



Submarine morpho-sedimentology of the Betsiamites - Rimouski area, St. Lawrence estuary, Quebec, Canada

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A complex submarine geomorphology was revealed from multibeam bathymetric and seismic reflection surveys conducted between 2001 and 2005 in the Lower St. Lawrence Estuary between Betsiamites River and Rimouski, Quebec. Many erosional and depositional structures were observed on the Estuary shelf and the Laurentian Channel and are thought to be related to the major sub-aerial slides identified in the coastal quaternary deposits. This sub-aerial landslide is linked to a major earthquake that occurred in Eastern Quebec in 1663 and seems also to have a correlation with the submarine mass movements observed. However, more than one events of debris flow were identified on the seismic reflection surveys, which lead to the interpretation that the area has been unstable and active during the Holocene. Several regions on the shelf and on the Laurentian channel show evidences of gas pockmarks which could potentially influence submarine slope stability. Other structures such as buried channels and meanders could be linked to the deglaciation-related processes in the surrounding area. In this research we describe the overall geomorphology of an area of about 400 km² and the morpho-sedimentology of the various submarine geomorphologic features observed. A depositional sequence and erosional history of the glaciomarine and post-glacial sediments of the area is also established. The linkage between the sub-aerial landslide and the submarine mass movement signatures is investigated in order to clearly define the correlation between these events. Studies of such mass movement deposits provide useful insight into submarine processes such as sediment instability in the St. Lawrence estuary.