Curriculum Vitae Johannes A.C. Barth

Professor Johannes A.C. Barth
PhD in Biogeochemistry / Diplom Hydrogeologist

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Erlangen, 27.12.18

1. Research and studies at eight different universities

Chair of Applied Geology Friedrich-Alexander Universität Erlangen-Nürnberg (Head of Department since 10_2017)	**since 2008**
Scientific coordinator of EU Project AquaTerra at Eberhard Karls Universität Tübingen	**2004 - 2008**
Lecturer in Biogeochemistry at SUERC, an interdisciplinary and environmental research centre of various Scottish Universities	**2000 - 2004**
Post-doctoral research fellow, Queen's University of Belfast, N. Ireland UK	**1998 - 2000**
PhD in Biogeochemistry of the St. Lawrence River, University of Ottawa, Canada	**1994 - 1998**
Diploma in Hydrogeology and applied Geology, Ruhr-Universität Bochum	**1990 - 1993**
BSc in Geology / Palaeontology, Ludwig-Maximilians Universität München including 1-year stay at Edinburgh University	**1986 – 1990**

2. Research profile

Focus of my research lies on ecological and biogeochemical understanding of aqueous and ecosystems on various scales including interactions of waters, soils and plants with natural versus anthropogenic influences. This framework includes interactions with Hydro(geo)logy, Biology, Engineering, Computing, Geophysics and Chemistry amongst other disciplines.

Standard analytical techniques include gas- and liquid chromatographic, flame ionisation, spectrophotometric and inductively couple plasma techniques with links to stable isotope investigations of water and carbon. These can be grouped into the following categories:

1. If isotope ratios remain unchanged during environmental processes, they provide information about sources. Mass balance distributions of surface and groundwaters with distinct isotope labels are examples for such work (e.g. Barth &Veizer 2004).
2. If stable isotope ratios change, they are useful to show mechanisms of transformation and quantify turnover. An example would be systematic ^{13}C-enrichment in remaining substrates such as chlorinated solvents during biodegradation (Barth et al. 2002).

As additional information to concentration measurements, isotope techniques can reveal new information that becomes increasingly important to understand processes starting from a regional context and leading to global observations. It is also crucial to test the above aspects in various environments, such as natural (e.g. poorly populated), managed (agricultural and forested) to anthropogenic areas (industrial and urban). Such approaches will increase our understanding of mechanisms of environmental change.

3. Editor, reviewer and honorary tasks

- President of the German Chapter of International Association of Hydrogeologists (IAH) since 2014
- Editor in Chief of Journal Grundwasser (2009 to 2013)
- Guest editor of special issue " AquaTerra: Pollutant behavior in the soil, sediment, ground, and surface water system" (*Environmental Pollution,* 2007)

- Guest editor of special issue "Transfer of Pollutants in soils, sediments and water systems: From small to large scale (AquaTerra) (*Jounral of Hydrology*, 2009)
- Guest editor of special issue "Sustainability of Groundwater" (open access journal *Sustainability* 2010/ 2011)
- Reviewer for *Environmental Science and Technology, Chemosphere, Science of the Total Environment, Geochimica et Cosmochimica Acta, Journal of Environmental Mangement, Environmental Pollution, Groundwater, Journal of Contaminant Hydrology, Biogeochemistry* etc.).
- Advisor and referee for various research initiatives including EU Marie Curie Fellowships, American Petroleum Fund, Swiss Science Foundation amongst others.

4. Teaching and supervision of students

- Courses taught in Hydrogeology, Tracer and Isotope techniques, Hydrogeological Field Applications, Basin-Scale Water Management, Project Planning, Soil Mechanics and Laboratory Exercises, Stable Isotopes in the Hydrosphere, Environmental Isotopes in Chemistry and Aquatic Chemistry at Universities of Ottawa, Glasgow, Edinburgh, Tübingen and Erlangen.
- Supervised > 25 MSc theses, 17 BSc theses and 6 PhD theses.

