Influence of Different Modeling Techniques on Reservoir Volume

Lothar Schulte[2] and Ayyub Aghamoghlanov[1]

[1]Petroleum Geosciences Engineering, University of Stavanger, Baku, Azerbaijan.
[2]Schlumberger, Stavanger, Norway.

ABSTRACT

Facies modeling is one of the initial stages on the way to reservoir volume calculation. Typically, for each depositional environment, a particular facies modeling method is best suited. The geology of the area of investigation can be described by a stacked channel (deltaic) depositional environment. This work represents a set of models, which are created using Object Modeling and Sequential Indicator Simulation method. Sequential Indicator Simulation is a pixel based modeling method, which is based on the estimation of the probability of each facies at every grid point. The facies at the grid point is derived from the Cumulative Distribution Function (CDF) of the facies probabilities and a random number generator used for deriving the facies from the (CDF). The main modeling parameters of the Sequential Indicator Simulation method are: a controlling parameter for the random number generator and the three variogram ranges. Reservoir models based on Object Modeling consist of objects, such as channels or simple geometrical bodies. In the object based modeling method, the main parameters describing channel geometry are: Thickness, Width, Amplitude and Wavelength. One of the main purposes of this project is to investigate the influence of these modeling parameters on the reservoir volume spread. Research is also covering the influence of the well position with respect to the reservoir on the reservoir volume spread. This is accomplished thru defining areas of investigations at different locations with respect to one well. Finally, a close look is taken at the seismic impedance as a guide for facies modeling, which can help reducing the reservoir volume uncertainty. The outcome of the study will be a set of recommendations for facies modeling of a stacked channel environment that result in a more reliable reservoir volume estimation and uncertainty evaluation.