

Curriculum Vitae Johannes A.C. Barth

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

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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) (*Journal 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 Management*, *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 19 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 business 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 prize 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).

Publikations 2013 to 2017

1. Barth, J.A.C., Mader, M., Nanning, 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.
2. 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.
3. 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.
4. 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*.
5. 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.
6. 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.
7. 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.

8. 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 Uhlirka catchment (Czech Republic). *Science of the Total Environment* 598, 1037-1049.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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.
16. Barth, J.A.C., Mader, M., Myrntinen, 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.
17. 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.
18. Becker, V., Myrntinen, 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 CO₂ with DIC and H₂O in saline reservoir fluids. *International Journal of Greenhouse Gas Control* 39, 215-224.
19. 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.
20. Mayer, B., Humez, P., Becker, V., Dalkhaa, C., Rock, L., Myrntinen, 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.
21. Myrntinen, 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.
22. Myrntinen, A., Becker, V., Mayer, B., van Geldern, R. and Barth, J.A.C. (2015b) Determining in situ pH values of pressurised fluids using stable carbon isotope techniques. *Chemical Geology* 391, 1-6.
23. 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.
24. 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.
25. 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.
26. 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.
27. 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, 18-25.
28. Myrntinen, A., Becker, V., Mayer, B. and Barth, J.A.C. (2014) Stable carbon isotope fractionation data between H₂CO₃ and CO₂(g) extended to 120 °C. *Rapid Communications in Mass Spectrometry* 28, 1691-1696.
29. Nowak, M.E., Van Geldern, R., Myrntinen, 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.

30. 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.
31. van Geldern, R., Kuhlmann, 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.
32. Van Geldern, R., Nowak, M.E., Zimmer, M., Szzybalski, A., Myrntinen, 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.
33. 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>.
34. Barth, J. and Liedl, R. (2013) Almost 200 billion litres later. *Grundwasser* 18, 221.
35. Chandrajith, R., Barth, J.A.C., Subasinghe, N.D., Merten, D. and Dissanayake, C.B. (2013) Geochemical and isotope characterization of geothermal spring waters in Sri Lanka: Evidence for steeper than expected geothermal gradients. *Journal of Hydrology* 476, 360-369.
36. Kühn, M., Barth, J.A.C., Baumann, G., Becker, V., M., B., Buske, S., Fritschen, R., Giese, R., Groß, C., Henniges, J., Hopt, L., Kock, D., Krüger, M., Morozova, D., Myrntinen, A. and Würdemann, H. (2013) Reservoir and Cap Rock Monitoring, in: Kühn, M., Münch, U. (Eds.), *CLEAN. CO2 Large-Scale Enhanced Gas Recovery in the Altmark Natural Gas Field - GEOTECHNOLOGIEN Science Report No. 19*. Springer, Heidelberg, New York, Dordrecht, London, pp. 99-130.
37. Nowak, M., Myrntinen, 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.
38. Nowak, M., Myrntinen, A., van Geldern, R., Becker, V., Mayer, B. and Barth, J.A.C. (2013b) A Brief Overview of Isotope Measurements Carried Out at Various CCS Pilot Sites Worldwide, in: Michael Z. Hou, H.X., Patrick Were (Ed.), *Clean Energy Systems in the Subsurface: Production, Storage and Conversion*, Berlin, Heidelberg, pp. 75-87.
39. Nowak, M., Myrntinen, A., Zimmer, M., Wiese, B., Van Geldern, R. and Barth, J.A.C. (2013c) Well-based, geochemical leakage monitoring of an aquifer immediately above a CO2 storage reservoir by stable carbon isotopes at the Ketzin pilot site, Germany, *Energy Procedia*, pp. 346-354.
40. Rausch, R. and Barth, J. (2013) Too little water or too little confidence? *Grundwasser* 18, 1.
41. 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.
42. Van Geldern, R., Verma, M.P., Carvalho, M.C., Grassa, F., Delgado-Huertas, A., Monvoisin, G. and Barth, J.A.C. (2013b) Stable carbon isotope analysis of dissolved inorganic carbon (DIC) and dissolved organic carbon (DOC) in natural waters - Results from a worldwide proficiency test. *Rapid Communications in Mass Spectrometry* 27, 2099-2107.
43. 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.
44. Kuntz, D. and Barth, J. (2012) Curtain up - Online is on stage. *Grundwasser* 17, 55.
45. Myrntinen, A., Becker, V. and Barth, J.A.C. (2012a) A review of methods used for equilibrium isotope fractionation investigations between dissolved inorganic carbon and CO₂. *Earth-Science Reviews* 115, 192-199.
46. Myrntinen, A., Becker, V., Nowak, M., Zimmer, M., Pilz, P. and Barth, J.A.C. (2012b) Analyses of pre-injection reservoir data for stable carbon isotope trend predictions in CO₂ monitoring: Preparing for CO₂ injection. *Environmental Earth Sciences* 67, 473-479.
47. Myrntinen, A., Jeandel, E., Ukelis, O., Becker, V., van Geldern, R., Blum, P. and Barth, J.A.C. (2012c) Stable carbon isotope techniques to quantify CO₂ trapping under pre-equilibrium conditions and elevated pressures and temperatures. *Chemical Geology* 320-321, 46-53.
48. 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.
49. Becker, V., Myrntinen, A., Barth, J.A. and Bayer, P. (2011a) A summary on the special issue "sustainability of groundwater". *Sustainability* 3, 1792-1795.
50. Becker, V., Myrntinen, A., Blum, P., Van Geldern, R. and Barth, J.A.C. (2011b) Predicting $\delta^{13}\text{CDIC}$ dynamics in CCS: A scheme based on a review of inorganic carbon chemistry under elevated pressures and temperatures. *International Journal of Greenhouse Gas Control* 5, 1250-1258.
51. Schulte, P., van Geldern, R., Freitag, H., Karim, A., Négrel, P., Petelet-Giraud, E., Probst, A., Probst, J.L., Telmer, K., Veizer, J. and Barth, J.A.C. (2011) Applications of stable water and carbon isotopes in watershed research: Weathering, carbon cycling, and water balances. *Earth-Science Reviews* 109, 20-31.
52. Barth, J. and Liedl, R. (2010) Was ist neu bei Grundwasser? - Staffelstab übernommen. *Grundwasser* 15, 1-1.

53. Barth, J.A.C., Fllimenau, V., Bayer, P., Struckmeier, W. and Grathwohl, P. (2010) Global Water Balance in: Graedel, T.E., van der Voet, E. (Eds.), Linkages of Sustainability. Massachusetts Institute of Technology and Frankfurt Institute for Advanced Studies, pp. 221-233.
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55. Bovolo, C.I., Blenkinsop, S., Majone, B., Zambrano-Bigiarini, M., Fowler, H.J., Bellin, A., Burton, A., Barceló, D., Grathwohl, P. and Barth, J.A.C. (2010) Climate Change, Water Resources and Pollution in the Ebro Basin: Towards an Integrated Approach in: Barcelo, D., Petrovic, M. (Eds.), *The Ebro River Basin. Handbook of Environmental Chemistry*. Springer, Berlin, Heidelberg, pp. 295-329.
56. Finkel, M., Barth, J.A.C. and Grathwohl, P. (2010) *Advanced Tools and Models to Improve River Basin Management in Europe in the Context of Global Change - AquaTerra*. Edited Book. IWA (International Water Association), London, UK.
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