

Improved Spatial Models of Short Range Permeability Variations

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ABSTRACT

Permeability derived from well test analyses varies greatly between adjacent wells. Heterogeneity exists at different scales and can be attributed to coal seam distribution and continuity, composition, diagenesis, geomechanical characteristics and reservoir stress evolution. Variations in permeability between wells cannot be estimated with confidence. Current modelling practices are unsatisfactory.

LITERATURE REVIEW

Geological Controls

cleating, composition, rank, diagenesis, thickness, structure (anticlines, faults), shrinkage, stress history

Operational Aspects

Well Design, Drilling, Completion, Damage

Measurement Techniques

Core, Logs, Geophysics, Well Tests, Production Data, Analysis, History Matching

Modelling

Static, Grid size, Correlation, Properties, Upscaling, Geostatistics, Dynamic

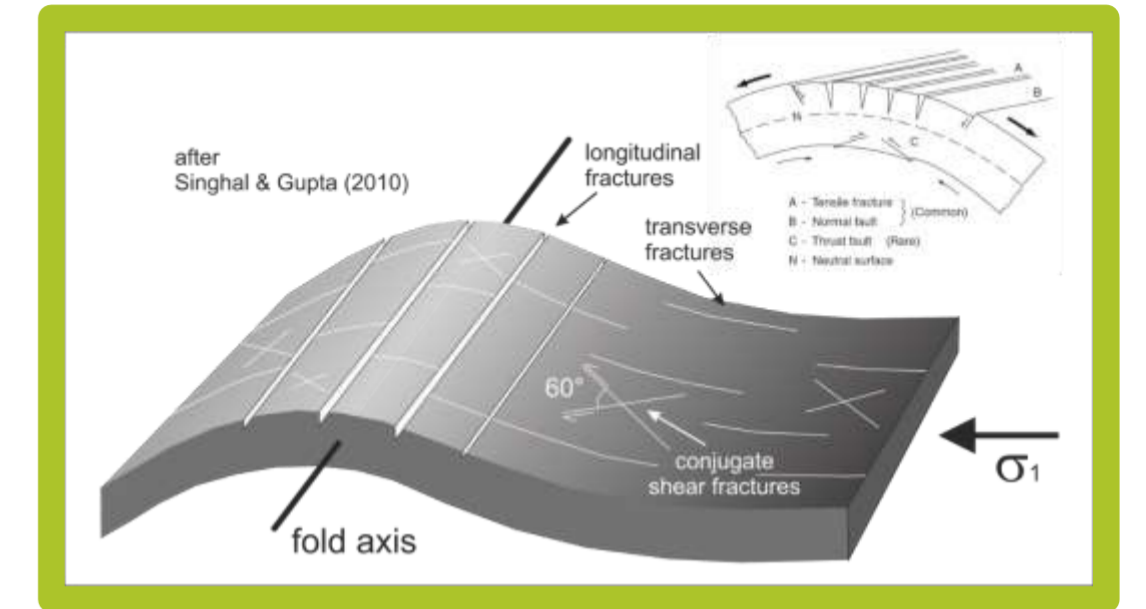
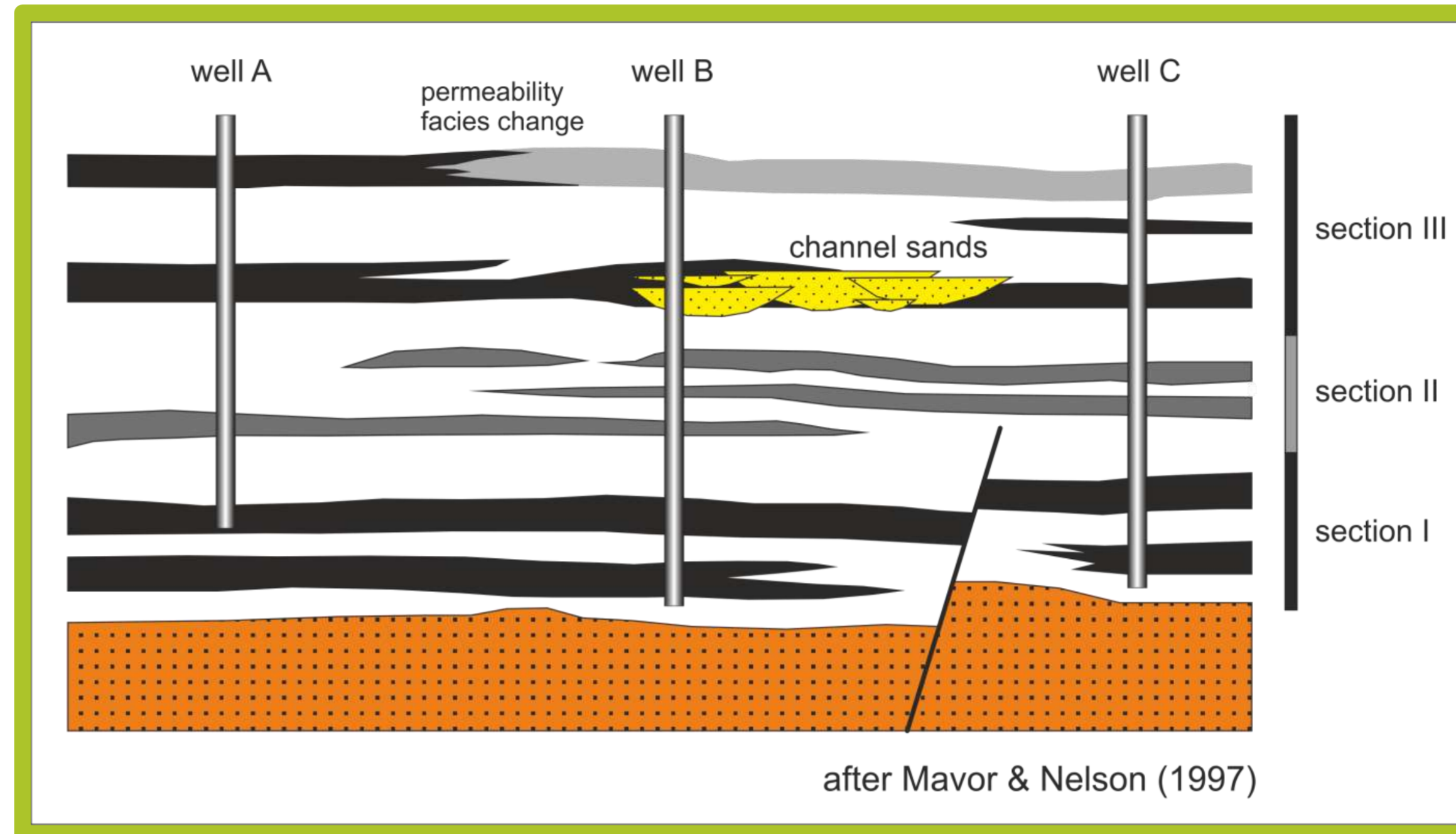
EARLY INSIGHTS

