

New Directions in Reservoir Characterisation

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The use of geostatistical tools for modeling reservoir heterogeneities and assessing uncertainty in reservoir forecasting has increased significantly since the 1990s. Building a suitable reservoir model calls upon the skills of many people. Geologists provide critical input on the sedimentology and stratigraphy of the subsurface. Geophysicists provide valuable information on the geometry of the reservoir and the internal distribution of reservoir properties in the interwell region. Engineers, with their knowledge of flow processes and production data, provide critical information on connectivity and major heterogeneities.

I do not address any single discipline; the emphasis is on the interdisciplinary interaction necessary to build numerical geological models consistent with all available information sources. The new directions of 10-15 years ago are now commonplace: object-based modeling of facies, sequential simulation of petrophysical properties, cosimulation with seismic, and so on.

This talk reviews current research directions and discusses some of the tools that will become commonplace in the next 10-15 years. The main challenges of heterogeneity modeling, data integration, and uncertainty quantification have not changed; however, improved understanding of data, geological processes and dynamic data will drive applications in the next years. The full solution of fine-scale 3-D modeling followed by costly post-processing will be supplemented by tools tailored to specific problems and limited professional resources. Optimization tools for decision making such as well placement will become commonplace.