



The practical side of solute transport modelling for optimized remediation

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"Pump and Treat" (P&T) is a debated, yet common, practice for removing a (large) contaminant plume and treating it ex-situ. An optimal design of P&T usually involves a model for the fate and transport of contaminants in the aquifer. Different pumping setups are considered, and removal rates are calculated. The flow model is typically based on the available set of geological data, which is usually rather limited, and on data measured in wells, including well tests and historical measurements of head. The transport model, in turn, is typically based on an extremely limited number of concentration measurements and on various rough assumptions regarding the sources and sinks of the contaminant. Thus, the resulting model is suffering of large inaccuracies, and decision making based on such model is rather limited.

In addition, such models usually use rather large numerical cells, and (accordingly) rather large value of longitudinal dispersivity (α_L). The calibration of this parameter is typically based on concentration data obtained after the discovery of the contaminant. It is common that when the contamination is discovered, production wells are shut down and the flow in the area of the plume becomes a regional one. Thus, it is reasonable to hypothesize that the prediction of transport close to the P&T wells may result in exaggerated mixing of the plume at this zone of radially converging flow. An example to such model, focused on a Perchlorate spill in the coastal aquifer of Israel, is discussed.