

Transport Modeling of Desorbed ^{137}Cs from Contaminated Artificial Lake

Jaehyun Lee

Geologic Fluid Dynamics & Geologic Fluids Lab.

Despite many safety measures in nuclear power plants, some unexpected situations can occur that cause severe radiation accidents. From these accidents, radionuclides will be released into the large area, and ^{137}Cs , one of the most soluble radionuclides, can contaminate surrounding water resources. Sorbents can be used to remove dissolved ^{137}Cs in this situation, but without proper treatments, ^{137}Cs can be desorbed from the settled sorbents. Therefore, it is important to understand how the desorbed ^{137}Cs behaves in subsurface aquifers.

In this study, the 2D cross-sectional aquifer model was conducted to simulate the process of ^{137}Cs transport via the seepage of groundwater beneath the artificial lakes. The evolution of ^{137}Cs plume can be affected by the desorption rate and decay of ^{137}Cs , and hydrogeologic properties of the aquifer. As a model result, the contaminant plume represented very large fluctuation depending on the distribution coefficient (K_d) but showed the low risk in the general range of reported K_d values. For the future research, to predict more precisely, additional scenarios were conducted which consider more realistic situation such as heterogeneous or fractured media.