

Regional bedrock geology of the Baffin Island Shelf

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During the last decade geophysical and geological cruises in Davis Strait and Baffin Bay have outlined the regional bedrock geology of the Baffin Island continental shelf.

On the southeastern Baffin shelf Precambrian metamorphic rocks form the bedrock adjacent to the coast. Lower Paleozoic carbonate rocks underlie much of the shelf between Frobisher Bay and Cumberland Sound and extend northward toward Cape Dyer. These rocks also occur in Hudson Strait and Frobisher Bay and may be present in Cumberland Sound. Sedimentary and volcanic rocks mainly of Tertiary age occur over much of the central and outer parts of the southeastern shelf. The stratigraphic section off Cumberland Sound has been disturbed by the emplacement of northeast-southwest trending subsurface ridge-like structures. Mesozoic strata on the southeastern Baffin shelf appear to be confined to the subsurface except where locally involved in structures such as

those off Cumberland Sound.

On the northeastern Baffin shelf the presence of Paleozoic rocks beneath younger sequences shoreward of the continent-ocean transition zone has been suggested from seismic refraction results, but it has not been possible to confirm this by sampling. Upper Cretaceous (Senonian) marine sediments sampled at Home Bay and Buchan Trough occur extensively along the northeastern shelf beneath a variable cover of Lower Tertiary sediments.

Post-Eocene erosion has bevelled much of the southeastern Baffin shelf and developed deep transverse troughs on the northeastern shelf.

The presence of an active submarine oil seep, recovery of samples of promising source rocks by seafloor sampling and exploratory drilling results indicate that conditions favourable for the generation of hydrocarbons have existed in the area.

dipping thrust planes. The lower thrust emplaces amygdaloidal basalts and bedded tuffs (?Precambrian, ?Devonian) over sediments of the Tynemouth Creek Formation (Westphalian A-B). Close to the thrust plane, the underlying sediments have been overturned towards the north. Resting unconformably on the upper surface of the basalt is a thin layer (<5m) of Windsor limestone (Visean; probably zone A or B) which is disconformably overlain by coarse, polymict conglomerates of inferred Hopewell/Canso Group age (Namurian). This sequence, which may be a few metres or tens of metres thick dips to the southeast at up to 50°. It is truncated by a major fault extending in a northeast-southwest direction and dipping southeast at 45°. To the southeast of the fault, lie thick-bedded Hopewell conglomerates, overturned towards the west and northwest, and dipping towards the east and

southeast between 30° and 90°. These beds appear to be part of a large recumbent fold which was subsequently thrust over the lower, non-inverted limb. Folding and thrusting in the Quaco area was certainly post-Westphalian B and may be viewed as a local response to dextral strike-slip movement on the Cobequid Fault which is inferred to lie a few km to the south. Following Alleghenian/Hercynian deformation, the area underwent extensive erosion prior to deposition of a thick sequence of Triassic alluvial sediments (Quaco Formation). The upper thrust plane was reactivated as a normal fault during a phase of post-Triassic rifting along the Bay of Fundy (presumably related to early Atlantic rifting). During this period, blocks of the Triassic were downfaulted (100s or even 1000s of metres) against rocks ranging in age from ?Precambrian to Westphalian.