M.Sc. THESIS DEFENCE

by

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"Chronostratigraphy of the Beaufort Formation, western Canadian Arctic Archipelago"

PLACE: The Milligan Room, 8th Floor Biology Wing, LSC, Dalhousie University

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TIME: 9:00 a.m.

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PLEASE NOTE: A copy of the thesis is available in the main Earth Sciences Office (LSC) 3006
The Beaufort Formation (BF) braided river deposit contains exceptionally well-preserved logs, leaves, peat, insects, and vertebrate fossils that provide key evidence for Arctic environmental conditions during the Pliocene. Its wide geographic range along the western edge of the Canadian Arctic Archipelago suggests that its deposition and incision history were dictated by regional drivers of sediment transport (e.g., sea-level change, permafrost thaw, ice sheet erosion, and dynamic topography). Hence, the BF provides clues about both environmental and depositional conditions. However, the available geochronology is insufficiently precise to link the BF deposition to specific climatic events, such as the polar amplification of global warming (Pliocene Climate Optimum, 3.3-3.0 Ma) or the onset of northern hemisphere glaciations (Plio-Pleistocene transition, 2.6 Ma). I use cosmogenic nuclide burial dating at the southernmost BF locality (Ballast Brook on Banks Is.) to obtain: a) a minimum age of $2.72^{+0.34}_{-0.24}$ (1 σ) Ma, and b) a maximum catchment-wide paleo-erosion rate of 49-86 ± 2 cm/ka. The description of a previously unreported glaciofluvial gravel (which approximately occurs at the same stratigraphic level as an ice-wedge pseudomorph and may coincide with the base of a previously-mapped 3 km-wide cut-and-fill channel) dates the earliest evidence of CAA glaciation, at 2.72 Ma. The presence of the large channel, which runs parallel to and is within 5 km of the current northern coast of Banks Is., suggests that M’Clure Strait (and the Northwest Passage) was not in its present position or was filled. This is supported by the predominantly NW paleoflow measured in the BF exposures in the study area. The BF and the voluminous correlative portions of the offshore Iperk Formation may have been sourced by nearby deposits of the unconsolidated Paleogene Eureka Sound Group and Miocene Ballast Brook Formation.