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Development of evaluation technology for characteristics of rock mass on solute transport

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In this study, the techniques for in-situ tracer experiments, acoustic tomography, and radon concentration measurements and highly-viscous-fluid injection tests were developed in order to evaluate solute transport characteristics of rock mass.

As for the techniques for in-situ tracer experiments, a new testing apparatus was manufactured to conduct experiments with sorbing tracers in fractured rocks. An inverse analysis method was also developed on the basis of the neural network approach to estimate fracture aperture, longitudinal dispersion length and distribution coefficient on rock matrix from tracer breakthrough curves.

As for the technique for acoustic tomography, a new testing apparatus was manufactured. In the apparatus, acoustical waves of high frequency 10 ? 100 kHz are used to detect fractures between boreholes.

A technique for radon concentration measurements was developed to estimate the average aperture of a fracture between boreholes based on the concentration of radon dissolved in the groundwater in a fracture and the radon flux from the fracture surface.

A technique for highly-viscous-fluid injection test was also developed to estimate flow dimension and fracture aperture. In this technique, methylcellulose aqueous solution is used as highly-viscous -fluid.

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Keywords: HLW disposal, fracture, tracer experiment, solute migration, rock mass