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主論文審査の要旨

《本文》

The originalities of this thesis are: to develop the ordinary kriging and co-kriging for groundwater As concentration model and then used it to interpret the underlying geological process in the hydrothermal mineralization area; to develop an advection dispersion contaminant transport simulation to distinguish two possible sources of As in the shallow groundwater and comparing the spatial distribution pattern of As in the groundwater with the result form geostatistic model. In addition the interpretation of geology and hydrological process is verified by combining stable isotopes analyses and geochemistry of waters with microscopy, spectroscopy and SEM analyses of rock samples. The study of As contamination in mineralization area can contribute to the field of environmental earth sciences especially in water resources and contamination to determine the mechanism of contamination and understanding spatial-temporal distribution model of As concentration for water resources management to support a better quality of human life.

Some works are recommended for the future research. First is to develop an approach to estimate the uncertainty of seam structures by using the combination of indicator kriging, sequential Gaussian simulation and sequential Gaussian co-simulation and then compare it to the combination of ordinary kriging and co-kriging. The second future work is to develop a reactive 3D advection dispersion simulation based on plausible chemical reactions for simulating As contamination especially in area which has high As rich minerals associated with mineralization and dissolution of minerals. The third is for SEM, where the combination with electron probe microanalyser (EPMA) on observation tools is necessary to see the form of very fine particles in very low concentration (ppm).

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