Geostatistical Seismic Inversion Using Analogs for Reservoir Characterization and Uncertainty Assessment in Early Stages of Exploration

Ângela Pereira[1], Ruben Nunes[1], Leonardo Azevedo[1], Luís Guerreiro[2], and Amílcar Soares[1]

[1]CERENA/Instituto Superior Técnico
[2]PARTEX Oil and Gas

Abstract

In early exploration stages, particularly on unexplored areas, seismic reflection data is most of the times the only data available due to the low acquisition cost and great spatial coverage. In reservoir modeling and characterization, the goal is to predict the subsurface geology and to infer the spatial distribution of the petrophysical properties of interest inside the potential reservoir areas. Geostatistical seismic inversion methods are commonly used to estimate the elastic subsurface properties by simultaneously integrating seismic data with well-log data. However, in unexplored areas the well-log data information is normally absent. In this work we present a new geostatistical seismic inversion methodology that integrates geological analog information as aprioristic acoustic impedance distributions functions to estimate the elastic properties of the reservoir. This geostatistical seismic inversion methodology is particularly of interest to unexplored or frontier basins.