

Structural Style of the Lower Cretaceous in the Woolsthorpe-Cobden Region, Western Victoria, Australia, and Its Implications for Hydrocarbon Exploration in the Central Onshore Otway Basin

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Seismic and well data from the Woolsthorpe-Cobden region of the Central Onshore Otway Basin in Western Victoria, Australia, have been used to document the style and geometry of Early Cretaceous structures. Half grabens bounded by large Tithonian-Barremian extensional faults developed within Palaeozoic Basement and were filled with syn-rift fluvio-lacustrine sediments of Crayfish Supersequence. A Barremian unconformity, which is one of the regionally recognised seismic horizons, bounds the top of the Crayfish Supersequence and underlies Aptian-Albian fluvio-lacustrine sediments of the Eumeralla Supersequence. The unconformity is clearly angular in the west and centre of the area but becomes less obvious in the east. Faulting activity decreased significantly in the Aptian-Albian allowing basinwide deposition of the Eumeralla Supersequence over the Crayfish half grabens. New extensional faults formed during the Late Cretaceous cut a major unconformity above Eumeralla Supersequence and syn-Upper Cretaceous sediments. Subsurface mapping shows that trapping mechanism will be one of the major risks for hydrocarbon exploration because no significant closures have been recognised at Lower Cretaceous level. Tilted fault blocks structures are capped by only thin Crayfish sediments. For future exploration strategy of Lower Cretaceous targets, we suggest possible stratigraphic traps, such as sandstone pinch-outs, may be more prospective.