

Distribution and Origin of “Anomalously Thick Sandstone Bodies” in the Middle Triassic Doig Formation, Western Canada Sedimentary Basin

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Abstract

Isolated, thick sandstone bodies encased in shale beds and present in the Middle Triassic Doig Formation have been termed “anomalously thick sandstone bodies” (ATSBs) and are present in west-central Alberta and northeast British Columbia. They occur at several stratigraphic levels within the Doig Formation, over a limited geographic area and tend to become younger to the west and southwest. Their distribution closely parallels the trend of the Peace River Embayment and the location of individual ATSBs may be controlled by underlying normal faults in Carboniferous and Permian beds.

The ATSBs vary in size and shape from single well occurrences to long and narrow, to irregular in shape. Sediment thickness ranges up to about 55 m. The sedimentary structures and facies associations within the ATSBs indicate deposition in a shoreface environment. Stratigraphic relationships indicate that they formed during a relative sea-level fall.

A number of interpretations for their origin have been published: 1) estuarine deposits, 2) deltaic, 3) low-stand shoreface deposits, 4) slope-slumps filled with turbidites, 5) growth-fault grabens filled with shoreface deposits, and 6) shelf slumps filled with shoreface sediments and formed during periods of relative sea-level fall. Interpretation number 6 appears to fit the facies and stratigraphic setting. The ATSBs formed in translational and rotational slumps on a muddy prograding siliciclastic sediment lens during periods of relative sea-level fall. Lower and middle shoreface deposits filled in these slumps during base-level fall and were subsequently capped by a thin layer of transgressive sandstone when sea-level began to rise.