



Neoglaciation Advance and Retreat

A reconnaissance of the shorelines of Blackstone Bay found few deposits of till or outwash formed by the neoglaciation advance of the glaciers. A small till deposit at the mouth of the stream draining Concordia Glacier (sheet 1) was searched without finding any evidence of former vegetation. Hence the time of the neoglaciation advance is undetermined; judging from advances of other Alaskan tidewater glaciers, this probably occurred in the last 2000 to 4000 years. Climax forests mantle the slopes of the northern part of Blackstone Bay, but the southern part is relatively free of trees, although dense brush thickets are present. This led some early investigators to conclude that the retreat of the glaciers from Willard Island had occurred within a century or two (Tarr and Martin, 1914, p. 360, 361). Isolated groups of trees in protected areas and tree-ring count disclose that the bay south of Willard Island had been free of ice for at least 480 years, and the lack of trees was judged to be due to climatological effects of the nearby icefield (Cooper, 1942, p. 16). A peat sample obtained from the base of a small peat bog on Badger Point by C. J. Heusser in 1978 had a carbon-14 age of 580±55 years before present (B.P.). The glaciers thus had retreated to the head of the bay before 1400 and suggest drastic retreat from the terminal moraines probably occurred around 1350, if the rate of retreat of present-day retreating tidal glaciers is used as a guide. Both Blackstone and Beloit Glaciers end in retracted, stable positions at the head of the bay, but as late as 1935-1952, Beloit Glacier ended on the sharp-crested moraine shoal 0.4 mi (0.6 km) in front of the present ice front. The age of the moraine in front of Blackstone Glacier is unknown, but the absence of vegetation on the shores, and published maps (Map A, sheet 1) and Tarr and Martin (1914, fig. 53) suggest it is probably less than 100 years old. The probable positions of the ice fronts in 1935 are determined from Map A, sheet 1, and the 1909 positions are from Map B, sheet 1. From Tarr and Martin's descriptions (1914, p. 361), the glaciers shown here ending on land had retreated slightly by 1910 from an advance which had culminated about 1888; these glaciers have since continued to retreat slowly.

Holocene Sediments

Depth curves shown here were compiled from the hydrographic surveys shown on sheet 1. These disclose (a) a level-floored basin more than 1100 ft (335 m) below sea level in the northern part of the bay, (b) and (c) neoglaciation terminal-moraine shoals east and west of Willard Island, and basins south of the terminal moraine with a maximum water depth exceeding 500 ft (150 m) on the east and 200 ft (60 m) on the west of Willard Island, and (d) inlets with very irregular water depths generally less than 100 ft (30 m) leading to the tidewater Blackstone and Beloit Glaciers at the head of the bay. Although sediment thickness data are unavailable, the northern part of the bay doubtless contains deep deposits which have been accumulating since the retreat of pleistocene glaciers; from other inlets in Alaska it is estimated that the maximum sediment thickness may exceed 1000 ft (300 m) in places. South of the terminal-moraine shoals, sediments are restricted to the deeper basins east and west of Willard Island, and due to their limited area, which is shown by longitudinal profiles, probably do not much exceed 100 ft (30 m) in thickness, implying a relatively brief interval of accumulation.

- Explanation**
- *— Approximate position of dated glacier terminus position or trimline; heavy line where glacier terminated in water.
 - Approximate areas of thick sediment deposits
 - Exposure of preneoglaciation forest debris
 - ¹⁴C (carbon-14) dated preneoglaciation forest debris

Profiles

The profiles shown are photographic copies of original depth-recorder charts which are scaled in either meters (Ross SL 600C) or fathoms (Ross 400B). The scales for meters and feet shown at the left of each profile have been adjusted to correct for tidal effects when required. Hand-written notes on charts are generally navigation data.

Profile A-A'. The rough, irregular bottom with little or no sediment accumulation in the basin south of the terminal-moraine shoal is in striking contrast to the relatively smooth slopes north of the moraine. The sediments north of the moraine have been accumulating probably since the Pleistocene glaciers retreated, while the absence of sediments south of the moraine suggests the neoglaciation advance stripped the early Holocene sediments which in part make up the present terminal-moraine shoal. Retreat from the shoal was evidently rapid and recent enough that very little sediment has been deposited.

Profile B-B'. The irregular bottom shown in this profile indicates the recently deglaciated nature of this basin, where practically no sediments have accumulated despite the active Blackstone Glacier's discharging debris into the head of the inlet.

Profile C-C'. This profile shows a small area of ponded sediments south of the terminal moraine and plunges at near the angle of repose to the depths of northern Blackstone Bay. Irregular bottom near the base of the moraine is interpreted to be slump deposits of materials discharged over the moraine when the glacier terminated on the shoal. The extreme northern end of the profile extends over some of the nearly level surface of the thick, ponded sediments which fill the northern part of Blackstone Bay.

Profile D-D'. This profile crosses the largest sediment deposit (relatively level area) in the basin east of Willard Island then rises with an irregular bottom, judged to be bedrock, to a shoal interpreted to be a terminal moraine (questioned on map), then south along the approximate centerline of Beloit Inlet. An abrupt rise, also interpreted to be a terminal moraine, crosses the inlet in the area where the glacier terminated between 1935 and 1952. The rough, rocky bottom of Beloit Inlet indicates very little sediment accumulation.

Acknowledgments

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References

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PRELIMINARY BATHYMETRY OF BLACKSTONE BAY AND NEOGLACIAL CHANGES OF BLACKSTONE GLACIERS, ALASKA

Scale 1:20,000

MAP NOT FOR USE IN NAVIGATION

DEPTH CURVES IN FEET DATUM IS APPROXIMATE MEAN LOWER LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 10 FEET

By
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