Atlantic Geology

A Geomorphological Map and Description of an emerged Pleistocene Delta, Eastport Peninsula, Newfoundland

Arthur S. Dyke

Volume 8, numéro 2, september 1972

URI : https://id.erudit.org/iderudit/ageo08_2rep04

Aller au sommaire du numéro

Éditeur(s)

Maritime Sediments Editorial Board

ISSN

0843-5561 (imprimé)
1718-7885 (numérique)

Découvrir la revue

Citer cet article

Dyke, A. S. (1972). A Geomorphological Map and Description of an emerged Pleistocene Delta, Eastport Peninsula, Newfoundland. *Atlantic Geology*, *8*(2), 68–72.

Maritime Sediments, Vol. 8, No. 2, September 1972, pp. 68-72.

A Geomorphological Map and Description of an emerged Pleistocene Delta, Eastport Peninsula, Newfoundland *

ARTHUR S. DYKE**
Department of Geography, Memorial University of Newfoundland, St. John's, Nfld.

Introduction

The Eastport delta is an extensive, raised late-Wisconsin feature located at the head of Bonavista Bay on the northeast coast of the Island of Newfoundland. The area underlain by deltaic and related sediments cuts across the Eastport Peninsual from Northeast Arm eastward to the Communities of Eastport and Sandy Cove (Fig. 1).