New Measurement Techniques: directional logging while drilling tools

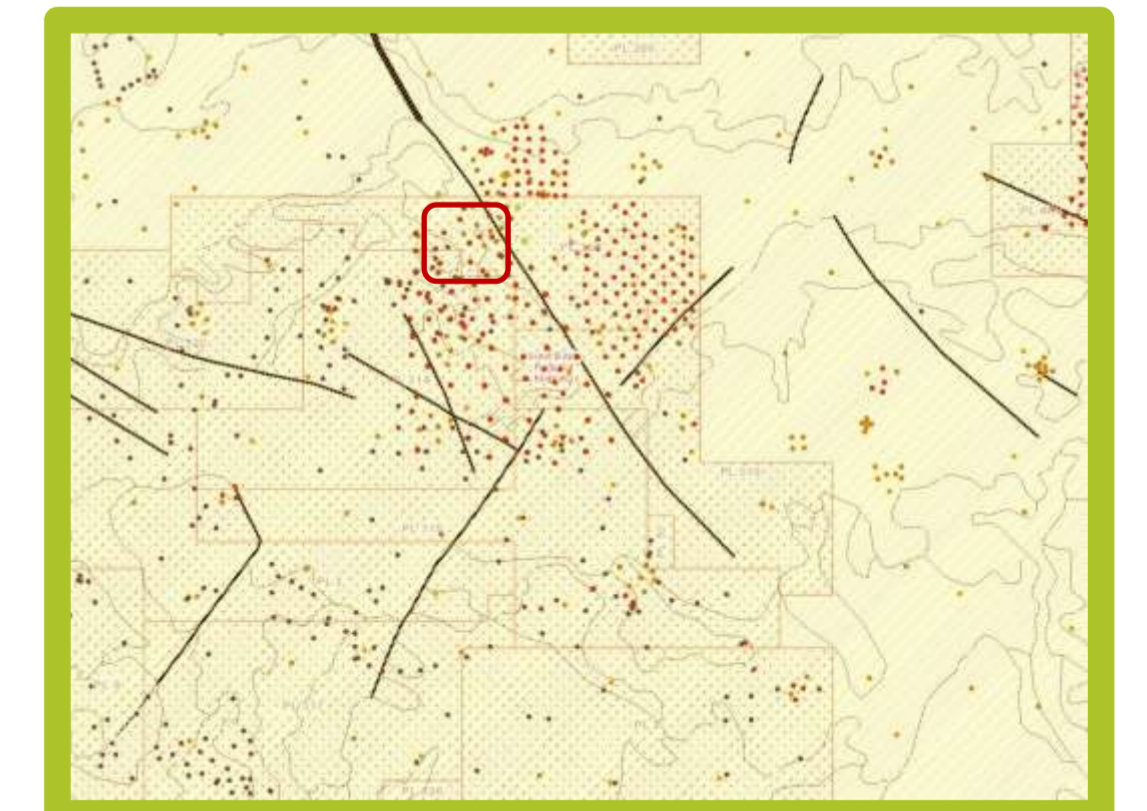
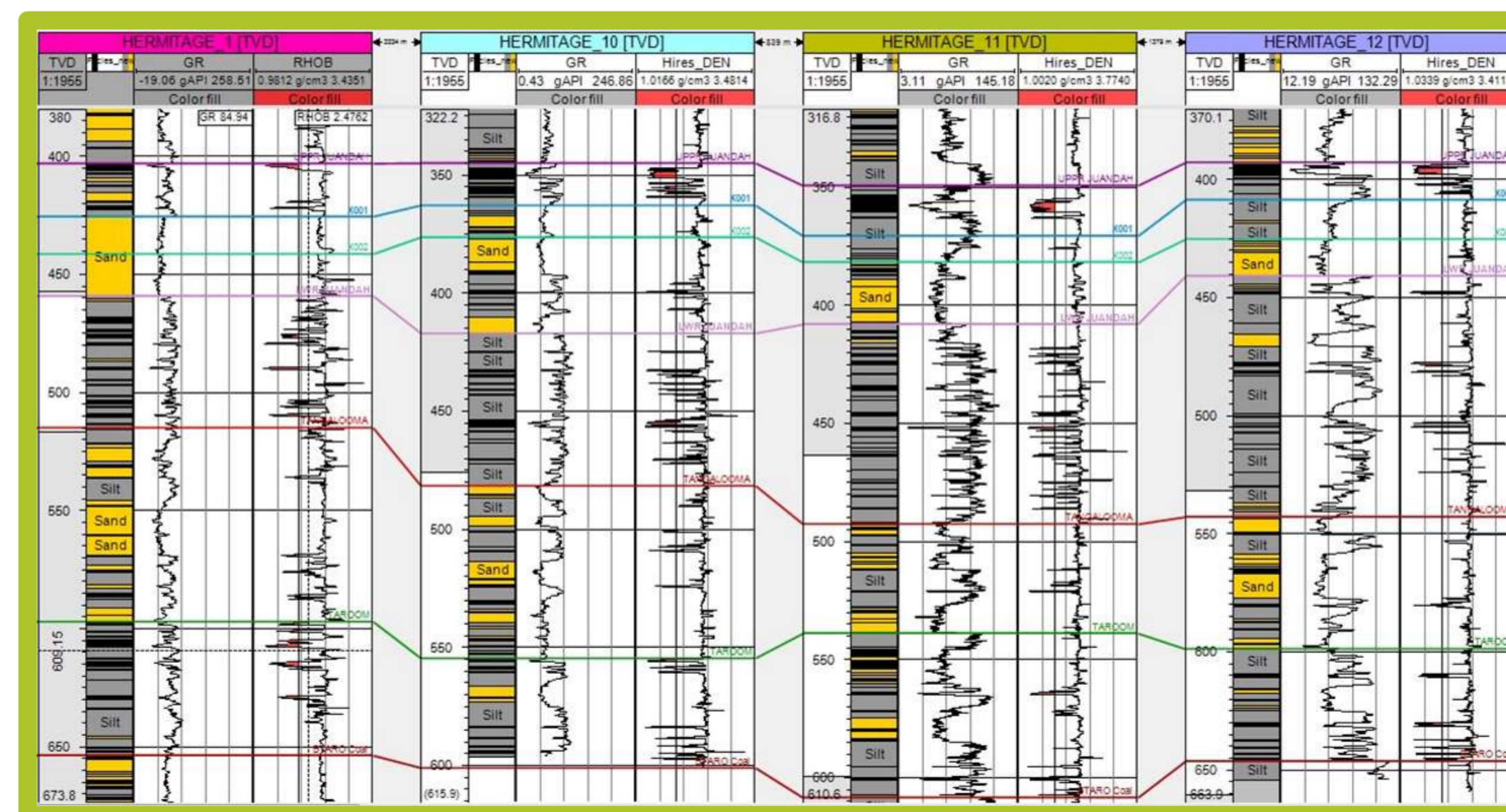
Improved correlation: onshore sequence stratigraphy

Better data interpretation: wells tests, production data, logs, combined data sets, seismic attributes

Improved geostatistics: multi-point, non-linear, spatio-temporal



PRELIMINARY SPATIAL MODELS



Acknowledgments: Santos has provided data

Way forward: i) better ways to use existing data and ii) improved modelling practice