
Abstract

High-resolution characterization methods, honed for sedimentary rock aquifers and chlorinated solvent contamination conditions at many industrial sites across North America, provide insights regarding fracture and matrix properties controlling groundwater flow and contaminant transport conditions. Multiple, complementary data sets are used at field sites to identify and quantify processes and their interactions so that environmental scientists and engineers can better predict the risks associated with various physical and contaminant threats to groundwater and surface water systems. This presentation aims to overview the insights gained from various novel field methods and laboratory measurements made in complex sedimentary rock environments with decades-old contamination serving as long-term natural gradient tracer experiments, and how we as a profession at large might improve site remediation decisions.

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Dr. Parker is a Professor at the University of Guelph and holds a Senior Industrial Research Chair from the Canadian Natural Sciences and Engineering Research Council since 2007. She began her professional career more than 30 years ago as an environmental engineer in New York State working on characterizing, monitoring and remediation industrial-derived contaminants in groundwater, primarily in glacial and bedrock sediments. After seven years working to characterize and remediate chlorinated solvent and metal contaminants in various complex hydrogeologic environments under RCRA and Superfund legislation, she continued her education at the University of Waterloo (Ontario, Canada) where she completed her PhD in Earth Sciences in 1996 and became a Research Assistant/Associate Professor until 2007. As founding director of the G360 Institute for Groundwater Research, she directs a large group of interdisciplinary scientists and engineers that focus on developing and implementing high resolution field methods aimed at quantifying advective and diffusive transport and associated reactive processes at aged industrial contaminated sites to develop robust, process-based site conceptual models for assessing risks to receptors and appropriate monitoring and remediation approaches for site management and aquifer protection. Her long-term focus has been on quantifying the role of diffusion on source zone and plume evolution and limits to remediation along with improved characterization of aquitards to improve groundwater flow system understanding.

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