

Outcrop-based investigation of thin siltstone beds in basin-floor fan deposits and their impact on reservoir flow

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The presence of thin discontinuous siltstone beds within deep-water clastic reservoirs can potentially have a significant impact on reservoir flow. The vertical frequency of such siltstone beds in the subsurface can be obtained from core and well logs. However, these beds are typically not correlatable over inter-well volumes, so that changes in their lateral continuity and nature are difficult to determine. Such data is best inferred from outcrop analogues.

This poster presents the results of an outcrop to flow simulation study that, focused on the effects on reservoir flow of thin discontinuous siltstone beds within thick bedded basin floor fan sandstones of the Late Miocene Mount Messenger Formation. The lateral discontinuity of the siltstone beds along this section is due to scouring, resulting in local vertical amalgamation of sandstone beds and thus vertical connectivity. The nature of the thin siltstone beds in these deposits ranges from "simple" horizontal beds to inclined beds and locally, compensation style merging of siltstone beds is observed.

2D flow modelling based on the outcrop section shows that although the sandstones are well connected, the presence and variability in the nature and number of discontinuous siltstone beds, imparts heterogeneity in flow properties over relatively short horizontal distances (10's meters).