

Title:

AVO analysis of thin layers: Application to CO₂ storage at Sleipner

Abstract: 200 words

We present an application of model based AVO to a case of thin layer reflections at Sleipner. This approach accurately accounts for the interference of reflections between the layers, as long as the seismic parameters and interfaces are well defined. For a set of defined reflector classes, reference AVO curves are modelled, and approximated by singular value decomposition of the reference curves. The coefficients of the obtained basis functions are then used for classification of reflector responses in measured data.

We apply this method to analyse the top most reflection from a series of thin CO₂ layers. This reflection could come from the interface of the thick top mudstone with a CO₂ layer, or from CO₂ trapped beneath one of the thin intra-reservoir mudstone layers; the data are therefore compared to modelled results for both cases. The model parameters are obtained from well-logs, and by thermodynamic equations and rock physics relations. There are comparable trends between results for the modelled data and the measured data from Sleipner if the model is for CO₂ trapped under the top mudstone rather than under a 1-m layer of mudstone. The results show that the method can differentiate between different scenarios.