
Abstract

Standard geophysical methods for monitoring CO₂ injection have severe limitations in many cases. In particular, while the presence or absence of CO₂ can be monitored during an injection, it is difficult to quantify changes in CO₂ saturation in most reservoirs. We hypothesize that amplitude variation with offset (AVO) attributes may be able to provide more sensitive discriminators for CO₂ presence. We propose a workflow useful for the prediction of the AVO response to a CO₂ flood under arbitrary fluid saturation and pressure conditions. Using this workflow, we combine laboratory and numerical experiments to upscale and predict the effects of small-scale heterogeneities on AVO response at the seismic scale. This exercise demonstrates the ability of AVO to not only determine the presence or absence of CO₂, but also to track changes in CO₂ saturation over time.

Contact NER for more information.