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HEAVY METALS TRANSPORT FROM WASTEWATER SPILLS INTO A COASTAL AQUIFER AND SEAWATER

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Abstract

Wastewater generated from industrial activities has delivered elevated heavy metal concentrations into fresh and salted aqueous systems. Herein, the migrated trace metals were studied from their initial location through a coastal aquifer up to the seawater. The experiments were carried out at lab scale using a sandbox with glass beads and two attached chambers containing natural groundwater and seawater. The study focused on the transport behaviour of heavy metals such as copper, zinc and lead into freshwater and seawater. Plasma optical emission spectrometry (ICP-OES) analysis was performed to detect the heavy metal concentrations from the water samples taken with time from the experiments. The simulation work adopted Groundwater Modelling System (GMS) codes were used for validation of the experimental outcomes. Results showed that the heavy metals concentrations in wastewater effluents affect the water quality of the aquifer. The water quality and resistance of the aquifer to heavy metals pollution increased with the presence of a renewable recharging of freshwater along with the contamination source. Heavy metal ions in seawater exhibited a gradual increase in their concentrations with time in all studied cases.

Keywords: groundwater, heavy metals, seawater intrusion, trace transport, water quality

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