

## **Pennsylvanian–Early Permian cyclic shelf sedimentation in the Sverdrup Basin at the time of contemporaneous tectonism, SW Ellesmere Island, Arctic Canada (Nunavut)**

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### **Abstract**

Around the world, Bashkirian (Pennsylvanian) to Sakmarian (Lower Permian) strata are arranged in a series of high-order unconformity-bounded transgressive-regressive (T-R) sequences, also known as cyclothems. Because cyclothems accumulated contemporaneous to widespread glacial advances and retreats in Gondwana, they are considered to be of glacio-eustatic origin. Indeed, evidence indicates these sequences were the result of high amplitude (50–100 m) relative sea level fluctuations at a periodicity ranging from 100,000 to 400,000 years. In stable cratonic areas, such as the Midcontinent USA or the Russian Platform, individual cyclothems have been correlated over hundreds to thousands of kilometres laterally providing a reliable temporal “strip-chart” of the sedimentary record. In contrast, areas of contemporaneous tectonic activity (compressional or extensional) display a much less reliable cyclothem record. In such instances, individual cycles or groups of cycles can be missing, and cycle-to-cycle correlations, even over short distances, is difficult, if not impossible. The Western Canada Sedimentary Basin (WCSB) is one such area that was under the throes of active tectonism and where the Pennsylvanian–Early Permian record comes and goes over short distances, often from well to well. The Sverdrup Basin is another example of a tectonically-influenced basin, but contrary to the WCSB, the Pennsylvanian–Lower Permian record is here very thick and superbly exposed. Deciphering the low-order tectonic influence from the high-order glacio-eustatic influence on sequence stratigraphic packaging was one goal of our study.