# Dr. Ramon Aravena

Professor Emeritus, Department of Earth and Environmental Sciences, University of Waterloo

Dr. Aravena is a Professor Emeritus with more than 25 years experience in the application of isotope techniques in hydrogeology and groundwater geochemistry. He has been involved in numerous groundwater studies in Latin America, Canada and the U.S. related to evaluation of groundwater resources and groundwater protection.

His current research focus on groundwater contamination caused by agricultural, industrial and urban activities using environmental isotopes as tracers to provide information about sources and processes that affect nitrate and organic compounds in groundwater.

**Research Areas of Interest**

- Isotope techniques to trace groundwater contamination
- Agricultural, industrial and urban pollution of groundwater
- Degradation of nitrate and organic compounds in water

In addition to being a member of the University Consortium for Field-Focused Groundwater Contamination Research, Dr. Aravena is also a reviewer for several journals, sits on the editorial board of the Journal for Contaminant Hydrology, and is a member of the experts group of the International Atomic Energy Agency in the field of Isotope Hydrology, along with service in many other professional associations.

# Selected Papers

## Selected Publications


Bouchard, D., Hunkeler, D., Madsen, E.L., Buscheck, T., Daniels, E., Kolhaltar, R., DeRito, C.M., Aravena, R., Thomson, N. 2018. Application of diagnostic tools to evaluate remediation performance at petroleum hydrocarbon sites. Groundwater Monitoring and Remediation, 38 (44): 88-98.

Mahsa, S., Thomson, N.R., Aravena, R., Barker, J.F., Madsen, E.L., Marchesi, M., DeRito, C.M., Bouchard, D., Buscheck, T., Kolhatkar, R., and Daniels, E.J. 2018. Integrated Plume Treatment Using Persulfate Coupled with Microbial Sulfate Reduction. Groundwater Monitoring and Remediation, 38 (44): 45-61.

Solano, F.M., Marchesi, M., Thomson, N.R., Bouchard, D., Aravena, R. 2018. Carbon and Hydrogen Isotope Fractionation of Benzene, Toluene and *o*-Xylene during Chemical Oxidation by Persulfate. Groundwater Monitoring and Remediation 38 (44): 62-72.

Spalding, R.F., Hirsh, A.J., Exner, M.E., Stange, M., and Aravena, R.**2018.** Integrated Deep Soil N and Groundwater Isotope Investigation of N Sources Captured by Municipal Wells. Ground Water Monitoring and Remediation https://doi.org/10.1111/gwmr.12311.

Wei, Y., Thomson, N.R., Aravena, R., Barker, J.F., Madsen, E.L., Kolhatkar, R., De Rito, C.M., Buscheck, T.E., and Hunkeler, D. 2018. Infiltration of sulfate to enhance sulfate reduction of petroleum hydrocarbons. Ground Water Monitoring and Remediation 38 (44): 73-87.

Bouchard, D., Marchesi, M., Madsen, E.L., DeRito, C.M Thomson, N.R., Aravena, R., Barker, J.M., Buscheck, T., Kolhatkar, R., Daniels, E.J., and Hunkeler, D. 2018. Diagnostic Tools to Assess Mass Removal Processes During Pulsed Air Sparging of a Petroleum Hydrocarbon Source Zone. Groundwater Monitoring and Remediation, 38 (44): 29-44.

Wanner, P., Parker, B.L., Chapman, S.W., Lima, G., Gilmore, A., Mack, E.E., and Aravena, R. 2018. Identification of Degradation Pathways of Chlorohydrocarbons in Saturated Low-Permeability Sediments Using Compound-Specific Isotope Analysis.2018. Environmental Science & Technology 52: 7296–7306.

Pierce, A.A., Chapman, S.W., Zimmerman, L.K., Hurley, J.C., Aravena, R., Cherry, J.A and Parker, B.L 2018. DFN-M field characterization of sandstone for a process-based site conceptual model and numerical simulations of TCE transport with degradation. Journal of Contaminant Hydrology, (in press), DOI. 10.1016/j.jconhyd.2018.03.00



Pierce, A.A., Chapman, S.W., Zimmerman, L.K., Hurley, J.C., Aravena, R., Cherry, J.A and Parker, B.L 2018. DFN-M field characterization of sandstone for a process-based site conceptual model and numerical simulations of TCE transport with degradation. Journal of Contaminant Hydrology, (in press), DOI. 10.1016/j.jconhyd.2018.03.00



Bennett, P., Hyman, M., Smith, C., El Mugammar. H., Chu, M.Y., Nickelsen, M., Aravena, R. 2018. Enrichment of Carbon-13 and Deuterium During Monooxygenase-mediated Biodegradation of 1,4-Dioxane. Environmental Science & Technology Letter, 5: 148–153.

Marchesi, M., Luca, L., O, Shouakar-Stash., Pietrini, I., de Ferra, F., Giovanna, C., Aravena, R., Franzetti, A., and Stella, T. 2017. $^{37}$Cl-Compound Specific Isotope Analysis and Quantitative PCR (qPCR) for Monitoring Monoclorobenze (MCB) Biodegradation under aerobic Conditions. Science of the Total Environment 619–620 (2018) 784–793.

Alberti, L., Marchesi, M., Trefiletti, P., and Aravena, R. 2017. Compound Specific Isotope Analysis (CSIA) application for source apportionment and natural attenuation assessment of chlorinated benzenes. Water, 9, 872; doi:10.3390/w9110872.

Palau, J., Shouakar-Stash, O., Hatijah, M., Siti; Yu, R., Rosell, M., Marco-Urrea, E., Freedman, D., Aravena, R., Soler, A., Hunkeler, D. 2017. Hydrogen isotope fractionation during biodegradation of 1,2-dichloroethane: potential for pathway identification using a multi-element isotope approach. Environmental Science & Technology, 51:10526–10535.

Wanner, P., Parker, B.L., Chapman, S.W., Aravena, R., Hunkeler, D. 2017. Does sorption influence isotope ratios of chlorinated hydrocarbons under field conditions? Applied Geochemistry 84: 348-359.