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Uncertainty and Optimization Analysis Using PETREL RE

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Abstract : The ability to make quick yet intelligent and value-added decisions to develop new fields has always been of great significance. In situations where the capital expenses and subsurface risk are high, carefully analyzing the inherent uncertainties in the reservoir and how they impact the predicted hydrocarbon accumulation and production becomes a daunting task. The problem is compounded in offshore environments, especially in the presence of heavy oils and disconnected sands where the margin for error is small. Uncertainty refers to the degree to which the data set may be in error or stray from the predicted values. To understand and quantify the uncertainties in reservoir model is important when estimating the reserves. Uncertainty parameters can be geophysical, geological, petrophysical etc. Identification of these parameters is necessary to carry out the uncertainty analysis. With so many uncertainties working at different scales, it becomes essential to have a consistent and efficient way of incorporating them into our analysis. Ranking the uncertainties based on their impact on reserves helps to prioritize/ guide future data gathering and uncertainty reduction efforts. Assigning probabilistic ranges to key uncertainties also enables the computation of probabilistic reserves. With this in mind, this paper, with the help the uncertainty and optimization process in petrel RE shows how the most influential uncertainties can be determined efficiently and how much impact so they have on the reservoir model thus helping in determining a cost effective and accurate model of the reservoir.

Keywords : uncertainty, reservoir model, parameters, optimization analysis
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