

# **The Effect of Reactivating Basement Structure on Devonian Strata of the Western Canada Sedimentary Basin**

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## **ABSTRACT**

The WCSB carries the structural heredity from not only the Laramide orogeny, but also an ancient intracratonic fault system which constitutes part of the basement structure within this basin. Devonian depositional models, sequences and their boundaries, correlations, even pool and field boundaries have been interpreted without a systematic approach to understanding and integrating this time-transgressive structural imprint. Differential erosion, overthickened sections, fracturing and anomalous mineralization result from the subtle dominantly vertical movements of the intracratonic faults. These vertical movements may be a result of the cratonic transmission of in-plane stresses from the Antler orogeny.

This project utilizes “raw” data from a variety of sources which is then interpreted in context, both temporally and spatially. Techniques include extensive core work, biostratigraphy and remotely-sensed data have been integrated. The focus has been to document the basic sequences, their boundaries, and to determine the structural grid/ framework. This applied methodology not only shows the connections between sequences, structure and time, but also carries substantial predictive potential.

The case study to be presented is of a WCSB “sub-basin” now interpreted as a down-dropped graben complex. Substantial correlation problems within these Devonian strata resulted from the lack of recognition of this graben complex. The resulting domino effect proceeded down-section, leaving prospective reservoirs undrilled. The techniques utilized for this research can be used as a template for application to other areas and rock units both within and outside the basin. This multi-disciplinary approach can be applied with equal validity to exploration for hydrocarbons and potentially economic sulphide deposits.