A Validation of Water- CO2 Migration Model by In-situ Gaseous CO2 Injection Test into Rock Mass

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CO_2 geologic storage, which is investigated as a reduction method of greenhouse gas, needs to be conducted CO_2 migration analysis that aims to evaluate time and space of CO_2 migration and environmental influence on rock mass and groundwater. Since it is not obvious that a numerical analysis using CO_2 migration model, which includes spatial distribution of absolute permeability and porosity, relative permeability, capillary pressure, and CO_2 physical properties, can represent the actual migration behavior of CO_2, a field CO_2 injection test and its numerical simulation using the CO_2 migration model were performed in this study. As a result, reproduction of pressure response and CO_2 migration speed in the field experiment can indicate a validation of the CO_2 migration model, which is constituted of absolute permeability acquired from the result of the field permeability test and its simulation, relative permeability, porosity, and capillary pressure measured or evaluated in the laboratory using boring core. In addition, the numerical simulation resulted in the feature of CO_2 migration that dissolved CO_2 can spread wider than gaseous CO_2 can do during CO_2 injection.