3D Stochastic Models for Reservoir Characterization (on the Example of Bahar Field, Azerbaijan)

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Currently hydrocarbon exploration in Azerbaijan is focused on the offshore sector, where detail prediction of deposition environments and reservoir architecture is problematic due to limited core recovery and absence of accurate reservoir models. That's why Bahar oil-gas field were chosen for modelling.

A variety of stochastic models have been employed to stimulate the architecture of hydrocarbon reservoirs of fluvial-deltaic origin. In this report we concentrated on object-based models particularly designed for geological problems requiring the discrete variables' prediction. As a visualization tool we used well-known Reservoir Modelling System (RMS-6.1).

Several types of data observed in wells were included as input to the program: 1) sedimentary units' identification and thicknesses; 2) permeability/porosity observations from plugs/logs; 3) interpretation of channel/channel belts as being present in one or more wells. Some assumptions (like paleo-currents direction, sand/shale ratio) necessary for the model run were made basing on outcrops analogue data.

On the basis of existed premises and digitised data the reconstruction of paleogeographic environment (allowed to reveal several important facies associations- fluvial, delta plain, delta front, prodelta- differed from each other by clay and sand content, grain size, thickness, lateral continuation) and 3Dmodeling of sedimentary architecture (together with reservoir properties' petrophysical simulations) for upper section of Lower Pliocene sedimentary unit were carried out.

Such modelling represents the greatest promise for the thorough understanding of a real reservoir 3Dgeometry. However, integrated information from other sources (seismic data, tectonics) must be used for complete reservoir evaluation.

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