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Transport of chloride through saturated soil column: An experimental study

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Abstract. The groundwater is a very important part of the environment and must be protected for the benefit of the present and future generation. The contamination of soil and groundwater by chemicals has become an increasing concern in the recent past. These chemicals enter the groundwater system by a wide variety of mechanisms, including accidental spills, land disposal of domestic and industrial wastes and application of agricultural fertilizers. Once introduced into an aquifer, these contaminants will be transported by flowing groundwater and may degrade water quality at nearby wells and streams. For improving the management and protection of groundwater resources, it is important to first understand the various processes that control the transport of contaminants in groundwater. Predictions of the fate of groundwater contaminants can be made to assess the effect of these chemicals on local water resources and to evaluate the effectiveness of remedial actions. In this study, an attempt has been made to investigate the behaviour of solute transport through porous media using laboratory experiments. Sodium chloride was used as a conservative chemical in the experiment. During the experiment, pulse boundary condition and continuous boundary conditions were used. Experimental results have been presented for conservative solute transport in the sand. The pattern of the break through curve remains almost same in all the cases of varying flow rate and initial concentration of conservative chemical.

Keywords: contaminant transport; porous media; saturated; solute column experiment; pulse type and continuous type

1. Introduction

The groundwater is a valuable natural resource. It is generally less susceptible to contamination and pollution when compared to surface water bodies. Also, the natural impurities in rainwater, which replenishes groundwater systems, get removed while infiltrating through soil strata. But, In India, where groundwater is used intensively for irrigation and industrial purposes, a variety of land and water-based human activities are causing pollution of this precious resource. The groundwater must be protected for the benefit of the present and future generation. The source contaminating groundwater is normally detected much later, since groundwater moves at a very slow rate in aquifers. Most of the groundwater contaminants are reactive in nature and they

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