

Uninterrupted Middle Permian To Early Triassic Sedimentation In The Canadian Arctic : Cold NW Pangea Margin As A Formidable Barrier To Biotic Migration Prior To The PT Extinction

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ABSTRACT

One of the most enduring ideas about the stratigraphy of the Sverdrup Basin, and most of NW Pangea, including western Canada, is that a major sub-Triassic hiatus, encompassing the uppermost three stages of the Permian (Capitanian, Wuchiapingian, Changhsingian), occurs across the entire width of the basin. This idea is based upon the older ages (Roadian and Wordian) traditionally assigned to fossils found in various units (van Hauen, Degerbols and Troid Fiord formations) beneath the Triassic Blind Fiord Formation and to the belief that the entire basin was subjected to widespread erosion near the end of the Permian. However, new carbon isotopic data in concert with sequence stratigraphy and a thorough analysis of surface and subsurface physical and seismic relationships of sub-Blind Fiord units is showing a different picture. While there is evidence for a significant sub-Blind Fiord unconformity at the basin margin, there is also plenty of evidence to show that this unconformity does not carry across the entire basin, nor that 15 Ma worth of strata are missing beneath it.

The goal of this presentation is to demonstrate that Middle and Late Permian rocks younger than Wordian exist in the Sverdrup Basin and to provide an explanation as to why such an obvious conclusion has eluded past workers. It is proposed that cold oceanic conditions, associated with a shift in thermohaline circulation in Early Permian time (see other talk by Beauchamp), prevented diagnostic biota representative of the uppermost three Permian stages to migrate from the low latitude areas of western USA and the Tethys to the mid latitude areas of NW Pangea. These conditions also allowed an impoverished biota to linger much longer in NW Pangea than elsewhere in the world, thus resulting in Wordian-like biota within post-Wordian strata. Rapid and global warming associated with the end-Permian extinction removed the cold water barrier from the oceanic margin of NW Pangea, but only resilient swimming organisms like

conodonts and ammonoids were able to take advantage of this new niche, as most other organisms had been eradicated by the extinction.