

SUMMARY

A two-dimensional unsaturated water flow and mass transport modelling has been performed with the aim of evaluating the displacement of a pollution front through different unsaturated soil sediments.

Polluted water is assumed to infiltrate at the top of the unsaturated zone and the pollution front displacement is evaluated for three different types of soil sediments. The efficiency of the hydraulic barrier to retard the pollution front is illustrated by using different permeabilities for the soil sediments.

The simulations were conducted by using synthetic data for an unsaturated zone assumed to be 10 meters long and 5.2 meters deep. After one day of infiltration of water polluted by dissolved benzene at a rate of 3 l/s, the pollution front was located at 1.7 meters depth from the soil surface in sand and at 2.6 meters depth in gravel.

After 1 week of infiltration of polluted water in the sandy soil, 50% of the initial concentration at the surface is found at a depth of 1.8 meters and 25% is found at a depth of 3.2 meters. In gravel, on the other hand, the isoline with 50% concentration has propagated far beyond the bottom boundary at a depth of 5.2 meters.