

Cenozoic structural geology of Banks Island, western Canadian Arctic Archipelago, N.W.T.

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Banks Island is the westernmost island of the Canadian Arctic Archipelago and is situated near the continental margin of North America towards the Canada Basin of the Arctic Ocean. Until now, little was known about tectonic structures on Banks Island and their possible relationships to the tectonic evolution of the continental margin. Field and seismic data indicate that sedimentary rocks on Banks Island have been affected by extensional movements creating abundant normal faults. Fieldwork on Banks Island during the summer of 2016 showed that Devonian, Cretaceous and Paleogene deposits on northern Banks Island are characterized by a number of local, restricted deformation zones that we interpret to indicate both dextral and subordinate sinistral strike-slip deformation along NNE-SSW striking structures parallel to the continental margin of Banks Island. The presence of Cenozoic strike-slip deformation on Banks Island extends the area of known Cenozoic strike-slip along the continental margin southwestward from where it had been previously documented in northern Ellesmere Island. Field observations indicate normal faulting took place before and after the strike-slip deformation. The observation of strike-slip motion on Banks Island suggests a component of strike slip over the whole Paleogene North American margin.