

Bayesian geostatistical approach in rock physics modeling and seismic data analysis

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Summary

Achieving higher accuracy in our reservoir models is important for reservoir characterization and flow simulation in unconventional reservoirs due to the complexity and heterogeneity of these types of reservoirs. Moreover, more accuracy can mitigate the risk of induced seismicity during hydraulic fracturing activities and help in making better decisions in enhanced oil recovery scenarios. To build better geological models, our models should incorporate uncertainties in a quantitative way. The Bayesian approach can be used to produce such models, by helping us understand how these models are comparable with the input data and prior information, and how we can incorporate uncertainties into the models. In this study, we used a dataset from an unconventional reservoir in Western Alberta, including both well and seismic data, to produce optimized rock physics and seismic models using the Bayesian approach. Our results indicate that exploring the associated risks in these models plays an important role in the understanding of our dynamic reservoir models.