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Radionuclides Transport Phenomena in Vadose Zone

Authors : R. Testoni, R. Levizzari, M. De Salve

Abstract : Radioactive waste management is fundamental to safeguard population and environment by radiological risks. Environmental assessment of a site, where nuclear activities are located, allows understanding the hydro geological system and the radionuclides transport in groundwater and subsoil. Use of dedicated software is the basis of transport phenomena investigation and for dynamic scenarios prediction; this permits to understand the evolution of accidental contamination events, but at the same time the potentiality of the software itself can be verified. The aim of this paper is to perform a numerical analysis by means of HYDRUS 1D code, so as to evaluate radionuclides transport in a nuclear site in Piedmont region (Italy). In particular, the behaviour in vadose zone was investigated. An iterative assessment process was performed for risk assessment of radioactive contamination. The analysis therein developed considers the following aspects: i) hydro geological site characterization; ii) individuation of the main intrinsic and external site factors influencing water flow and radionuclides transport phenomena; iii) software potential for radionuclides leakage simulation purposes.

Keywords : HYDRUS 1D, radionuclides transport phenomena, site characterization, radiation protection
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