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Reservoir thickness estimation of a fluvial system in an onshore basin, Australia

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Abstract: The effective production of hydrocarbons from the Birkhead Formation in the Eromanga Basin, onshore Australia relies on understanding the complex distribution of reservoir and seal rocks deposited in a fluvial environment. To visualize this complexity, sequence stratigraphic concepts applied to non-marine basins were combined with 3D seismic data visualization in a study of the Birkhead interval over the Merrimelia, Meranji and Pelican fields. Fluvial channel, crevasse splay channel, floodplain-crevasse splay complex and floodplain facies were recognized from the well log motifs in the Birkhead Formation. The interval is interpreted as an alluvial transgressive systems tract bounded by flooding surfaces consisting of shaly or coaly intervals with lateral discontinuity of the fluvial facies. Combining the spatial distributions of sedimentary facies from the well logs and seismic amplitude distributions in the upper part of the interval results in the interpretation of a fluvial meandering channel belt including point bars and abandoned channels. The point bar sandstones in the channel belt should make good reservoirs and the juxtaposition of the point bar and abandoned channel facies can result in a stratigraphic trap component within the channel belt. Although the point bars are known to be wet in this area, it is useful to consider their capacity as oil reservoirs, since they may serve as analogues for similar untested point bars elsewhere. Multiple realizations of the distribution of sandstone thickness of the point bars were generated by conditional simulation, using seismic amplitudes to control extrapolation of the well data. This gave 10m thick in maximum of net sandstone in a point bar area and a potential reserves distribution with a mean value of 18.8 million bbl in

place. The complexity of the fluvial channel described in this paper should aid understanding of the reservoir and seal distribution and help optimize production from other fields.

Key words: [Sequence stratigraphy](#), [visualization](#), [geostatistics](#), [fluvial reservoir](#), [Merrimelia Field](#), [Meranji Field](#), [Pelican Field](#), [Birkhead Formation](#), [GMI trend](#), [Cooper Basin](#), [Eromanga Basin](#), [Australia](#)

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