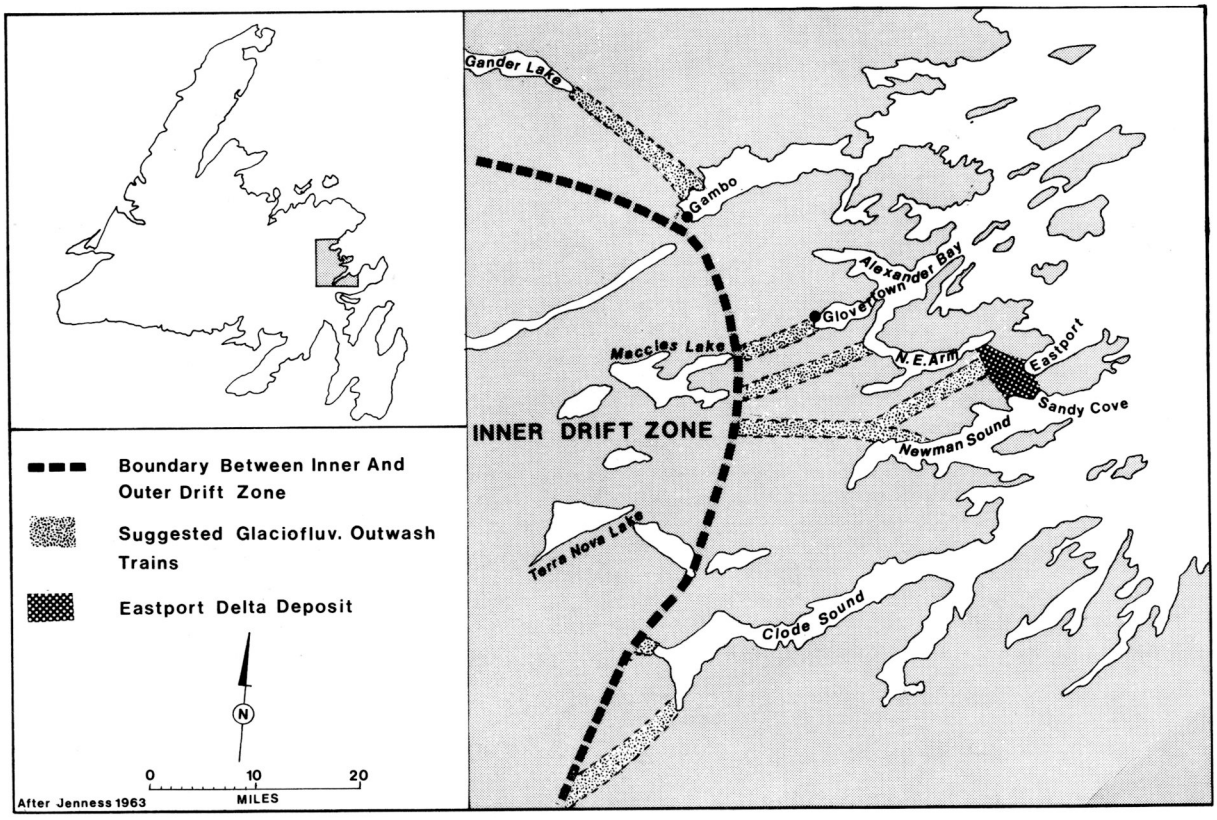

Figure 1: Location of the Eastport Delta relative to Jenness' inner and outer drift zone and related outwash trains.

Previous Studies

The Eastport deposits were studied by S.E. Jenness (1960, 1963),.who described their stratigraphy and interpreted their relation to the deglacial history of northeastern Newfoundland.

Jenness proposed that following deglaciation of the coastal zone of eastern Newfoundland, the ice margin paused in its general retreat, or alternatively re-advanced, and built an end moraine which he regarded as a line of demarcation between an "inner" and an "outer drift zone". It was further proposed that during this stillstand melting produced outwash deposits along 24 major valleys in the outer zone and that all but five of these deposits terminated as deltas at the coast (Fig. 1).

Jenness divided the deltaic deposits on the Eastport Peninsula into three mapping units, each terraced on its seaward edge at: (a) 30 m (100 ft) above sea level at Sandy Cove, (b) 30 m (100 ft) above sea level on the northern side of the head of Eastport Bay, and (c) 15 m (50 ft) above sea level at Southwest Cove (Fig. 3). It was suggested that the 15-m terrace represented the depositional level of a delta younger than the sediments underlying the 30-m terraces.

* Manuscript received March 8, 1973.

