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Role of sediment supply and relative sea-level on sediment delivery to submarine deltas and fans of the Laurentian Channel (Lower St. Lawrence Estuary, Eastern Canada)

Alexandre Normandeau (1,4), Patrick Lajeunesse (1), Guillaume St-Onge (2), and Pierre Francus (3)

(1) Département de Géographie, Université Laval, Québec, Canada (alexandre.normandeau@queensu.ca), (2) Institut des sciences de la mer de Rimouski (ISMER), Univesité du Québec à Rimouski, Rimouski, Canada, (3) Institut national de la recherche scientifique, Centre Eau-Terre-Environnement, Québec, Canada, (4) Department of Geography and Planning, Queen's University, Kingston, Canada

Series of submarine canyons and channels observed in the Lower St. Lawrence Estuary (LSLE; Eastern Canada) provide an opportunity to analyze in great detail their morphology, spatial distribution and Holocene activity in a relatively shallow ($\leq$300 m) semi-enclosed basin. Four categories of canyons and channels were identified according to their feeding sources: glacially-fed, river-fed, longshore drift-fed and sediment-starved systems. This presentation will focus on the interaction between glacially-fed, river-fed (deltas) and longshore drift-fed systems. Three main types of deposits were identified in sediment core samples and seismic stratigraphy: turbidites, debrites and hyperpycnites. The analysis of high-resolution multibeam data, seismic profiles and sediment cores reveals the differences in timing of these gravity flow deposits related to submarine fan deposition. Submarine fans related to glacial meltwaters were formed during deglaciation, near 11 ka cal BP. Following the retreat of the Laurentide Ice Sheet margin in the LSLE, delta progradation allowed the formation of submarine channels by debris and hyperpycnal flows. A reduction of sediment supply from the rivers and a relative sea-level stabilization by 7 ka cal BP then limited the occurrence of these debris and hyperpycnal flows and favoured erosion of the delta fronts. During delta progradation, longshore drift-fed submarine fans were also formed due to high sediment supply, but continued transferring terrigenous material throughout the Holocene. This continued activity was possible because delta fronts eroded and longshore drift transported sediments to the canyons located at the end of a littoral cell. This study highlights that the variability and timing of sediment deposition in submarine deltas and fans is controlled primarily by variations in sediment supply in a formerly glaciated environment.