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# Advanced Geothermal Reservoir Evaluation

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**Abstract**
Geothermal power generation is one of the base load power sources with very low CO2 emissions. To expand the use of geothermal energy, development risks, such as unsuccessful drilling due to subsurface uncertainties, need to be reduced at an early stage. In general, geophysical surveys (e.g., MT, Gravity, Seismic) are conducted to estimate location and size of reservoirs in new geothermal development sites. However, since distribution and direction of the geothermal fluid cannot be determined only from these surveys, reservoir simulations must be performed based on a conceptual model obtained from the geophysical exploration data. The numerical model can also be used to predict future production. This presentation will first introduce the flow of this series of reservoir evaluations.

As a new approach to reservoir evaluation, monitoring methods after starting production will be also presented. For the sustainable utilization of geothermal resources, understanding the appropriate amount of production and reinjection is necessary. Continuously monitoring subsurface conditions, such as fluid increase/decrease is also crucial. As changes in density caused by increases or decreases in fluid appear as gravity changes at the surface, repeated microgravity measurements can be used to estimate changes in subsurface conditions. Compared with other monitoring methods, repeated microgravity measurements are advantageous because they are low-cost, require minimal personnel, and provide information as a two-dimensional distribution. As few studies have combined reservoir analyses, gravity observations and numerical analysis were conducted in same area, and forward calculation of gravity changes caused by production were performed. By comparing the forward gravity calculations with the measured values, it was shown that improvements in the current reservoir model (e.g., Porosity, Permeability) can be found.