** Present address: Institute of Arctic and Alpine Research, Univ. of Colorado, Boulder, Colorado.

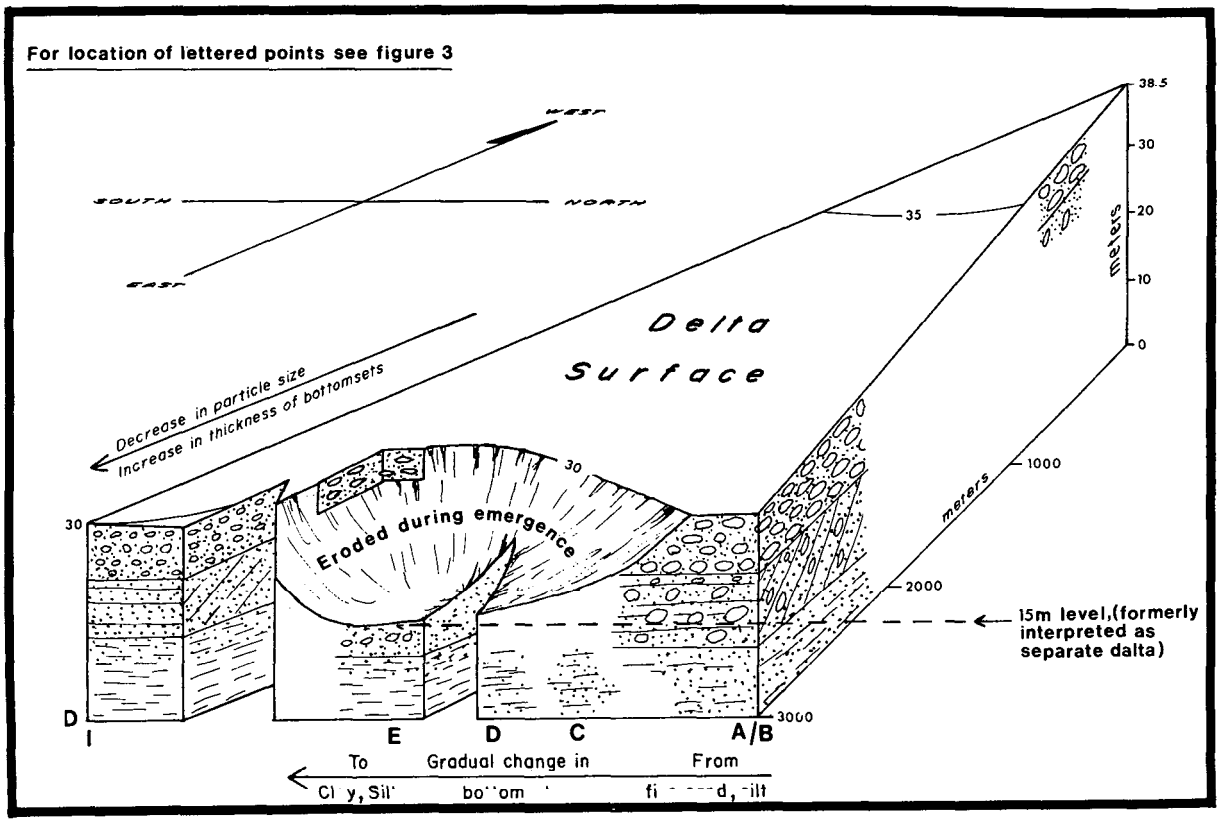

Figure 2: Schematic representation of Eastport Delta stratigraphy.

