

# **Structurally Influenced Nordegg Member Facies Belts: Deposition Within an Emerging Retro-Foreland Basin**

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## **ABSTRACT**

The Lower Jurassic Nordegg Member of the Western Canada Sedimentary Basin provides a unique opportunity to study tectonic influences on sedimentation within an emerging retro-foreland basin.

In the subsurface of west-central Alberta, the Nordegg Member is predominately a fine-grained calcareous shale and marlstone package. It is organic-rich and contains numerous ammonite lateral impressions, coccoliths and radiolaria. Such well-constrained biostratigraphic control allows comparison of local relative sea-level changes with global sea-level curves. Hence, the influence of eustatic versus local tectonic controls on sedimentation can be assessed.

Another method of demonstrating the influence of tectonics on the deposition of the Nordegg Member is comparing the orientation of Nordegg Member facies belts and paleogeography through time. We will demonstrate how Nordegg Member facies boundaries changed significantly in orientation during the Early Jurassic. Such shifts in facies orientations were likely related to changes in basin shape due to differential loading onto the western edge of the North American plate. The reconstruction of Nordegg Member paleogeography was aided by identification and mapping of key stratigraphic surfaces such as angular unconformities, paleosols, as well as transgressive and erosional surfaces. Some of these surfaces were unexpected within strata previously interpreted to have been deposited on the continental slope and “deeper” shelf of the pre-Laramide passive margin of western North America.

Additional structural influences on the Nordegg Member include abrupt facies changes in the Peace River Arch region, in particular across the north rim of the Ft. St. John Graben.