M., P. Van Cappellen and P. Regnier:** "Modeling the impact of microbial activity on biogeochemical cycles in porous media" Geochimica et Cosmochimica Acta 69: 5005-5019. 2005.

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**Thullner M., J. Zeyer and W. Kinzelbach:** "Influence of microbial growth on hydraulic properties of pore networks" Transport in Porous Media, 49: 99-122. 2002.

**Thullner M., P. Höhener, W. Kinzelbach and J. Zeyer:** "Validation of the dual pumping technique for level-determined groundwater sampling in a contaminated aquifer" Journal of Hydrology, 235: 104-116. 2000.

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Non peer reviewed articles:

**Khurana S., F. Heße, A. Hildebrandt and M. Thullner:** "Predicting the impact of spatial heterogeneity on microbial redox dynamics and nutrient cycling in the subsurface" Biogeosciences Discussions (preprint). 2021.

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Book chapters:

**Thullner M., A. I. Stefanakis and S. Dehastani:** "Constructed Wetlands Treating Water Contaminated with Organic Hydrocarbons"; In: Constructed Wetlands for Industrial Wastewater Treatment. Ed.: A. I.

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## Proceedings:

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