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Education

- 2007 PhD in Environmental Science, ETH Zurich, Switzerland. Thesis title:
The influence of bottom boundary turbulence on sediment solute
dynamics
- 2002 Graduate Diploma in Computing, University of Limerick, Ireland
- 2001 M.S. in Geoecology, University of Bayreuth, Germany. Thesis title:
Vorkommen, Bedeutung und Bildung von Schwertmannit in Restseen
des Braunkohlentagebaus.

Professional experience

- since 2012 Researcher, Institute of Biogeochemistry and Pollutant Dynamics,
ETH Zurich, CH-8092 Zurich, Switzerland
- 2011 Junior group leader, Leibnitz Institute of Freshwater Ecology and
Inland Fisheries, Department of Ecohydrology, Berlin, Germany
- 2008-2010 Post doctoral scholar, Environmental Fluid Mechanics Group,
Department of Civil and Environmental Engineering, UC Berkeley.
- 2007-2008 Post doctoral scholar, Eawag, Swiss Federal Institute of Aquatic
Science and Technology, Surface Waters – Research and Management,
Kastanienbaum, Switzerland
- 2003-2007 Teaching assistant, Institute of Biogeochemistry and Pollutant
Dynamics, ETH Zurich, CH-8092 Zurich, Switzerland
- 2003-2007 Research associate, Eawag, Swiss Federal Institute of Aquatic Science
and Technology, Surface Waters – Research and Management,
Kastanienbaum, Switzerland
- 2002-2003 Research associate, Department of Applied Mathematics, University of
Erlangen, Germany

Teaching

Field course “Analysis of aquatic systems” (2005 and 2006 at ETH): Assistance in preparing the course, supervision of students during field sampling and laboratory work.

Lectures and exercises in the course “biogeochemical processes in aquatic systems” (2005 -2007 and 2012-2014 at ETH): Preparation of exercises and their solutions, lecturing chapters on geochemical modeling, oxygen and redox dynamics.

Chemistry laboratory course for life science (2005-2007 at ETH): Supervision and preparation of the experiment “potentiometric detection of lead”

Chemistry laboratory course for life science (2008 at ETH): Organization of the course.

PhD course on “Time Series Analysis” (2011 at IGB)

Lecture ‘Biogeochemical Modelling of Sediments, Lakes and Oceans’: Conceptualization and teaching of 1/3 of the lecture (2014-2016 at ETH).

Students

Advising and support of the PhD Students Claudia Lorrai (ETH), Lee Bryant (Virginia Tech), Kevin Hsu and Steve Gladding (both UC Berkeley), Kirsten Oswald (ETH), Jovana Kokic (Uppsala University), Bekka Ellis (University of Bath)

Bachelor Students: Fabian Solano (2015, ETH Zürich), Dominic Hafner (2016, ETH)

Master Students: Kora Mejer (2013, Univ. Trier), Hannah Bruderer (2013, ETH Zürich)

PhD Students: Rohini Athavale (since June 2014), Matthias Zimmermann (since 2015)

Postdocs: Ilga Kokorite (2012-2013)

Research Interests

Turbulent transport and mixing processes in lakes and estuaries

Solute, sediment and fluid dynamics at the sediment-water interface

Characterization and application of sensors for physical and chemical *in-situ* measurements

Characterization and modeling of biogeochemical processes

Grants

- 2008-2009 Postdoctoral research fellowship of the Swiss National Science Foundation
- 2009-2010 Postdoctoral research fellowship of the German Research Foundation (DFG)
- 2015-2018 MOBTrait: Understanding the diversity of aerobic methane oxidizing bacteria in lacustrine oxyclines using community ecology and trait-based modeling CHF 470100.- (Co-PI, SNF)

Reviewer

Aquatic Sciences, Water Resources Research, Journal of Hydrology, Limnology and Oceanography: Methods, Limnology and Oceanography, Limnology and Oceanography: Fluids and Environments, Geochimica et Cosmochimica Acta, Estuaries and Coasts, Journal of Geophysical Research, Marine Ecology Progress Series, Ecological Informatics, Science of the Total Environment, Measurement Science and Technology.