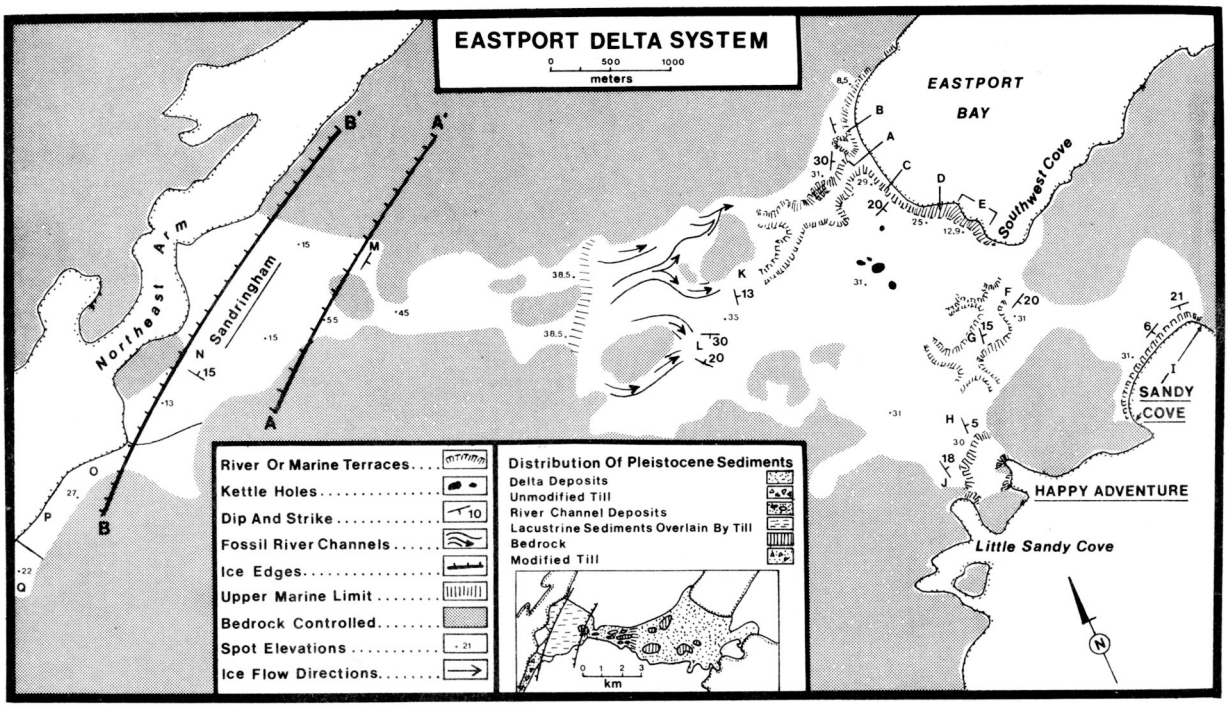

Figure 3: Map of Eastport Delta System

Eastport Peninsula Deposits

Investigations by the present writer in the spring of 1971 permit a re-interpretation both of the relation of the Eastport deposits to the late-Wisconsin ice frontal position, and of the relative time of deposition of sediments on different parts of the peninsula.

The boundaries of the delta system were mapped from aerial photographs (scale 1:18,400) and checked in the field. For the most part, the contact between bedrock and glaciomarine, glaciofluvial, or glaciolacustrine sediments is visible as a pronounced break in slope. The total area included within the delta system is approximately 10 km^2 (Fig. 3).

Stratigraphic and sedimentological measurements were made at 17 natural and man-made exposures identified on Figure 3 as lettered points and zones. Strike and dip measurements as well as vertical and horizontal grain-size variations are graphically presented on Figures 3 and 2, respectively. The data led to formulation of the following conclusions:

1) The reportedly younger 15-m (50 ft) delta at Southwest Cove cannot be distinguished as a morphologically separate unit from those deposits terraced at 30 m elsewhere on the peninsula; nor can an abandoned stream channel, parent to such a deposit, be identified.

The terrace in zone E was determined by levelling to be 12.9 m above highest high tide (as recognized by the highest kelp line on the nearby beach). The stratigraphic and compositional similarity of bottom-set materials between zone I and zone E (Figs. 4 and 5) as well as the gradual change in grain sizes of bottom-set deposits between point A/B and zone E suggest that the Southwest Cove terrace is an erosional level (Fig. 2). Horizontally bedded sand and gravel at point F, a short distance inland from zone E, and there lying 30 m above sea level are regarded as a mixture of top-set and river channel deposits (Fig. 6) at the landward edge of the area eroded during emergence. This supports the idea of an erosional origin for the Southwest Cove terrace.

2) The ice front during the time of deposition of the delta stood at the bedrock controlled watershed between the communities of Eastport and Sandringham (i.e. near point M, Fig. 3). Close proximity of the ice is also suggested by the presence of kettle holes on the delta surface.

With migration of the ice front westward of this divide, cross-bedded sand, silt, and clay were deposited in a small ice-marginal lake. A till sheet spproximately 1 m thick overlying the

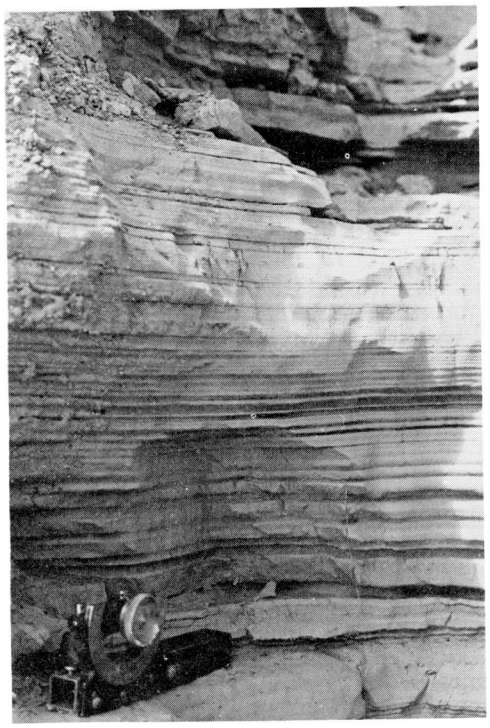

Figure 4: Clay laminated bottomset beds, zone E (compare with Fig. 5).

