Geophysical Research Abstracts
Vol. 19, EGU2017-5637, 2017
EGU General Assembly 2017
© Author(s) 2017. CC Attribution 3.0 License.

Supercritical flow bedforms in active (and less active) turbidite systems of Eastern and Arctic Canada

Alexandre Normandeau (1), Patrick Lajeunesse (2,3), Calvin Campbell (1), Edward King (1), Guillaume St-Onge (4), Daniel Bourgault (4), Urs Neumeier (4), Pierre Francus (3), Antoine Gagnon-Poiré (2,3)

(1) Geological Survey of Canada - Atlantic, Bedford Institute of Oceanography, Dartmouth, Canada (alexandre.normandeau@canada.ca), (2) Département de géographie, Université Laval, Québec, Canada, (3) Institut national de la recherche scientifique, Centre Eau Terre Environnement, Québec, Canada, (4) Institut des sciences de la mer de Rimouski, UQAR, Rimouski, Canada

Recent high-resolution multibeam bathymetry mapping of lakes, shallow- (<500 m) and deep-marine zones from Eastern and Arctic Canada has imaged numerous deltas, submarine canyons, and turbidite channels on scales of hundreds of metres to hundreds of kilometres in extent. In this presentation, we provide shallow water examples of bedforms from McClure Strait and Baffin Bay fjords (Arctic Canada), the St. Lawrence Estuary and fjord-lakes from Eastern Canada and deep-water examples from offshore Nova Scotia. These systems are affected by sediment density flows triggered by different mechanisms, including delta-front slope failures, hyperpycnal flows, and other unknown processes. Despite great variation in size, geological settings and trigger mechanisms, bedforms observed on flow paths have similar geomorphic expression. Most of the bedforms have a crescentic shape and are characterized by an increase in wavelength and asymmetry as the slope decreases offshore from the shoreline. Repeated multibeam bathymetry mapping and seismic reflection imaging demonstrate that these bedforms migrate upslope by the erosion of their lee side and sediment deposition on their stoss side. Their morphological expression and upslope migration indicate that they were formed by supercritical flows as antidunes and cyclic steps. Further, their morphology suggest that the flows accelerate and increase in discharge and thickness as they evolve downslope. These new datasets thus demonstrate the ubiquity of supercritical flow bedforms in a wide range of environments, from high sediment supply (deltas) to sediment-starved margins.