

Technical Challenges of Machine Learning Approach for Porosity Estimation in Nagaoka CCS site

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In CCS, the distribution of hydraulic parameters such as porosity and permeability is one of the key parameters for evaluation of CO₂ storage capacity and CO₂ saturations. These parameters are measured as 1D profiles through well-logging. CCS projects, in general, have only a few wells available in the area of target. The 3D seismic data which covers the three dimensional space does not represent the hydraulic features directly. A technique to integrate these different types of data is required to estimate appropriate geological models.

Machine learning (ML) is a technique for predicting a target property from unknown input data by learning the relationship between known input data and prediction target. In this research, we apply ML approaches to Nagaoka CCS site data for predicting porosity distribution from seismic attributes created from the 3D seismic data. Determination of hyper-parameters of the ML model is often site-specific in predicting geological models. We present the technical challenges when using multiple attributes as input data.

Keywords: CCS, Machine Learning, Geological model