Figure 5: Clay laminated bottomset beds, zone I.

Figure 6: Stratigraphy at point F.

lacustrine sediments (Fig. 7) and the mildly fluted appearance of the land surface in the Sandringham area require a small scale re-advance of the galcial ice.

The absence of glaciofluvial deposits to the west of Sandringham and the presence of unmodified till with a diagnostic fabric at point Q argues against extension of the outwash train westward of ice front BB' (Fig. 3) and association of the delta with the proposed end moraine shown in Figure 1.

3) The marine limit has been placed upstream of the most landward exposures where deltaic sediments were observed (points K and I). The elevation of the marine limit was measured by altimeter and found to be 38.5 m (± 2 m, suggested error) above sea level.

4) With emergence of the delta, stream incision into the deposits has resulted in the formation of a series of river terraces graded to successively lower relative sea level stands. Elevations of several marine terraces are given by spot heights (in metres) in Figure 3.

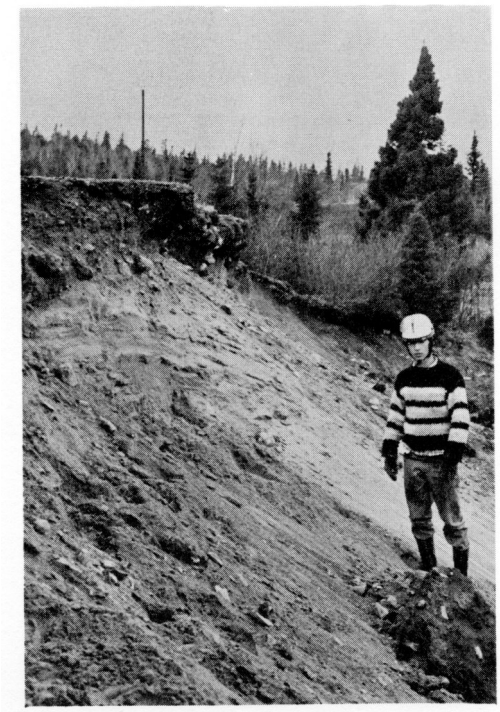

Figure 7: 1 m thick body of till overlying outwash lacustrine sediments, point N.

Summary

Glaciomarine and glaciofluvial sediments were deposited on the Eastport Peninsula during the time of deglaciation of the nearby coastal zone. During the time of accumulation of these sediments the ice front stood within 2 km of the marine limit shoreline which stands 38.5 m above sea level. Further ice retreat westward led to damming of a small ice-marginal lake and deposition into that lake, followed by a small-scale re-advance and till deposition. During emergence, resulting from glacio-isostatic recovery of the coast, lower strandlines were formed (wave-cut platforms), the largest of which lies at 12.9 m above sea level, and river terraces were formed by intermittent incision of a stream into the delta.

Present evidence does not allow time correlation of the Eastport deposits with other glaciomarine features in eastern Newfoundland.

Acknowledgements

This paper is based on field research for my B.Sc. thesis presented to the Geography Department of Memorial University. My thanks are extended to Professor R.J. Rogerson who supervised its writing. Final drafting of figures was executed by Gilbert Learning of Memorial University. Editorial assistance by Dr. D.R. Grant, Geological Survey of Canada and Dr. I.A. Brookes, York University, Toronto proved both helpful and encouraging.

References cited

JENNESS, S.E., 1960, Late Pleistocene glaciation of eastern Newfoundland. Bull. Geol. Soc. Amer., Vol. 71, pp. 161-180.

_____ , 1963, Terra Nova and Bonavista map-areas, Newfoundland. G.S.C. Mem. 327.