Other activities

Session organizer “Lakes and inland seas in a changing environment” at the EGU General Assembly 23-28. April 2017 in Vienna, Austria.

Session organizer “Lakes and inland seas in a changing environment” at the EGU General Assembly 17-22. February 2016 in Vienna, Austria.

Session organizer “Sediment resuspension –Stand der Forschung und Perspektiven” at the Jahrestagung der deutschen Gesellschaft für Limnologie, 12-16. September 2011, Freising, Germany.

Session organizer “Geochemical consequences of advection in aquatic sediments” at ASLO Aquatic Sciences Meeting February 17-22 February, 2013 in New Orleans, Louisiana, USA.

Publications (peer reviewed)

Oswald K., J. Graf, S. Littmann, D. Tienken, A. Brand, B. Wehrli, M.M.M. Kuypers, C. J. Schubert, J. Milucka. 2017. Crenothrix are major methane consumers in stratified lakes. ISME Journal. Advance online. doi: 10.1038/ismej.2017.77

Athavale, R., C. Dinkel, B. Wehrli, E. Bakker, G. A. Crespo, A. Brand. 2017. Robust solid-contact ion selective electrodes for high resolution in situ measurements in fresh water systems. Environmental Sciences and Technology Letters. 4 (7): 286–291. doi: 10.1021/acs.estlett.7b00130

- Koca K., C. Noss, C. Anlanger, A. Brand, A. Lorke. 2017. Performance of the Vectrino Profiler at the sediment–water interface. *Journal of Hydraulic Research*. 55(4): 573-581. doi: 10.1080/00221686.2016.1275049
- Brand, A., C. Noss. 2017. High-resolution flow characterization close to the sediment-water interface in a run of the river reservoir. *Water Resources Research* 53(5): 4286-4302. doi: 10.1002/2016WR020203
- Oswald K., J. Milucka, A. Brand, S. Littmann, B. Wehrli, M.M.M. Kuypers, C. J. Schubert. 2016. Aerobic methanotrophs mitigate methane emissions from anoxic lake waters. *Limnology and Oceanography* 61: S101-S118. doi: 10.1002/lno.10312
- Oswald, K., C. Jegge, J. Tischer, J. Berg, A. Brand, M.R. Miracle, X. Soria, E. Vicente, M. F. Lehmann, J. Zopfi. C. J. Schubert. 2016. Methanotrophy under versatile conditions in the water column of the ferruginous meromictic Lake La Cruz (Spain). *Frontiers in Microbiology* 7: 1762. doi: 10.3389/fmicb.2016.01762
- Kokic J., E. Sahlée, A. Brand, S. Sobek. 2016. Low sediment-water gas exchange in a small boreal lake. *JGR: Biogeosciences* 121. doi: 10.1002/2016JG003372
- Brand, A., H. Bruderer, K. Ostwald, C. Guggenheim, C. Schubert, B. Wehrli. 2016. Oxygenic primary production below the oxycline and its importance for redox dynamics. *Aquatic Sciences* 78(4): 727–741. doi: 10.1007/s00027-016-0465-4
- Brand, A., C. Noss, C. Dinkel, M. Holzner. 2016. High resolution measurements of turbulent flow close to the sediment-water interface using a bistatic acoustic profiler. *Journal of Atmospheric and Oceanic Technology* 33(4): 769-788. doi: 10.1175/JTECH-D-15-0152.1
- Athavale, R., I. Kokorite, C. Dinkel, E. Bakker, B. Wehrli, G. A. Crespo, A. Brand. 2015. Towards in-situ ion profile determination by using ion-selective electrodes in lakes. *Analytical Chemistry* 87(24): 11990–11997. doi: 10.1021/acs.analchem.5b02424
- Hölker F., M. J. Vanni, J. J. Kuiper, C. Meile, H.-P. Grossart, P. Stief, R. Adrian, A. Lorke, O. Dellwig, A. Brand, M. Hupfer, W. M. Mooij, G. Nützmann, J. Lewandowski. 2015. Tube-dwelling invertebrates: tiny ecosystem engineers have large effects in lake ecosystems. *Ecological Monographs* 85(3): 333-351.
- Oswald K., J. Milucka, A. Brand, S. Littmann, B. Wehrli, M. M. M. Kuypers, C. Schubert. 2015. Light-Dependent aerobic methane oxidation reduces methane emissions from seasonally stratified lakes. *PLoS ONE* 10(7): e0132574. doi: 10.1371/journal.pone.0132574
- Schreiber, F., M. Zimmermann, S. Escrig, T. Hübschmann, M. Kirf, A. Brand, F. R. Inglis, N. Musat, S. Müller, A. Meibom, M. Ackermann. 2015. Phenotypic heterogeneity in metabolic traits of a rare biosphere bacterium in its natural environment measured with a combination of FACS and nanoSIMS. *Frontiers in Microbiology* 6: Article 243. doi: 10.3389/fmicb.2015.00243