5. Other distinctions / invitations

- Member of Bavarian Delegation visit to Québec with Minister of Economy Martin Zeil (2012)
- Shortlisted for leading the International Geosphere Biosphere Programme (IGBP), Sweden, 2008
- Offer to lead European Geosciences Union (EGU, succession of Arne Richter)
- Invitation to Ernst Strüngmann Forum (former Dahlem Conference) in Frankfurt with Nobel-Price Laureate Paul Crutzen (November 2008)
- Personal invitation for buisness lunch Canadian Premier Stephen Harper (Juli, 2007)
- Invitation to DFG Conference "Earth, Fire, Water, Air and Life" as one of 80 leading young German scientist living abroad, Washington DC, 4. – 6. April 2004.
- University of Ottawa Graduate Students Association Academic Projects Fund (1997).
- European Union of Geosciences Grant to participate at EUG Meeting in Strasbourg (1997).
- Don Rennie Memorial Award - Great Lakes Research Consortium price for excellence in research and presentation (Syracuse Conference, 1996).
- University of Ottawa scholarship with tuition fee waiver (1994 to 1996**,** 35.713 $).
- University of Ottawa School of Graduate Studies and Research Travel Grant to attend Sixth V.M. Goldschmidt-Conference in Heidelberg (1996).

Publications

1. Juhlke, T.R., Van Geldern, R., Huneau, F., Garel, E., Santoni, S., Hemmerle, H. and Barth, J.A.C. (2019) Riverine carbon dioxide evasion along a high-relief watercourse derived from seasonal dynamics of the water-atmosphere gas exchange. Science of The Total Environment 657, 1311-1322.
2. Bandara, U.G.C., Diyabalanage, S., Hanke, C., van Geldern, R., Barth, J.A.C. and Chandrajith, R. (2018) Arsenic-rich shallow groundwater in sandy aquifer systems buffered by rising carbonate waters: A geochemical case study from Mannar Island, Sri Lanka. Science of The Total Environment 633, 1352-1359.
3. Haschke, S., Mader, M., Schlicht, S., Roberts, A.M., Angeles-Boza, A.M., Barth, J.A.C. and Bachmann, J. (2018) Direct oxygen isotope effect identifies the ratedetermining step of electrocatalytic OER at an oxidic surface. Nature Communications, (2018) 2019:4565 | DOI: 2010.1038/s41467-41018-07031-41461 |www.nature.com/naturecommunications.
4. Mader, M., Roberts, A.M., Porst, D., Schmidt, C., Trauth, N., van Geldern, R. and Barth, J.A.C. (2018) River recharge versus O2 supply from the unsaturated zone in

