

# Onshore-offshore comparisons of Cretaceous and Paleogene strata from Bylot Island and the western Baffin Bay margin, Nunavut, Canada

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The Labrador Sea and Baffin Bay formed during Cretaceous rifting and subsequent Maastrichtian to Paleocene seafloor spreading, which ended by late Eocene time. The age and nature of rift-related sedimentary strata along the western Baffin Bay margin are largely unknown due to limited sampling; accordingly, analogues must be drawn from nearby contemporaneous onshore exposures. The rift succession is also preserved onshore in Eclipse and North Bylot troughs on Bylot and northern Baffin islands, as well as in small exposures on southeast Baffin Island. Here, we compare Lower Cretaceous through Paleogene units between the onshore and offshore. The ichnology and sedimentology of 35 stratigraphic sections from Eclipse and North Bylot troughs were assessed, in conjunction with palynological analyses, to better understand their depositional environments and age. Along the western Baffin Bay margin, twenty-three shallow core-hole bedrock samples, in addition to bedrock material from three piston cores and two dredge samples, were assessed in terms of their sedimentological and ichnological characteristics, and palynological analyses were conducted for the few samples lacking previous age determinations. Lower Cretaceous strata from Eclipse and North Bylot troughs, as well as strata previously documented from southeast Baffin Island, generally considered non-marine in origin, also show several shallow marine, shoreface intervals characterized by the *Skolithos* or proximal *Cruziana* Ichnofacies. Comparable offshore, Lower Cretaceous samples from Cumberland Sound and northeast of Padloping Island, comprise shales and sandstones of non-marine to possibly shallow marine, deltaic origin based on palynology and sedimentology. Upper Cretaceous sections on Bylot Island include thick mudstones and lesser sandstones. The mudstones typically contain abundant *Phycosiphon*, consistent with a distal marine, *Zoophycos* Ichnofacies, but outer to inner shelf transitions with sandstone intervals show a more diverse archetypal *Cruziana* Ichnofacies. The sandstones are storm-dominated, with interbedded fair-weather beds also containing an archetypal *Cruziana* Ichnofacies. A number of offshore Upper Cretaceous mudstone samples from Buchan Trough, Home Bay, and Scott Trough similarly contain a distal *Cruziana* to *Zoophycos* Ichnofacies consistent with outer shelf settings; some sandier intervals may reflect distal prodeltaic deposition. Onshore Paleocene mudstones contain a low diversity and low abundance of trace fossils reflecting shallow, brackish-marine deposition, with localized beds containing cone-in-cone structures that could be comparable to an undated core sample from Scott Trough. Overall, the onshore succession appears to compare closely with offshore samples, proving its value as a vital stratigraphic analogue.