- Zigah, P. K., K. Oswald, A. Brand, C. Dinkel, B. Wehrli, C. J. Schubert. 2015. Methane oxidation pathways and associated methanotrophic communities in the water column of a tropical lake. *Limnology and Oceanography* 60: 553-572. doi: 10.1002/lno.10035
- Brand, A., J. Lacy, S. Gladding, R. Holleman, M. Stacey. 2015. Model based interpretation of sediment concentration and vertical flux measurements in a shallow estuarine environment. *Limnology and Oceanography* 60: 463-481. doi: 10.1002/lno10047
- Lacy, J.R., S. Gladding, A. Brand, A. Collignon, M. Stacey. 2014. Lateral baroclinic forcing enhances transport of sediment from shallows to channel in an estuary. *Estuaries and Coasts*. doi:10.1007/s12237-013-9748-3
- Brand A., J. Lewandowski, E. Hamann, G. Nützmann. 2013. Advection around U-shaped, ventilated burrows. A model study. *Water Resources Research* 49: 2907-2917, doi:10.1002/wrcr.20266.
- Bryant, L, D.F. McGinnis, C. Lorrai, A. Brand, J. Little, A. Wüest. 2010. Evaluating oxygen flux at the sediment-water interface: both sides of the story. *Limnology and Oceanography: Methods* 8: 610-627
- Brand, A., J. Lacy, K. Hsu, D. Hoover, S. Gladding, M. Stacey. 2010. Wind-enhanced resuspension in the shallow waters of South San Francisco Bay – Investigating mechanism and potential implications for sediment transport. *Journal of Geophysical Research-Oceans* 115, C11024, doi:10.1029/2010JC006172
- Lorrai, C., D. F McGinnis, A. Brand, C. Dinkel, P. Berg, and A. Wüest. 2010. Application of Oxygen Eddy Correlation in Aquatic Systems. *Journal of Atmospheric and Oceanic Technology*, 27(9): 1533-1546
- Bryant, L, C Lorrai, D.F. McGinnis, A. Brand, A. Wüest, J. Little. 2010. Variable sediment oxygen uptake in response to dynamic forcing. *Limnology and Oceanography*: 55(2): 950-964
- Brand, A., C. Dinkel, and B. Wehrli. 2009. Influence of the diffusive boundary layer on solute dynamics in the sediments of a seiche-driven lake: A model study, *Journal of Geophysical Research*, 114, G01010, doi:10.1029/2008JG000755
- Brand, A., D. F. McGinnis, B. Wehrli, A. Wüest. 2008. Intermittent oxygen flux from the interior into the bottom boundary of lakes as observed by eddy correlation, *Limnology and Oceanography* 53(5): 1997-2006
- McGinnis, D. F., P. Berg, A. Brand, C. Lorrai, T. J. Edmonds, A. Wüest. 2008. Measurements of eddy correlation oxygen fluxes in shallow freshwaters: Towards routine applications and analysis, *Geophysical Research Letters* 35: L04403
- Brand, A., B. Müller, A. Wüest, C. Dinkel, N. P. Revsbech, L. P. Nielsen, O. Pedersen, L. R. Damgaard, L. H. Larsen, B. Wehrli. 2007. Microsensor for in-situ flow measurements in benthic boundary layers at sub-millimeter resolution with extremely slow flow. *Limnology and Oceanography: Methods*. 5: 185-191