shallow riparian groundwater: A case study from the Selke River (Germany). Science of the Total Environment 634, 374-381.
5. Marx, A., Conrad, M., Aizinger, V., Prechtel, A., Van Geldern, R. and Barth, J.A.C. (2018) Groundwater data improve modelling of headwater stream CO2 outgassing with a stable DIC isotope approach. Biogeosciences 15, 3093-3106.
6. Michelsen, N., van Geldern, R., Roßmann, Y., Bauer, I., Schulz, S., Barth, J.A.C. and Schüth, C. (2018) Comparison of precipitation collectors used in isotope hydrology. Chemical Geology 488, 171-179.
7. van Geldern, R., Schulte, P., Mader, M., Baier, A., Barth, J.A.C., Juhlke, T.R. and Lee, K. (2018) Insights into agricultural influences and weathering processes from major ion patterns. Hydrological Processes.
8. Barth, J.A.C., Mader, M., Nenning, F., van Geldern, R. and Friese, K. (2017) Stable isotope mass balances versus concentration differences of dissolved inorganic carbon–implications for tracing carbon turnover in reservoirs. Isotopes in Environmental and Health Studies 53, 413-426.
9. Daesslé, L.W., Orozco, A., Struck, U., Camacho-Ibar, V.F., van Geldern, R., Santamaría-del-Angel, E. and Barth, J.A.C. (2017) Sources and sinks of nutrients and organic carbon during the 2014 pulse flow of the Colorado River into Mexico. Ecological Engineering 106, 799-808.
10. Dusek, J., Vogel, T., Dohnal, M., Barth, J.A.C., Sanda, M., Marx, A. and Jankovec, J. (2017) Dynamics of dissolved organic carbon in hillslope discharge: Modeling and challenges. Journal of Hydrology 546, 309-325.
11. Lee, K.Y., van Geldern, R. and Barth, J.A.C. (2017) A high-resolution carbon balance in a small temperate catchment: Insights from the Schwabach River, Germany. Applied Geochemistry 85, 86-96.
12. Mader, M., Schmidt, C., van Geldern, R. and Barth, J.A.C. (2017a) Dissolved oxygen in water and its stable isotope effects: A review. Chemical Geology 473, 10-21.
13. Mader, M., Schwerna, P., Buchholz, R., van Geldern, R. and Barth, J.A.C. (2017b) A new approach to quantify system efficiency with dissolved oxygen isotopes during engineered growth of Galdieria sulphuraria. Algal Research 26, 294-301.
14. Marx, A., Dusek, J., Jankovec, J., Sanda, M., Vogel, T., van Geldern, R., Hartmann, J. and Barth, J.A.C. (2017a) A review of CO2 and associated carbon dynamics in headwater streams: A global perspective. Reviews of Geophysics 55, 560-585.
15. Marx, A., Hintze, S., Sanda, M., Jankovec, J., Oulehle, F., Dusek, J., Vitvar, T., Vogel, T., van Geldern, R. and Barth, J.A.C. (2017b) Acid rain footprint three decades after peak deposition: Long-term recovery from pollutant sulphate in the Uhlirska catchment (Czech Republic). Science of the Total Environment 598, 1037-1049.
16. Baier, A., van Geldern, R., Löhr, G., Subert, H.L. and Barth, J.A.C. (2016) Groundwater units and their potential for development at Nuremberg, Germany. Grundwasser 21, 253-266.
17. Chandrajith, R., Diyabalanage, S., Premathilake, K.M., Hanke, C., van Geldern, R. and Barth, J.A.C. (2016) Controls of evaporative irrigation return flows in comparison to seawater intrusion in coastal karstic aquifers in northern Sri Lanka: Evidence from solutes and stable isotopes. Science of the Total Environment 548-549, 421-428.
18. Daesslé, L.W., van Geldern, R., Orozco-Durán, A. and Barth, J.A.C. (2016) The 2014 water release into the arid Colorado River delta and associated water losses by evaporation. Science of the Total Environment 542, 586-590.
19. Filimonau, V. and Barth, J.A.C. (2016) From Global to Local and Vice Versa: On the Importance of the 'Globalization' Agenda in Continental Groundwater Research and Policy-Making. Environmental Management 58, 491-503.
20. Penckwitt, J., van Geldern, R., Hagspiel, B., Packebusch, B., Mahr, A., Burkhardt, K. and Barth, J.A.C. (2016) Quantification of groundwater infiltration into urban sewer systems using stable isotopes. Grundwasser 21, 217-225.
21. van Geldern, R. and Barth, J.A.C. (2016) Oxygen and Hydrogen Stable Isotopes in Earth's Hydrologic Cycle, Isotopic Landscapes in Bioarchaeology, pp. 173-187.

