

Normal Faulting Compartmentalizing an Inverted Reservoir: A Case Study from Inboard Northwest Borneo

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The South Furious Field, N.W. Borneo, has been in production since 1980 yet considerable uncertainty still surrounds the evolution of the reservoir anticline, which exhibits significant variation in structural style along strike. The field is highly compartmentalised, the main antiform is divided by a transfer fault, the reservoir is segmented by at least two sets of normal faults and exhibits stratigraphic heterogeneity. Seismic quality is only fair in the core of the anticline due to the cross-cutting faults and the reservoir heterogeneity. This results in a low degree of confidence with the correlation of faults through the seismic volume. As a result, predicting hydrocarbon distribution ahead of drilling carries a high degree of risk.

Structural restorations of seismic images using 2-DMove restoration software reveal an early phase of counter regional extensional growth faulting down throwing to the SE. NE-SW striking reservoir-scale normal faults developed via crestal collapse above a mobile shale mass. Inversion drove a structural wedge to the NW and produced folding, uplift and erosion of the reservoir rotating the reservoir-scale faults to more gentle dips. As compression continued and the fold limbs steepened, gravity sliding above the shale detachment produced a second set of normal faults striking WNW-ESE offsetting the early, rotated normal faults.

Further development of the field is optimised by developing understanding the structural history, identifying a viable and valid fault framework, and predicting changes in fault behaviour due to a modified stress regime.