Regenspurg, S., A. Brand, S. Peiffer. 2004. Formation and stability of schwertmannite in acidic mining lakes. *Geochimica et Cosmochimica Acta*, 68 (6): 1185-1197

Publications (other)

Brand, A., C. Dinkel, B. Wehrli, A. Wüest, C. Noss. Investigating turbulent flow close to the sediment-water interface in a run of the river reservoir at high spatial resolution. Extended abstract for the 19th Workshop on Physical Processes in Natural Waters, 11-15 July 2016, Bath, Great Britain.

Brand, A., C. Dinkel, B. Wehrli, and M. Holzner. High resolution current measurements close to the sediment-water interface using a bistatic acoustic profiler. Extended abstract for the 18th Workshop on Physical Processes in Natural Waters, 24-28. August 2015, Landau (Pfalz), Germany.

Bryant, L., A. Brand, G. Kirillin and C. Engelhardt. Rocking seiches and sediment dancers: Effects on sediment oxygen uptake and porewater chemistry. Extended abstract for the 18th Workshop on Physical Processes in Natural Waters, 24-28. August 2015, Landau (Pfalz), Germany.

Donis, D., F. Janssen, D.F. McGinnis, F. Wenzhöfer, M.E. Böttcher and A. Brand. Aquatic eddy correlation oxygen flux estimates for coastal permeable sediments (southern Baltic Sea): best practice in presence of surface waves. Extended abstract for the 18th Workshop on Physical Processes in Natural Waters, 24-28. August 2015, Landau (Pfalz), Germany.

Brand, A., J. Lewandowski, E. Hamann and G. Nützmänn. Advection in bioirrigated Muddy sediments-can it be relevant? A model study. Proceedings of the XIX. International Conference on Water Resources, CMWR 2012, 17-22. June 2012, University of Illinois at Urbana-Champaign.

Brand, A., J. R. Lacy, S. Gladding, R. Holleman and M. T. Stacey. 2011. Investigating sediment dynamics using ADV, sediment transport modeling, and LISST. *Erweiterte Zusammenfassungen der Jahrestagung der deutschen Gesellschaft für Limnologie 2011*

Brand, A., J. Lacy, K. Hsu, D. Hoover, S. Gladding, and M. Stacey. 2010. Seasonal variation of mechanisms governing sediment dynamics in South San Francisco Bay. Extended abstract for the 14th Workshop on Physical Processes in Natural Waters, 28. June – 1. July 2010, Reykjavik, Iceland.

McGinnis, D. F., C. Lorrai, P. Berg, A. Hume, A. Brand, T. Edmonds, A. Wüest. 2007. Local oxygen fluxes in a riverine reservoir estimated from the eddy-correlation technique. Proceedings of the Fifth International Symposium on Environmental Hydraulics (ISEH V), 4-7. December 2007 Tempe, Arizona.

McGinnis, D. F., T. J. Edmonds, P. Berg, A. Brand, M. Schurter, C. Dinkel, and A. Wüest. 2006. Oxygen fluxes from eddy-correlation measurements: A tale of two lakes. Proceedings of the Sixth International Symposium on Stratified Flows, 11 -14. December, Perth, Australia.

Wüest, A., D. F. McGinnis, A. Lorke, and A. Brand. 2006. Bottom boundary layers in lakes. Proceedings of the Sixth International Symposium on Stratified Flows, 11 -14. December, Perth, Australia.

Presentations

Brand, A., H. Bruderer, M. Zimmermann, D. Steiner and B. Wehrli. Oxygenic primary production close to the oxic-anoxic interface in hypertrophic Lake Rotsee. Talk given at the 10th symposium for European freshwater sciences 2-7. June 2017 in Olomouc, Czech Reepublic.

