MODELING OF HYDROGEOCHEMICAL PROCESSES WITHIN LANDFILLS - A STOCHASTIC APPROACH

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Landfills are often subject to uncer- tainty concerning the quantity as well as quality of deposited material. Chemi- cal interactions between the waste and the seepage water become a possible source of contamination for groundwater. Especially old and uncontrolled land- fills lack information on their content and were often installed without base sealing or draining. These sites cause an unknown amount of hazard for ground- water.Hydrodynamical solute transport models as well as hydrogeochemical equilibrium models are widely used to predict trans- port behavior and exchange rates of chemical phases. However both are based on information on hydraulic parameters and geochemical input quantities,respec- tively. The gap between the scarce information on content of landfills and the resul- ting hydrogeochemical processes on the one hand and the quantitative base in- formation needed for the computational tools to predict harzards on the other hand can be filled by means of a stocha- stic approach. The fact that all, natu- rally or artificially deposited geologi- cal bodies are subject to spatial varia- bility can be considered using geostati- stical principles.Hydrochemical analyses from a well inve- stigated landfill in East Germany were used to characterize the spatial varia- bility of some important inorganic com- pounds by means of variogram analysis. Site specific bivariate correlations between these compounds were evaluated. Using a geostatistical simulation tech- nique spatial realizations of typical seepage water compositions were genera- ted, which serve as input for the mode- ling of hydrochemical processes within the landfill. The variety of model re- sults reflects the possible spectrum of chemical output of a fairly unknown de- posit and thus helps to quantify possi- ble hazards.