AP19

Digital Outcrop Modeling of Minjur, Marrat and Dhurma Formations: Integrating Sedimentology, Stratigraphy and LiDAR data

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SUMMARY

Digital outcrop models provide important high resolution and quantitative sedimentological data unavailable or difficult to be obtained from the subsurface formations. The Jurassic succession contains several important reservoirs that have excellently exposed stratigraphically equivalent units in central Saudi Arabia. This study provides an outcrop-based case study dealing with Late Triassic to the Middle Jurassic of Minjur, Marrat and Dhurma formations. The study was carried on selected outcrops around Riyadh in central Saudi Arabia. The main objective of the study is to investigate the sedimentological heterogeneity, establish the stratigraphic hierarchy and the reservoir zonation and eventually to build up digital outcrop model. The study was based on sedimentological field observations, Gamma Ray measurements, terrestrial laser scanning or LiDAR data and laboratory analysis. The products of this study are high resolution digital outcrop models for these formations. This final integrated model was capable to reveal detailed description of the sedimentology, the stratigraphic hierarchy, the spatial stacking pattern, distribution of the lithofacies and cyclicity within each formation. The model also helped to characterize and correlate the reservoir and the non-reservoir units and to reveal types of depositional heterogeneity and their lateral continuity and architecture. The models might contribute to understand and reveal micro to macro inter-well sedimentology and heterogeneity and help to and resolve any related uncertainties. The final digital models could act as a geological database and if integrated with subsurface data would enhance our understanding and prediction for the reservoir quality and architecture of these formations.