

Numerical simulation of changes in geophysical observables due to CO₂ injection into aquifers

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Mathematical postprocessors have been developed in cooperation with NEDO to calculate time-dependent earth-surface distributions of microgravity, electrical self-potential and apparent resistivity (from either DC or MT surveys). The temporal changes are caused by changing underground conditions (pressure, temperature, gas saturation, concentrations of dissolved species, flow rate, etc.), as computed by numerical unsteady multidimensional thermohydraulic reservoir/aquifer simulations. Although the initial application was for monitoring geothermal reservoirs during fluid production and reinjection, the postprocessors can be applied to various subsurface phenomena associated with groundwater in addition to management of geothermal resources. We have developed a postprocessor to describe temporal changes in seismic velocity/attenuation as additional one for the application to CO₂ geo-sequestration problem and carried out preliminary simulations.