Contaminant Hydrogeology (1975-1987)

1975: Cherry, Gillham and Pickens demonstrated why contaminant hydrogeology differs from water supplies and hydrogeology.

1974-1979: Cherry led the establishment of a groundwater field research facility at the CFB Borden sandpit to facilitate long-term, interdisciplinary field research of contaminant hydrogeology. Yielded the Stanford-Borden experiments investigating the fate and transport of dissolved chlorinated hydrocarbons.

1976: Gélinas worked on problems of resource and contaminant hydrogeology throughout Quebec, where he was regarded as the Father of Quebec Hydrogeology. He was the first to suggest the naming of the Robert N. Farvolden Award, an award he received himself in 2009.

1981: Tang, Frid and Sudicky conducted groundbreaking research on contaminant transport in fractured rock.

1985: Cherry received both the Meiner Award for a group of (seven) papers published in the Journal of Hydrology in 1983 on the Borden case history, and the Horton Award for contributions of the understanding of the physical and chemical aspects of groundwater contamination.

1987: The University Consortium Solvents-in-Groundwater Research Program was initiated in response to the urgent need for focused research on dense non-aqueous phase liquids (DNAPLs) in groundwater and its treatment options.


1972: Cherry developed the concept of “use-of-encounter” to explain the evolution of the major ion chemistry of groundwater quality in Prairie groundwaters. The original concepts were presented by Cherry at the 24th International Geological Congress in Montreal, which brought the international hydrogeological community to Canada for many field trips.

1979: Researchers at Chalk River Nuclear Laboratories identified the redox evolution sequences in groundwater flow systems based on the thermodynamic model of Stumm. This indicated the likelihood of the microbial catalysis of the redox sequences and laid a foundation for monitoring natural attenuation as a remedial option.

Environmental Isotopes (1970s-1990s)

1971: Fritz built up an internationally recognized laboratory and graduate program in environmental iso- tope research and introduced isotope geochemistry into hydrogeology.

1981: The geochemistry of methane in groundwater presented by Barker and Fritz showing that methane could be fingerprinted isotopically as to its origin. This laid the geochemical foundation for understanding fugitive-gas migration during the fracking boom of the 21st century and questions raised about leaking oil and gas wells.

1997: Clark and Fritz published Environmental Isotopes in Hydrogeology.

Stochastic Hydrogeology (1975-1986)

1975: Freeze published the first paper conceptualizing stochastic analysis of groundwater flow in heterogeneous media.

1986: Sudicky published findings from the Borden experiment, demonstrating small-scale, random patterns of heterogeneity control longitudinal dispersion in groundwater.

Technological Advancements (1970 - 1989)

1970s: Westbay Systems introduced multilevel groundwater level monitoring technology, providing three-dimensional hydrogeological data.

1989: Waterloo Hydrogeologic Inc. released FLOWPATH, the first graphical modelling software package in the industry.

Publications (1970 to 2014)

1979: Freeze and Cherry publish Groundwater.


2014: The Geological Survey of Canada (GSC) published Canada’s Groundwater Resources, a major compilation of the current knowledge of the groundwater resources in Canada since the previous synthesis in 1987.

Crossing Disciplines (1967- Present)

1967: Lasnos and Carlson used surficial techniques such as sonic refraction to establish the field of hydrogeophysics.

1969: Freeze and Hantzen publish a “blue-print” for numerical modelling of waterways with coupled groundwater and surface water.

1971: Patton and Deere first considered groundwater flow systems around open-pit mines.

1972: SRC worked with USGS to demonstrate downhole geophysics.

1972: van Everdingen investigated thermal and mineral springs of the southern Rocky Mountains.

1973: van Everdingen made significant contributions on groundwater flow in permafrost.

1977: Hodge and Freeze conducted the first simulations that demonstrated slope stability and landform geometry as a groundwater problem.


1983: van der Kamp and Gale publish a theory of earth tide and baromeric effects in porous formations with compressible granits.

1986: Hendry, Cherry and Wallick study the origin and distribution of sulphate in the Prairies.

1991: van der Kamp and Maathuis show that snow accumulation at the ground surface and changes of total soil moisture cause changes of mechanical stress which show up as fluctuations of groundwater levels in deep karstic wells.

1999: van der Kamp and Hayashi investigated the groundwater recharge function of small wetlands in the semi-arid northern prairies.

2003: Chapuis and Aubertain conducted laboratory permeability testing to test saturated hydraulic conductivity.

Nuclear Waste Disposal (2005-2011)

The Nuclear Waste Management Organization undertook field characterization of a potential deep geological repository at the Bruce Nuclear Site in southwest Ontario. Record low hydraulic conductivities were measured. Isotope geochemistry suggested pore fluids are >600 million years old. Diffusion limits radionuclide migration.

2014: The Geological Survey of Canada (GSC) published Canada’s Groundwater Resources, a major compilation of the current knowledge of the groundwater resources in Canada since the previous synthesis in 1987.