Brand, A., B. Wehrli, C.Noss. High resolution flow characterization close to the sediment-water interface. Poster presented at the EGU General Assembly 23-28. April 2017 in Vienna, Austria.

Brand, A. Measuring oxygen fluxes in complex systems using eddy correlation: Insights and challenges. Invited talk at the Plymouth Marine Laboratory, 23. November 2016 in Plymouth, U.K.

Brand, A. Aquatic eddy correlation - Past experiences and future challenges. Invited talk given at the National Oceanography Centre - Liverpool 9. November 2016 in Liverpool U.K.

Brand, A. Does aquatic eddy correlation work everywhere? Insights form lakes and estuaries. Invited talk given at the Helmholtz Center Geesthacht for Materials and coastal research, 26. October 2016 in Geesthacht, Germany.

Brand, A., C. Dinkel, B. Wehrli, A. Wüest, C. Noss. Investigating turbulent flow close to the sediment-water interface in a run of the river reservoir at high spatial resolution. Talk given at the 19th Workshop on Physical Processes in Natural Waters, 11-15 July 2016 in Bath, Great Britain.

Brand, A., C. Dinkel, C. Noss, B. Wehrli and M. Holzner. Applicability of the Vectrino profiler to study fluid flow in the close vicinity of the sediment-water interface. Pico presentation given at the EGU General Assembly 17-22. February 2016 in Vienna, Austria.

Brand, A., C. Dinkel, B. Wehrli and M. Holzner. Measurements close to the sediment-water interface using the Vectrino II - lessons learned in flumes and field. Invited Talk given at the Nortek Pulse-Coherent Symposium 22nd-23rd October 2015, Karlsruhe, Germany.

Brand, A., C. Dinkel, B. Wehrli and M. Holzner. High resolution current measurements close to the sediment-water interface using a bistatic acoustic profiler Talk given at the 18th Workshop on Physical Processes in Natural Waters, 24-28. August 2015, Landau (Pfalz), Germany.

Brand, A., C. Dinkel, M. Holzner and B. Wehrli. In-situ current measurements at the sediment-water interface of lakes using a high resolution acoustic velocity profiler. Talk given at ASLO Aquatic Sciences Meeting 22-27th February 2015 in Granada, Spain

Brand, A. Investigating solute and particle transfer dynamics across the sediment-water interface using eddy correlation in lakes and estuaries. Invited talk given at the Dept. Ecology and Genetics, Limnology, Uppsala University, 30. May 2014, Uppsala, Sweden

Brand, A., H. Bruderer, C. Schubert and B. Wehrli. Oxygenic primary production in the hypolimnion: a main driver for biogeochemical cycling at the oxic-anoxic interface in shallow lakes? Poster presented at the 46th International Liège Colloquium on low oxygen environments in marine, estuarine and fresh waters 5th-9th May 2014 in Liège, Belgium

Brand, A., J. R. Lacy, S. Gladding, R. Holleman and M. T. Stacey. Vertical transport modeling, ADV and Laser In Situ Scattering Transmissometry (LISST) useful tools in characterizing sediment dynamics? Invited talk given at the Marine Biological Station (MBSS), 24. October 2013 in Piran, Slovenia.

Brand, A., J. Lewandowski, E. Hamann and G. Nützmänn. Can advection be disregarded in muddy, bioirrigated sediments? A model study. Talk given at ASLO Aquatic Sciences Meeting 17-22 February, 2013 in New Orleans, Louisiana, USA

Brand, A., J. Lewandowski, E. Hamann and G. Nützmänn. Advection in bioirrigated Muddy sediments-can it be relevant? A model study. XIX International Conference on Water Resources, CMWR 2012, 17-22. June 2012, University of Illinois at Urbana-Champaign.

Brand, A., J. R. Lacy, S. Gladding, R. Holleman and M. T. Stacey. Investigating sediment dynamics using ADV, sediment transport modeling, and LISST. Jahrestagung der deutschen Gesellschaft für Limnologie, 12-16. September 2011, Freising, Germany.

