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Construction of Environmental Fate Model for Risk Assessment

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In terms of the risk assessment, qualitative and quantitative informations are needed to estimate the exposures of environmental pollutants, which may create risks, and those are the information according to the changes caused by the movement of substances from the pollutant and duration. The movement and changes of substances take place through many phases and the quantity of substances existing within the medium are estimated and utilized by clarifying the movement and change phases. Since there are limitations in measuring the doses of substances within all medium according to the time period, estimating method through modeling are developed. In this research, we had approached movement of pollutants through fugacity model concept. Fugacity Model concept explains that the movement is created according to the features of medium composition (solid, liquid, and gas) within each medium, water solubility of substance, carbon-absorption coefficient, vapor pressure, and other physical and chemical features, and that the substances move according to the fugacity of the substances.

Based on the concept of Fugacity model, environmental movement modeling program was constructed by utilizing the STELLA, a software developed for the Dynamic modeling. Each of environment medium were divided into total of 8 compartments. Movement phases created in each medium were displayed and estimated formula relevant to each movement phases were entered.

The subsistence of substances in each compartment are changes according to the inflow or outflow doses and it is created by inflow from pollutant, inflow/outflow from transformation/decay, or inflow/outflow from other compartment. We have constructed a model that can estimate the subsistence within the medium through the movement estimate formula of substances according to such inflow or outflow phases.

Keyword : Environmental Fate, Dynamic model