

Estimation Model Development for Evaporation Potential from Contaminated Soil and Inhalation Risk Assessment

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[Abstract]

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This study focuses on trichloroethylene (TCE), benzene, and mercury as highly volatile substances for which air quality standards and guideline values have been established and aims to evaluate their potential evaporation for assessing and estimating the risk of intake via volatilization from contaminated soil, as well as for determining the need for countermeasures. In this study, we have conducted a lot of measurements and experiments on multiphase transport of volatile substances in contaminated soil and migration to the atmosphere, referred to as volatile flux, and construct a prediction model of volatile flux from contaminated soil by comparing with existing models proposed in various countries to predict and evaluate concentrations in surface air, and finally we develop a numerical model that can be used to evaluate the risk of intake of contaminated soil and groundwater in Japan. We have compared the models that have been proposed in various countries to predict and evaluate concentrations in surface air and propose procedures and models for evaluating health risks due to inhalation of surface air that are appropriate for the characteristics of contaminated sites and soil and groundwater environments in Japan. The advanced and novel model is applicable to actual soil contamination by evaluating the effects of soil cover and shielding on contaminated soil from the viewpoint of risk management. In addition, the results of this research can be applied to the practical environmental policies, such as the estimation of volatile flux at the silverly contaminated sites and the utilization of the level of contamination using the measured value of potential evaporation in unsaturated soil.

[References]

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