



Department of Geology Seminar Series
Presents

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Oceanography

*Active Marine Geohazards on the seafloor of
Eastern and Arctic Canada*

THURSDAY, NOVEMBER 22 - 1:00pm
Science 411

Everyone is welcome to attend!



GEOLOGY
FACULTY OF SCIENCE

ACTIVE MARINE GEOHAZARDS ON THE SEAFLOOR OF EASTERN AND ARCTIC CANADA

Alexandre Normandeau

Geological Survey of Canada, Bedford Institute of Oceanography

Submarine landslides and turbidity currents are gravity flows that transfer large amounts of sediment and organic carbon to the deep-sea. They represent major geohazards as they can sever fiber-optic communication cables, rupture subsea pipelines, and damage oil and gas infrastructures. Thus, an understanding of where, when and how they occur is critical to mitigating their impact. Because there are so few direct observations of turbidity currents and submarine landslides, the factors responsible for triggering them are poorly known and understood. This presentation will illustrate the controls governing the most recent and active geohazards observed on the seafloor of both eastern and Arctic Canada. In eastern Baffin Island fjords, the behaviour of retreating glaciers dictates the presence or absence of turbidity currents on delta fronts. In southeastern Canada, glaciers are now absent, suggesting that most geohazards occurred during the late-Pleistocene when glaciers provided large volumes of sediment to the continental slope. However, new mapping of the southeastern Canadian shelf and margin has revealed recent giant landslides and active turbidity currents. Offshore of Nova Scotia, a submarine landslide deposit the size of lake Ontario, triggered between 4 and 1.5 ka BP, was just discovered. Additionally, a monitoring program undertaken in the Gulf of St. Lawrence combining repeat mapping of the seafloor with acoustic doppler current profilers (ADCPs) revealed the recurring presence of turbidity currents that lead to the migration of bedforms on the seafloor. Geohazards in eastern and Arctic Canada, therefore, appear to be more active than previously thought; we need only look in the right locations with a fresh perspective!

Research Profile

Alexandre Normandeau

Geological Survey of Canada, Bedford Institute of Oceanography

Normandeau's research focuses on sediment transport processes in marine and lacustrine environments across a broad range of temporal and spatial scales. Specifically, his goal is to understand the triggers and the frequency of extreme events such as submarine landslides and turbidity currents that can severely damage submarine infrastructures. At the GSC, Normandeau is involved in the study of marine geohazards along the Eastern Canadian margin, the Western and Eastern Canadian Arctic and the Gulf of St. Lawrence. Normandeau uses a wide variety of methods, including high-resolution seafloor mapping techniques (multibeam bathymetry) and geophysics, water column measurements using current profilers and the collection of sediment cores that are analyzed for physical and geochemical properties.