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Modeling Reality—Importance and Impact: A 3-D Modeling Sensitivity Study on the Grassy Member of the Blackhawk Formation, Book Cliffs, Utah

The Blackhawk Formation is a frequently used analogue for various subsurface shoreface reservoirs. Copious parameters are routinely abstracted and used in the construction of 'analogous' subsurface reservoir models. The quality of the outcrops provide an excellent opportunity to explore the ability of available reservoir modelling packages to accurately replicate nature. Recognising associated pitfalls has direct implications for successful modelling of sparsely sampled subsurface reservoirs.

This study focuses on the construction of realistic outcrop models for the Grassy Member of the Blackhawk Formation, Utah. A series of sensitivity tests are performed and their impact on the resulting model ranked accordingly in terms of the kv/kh ratio.

The sensitivities addressed include: · The degree of well constraint necessary for accurate (or acceptable) replication of the outcrop · Specificity of shale statistics, i.e. the impact of grouping shale length statistics according to parasequence, facies association or outcrop as opposed to using the combined dataset, · Derivation of realistic probability density function's for body size distribution, and · Modelling only those shales that would be resolved by standard gamma-logging.

Our initial findings indicate that lower well constraint, non-specificity of input shale statistics and poor representation of body size distributions have a negative impact on kv/kh, whilst modelling only shales above the gamma-log threshold results in a reduction in honouring of well data and an over optimistic prediction of kv/kh. We conclude with an assessment of the implications for reservoir management when modelling real world reservoirs using outcrop statistics.

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