

Seasonal variation of the beach profile at Miscou Island, New Brunswick: effect of ice

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Most previous studies on beach dynamics have been carried out in low-latitude regions or in summer, when the effect of ice is negligible. The objective of this research is to describe and quantify the active mechanisms that control the beach profile over the entire year, including the winter when ice processes affect the morphology and sediment budget. The basis of the field work was the repeated measurements of a dense set of beach profiles at monthly intervals on a small linear beach at the northeastern end of Miscou Island, New Brunswick. The results show that changes in beach profile related to ice processes were similar in magnitude to storm-induced changes. Most of the important changes occurred during early winter as the ice foot was forming, when

there remained open water offshore. During this period storm waves hit the developing ice foot and sand was washed onto its surface where it accumulated. At the same time, some profiles showed substantial erosion immediately in front of the ice foot due to wave reflection on the artificially steepened profile. Parts of the ice foot were observed to break off periodically and move offshore during early winter storms. This may provide a mechanism for net loss of sediment from the beach at this time of the year. In the spring, after the ice was gone, sediment had accumulated as irregular mounds in the region of the ice foot, indicating that most of the ice foot thawed *in situ* and that there was little export of sediment by ice rafting at this time.