

Devonian Antler Fold and Thrust Belt and Foreland Basin Development in the Southern Canadian Cordillera: Implications for the Western Canada Sedimentary Basin

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Interpretations of outcrop data from the Purcell and Rocky Mountains of southern Canada reinforce the controversial view, debated over the last several decades, that the mid-Paleozoic Antler Thrustbelt and associated foreland basin extended to the north, from the type area in the western United States, into Canada. Middle Devonian syndepositional folding is recognized within Middle Devonian foredeep strata within a wedge-top basin exposed in the Delphine Creek region of the Purcell Mountains. Middle Devonian foreland basin strata include coarse-grained clastics derived from uplifts at the western region of the continental margin, and pinch out to the northeast against the Western Alberta Ridge, which is interpreted to have been a peripheral bulge.

The Western Canada Sedimentary Basin is interpreted to have been a distal foreland basin during the Devonian and Mississippian. Significant changes in subsidence and uplift patterns within the basin, and an increase in the general rate of subsidence, may have been influenced by a combination of flexural loading by thrust sheets and foreland basin strata and horizontal in-plane stresses associated with Antler convergent tectonism. Faults that influenced deposition of mid-Paleozoic sediments, and created permeable pathways for the flow of hot fluids, may have formed as the result of horizontal in-plane stresses. Hot fluids that significantly influenced diagenetic processes in mid-Paleozoic carbonate reservoir rocks may have been tectonically expelled into the distal foreland basin in response to Antler thrust belt development.