22. van Geldern, R., Kolb, A., Baier, A. and Barth, J.A.C. (2016) Erratum zu: Stabile Isotope als Tracer zur Bestimmung der Abstandsgeschwindigkeit in Trinkwassergewinnungsbrunnen aus Uferfiltrat (Grundwasser, (2015), 10.1007/s00767-015-0296-6). Grundwasser 21, 345.
23. Vitvar, T., Sanda, M., Marx, M., Hubert, E., Jancovec, J. and Barth, J. (2016) Hydrochemical and isotopic tracing of runoff generation in the small mountainous catchment Uhlířská (Czech Republic), using the netpath approach. Acat Hydrologica Slovaca 17, 190-198.
24. Barth, J.A.C., Mader, M., Myrttinen, A. and Mayer, B. (2015a) Advances in Stable Isotope Monitoring of CO2 Under Elevated Pressures, Temperatures and Salinities: Selected Results from the Project CO2ISO-LABEL, Geological Storage of CO2 – Long Term Security Aspects. Springer, pp. 59-71.
25. Barth, J.A.C., Nowak, M.E., Zimmer, M., Norden, B. and van Geldern, R. (2015b) Monitoring of cap-rock integrity during CCS from field data at the Ketzin pilot site (Germany): Evidence from gas composition and stable carbon isotopes. International Journal of Greenhouse Gas Control 43, 133-140.
26. Becker, V., Myrttinen, A., Nightingale, M., Shevalier, M., Rock, L., Mayer, B. and Barth, J.A.C. (2015) Stable carbon and oxygen equilibrium isotope fractionation of supercritical and subcritical CO<inf>2</inf> with DIC and H<inf>2</inf>O in saline reservoir fluids. International Journal of Greenhouse Gas Control 39, 215-224.
27. Chandrajith, R., Jayasena, H.A.H., van Geldern, R. and Barth, J.A.C. (2015) Assessment of land subsidence mechanisms triggered by dolomitic marble dissolution from hydrogeochemistry and stable isotopes of spring waters. Applied Geochemistry 58, 97-105.
28. Mayer, B., Humez, P., Becker, V., Dalkhaa, C., Rock, L., Myrttinen, A. and Barth, J.A.C. (2015) Assessing the usefulness of the isotopic composition of CO2 for leakage monitoring at CO2 storage sites: A review. International Journal of Greenhouse Gas Control 37, 46-60.
29. Myrttinen, A., Becker, V. and Barth, J.A.C. (2015a) Corrigendum to 'A review of methods used for equilibrium isotope fractionation investigations between dissolved inorganic carbon and CO2' [Earth Sci. Rev. 115(2012), [192-199], doi:10.1016/j.earscirev.2012.08.004.]. Earth-Science Reviews 141, 178.
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31. Orozco-Durán, A., Daesslé, L.W., Camacho-Ibar, V.F., Ortiz-Campos, E. and Barth, J.A.C. (2015) Turnover and release of P-, N-, Si-nutrients in the Mexicali Valley (Mexico): Interactions between the lower Colorado River and adjacent ground- and surface water systems. Science of the Total Environment 512-513, 185-193.
32. van Geldern, R., Kolb, A., Baier, A. and Barth, J.A.C. (2015a) Determination of fluid velocities in drinking water supply wells using bank filtration by means of stable isotope tracers. Grundwasser 20, 169-179.
33. van Geldern, R., Schulte, P., Mader, M., Baier, A. and Barth, J.A.C. (2015b) Spatial and temporal variations of pCO2, dissolved inorganic carbon, and stable isotopes along a temperate karstic watercourse. Hydrological Processes 29, , 3423-3440.
34. Chandrajith, R., Chaturangani, D., Abeykoon, S., Barth, J.A.C., van Geldern, R., Edirisinghe, E.A.N.V. and Dissanayake, C.B. (2014) Quantification of groundwater-seawater interaction in a coastal sandy aquifer system: A study from Panama, Sri Lanka. Environmental Earth Sciences 72, 867-877.
35. Engelhardt, I., Barth, J.A.C., Bol, R., Schulz, M., Ternes, A., Schüth, C. and van Geldern, R. (2014) Quantification of long-term wastewater fluxes at the surface water/groundwater-interface: An integrative model perspective using stable isotopes and acesulfame. Science of the Total Environment 466-467, 16-25.
36. Myrttinen, A., Becker, V., Mayer, B. and Barth, J.A.C. (2014) Stable carbon isotope fractionation data between H2CO 3 * and CO2(g) extended to 120 °c. Rapid Communications in Mass Spectrometry 28, 1691-1696.

