

During the 1970s and 1980s there was an active coastal mapping program in the Canadian Arctic Archipelago by the Geological Survey of Canada (GSC). Repetitive aerial reconnaissance and ground surveys were initially completed along several of the inner islands and later extended to outer parts of the archipelago including the western shores of Baffin Bay and a small portion of the Arctic Ocean coast. More than 100 shoreline monitoring sites were established where cross-shore survey lines, sediment samples, thaw depth measurements and photographs were collected. Repetitive surveys of these shorelines provide important baseline information for assessing the rates and causes of longer term coastal change.

In 2005, twenty-one shoreline monitoring sites along Lancaster Sound-Barrow Strait were resurveyed to assess their physical changes since our last visit in 1985 or 1992. Three sites had been established at Resolute Bay in 2003. One objective of the 2005 survey was to document whether physical shoreline changes and beach thaw depths have accelerated since the 1970s. Sites selected for resurvey spanned a wide range of environmental conditions. Relative sea level is rising at the east end of Lancaster Sound and falling in Barrow Strait and wave fetch decreases in an east to west direction.

A preliminary analysis of the 2005 surveys suggests shores at the eastern entrance to Lancaster Sound have been significantly reworked by waves. Some barrier beaches have been overwashed by waves and forced landward. Beaches along southern Barrow Strait have been eroded and significantly built up by one or more unknown storms since 1992. Beaches along the north coast of Barrow Strait near Resolute Bay show little or no change since 2003. Thaw depths beneath gravel beaches were deeper than those observed in the 1970s; however, depths of thaw beneath sand beaches were no greater than those observed in 1985.

A new island and potential new barrier beach complex were observed forming off the north coast of Somerset Island. It was not present in 1992. Islands and shore ridges built by sea ice have been observed in the western Arctic but this is our first observation in the eastern Arctic. It provides further evidence of how gravel beaches are initiated on low gradient coasts and the importance of sea ice in beach development.

Monitoring coastal change in the eastern Canadian Arctic

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