Brand, A. Sediment dynamics in the South San Francisco Bay. Lessons learned from ADV, LISST and vertical transport modeling. Invited talk at the Leibniz Institute for Baltic Sea Research. 5. April 2011, Warnemünde, Germany

Brand, A., S. Gladding, J. R. Lacy and M. T. Stacey. Model based interpretation of sediment concentration and vertical flux measurements in the shoals of South San Francisco Bay. Invited talk at the 6th Biennial Bay-Delta Science Conference, 27-29. September 2010, Sacramento, USA.

Brand, A. Investigating solute and particle transfer dynamics across the sediment-water interface using eddy correlation. Invited talk at the Leibniz-Institute of Freshwater Ecology and Inland Fisheries. 5. July 2010, Berlin, Germany

Brand, A., J. Lacy, K. Hsu, D. Hoover, S. Gladding, and M. Stacey. Seasonal variation of mechanisms governing sediment dynamics in South San Francisco Bay. 14th Workshop on Physical Processes in Natural Waters, 28. June – 1. July 2010, Reykjavik, Iceland.

Brand, A., J. R. Lacy, K. Hsu, D. Hoover, S. M. Gladding, M. T. Stacey: Wind-induced formation of turbidity gradients along the shoal channel transition in south

San Francisco Bay and potential implications for sediment transport. Talk given at the 2010 Ocean Sciences Meeting 23 February 2010 in Portland, USA.

Brand, A., B. Wehrli: Modeling the effect of a dynamic diffusive boundary layer on pore water solutes. Poster presented at ASLO Aquatic Sciences Meeting 25-30 January, 2009 in Nice, France.

Brand, A.: The influence of internal seiching on sediment solute dynamics and turbulent oxygen transport. Invited talk given at the Seminar on Environmental Engineering, 24 October 2008 at UC Berkeley, USA

Brand, A., B. Wehrli: Influence of the diffusive boundary layer on the solute dynamics in the sediments of a seiche-driven lake: A model study. Talk given at the 236th ACS National Meeting, 17-21 August 2008, Philadelphia, USA

Brand, A.: Tempest in a teacup - Oxygen dynamics in the bottom boundary layer of lakes. Invited talk at the University of Bayreuth. 13. May 2008, Bayreuth, Germany

Brand, A., B. Müller, D. McGinnis, C. Dinkel, A. Wüest, B. Wehrli. Investigating physical processes at the sediment-water interface using H_2O_2 and Ca^{2+} sensing microsensors-Part I: Fluid dynamics and turbulent oxygen transport above the sediment-water interface of Lake Alpnach. Poster presented at Ernö Pretsch Symposium-Development and application of chemical sensors, The Swiss chemical society. 28.-29. June 2007, Zurich, Switzerland

Brand, A., D. F. McGinnis, B. Wehrli, A. Wüest. Eddy correlation measurements in a seiche driven prealpine lake. Talk given at ASLO Aquatic Sciences Meeting February 4-9 February, 2007 in Santa Fe, New Mexico, USA

Brand, A., B. Müller, A. Wueest, B. Wehrli. Measuring high resolution profiles of flow and dissolved species in a prealpine lake. Poster presented at ASLO Summer Meeting, 4-9 June, 2006 in Victoria BC, Canada

Brand, A., B. Müller, D. McGinnis, D. Richter, C. Dinkel, A. Wüest, B. Wehrli. Flow and dissolved species at the sediment water interface – an in situ study. Poster presented at International Conference on Electrochemical Sensors, 13-18 November 2005, Matrafured, Hungary

Theses

Brand A. 2008. The influence of bottom boundary layer turbulence on sediment solute dynamics. PhD thesis, ETH Zuerich.

Brand A. 2001. Vorkommen, Bildung und Bedeutung von Schwertmannit in Sedimenten von Restseen des Braunkohletagebaus. Masterthesis, Universität Bayreuth, Bayreuth.