

# GROUNDWATER FLOW SYSTEM MODELLING: A HISTORICAL AND PRACTICAL PERSPECTIVE

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The Groundwater flow system modelling began in the 1960's and early 70's with relatively simple but very innovative analytical and numerical solutions developed by the likes of Toth, Freeze & Witherspoon, Pinder & Bredehoeft, and Frind. Complexity has evolved from 2D homogeneous, isotropic systems to fully-integrated 3D groundwater-surface water interactions in multi-aquifer/aquitard discretely-fractured systems within regional basin-scale and even continental-scale domains. The historical development of groundwater flow system models is here presented from a practical perspective, highlighting real-world applications and their relevance for current hydrogeological practice. Applications include groundwater flow system modelling in the context of resource exploration and exploitation, nuclear waste storage, heat and contaminant transport, and water supply. The perspective of complexity vs. simplicity is highlighted in each case and advantages and limitations of various approaches are identified. Remaining challenges and future research directions are also reviewed.