

Tidal effects on transport of contaminants in a coastal shallow aquifer

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Abstract: The effects of tidal fluctuations on the spreading behavior of pollutants in an industrial site located near the Arabian Gulf was examined. Monitoring wells installed to observe the flow dynamics indicated that tides have an influence on the water level. A finite element model was used to simulate both groundwater flow and contaminant transport in the subsurface environment. The transport process modeling includes advection and dispersion. After calibration with field data, the model was applied to investigate the problem of groundwater contamination in the study area. The study of the tidal effects on the flow dynamics confirmed that the water table behavior is significantly influenced by the tidal fluctuation along the coastal boundaries. The model predicted a decrease in concentration of solute (as TDS) with time under the tidal influence indicating a loss of solute mass from the study area.