37. Nowak, M.E., Van Geldern, R., Myrttinen, A., Zimmer, M. and Barth, J.A.C. (2014) High-resolution stable carbon isotope monitoring indicates variable flow dynamic patterns in a deep saline aquifer at the Ketzin pilot site (Germany). Applied Geochemistry 47, 44-51.
38. van Geldern, R., Baier, A., Subert, H.L., Kowol, S., Balk, L. and Barth, J.A.C. (2014a) Pleistocene paleo-groundwater as a pristine fresh water resource in southern Germany - Evidence from stable and radiogenic isotopes. Science of the Total Environment 496, 107-115.
39. van Geldern, R., Kuhlemann, J., Schiebel, R., Taubald, H. and Barth, J.A.C. (2014b) Stable water isotope patterns in a climate change hotspot: The isotope hydrology framework of Corsica (western Mediterranean). Isotopes in Environmental and Health Studies 50, 184-200.
40. Van Geldern, R., Nowak, M.E., Zimmer, M., Szizybalski, A., Myrttinen, A., Barth, J.A.C. and Jost, H.J. (2014c) Field-based stable isotope analysis of carbon dioxide by mid-infrared laser spectroscopy for carbon capture and storage monitoring. Analytical Chemistry 86, 12191-12198.
41. Veizer, J., Barth, J.A.C., Kristal D. Dubois, K.D., Ferguson, P., Freitag, H., Karim, A., Telmer, K. and Wassenaar, L. (2014) Water Transpiration and the Carbon Cycle (Communications arising). Nature (communications arising) http://www.nature.com/nature/journal/v496/n7445/full/nature11983.html.
42. Barth, J. and Liedl, R. (2013) Almost 200 billion litres later. Grundwasser 18, 221.
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45. Nowak, M., Myrttinen, A., Van Geldern, R., Becker, V., Mayer, B. and Barth, J.A.C. (2013a) A brief overview of isotope measurements carried out at various CCS pilot sites worldwide, in: Hou, M.Z., Xie, H., Were, P. (Eds.), Springer Series in Geomechanics and Geoengineering. Springer, Berlin, Heidelberg, pp. 75-86.
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48. van Geldern, R., Hayashi, T., Böttcher, M.E., Mottl, M.J., Barth, J.A.C. and Stadler, S. (2013a) Stable isotope geochemistry of pore waters and marine sediments from the New Jersey shelf: Methane formation and fluid origin. Geosphere 9, 96-112.
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50. Gómez-Canela, C., Barth, J.A.C. and Lacorte, S. (2012) Occurrence and fate of perfluorinated compounds in sewage sludge from Spain and Germany. Environmental Science and Pollution Research 19, 4109-4119.
51. Kuntz, D. and Barth, J. (2012) Curtain up - Online is on stage. Grundwasser 17, 55.
52. Myrttinen, A., Becker, V. and Barth, J.A.C. (2012a) A review of methods used for equilibrium isotope fractionation investigations between dissolved inorganic carbon and CO 2. Earth-Science Reviews 115, 192-199.

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54. Myrttinen, A., Jeandel, E., Ukelis, O., Becker, V., van Geldern, R., Blum, P. and Barth, J.A.C. (2012c) Stable carbon isotope techniques to quantify CO 2 trapping under pre-equilibrium conditions and elevated pressures and temperatures. Chemical Geology 320-321, 46-53.
55. Van Geldern, R. and Barth, J.A.C. (2012) Optimization of instrument setup and post-run corrections for oxygen and hydrogen stable isotope measurements of water by isotope ratio infrared spectroscopy (IRIS). Limnology and Oceanography: Methods 10, 1024-1036.
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